

Course Description  
Environmental Engineering  
Department  
College of Engineering  
University of Mosul  
First Year / Bologna Process

## 1<sup>st</sup> Level

| Level     | Semester | No.         | Module Code | Module Name in English                  | اسم المادة الدراسية       | Language            | SSWL (hr/w) |             |            |           |            | Semn (hr/w) | Exam hr/sem | SSWL hr/sem | USSWL hr/sem | SWL hr/sem   | ECTS       | Module Type | Prerequisite Module(s) Code |
|-----------|----------|-------------|-------------|-----------------------------------------|---------------------------|---------------------|-------------|-------------|------------|-----------|------------|-------------|-------------|-------------|--------------|--------------|------------|-------------|-----------------------------|
|           |          |             |             |                                         |                           |                     | CL (hr/w)   | Lect (hr/w) | Lab (hr/w) | Pr (hr/w) | Tut (hr/w) |             |             |             |              |              |            |             |                             |
| UGI       | One      | 1           | ENV111      | Mathematics                             | الرياضيات                 | English             | 3           |             |            |           | 2          |             | 3           | 78          | 72           | 150          | 6.00       | S           |                             |
|           |          | 2           | ENV112      | Statics                                 | ميكانيك السكون            | English             | 3           |             |            |           | 2          |             | 3           | 78          | 72           | 150          | 6.00       | S           |                             |
|           |          | 3           | ENV113      | Engineering Drawing                     | الرسم الهندسي             | English             | 0           |             | 6          |           |            |             | 3           | 93          | 82           | 175          | 7.00       | S           |                             |
|           |          | 3           | ENV114      | Environmental Thermodynamics            | ترموداينميك البيئة        | English             | 2           |             |            |           | 1          |             | 3           | 48          | 52           | 100          | 4.00       | S           |                             |
|           |          | 5           | ENV115      | Statistics                              | الإحصاء                   | English             | 2           |             |            |           |            |             | 3           | 33          | 42           | 75           | 3.00       | S           |                             |
|           |          | 6           | UOM101      | Arabic Language                         | اللغة العربية             | Arabic              | 2           |             |            |           |            |             | 3           | 33          | 17           | 50           | 2.00       | B           |                             |
|           |          | 7           | UOM104      | Democracy and Human Rights              | الديمقراطية وحقوق الانسان | Arabic              | 2           |             |            |           |            |             | 3           | 33          | 17           | 50           | 2.00       | B           |                             |
|           |          |             |             |                                         |                           | Total               | 14          | 0           | 6          | 0         | 5          | 0           | 21          | 396         | 354          | 750          | 30.00      |             |                             |
|           |          |             |             |                                         |                           |                     |             |             |            |           |            |             |             | 25          |              |              |            |             |                             |
|           | UGI      | Semester    | No.         | Module Code                             | Module Name in English    | اسم المادة الدراسية | Language    | SSWL (hr/w) |            |           |            |             | Semn (hr/w) | Exam hr/sem | SSWL hr/sem  | USSWL hr/sem | SWL hr/sem | ECTS        | Module Type                 |
| CL (hr/w) |          | Lect (hr/w) | Lab (hr/w)  | Pr (hr/w)                               | Tut (hr/w)                |                     |             |             |            |           |            |             |             |             |              |              |            |             |                             |
| Two       |          | 1           | ENV121      | Calculus                                | حسابات التفاضل والتكامل   | English             | 3           |             |            |           | 2          |             | 3           | 78          | 72           | 150          | 6.00       | S           | ENV111                      |
|           |          | 2           | ENV122      | Dynamics                                | ميكانيك الحركة            | English             | 2           |             |            |           | 1          |             | 3           | 48          | 77           | 125          | 5.00       | S           |                             |
|           |          | 3           | ENV123      | Principles of Environmental Engineering | مبادئ هندسة البيئة        | Arabic              | 2           | 2           |            |           |            |             | 3           | 63          | 37           | 100          | 4.00       | C           |                             |
|           |          | 4           | ENV124      | Environmental Geology                   | جيولوجيا البيئة           | Arabic              | 2           |             |            |           |            |             | 3           | 33          | 42           | 75           | 3.00       | S           |                             |
|           |          | 5           | ENV125      | Drawing by Computer                     | الرسم بواسطة الحاسوب      | English             |             |             | 4          |           |            |             | 3           | 63          | 112          | 175          | 7.00       | S           | ENV113                      |
|           |          | 6           | UOM103      | Computer                                | حاسوب                     | English             | 1           |             | 2          |           |            |             | 3           | 48          | 27           | 75           | 3.00       | B           |                             |
|           |          | 7           | UOM102      | English 1                               | اللغة الإنكليزية 1        | English             | 2           |             |            |           |            |             | 3           | 33          | 17           | 50           | 2.00       | B           |                             |
|           |          |             |             |                                         |                           | Total               | 12          | 2           | 6          | 0         | 3          | 0           | 21          | 366         | 384          | 750          | 30.00      |             |                             |
|           |          |             |             |                                         |                           |                     |             |             |            |           |            |             | 23          |             |              |              |            |             |                             |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                      |                               |                                                                                                                                                                                                                                          |                                                                                |
|------------------------------------|--------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                      |                               |                                                                                                                                                                                                                                          |                                                                                |
| Module Title                       | Mathematic                           |                               | Module Delivery                                                                                                                                                                                                                          |                                                                                |
| Module Type                        | Support or related learning activity |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                |
| Module Code                        | ENV111                               |                               |                                                                                                                                                                                                                                          |                                                                                |
| ECTS Credits                       | 6                                    |                               |                                                                                                                                                                                                                                          |                                                                                |
| SWL (hr/sem)                       | 150                                  |                               |                                                                                                                                                                                                                                          |                                                                                |
| Module Level                       | 1                                    | Semester of Delivery          |                                                                                                                                                                                                                                          | 1                                                                              |
| Administering Department           | ENV8                                 | College                       | ENG4                                                                                                                                                                                                                                     |                                                                                |
| Module Leader                      | Mayada Hazim                         |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a>     |
| Module Leader's Acad. Title        | Lecturer                             | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                    |                                                                                |
| Module Tutor                       | Abeer Khalil Ibrahim                 |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:abeer.alsaraf@uomosul.edu.iq">abeer.alsaraf@uomosul.edu.iq</a> |
| Peer Reviewer Name                 | Mayada Hazim                         |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a>     |
| Scientific Committee Approval Date | 21/9/2024                            | Version Number                | 2.0                                                                                                                                                                                                                                      |                                                                                |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>The aim of this course is to introduce the students to main topics of mathematic. The course will cover Prerequisites for mathematic, Limits, Continuity, and Differentiation (methods and applications), Matrices, Operations on matrices, and Solution of system of equations by matrix.</p> <p>At the end of the course, students will have a broad knowledge of the basic concepts, techniques and applications of Differentiation and Matrices. This will be achieved through theoretical lectures, tutorials and homework</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Recognize fundamentals of math and the emphasis on functions and graphs(i).</p> <p><b>CLO-2:</b> understanding various limit problems both algebraically and graphically and using it by checking the continuity of various types of functions(i).</p> <p><b>CLO-3:</b> Finding the derivative of various types of functions using the differentiation rules (i).</p> <p><b>CLO-4:</b> Applying differentiation to find linear approximation and optimization problems(ii)</p> <p><b>CLO-5:</b> solve matrices and operations on matrices and using matrices in solving linear equations(i).</p>                                                                                                                                                                                                                                                                                                                                 |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b>Indicative content includes the following.</b></p> <p><u>Part A – Prerequisites for calculus</u><br/> Coordinates and Graphs in the Plane, Slope and Equations for Lines, Functions and Their Graphs, Shifts, Circles and Parabolas, A Review of Trigonometric Functions (17 hrs).</p> <p><u>Part B – Limits and Continuity</u><br/> Limits, The Sandwich Theorem and <math>(\sin \theta)/\theta</math>, Limits Involving Infinity, Continuous Functions. (10 hrs).</p> <p><u>Part C – Derivatives</u><br/> Slope, Tangent Lines, and Derivatives, Differentiation Rules, Velocity, Speed and Other Rate of Change, Derivatives of Trigonometric Functions, The Chain Rule, Implicit Differentiation and Fractional Powers, Linear Approximations and Differentials (17 hrs).</p> <p><u>Part D - Applications of Derivatives</u><br/> Related Rates of Change, Maximal, Minima and the Mean Value Theorem, Curve Sketching with <math>y'</math>, <math>y''</math>, Graphing Rational Functions-Asymptotes and Dominant Terms, Optimization (18 hrs.).</p> |

|                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                           |     |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----|
|                                                                                | <u>Part E - Matrices</u><br>Operation on matrices, Equal matrices, Addition and Subtraction of matrices, Multiplication by scalar, Multiplication of matrices, Transpose of a matrices, adjoin of a square matrix, Determinants, Properties of determinants, Singular matrix, Solution of system of equations by matrix inversion, Cramer's rule to solve the system of equations, Gaussian elimination. (18hrs).                                           |                                                                           |     |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم         |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                           |     |
| <b>Strategies</b><br>الاستراتيجيات                                             | Expanding students' perceptions of mathematic, familiarity with basic mathematical concepts and principles, and the ability to distinguish between different mathematical concepts. This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam. |                                                                           |     |
| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا       |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 80                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4.7 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                           |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |             |                  |                    |                                    |
|---------------------------------------------------|--------------------|-------------|------------------|--------------------|------------------------------------|
|                                                   |                    | Time/Number | Weight (Marks)   | Week Due           | Relevant Learning Outcome          |
| Formative assessment                              | Quizzes            | 5           | 5% (25)          | 3, 5, 8, 11 and 14 | CLO-1, CLO-2, CLO-3, CLO-4, CLO-5  |
|                                                   | Online Assignments | 1           | 2% (2)           | 6                  | CLO-1, CLO-2.                      |
|                                                   | Onsite Assignment  | 5           | 2% (10)          | 3, 6, 9, 12 and 15 | CLO-1, CLO-2, CLO-3, CLO-4, CLO-5. |
|                                                   | Projects / Lab.    | 0           | 0                | 0                  |                                    |
|                                                   | Report             | 1           | 3% (3)           | 12                 | CLO-1, CLO-2, CLO-3, CLO-4.        |
| Summative assessment                              | Midterm Exam       | 2hrs        | 10% (10)         | 9                  | CLO-1, CLO -2, CLO -3,             |
|                                                   | Final Exam         | 3hrs        | 50% (50)         | 16                 | All                                |
| Total assessment                                  |                    |             | 100% (100 Marks) |                    |                                    |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|         | Material Covered                                                                                                                   |
|---------|------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | Coordinates and Graphs in the Plane, Slope and Equations for Lines.                                                                |
| Week 2  | Functions and Their Graphs, shifts, circles and parabolas.                                                                         |
| Week 3  | A review of trigonometric functions.                                                                                               |
| Week 4  | Limits, the sandwich theorem and $(\sin \theta)/\theta$ , limits involving infinity.                                               |
| Week 5  | Continuous functions.                                                                                                              |
| Week 6  | Slope, tangent lines, and derivatives, differentiation rules, velocity, speed and other rate of change.                            |
| Week 7  | Derivatives of trigonometric functions.                                                                                            |
| Week 8  | The chain rule, implicit differentiation and fractional powers, linear approximations and differentials.                           |
| Week 9  | Related rates of change.                                                                                                           |
| Week 10 | Maximal, minima and the mean value theorem, curve sketching with $y'$ , $y''$ .                                                    |
| Week 11 | Graphing Rational Functions-Asymptotes and Dominant Terms.                                                                         |
| Week 12 | Optimization.                                                                                                                      |
| Week 13 | Operation on matrices, Equal matrices, Addition and Subtraction of matrices, Multiplication by scalar, Multiplication of matrices, |
| Week 14 | Transpose of a matrices, adjoin of a square matrix, Determinants, Properties of determinants and Singular matrix.                  |
| Week 15 | Solution of system of equations by matrix inversion, Cramer's rule, Gaussian elimination.                                          |
| Week 16 | <b>Preparatory week before the final Exam</b>                                                                                      |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|        | Material Covered |
|--------|------------------|
| Week 1 |                  |
| Week 2 |                  |
| Week 3 |                  |
| Week 4 |                  |
| Week 5 |                  |

## Learning and Teaching Resources

### مصادر التعلم والتدريس

|                          | Text                                                                                                                                                      | Available in the Library? |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | <ul style="list-style-type: none"> <li>Finney, R.L, &amp; Thomas, G.B, "Calculus" Addison. Wesley publishing company, USA, 11th, 2011.</li> </ul>         | Yes                       |
| <b>Recommended Texts</b> | <ul style="list-style-type: none"> <li>Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.</li> </ul>         | Yes                       |
| <b>Websites</b>          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

## Grading Scheme

### مخطط الدرجات

| Group                               | Grade                   | التقدير             | Marks %  | Definition                            |
|-------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                     | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                     | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                     | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                     | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>      | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                     | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                     |                         |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                              |                               |                                                                                                                                                                                                                                          |
|------------------------------------|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                              |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Engineering Mechanics-Static |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Support                      |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV112                       |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 6                            |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 150                          |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 1                            | Semester of Delivery          | 1                                                                                                                                                                                                                                        |
| Administering Department           | ENV8                         | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Salim Yousif, Samir Yasso    | e-mail                        | <a href="mailto:syasso@uomosul.edu.iq">syasso@uomosul.edu.iq</a>                                                                                                                                                                         |
| Module Leader's Acad. Title        | lecturers                    | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Ammar Mohammed               | e-mail                        | <a href="mailto:Ammar.mohammad@uomosul.edu.iq">Ammar.mohammad@uomosul.edu.iq</a>                                                                                                                                                         |
| Peer Reviewer Name                 | -----                        | e-mail                        | E-mail                                                                                                                                                                                                                                   |
| Scientific Committee Approval Date | 26/10/2024                   | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |      |          |   |
|-----------------------------------|------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |      |          |   |
| Prerequisite module               | None | Semester | 0 |
| Co-requisites module              | None | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Module Objectives<br>أهداف المادة الدراسية               | <p>The primary purpose of the study of engineering mechanics is to develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering. This capacity requires more than a mere knowledge of the physical and mathematical principles of mechanics; also required is the ability to visualize physical configurations in terms of real materials, actual constraints, and the practical limitations which govern the behavior of machines and structures. One of the primary objectives in a mechanics course is to help the student develop this ability to visualize, which is so vital to problem formulation. Indeed, the construction of a meaningful mathematical model is often a more important experience than its solution.</p> |



|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | Maximum progress is made when the principles and their limitations are learned together within the context of engineering application.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Learning Outcomes</b><br><br>مخرجات التعلم للمادة الدراسية   | <p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p><b>CLO-1:</b> Makes the students able to recognize different force systems, moments and couple.</p> <p><b>CLO-2:</b> The ability to draw Free Body Diagram and label the reactions on it.</p> <p><b>CLO-3:</b> Makes the students able to apply equilibrium equations in statics.</p> <p><b>CLO-4:</b> The ability to analyze different types of structures.</p> <p><b>CLO-5:</b> The ability to determine the section properties – first and second moment of the area.</p> <p><b>CLO-6:</b> The ability to apply friction principles.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Indicative Contents</b><br><br>المحتويات الإرشادية                  | <p>Indicative content includes the following.</p> <p><b><u>Part A – Force systems and resultants</u></b></p> <ul style="list-style-type: none"> <li>To discuss the concept of the moment of a force and show how to calculate it in two and three dimensions.</li> <li>To provide a method for finding the moment of a force about a specified axis.</li> <li>To define the moment of a couple.</li> <li>To present methods for determining the resultants of nonconcurrent force systems.</li> <li>To indicate how to reduce a simple distributed loading to a resultant force having a specified location.</li> </ul> <p><b><u>Part B – Equilibrium</u></b></p> <ul style="list-style-type: none"> <li>To develop the equations of equilibrium for a rigid body.</li> <li>To introduce the concept of the free-body diagram for a rigid body.</li> <li>To show how to solve rigid-body equilibrium problems using the equations of equilibrium.</li> </ul> <p><b><u>Part C – Structural Analysis (Trusses)</u></b></p> <ul style="list-style-type: none"> <li>To show how to determine the forces in the members of a truss using the method of joints and the method of sections.</li> <li>To analyze the forces acting on the members of frames and machines composed of pin-connected members.</li> </ul> <p><b><u>Part D - Friction</u></b></p> <p>To introduce the concept of dry friction and show how to analyze the equilibrium of rigid bodies subjected to this force.</p> <p><b><u>Part E - Center of gravity and Centroid</u></b></p> <ul style="list-style-type: none"> <li>To discuss the concept of the center of gravity, center of mass, and the centroid.</li> <li>To show how to determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary Shape.</li> </ul> <p><b><u>Part F - Moment of inertia</u></b></p> <ul style="list-style-type: none"> <li>To develop a method for determining the moment of inertia for an area.</li> <li>To introduce the product of inertia and show how to determine the maximum and minimum moments of inertia for an area.</li> <li>To discuss the mass moment of inertia.</li> </ul> |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Strategies</b><br>الاستراتيجيات                                     | This course has several components that include lectures, individual & group assignments, Exercises. The course will be taught in English, and all mandatory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                             |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------|----------------------|-----------------------------------|
|                                             |                                                                                                                                                       | assignments have to be submitted within the deadlines to be admitted to the exams. |                                          |                      |                                   |
| Student Workload (SWL)                      |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
| الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا      |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
| Structured SWL (h/sem)                      |                                                                                                                                                       | 78                                                                                 | Structured SWL (h/w)                     |                      | 5.2                               |
| الحمل الدراسي المنتظم للطلاب خلال الفصل     |                                                                                                                                                       |                                                                                    | الحمل الدراسي المنتظم للطلاب أسبوعيا     |                      |                                   |
| Unstructured SWL (h/sem)                    |                                                                                                                                                       | 72                                                                                 | Unstructured SWL (h/w)                   |                      | 4.8                               |
| الحمل الدراسي غير المنتظم للطلاب خلال الفصل |                                                                                                                                                       |                                                                                    | الحمل الدراسي غير المنتظم للطلاب أسبوعيا |                      |                                   |
| Total SWL (h/sem)                           |                                                                                                                                                       | 150                                                                                |                                          |                      |                                   |
| الحمل الدراسي الكلي للطلاب خلال الفصل       |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
| Module Evaluation                           |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
| تقييم المادة الدراسية                       |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
|                                             |                                                                                                                                                       | Time/Number                                                                        | Weight (Marks)                           | Week Due             | Relevant Learning Outcome         |
| Formative assessment                        | Quizzes                                                                                                                                               | 5                                                                                  | 3% (15)                                  | 3, 5, ,10, 12 and 14 | CLO-1, CLO-1, CLO-2, CLO-2, CLO-3 |
|                                             | Reports                                                                                                                                               | 2                                                                                  | 4% (8)                                   | 11                   | CLO-5                             |
|                                             | Assignments                                                                                                                                           | 7                                                                                  | 1% (7)                                   | 3, 4, 6, 8, and 12   | CLO-2, CLO-2, CLO-3, CLO-2, CLO-3 |
|                                             | Onsite Assignment                                                                                                                                     | 10                                                                                 | 1% (10)                                  | TBD                  | CLO-2, CLO-2, CLO-3, CLO-2, CLO-3 |
| Summative assessment                        | Midterm Exam                                                                                                                                          | 2hrs                                                                               | 10% (10)                                 | 7                    | CLO-1, CLO -2 and CLO-3           |
|                                             | Final Exam                                                                                                                                            | 3hrs                                                                               | 50% (50)                                 | 16                   | All                               |
| Total assessment                            |                                                                                                                                                       |                                                                                    | 100% (100 Marks)                         |                      |                                   |
| Delivery Plan (Weekly Syllabus)             |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
| المنهاج الاسبوعي النظري                     |                                                                                                                                                       |                                                                                    |                                          |                      |                                   |
|                                             | Material Covered                                                                                                                                      |                                                                                    |                                          |                      |                                   |
| Week 1                                      | Introduction, Fundamental concepts, Units of measurements, The international system of units, Numerical calculations, General procedure for analysis. |                                                                                    |                                          |                      |                                   |
| Week 2                                      | Scalars and Vectors, Vector Operations. The Free-Body Diagram                                                                                         |                                                                                    |                                          |                      |                                   |
| Week 3                                      | Coplanar Force Systems. Force System Resultants                                                                                                       |                                                                                    |                                          |                      |                                   |
| Week 4                                      | Principle of Moments. Moment of a Couple                                                                                                              |                                                                                    |                                          |                      |                                   |
| Week 5                                      | Reduction of a Simple Distributed Loading. Conditions for Rigid-Body Equilibrium, Free-Body Diagrams.                                                 |                                                                                    |                                          |                      |                                   |
| Week 6                                      | Two- and Three-Force Members.                                                                                                                         |                                                                                    |                                          |                      |                                   |
| Week 7                                      | Midterm Exam                                                                                                                                          |                                                                                    |                                          |                      |                                   |
| Week 8                                      | Simple Trusses, The Method of Joints.                                                                                                                 |                                                                                    |                                          |                      |                                   |

|                |                                                                           |
|----------------|---------------------------------------------------------------------------|
| <b>Week 9</b>  | Simple Trusses, The Method of sections.                                   |
| <b>Week 10</b> | Frame analysis                                                            |
| <b>Week 11</b> | Centroid of a Body.                                                       |
| <b>Week 12</b> | Centroid of Composite Bodies.                                             |
| <b>Week 13</b> | Definition of Moments of Inertia for Areas, Moments of Inertia for Areas. |
| <b>Week 14</b> | Moments of Inertia for Composite Areas.                                   |
| <b>Week 15</b> | Friction.                                                                 |
| <b>Week 16</b> | Preparatory week before the final Exam.                                   |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                          | Text                                                                                                                         | Available in the Library? |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | Hibbeler, R.C. " ENGINEERING MECHANICS – DYNAMIC 14 <sup>TH</sup> EDITION 2016" Pearson Prentice Hall                        | Yes                       |
| <b>Required Texts</b>    | MERIAM J.L., KRAIGE L.G. , BOLTON J.N. " Engineering Mechanics Volume 1 Statics " Ninth Edition 2018 John Wiley & Sons, Inc. | Yes                       |
| <b>Recommended Texts</b> | د.نزار جبرائيل - فخري ياسين – د.هشام العناز "الميكانيك الهندسي"                                                              | Yes                       |
| <b>Recommended Texts</b> |                                                                                                                              |                           |
| <b>Websites</b>          |                                                                                                                              |                           |

### Grading Scheme

مخطط الدرجات

| Group                               | Grade                   | التقدير             | Marks %  | Definition                            |
|-------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A - Excellent</b>    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                     | <b>B - Very Good</b>    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                     | <b>C - Good</b>         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                     | <b>D - Satisfactory</b> | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                     | <b>E - Sufficient</b>   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>      | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                     | <b>F – Fail</b>         | راسب                | (0-44)   | Considerable amount of work required  |
|                                     |                         |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                     |                                                                                                                                                                                                                                          |                              |
|------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| معلومات المادة الدراسية            |                     |                                                                                                                                                                                                                                          |                              |
| Module Title                       | Engineering Drawing | Module Delivery                                                                                                                                                                                                                          |                              |
| Module Type                        | Core                | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                              |
| Module Code                        | ENV113              |                                                                                                                                                                                                                                          |                              |
| ECTS Credits                       | 7                   |                                                                                                                                                                                                                                          |                              |
| SWL (hr/sem)                       | 175                 |                                                                                                                                                                                                                                          |                              |
| Module Level                       | 1                   |                                                                                                                                                                                                                                          |                              |
| Administering Department           | ENV8                | College                                                                                                                                                                                                                                  | ENG4                         |
| Module Leader                      | Mohammed Hisham     | e-mail                                                                                                                                                                                                                                   | m.h.alkafaf@uomosul.edu.iq   |
| Module Leader's Acad. Title        | Lectures            | Module Leader's Qualification                                                                                                                                                                                                            | MSC                          |
| Module Tutor                       | Ayad Abdullah Mousa | e-mail                                                                                                                                                                                                                                   | ayad_engineer@uomosul.edu.iq |
| Peer Reviewer Name                 | AMMAR MOHAMED       | e-mail                                                                                                                                                                                                                                   | E-mail                       |
| Scientific Committee Approval Date | 20/09/2024          | Version Number                                                                                                                                                                                                                           | 1.0                          |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونواتج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>The aim of this course is to help the students to use the technical drawing and performs drawing exercises with ruler, compass, T-square. make the student able to draw circles with straight lines, arcs and polygon. learns and applies dimensioning rules. knows the properties of cross section view and carry out the perspective drawings due to views.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>CLO-1:</b> use the technical drawing tools properly and to plot pictures according to the dimensions and properties of technical drawing. (i)</p> <p><b>CLO-2:</b>Using scale, types of scales and measurement techniques to drawings.(i)</p> <p><b>CLO-3:</b>Applying several geometric shapes by using a compass. (iii)</p> <p><b>CLO-4:</b>Learning and applies dimensioning rules.(iii)</p> <p><b>CLO-5:</b>Implementing the properties of cross section view. (iii)</p> <p><b>CLO-6:</b>Carrying out the perspective drawings due to views. (iii)</p> <p><b>CLO-7:</b>Increasing the students ability to imagine. (iii)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p style="text-align: center;"><b>Indicative content includes the following.</b></p> <p><u>Part A – Graphic instruments and their use</u><br/> This lectures will describe the most common drafting instruments in use and discuss how they are use. (5 hrs)</p> <p><u>Part B – Graphic geometry and engineering applications</u><br/> In order to create the drafter or designer needs to know how to construct various common geometric patterns, for example parallel line, circle, arc, polygon and ellipse. (20 hrs)</p> <p><u>Part C – Theory of projection. Orthographic projection</u><br/> Explain the theory of projection.Consisting of a set of two or more separate views of an object taken from different direction. (15 hrs)</p> <p><u>Part D - Isometric drawing</u><br/> A three dimension drawing or sketch shows the entire object in one view from the two or three plains(front, top, side view) (15 hrs)</p> <p><u>Part E - Missing view</u><br/> Find the missing view from the other views. (10 hrs)</p> <p><u>Part F - Section</u><br/> (10 hrs)</p> |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies                                                      | This course has several components that include lectures, classwork, homework and quiz. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا       |     |                                                                    |     |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 93  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 6.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 207 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7.1 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 200 |                                                                    |     |

| Module Evaluation<br>تقييم المادة الدراسية |              |             |                  |                                           |                           |
|--------------------------------------------|--------------|-------------|------------------|-------------------------------------------|---------------------------|
|                                            |              | Time/Number | Weight (Marks)   | Week Due                                  | Relevant Learning Outcome |
| Formative assessment                       | Quizzes      | 4           | 20 % (20)        | 5, 8, ,11 and 13                          | All                       |
|                                            | Classwork    | 10          | 12 % (10)        | 2, 3, 4, 6,7,9,10,12,14 and 15            | All                       |
|                                            | homework     | 14          | 8 % (8)          | 2, 3, 4,5, 6,7,8,9,10,11, 12,13,14 and 15 | All                       |
| Summative assessment                       | Midterm Exam | 2hr         | 10% (10)         | 7                                         | All                       |
|                                            | Final Exam   | 3hr         | 50% (50)         | 16                                        | All                       |
| Total assessment                           |              |             | 100% (100 Marks) |                                           |                           |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                  |
|------------------------------------------------------------------|------------------|
|                                                                  | Material Covered |

|            |                                                                  |
|------------|------------------------------------------------------------------|
| Week 1     | Introduction . Graphic instruments and their use. Types of lines |
| Week 2 - 5 | Graphic geometry and engineering applications                    |
| Week 6-8   | Theory of projection. Orthographic projection                    |
| Week 9-11  | Isometric drawing                                                |
| Week 12-13 | Missing view                                                     |
| Week 14-15 | Section                                                          |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                      | Available in the Library? |
| Required Texts                                           | <ul style="list-style-type: none"> <li>T.E.French ,engineering drawing and graphic technology ( 1986 )</li> </ul>                                         | Yes                       |
| Recommended Texts                                        | <ul style="list-style-type: none"> <li>ثامر محمد نوري (كتاب الرسم الهندسي المساعد) 2021</li> </ul>                                                        | Yes                       |
|                                                          | <ul style="list-style-type: none"> <li>د.احمد العبيدي (الرسم الهندسي والهندسة الوصفية) 2021</li> </ul>                                                    | Yes                       |
| Websites                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
| Module Title                                             | Thermodynamics and Heat Transfer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                               | Module Delivery                                                                                                                                                                                                                                                                                                                                |
| Module Type                                              | Supportive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                               | <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Theory</li> <li><input checked="" type="checkbox"/> Lecture</li> <li><input checked="" type="checkbox"/> Lab</li> <li><input checked="" type="checkbox"/> Tutorial</li> <li><input type="checkbox"/> Practical</li> <li><input type="checkbox"/> Seminar</li> </ul> |
| Module Code                                              | ENV114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                                                                                                                                                                                                                                                                                                                                                |
| ECTS Credits                                             | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |                                                                                                                                                                                                                                                                                                                                                |
| SWL (hr/sem)                                             | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                                                                                                                                                                                                                                                                                                                                                |
| Module Level                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Semester of Delivery          |                                                                                                                                                                                                                                                                                                                                                |
| Administering Department                                 | ENV8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | College                       | ENG4                                                                                                                                                                                                                                                                                                                                           |
| Module Leader                                            | Maan S. Mohammed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | e-mail                        | <a href="mailto:maandabbagh@uomosul.edu.iq">maandabbagh@uomosul.edu.iq</a>                                                                                                                                                                                                                                                                     |
| Module Leader's Acad. Title                              | Ass. Professor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Module Leader's Qualification | M.Sc                                                                                                                                                                                                                                                                                                                                           |
| Module Tutor                                             | Maan S. Mohammed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | e-mail                        | <a href="mailto:maandabbagh@uomosul.edu.iq">maandabbagh@uomosul.edu.iq</a>                                                                                                                                                                                                                                                                     |
| Peer Reviewer Name                                       | Maan S. Mohammed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | e-mail                        | <a href="mailto:maandabbagh@uomosul.edu.iq">maandabbagh@uomosul.edu.iq</a>                                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date                       | 3/10/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Version Number                | 2.0                                                                                                                                                                                                                                                                                                                                            |
| Relation with other Modules                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
| العلاقة مع المواد الدراسية الأخرى                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
| Prerequisite module                                      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Semester                      |                                                                                                                                                                                                                                                                                                                                                |
| Co-requisites module                                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Semester                      |                                                                                                                                                                                                                                                                                                                                                |
| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                                                                                                                                                                                                                                                                                                                                                |
| Module Aims<br>أهداف المادة الدراسية                     | <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>Write clear the objectives of this integrated subject.</li> <li>Enable the student to know theoretical and practical concepts of the thermodynamic processes.</li> <li>Enable the student to know theoretical and practical concepts of the physics materials properties and heat effect on it.</li> <li>Enable the student to measure the temperature and pressure with conventional and modern measuring devices.</li> <li>Enable the student to know the types of energy and practice applications.</li> <li>Develop the fundamental principles and laws of thermodin and to explore the implications of these principles for system behavior including:</li> <li>formulate the models necessary to study.</li> <li>Enable the student to know the types of system and their applications and how to deal with its</li> <li>an ability to work with concepts mathematically, and a functional understanding of how these ideas play out in the real world.</li> <li>Analyze and design heat transfer systems through the application of these principles.</li> <li>Use graphs and diagrams to convey results.</li> <li>develop the problem-solving skills essential to good engineering practice of heat</li> </ol> |                               |                                                                                                                                                                                                                                                                                                                                                |



|                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <p>transfer in real-world applications.</p> <p>13. Decide on strategies to be used and assumptions that need to be made.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Module Learning Outcomes</b><br/>مخرجات التعلم للمادة الدراسية</p> | <p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks:</p> <p><b>CLO 1:</b> Study of some concepts, definitions, and types of the systems.</p> <p><b>CLO 2:</b> Measurement of pressure and temperature and know and explain the devices work principle of temperature and pressure</p> <p><b>CLO 3:</b> Study the basic concepts of thermodynamics.</p> <p><b>CLO 4:</b> Develop a flexible and creative problem-solving ability and translate physical descriptions into mathematical equations.</p> <p><b>CLO 5:</b> Examine intermediate results or other quantities that could be used to ensure a solution.</p> <p><b>CLO 6:</b> Identify what they don't understand and ask specific questions to gain understanding and develop their ability to communicate ideas of science.</p> <p><b>CLO 7:</b> Enable the students who to use the programs of internet search to benefit sources, enable the student to prepare the daily special thermodynamics reports and prepare brochures which deal with the thermal effects on the environment.</p> <p><b>CLO 8:</b> Enable the student to work in research centers and industrial institutions.</p> <p><b>CLO 9:</b> Understand and apply the basic idea of heat transfer theorem to physical systems.</p> <p><b>CLO 10:</b> Study of types of energy and their application.</p> <p><b>CLO 11:</b> Study the difference between the closed and opened systems the mathematical models of the physical systems are explained and define and describe the steady state principle</p> <p><b>CLO 12:</b> The mode of Heat Transfer.</p> <p><b>CLO 13:</b> An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.</p> <p><b>CLO 14:</b> An ability to acquire and apply new knowledge and using appropriate learning strategies.</p> <p><b>CLO 15:</b> An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.</p> |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p>                | <p>Indicative content includes the following.</p> <p><b>Basic Quantities, including:</b> [10 hrs]</p> <ul style="list-style-type: none"> <li>State SI units and write the units and their abbreviations correctly.</li> <li>The advantage of developing the student's ability to understand thermodynamics objects.</li> <li>Know the types of energy and practice applications.</li> <li>Know the difference between heat transfer and work.</li> <li>How can be calculate the heat lost and gain from or by the system.</li> <li>How can be calculate the energy from or by the system.</li> <li>Distinguish heat transfer in the closed system.</li> <li>Distinguish work in the closed system.</li> </ul> <p><b>Types of energy and it is applications:</b> [10 hrs]</p> <ul style="list-style-type: none"> <li>State, explain, and apply different between the gage pressure.</li> <li>Differentiate between the pressure for the solid, liquid and gases.</li> <li>How can calculate and transfer the units.</li> <li>Solve problems using the</li> </ul> <p><b>The perfect gas law</b> [10hrs]</p> <ul style="list-style-type: none"> <li>What is the perfect gas (ideal gas)</li> <li>Study the general gas law.</li> <li>the behavior of many Gas constant, Boyle's law, Charles's law and Gay-Lussac's law.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>First law of thermodynamics and their application:</b> [10 hrs]</p> <ul style="list-style-type: none"> <li>In order to deal with the subject of applied thermodynamics rigorously it is necessary to know the difference between applications.</li> <li>The state of working fluid.</li> <li>Study the non-flow equation.</li> <li>Study the steady flow equation.</li> <li>The different between the closed system and open system and their application</li> </ul> <p><b>Heat Transfer:</b> [5 hrs]</p> <ul style="list-style-type: none"> <li>Heat Transfer by conduction.</li> <li>Heat Transfer by convection.</li> <li>Heat Transfer by radiation.</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                                    |                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b><br>الاستراتيجيات | The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting. |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب

|                                                                         |     |                                                                     |     |
|-------------------------------------------------------------------------|-----|---------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 48  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 3.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 52  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 3.5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 100 |                                                                     |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                      |                     | Time/Number | Weight (Marks)   | Week Due         | Relevant Learning Outcome          |
|----------------------|---------------------|-------------|------------------|------------------|------------------------------------|
| Formative assessment | Quizzes             | 5           | 4% (20)          | 4,6,9,11, and 15 | CLO 1,2,10,11, and 12              |
|                      | Assignments         | 4           | 2% (8)           | 5,7,10,12        | CLO 1,2,11, and 12                 |
|                      | On-site Assignments | 2           | 2% (4)           | 3,8              | CLO 10, and 12                     |
|                      | Reports             | 2           | 4% (8)           | 5, and 13        | CLO 1,2,10,11, and 12              |
| Summative assessment | Midterm Exam        | 2hrs        | 10% (10)         | 7                | CLO1,2,3,4,5,6,7,8,9,10,11, and 12 |
|                      | Final Exam          | 3hrs        | 50% (50)         | 16               | All                                |
| Total assessment     |                     |             | 100% (100 Marks) |                  |                                    |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الأسبوعي النظري

|        | Material Covered                   |
|--------|------------------------------------|
| Week 1 | Introduction, dimensions and unit. |

|                |                                                                                                                     |            |      |
|----------------|---------------------------------------------------------------------------------------------------------------------|------------|------|
|                | Some concepts and definitions and types of the systems.                                                             |            |      |
| <b>Week 2</b>  | Measurement of pressure and temperature                                                                             |            |      |
| <b>Week 3</b>  | Perfect gas laws                                                                                                    |            |      |
| <b>Week 4</b>  | Solved problems sheet No.1                                                                                          | Homework 1 | Quiz |
| <b>Week 5</b>  | Forms of Energy                                                                                                     |            |      |
| <b>Week 6</b>  | Solved problems sheet No.2                                                                                          | Homework 2 | Quiz |
| <b>Week 7</b>  | Mid-term Exam                                                                                                       |            |      |
| <b>Week 8</b>  | Thermodynamics laws / First law of thermodynamics<br>Thermodynamic processes - Applied to the closed system process |            |      |
| <b>Week 9</b>  | Solved problems sheet No.3                                                                                          | Homework 3 | Quiz |
| <b>Week 10</b> | Thermodynamic processes - Applied to the open system process                                                        |            |      |
| <b>Week 11</b> | Solved problems sheet No.4                                                                                          | Homework 4 | Quiz |
| <b>Week 12</b> | The modes of heat transfer                                                                                          |            |      |
| <b>Week 13</b> | Environmental application of Heat transfer                                                                          |            |      |
| <b>Week 14</b> | Isothermal and non-isothermal operations                                                                            |            |      |
| <b>Week 15</b> | Solved problems sheet No.5                                                                                          | Homework 5 | Quiz |
| <b>Week 16</b> | Final Exam of the semester                                                                                          |            |      |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                          | Text                                                                                                                                                      | Available in the Library? |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | Applied thermodynamics fifth edition by t.d eastop and a. mcconkey                                                                                        | Yes                       |
| <b>Recommended Texts</b> | Y. A. Çengel and M. A. Boles, Thermodynamics: An Engineering Approach, 5th ed, McGraw-Hill, 2006                                                          | No                        |
| <b>Websites</b>          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

### Grading Scheme

#### مخطط الدرجات

| Group                           | Grade                   | التقدير             | Marks (%) | Definition                                  |
|---------------------------------|-------------------------|---------------------|-----------|---------------------------------------------|
| <b>Success Group (50 - 100)</b> | <b>A - Excellent</b>    | امتياز              | 90 - 100  | Outstanding Performance.                    |
|                                 | <b>B - Very Good</b>    | جيد جدا             | 80 - 89   | Above average with some errors.             |
|                                 | <b>C - Good</b>         | جيد                 | 70 - 79   | Sound work with notable errors.             |
|                                 | <b>D - Satisfactory</b> | متوسط               | 60 - 69   | Fair but with major shortcomings.           |
|                                 | <b>E - Sufficient</b>   | مقبول               | 50 - 59   | Work meets minimum criteria.                |
| <b>Fail Group (0 – 49)</b>      | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)   | More work is required, but credit is given. |
|                                 | <b>F – Fail</b>         | راسب                | (0-44)    | A significant amount of work is required.   |
|                                 |                         |                     |           |                                             |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |             |                               |                                                                                                                                                                                                                                          |
|------------------------------------|-------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |             |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Statistics  |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Core        |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code                        | ENV115      |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 3           |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 75          |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 1           | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department           | ENV8        | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Abdulmuhsin | e-mail                        | mss_qzz@uomosul.edu.iq                                                                                                                                                                                                                   |
| Module Leader's Acad. Title        | Professor   | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                    |
| Module Tutor                       | -----       | e-mail                        | E-mail                                                                                                                                                                                                                                   |
| Peer Reviewer Name                 | -----       | e-mail                        | E-mail                                                                                                                                                                                                                                   |
| Scientific Committee Approval Date | 3/10/2024   | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |      |          |       |
|-----------------------------------|------|----------|-------|
| العلاقة مع المواد الدراسية الأخرى |      |          |       |
| Prerequisite module               | None | Semester | ..... |
| Co-requisites module              | None | Semester | ..... |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | There is a need to know how to deal with a large amount of data. The objectives of this module are how to generate informative data and how to extract information from data and to explain the valuable methods to present these data and extract the conclusions from them. Additionally, the module includes how to describe the data in a clear manner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <b>CLO-1:</b> Represent the collected data in a frequency table and histograms<br><b>CLO-2:</b> Identify the methods of statistical description<br><b>CLO-3:</b> Measure the deviation and dispersion of the data from the centre if it is symmetrical or skewed.<br><b>CLO-4:</b> Explaining the principles of probability and its use in statistical tests<br><b>CLO-5:</b> Using probability laws as tools to find the percentage of occasion occurrence.<br><b>CLO-6:</b> Employing probability distributions in decision-making<br><b>CLO-7:</b> Applying probability to test the hypotheses.<br><b>CLO-8:</b> Utilize normal distribution curve in the analysis of the problems.<br><b>CLO-9:</b> Using statistics as a tool for quality assurance of laboratory test.<br><b>CLO-10:</b> Test the relationships between variables. |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | Part A – Introduction to Statistics (3 hrs.)<br>Part B – Frequency distribution and data presentation (6 hrs.)<br>Part C – Measures of central tendency and variation (6 hrs.)<br>Part D – Probability distribution, rules and laws (6 hrs.)<br>Part E – Probability and combinatorial analysis (6 hrs.)<br>Part F – Normal distribution (6 hrs.)<br>Part G – Application of Normal distribution and hypotheses testing (9 hrs)<br>Part H – Correlation between variables                                                                                                                                                                                                                                                                                                                                                                |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | This course will include lectures, individual & group assignments. Exercises will include different methods to treat the data statistically according to type of data. The course will be taught in Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا</b>       |    |                                                                                  |     |
|---------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br><b>الحمل الدراسي المنتظم للطالب خلال الفصل</b>       | 48 | <b>Structured SWL (h/w)</b><br><b>الحمل الدراسي المنتظم للطالب أسبوعيا</b>       | 3.2 |
| <b>Unstructured SWL (h/sem)</b><br><b>الحمل الدراسي غير المنتظم للطالب خلال الفصل</b> | 27 | <b>Unstructured SWL (h/w)</b><br><b>الحمل الدراسي غير المنتظم للطالب أسبوعيا</b> | 1.8 |
| <b>Total SWL (h/sem)</b><br><b>الحمل الدراسي الكلي للطالب خلال الفصل</b>              | 75 |                                                                                  |     |

| Module Evaluation<br>تقييم المادة الدراسية |              |             |                  |                     |                                                    |
|--------------------------------------------|--------------|-------------|------------------|---------------------|----------------------------------------------------|
|                                            |              | Time/Number | Weight (Marks)   | Week Due            | Relevant Learning Outcome                          |
| Formative assessment                       | Quizzes      | 6           | 24% (24)         | 2, 3, 4, 5, 7, 8, 9 | CLO-1, CLO-2, CLO-3, CLO-4, CLO4, CLO5 and CLO-7   |
|                                            | Assignments  | 2           | 6% (6)           | 2, 7                | CLO-1, CLO-2, CLO-4 and CLO5                       |
|                                            | Report       | 1           | 4% (4)           | 8                   | CLO-7, CLO-10                                      |
|                                            | On site      | 1           | 6%(6)            | 2-13                | CLO-7, CLO-10                                      |
| Summative assessment                       | Midterm Exam | 1           | 10% (10)         | 10                  | (1)CLO-1, CLO-2, CLO-3; (2) CLO-4, CLO-5 and CLO-6 |
|                                            | Final Exam   | 3hr         | 50% (50)         | 16                  | All                                                |
| Total assessment                           |              |             | 100% (100 Marks) |                     |                                                    |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الأسبوعي النظري |                                                                                                                                                                                |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                                                                               |
| Week 1                                                     | Nature of Statistics: Introduction, statistical notations<br>Frequency Distributions: Frequency Distribution Table, Cumulative Frequency                                       |
| Week 2                                                     | Graphical presentation: Frequency Distribution, Cumulative Frequency Distribution.<br>Measures of central Tendency for raw and tabulated data: The Mean: Arithmetic, Geometric |
| Week 3                                                     | Harmonic mean, Median, Mode.<br>Measures of Dispersion or Variation: Range, Mean Deviation,                                                                                    |
| Week 4                                                     | Variance and Standard deviation for raw and tabulated data, Standardized score, Relationship between central tendency measures and unimodal distribution                       |
| Week 5                                                     | Probability and distributions: Sample space,                                                                                                                                   |
| Week 6                                                     | probability rules, events and cases                                                                                                                                            |
| Week 7                                                     | Probability laws: Addition law, Multiplication law.                                                                                                                            |
| Week 8                                                     | Combinations and permutations.                                                                                                                                                 |
| Week 9                                                     | Probability and Combinatorial analysis                                                                                                                                         |
| Week 10                                                    | Normal distribution                                                                                                                                                            |
| Week 11                                                    | Application of Normal distribution                                                                                                                                             |
| Week 12                                                    | Hypotheses testing: Z-test                                                                                                                                                     |
| Week 13                                                    | t distribution: t-test for a mean                                                                                                                                              |
| Week 14                                                    | Chi-square distribution: Chi-square test for variance and standard deviation                                                                                                   |
| Week 15                                                    | Correlation : Correlation coefficient                                                                                                                                          |
| Week 16                                                    | Preparatory week before the final Exam                                                                                                                                         |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                      | Available in the Library? |
| <b>Required Texts</b>                                    | Introduction to Statistics by Al-Rawi Kh.                                                                                                                 | Yes                       |
| <b>Recommended Texts</b>                                 | <ul style="list-style-type: none"> <li>Statistics for Sanitary Engineers by Berthouex and Brown, 2<sup>nd</sup> ed. (2002)</li> </ul>                     | No                        |
| <b>Websites</b>                                          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A - Excellent</b>    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                        |                 |                                   |                                                                                                                                                                                                                                          |
|-------------------------------------------|-----------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية                   |                 |                                   |                                                                                                                                                                                                                                          |
| Module Title<br>اسم المنهج                | اللغة العربية 1 |                                   | Module Delivery                                                                                                                                                                                                                          |
| Module Type<br>نوع المنهج                 | اساسي           |                                   | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code<br>رمز المنهج                 | UOM1011         |                                   |                                                                                                                                                                                                                                          |
| ECTS Credits<br>عدد الوحدات               | 2               |                                   |                                                                                                                                                                                                                                          |
| SWL (hr/sem)<br>الحمل الكلي               | 50              |                                   |                                                                                                                                                                                                                                          |
| Module Level / المستوى                    | 1               | Semester of Delivery / سحب المنهج |                                                                                                                                                                                                                                          |
| Administering Department<br>القسم الإداري | ENV8            | College<br>الكلية                 | ENG4                                                                                                                                                                                                                                     |
| Module Leader<br>اسم التدريسي             |                 |                                   | e-mail<br>البريد الالكتروني                                                                                                                                                                                                              |
| Module Leader's Acad. Title               |                 | Module Leader's Qualification     |                                                                                                                                                                                                                                          |
| Module Tutor                              |                 |                                   | e-mail                                                                                                                                                                                                                                   |
| Peer Reviewer Name                        | -----           | e-mail                            | E-mail                                                                                                                                                                                                                                   |
| Scientific Committee Approval Date        | 26/9/2024       | Version Number                    | 2.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |         |          |  |
|-----------------------------------|---------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |         |          |  |
| Prerequisite module               | لا يوجد | Semester |  |
| Co-requisites module              | لا يوجد | Semester |  |



| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module Objectives<br>أهداف المادة الدراسية                | <p>الهدف من هذا الفصل الدراسي هو تعريف الطلاب بالموضوعات الرئيسية لمادة اللغة العربية. سيغطي الفصل الدراسي المتطلبات الأساسية لتعاريف اللغة العربية، قواعد نحوية للأزمنة، تنمية القدرات النحوية لصيغ المفرد والجمع والممنوع من الجرد، بالإضافة الى البلاغة والتطبيق. وفي نهاية الفصل، سيكون لدى الطلاب معرفة واسعة بالمفاهيم وسيتم تحقيق ذلك من خلال المحاضرات النظرية والدروس والواجبات البتية والتقارير ذات الصلة بالمواضيع المطروقة.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | <p><b>CLO1:</b> تعريف الطالب بألفاظ اللغة العربية الصحيحة وتراكيبها وأساليبها السليمة بطريقة مشوقة وجذابة.</p> <p><b>CLO2:</b> أن يستغل الطالب وقت فراغه بالقراءة والاطلاع والرجوع إلى المكتبة.</p> <p><b>CLO3:</b> تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتصال مع الآخرين.</p> <p><b>CLO4:</b> تنمية الذوق الأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام ومعانيه وصورة.</p> <p><b>CLO5:</b> تنمية قدرة ومهارة الطالب الإملائية والخطية بحيث يستطيع الكتابة الصحيحة للكتب والمخاطبات الرسمية.</p> <p><b>CLO6:</b> تمكين الطالب على كتابة التقارير العملية والنظرية والعروض التقديمية بلغة عربية واضحة وصحيحة.</p> <p><b>CLO7:</b> القدرة على اكتساب وتطبيق المعرفة الجديدة واستخدام استراتيجيات تعليم مناسبة.</p> <p><b>CLO8:</b> القدرة على المشاركة والعمل بمهنية وإخلاقية للعمل في فرق متعددة التخصصات.</p>                                                                                                                              |
| Indicative Contents<br>المحتويات الإرشادية                | <p><b>الجزء الأول:</b> مقدمة عن اللغة العربية (4 ساعات)</p> <ul style="list-style-type: none"> <li>• مقدمة عن اللغة العربية</li> <li>• تعريف اللغة العربية ومميزاتها</li> </ul> <p><b>الجزء الثاني:</b> قواعد نحوية وتشمل: (6 ساعات)</p> <ul style="list-style-type: none"> <li>• الفعل الماضي</li> <li>• الفعل الماضي</li> <li>• الأفعال الخمسة</li> </ul> <p><b>الجزء الثالث:</b> تنمية القواعد النحوية وتشمل: (6 ساعات)</p> <ul style="list-style-type: none"> <li>• المثنى والجمع (المذكر السالم والمؤنث السالم)</li> <li>• التعجب</li> <li>• الممنوع من الصرف</li> <li>• المجرد والمزيد</li> </ul> <p><b>الجزء الرابع:</b> البلاغة والتطبيق (8 ساعات)</p> <ul style="list-style-type: none"> <li>• الاستعارة</li> <li>• الجناس</li> <li>• الطباق</li> <li>• التشبيه</li> </ul> <p><b>الجزء الخامس:</b> قواعد املائية: (3 ساعات)</p> <p>سوف يتم تعريف الطالب عن الأخطاء الإملائية الشائعة وطرق تجنبها بالإضافة الى كتابة المخاطبات الادرية.</p> <p><b>الجزء السادس:</b> قواعد العد والمعدود: (3 ساعات)</p> |

|                                                                         |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
|-------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------|---------------------------|
|                                                                         |                                                       | تعريف الطالب بقواعد واحكام العد والمعدود في اللغة العربية.                                                                                                                                                                                                                                                                                                                              |                                                                    |              |                           |
| Learning and Teaching Strategies                                        |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| استراتيجيات التعلم والتعليم                                             |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| Strategies<br>الاستراتيجيات                                             |                                                       | توسيع مدارك الطلاب لمادة اللغة العربية، والإلمام بالمفاهيم الأساسية للغة العربية والبلاغة، والقدرة على التمييز بين الأزمنة. يحتوي هذه الفصل على العديد من المكونات التي تشمل دراسة المحاضرات والبرامج التعليمية والمناقشة والواجبات المنزلية ومنصات التعلم الإلكتروني. سيتم تدريس الدورة باللغة العربية، ويجب تقديم جميع المهام الإلزامية في غضون المواعيد النهائية للقبول في الامتحان. |                                                                    |              |                           |
| Student Workload (SWL)                                                  |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطلاب خلال الفصل       |                                                       | 33                                                                                                                                                                                                                                                                                                                                                                                      | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطلاب أسبوعيا       |              | 2.2                       |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل |                                                       | 17                                                                                                                                                                                                                                                                                                                                                                                      | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا |              | 1.1                       |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              |                                                       | 50                                                                                                                                                                                                                                                                                                                                                                                      |                                                                    |              |                           |
| Module Evaluation                                                       |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| تقييم المادة الدراسية                                                   |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
|                                                                         |                                                       | Time/Number                                                                                                                                                                                                                                                                                                                                                                             | Weight (Marks)                                                     | Week Due     | Relevant Learning Outcome |
| Formative Assessment<br>التقويم التكويني                                | Quizzes<br>الكويز                                     | 3                                                                                                                                                                                                                                                                                                                                                                                       | 6% (18)                                                            | 4, 9, and 13 | All                       |
|                                                                         | H.W Assignments<br>الواجبات البيتية                   | 2                                                                                                                                                                                                                                                                                                                                                                                       | 4% (8)                                                             | 5, 11        | CLO4, CLO5, and CLO6      |
|                                                                         | Seminars<br>السمنار                                   | 1                                                                                                                                                                                                                                                                                                                                                                                       | 6% (6)                                                             | 12           | All                       |
|                                                                         | On-site Assignment<br>واجبات داخل الصف                | 2                                                                                                                                                                                                                                                                                                                                                                                       | 4% (8)                                                             | 6, 10        | CLO4, CLO5, and CLO6      |
| Summative Assessment<br>التقويم التلخيصي                                | Midterm Exam<br>امتحان نصف الفصل                      | 2 hrs                                                                                                                                                                                                                                                                                                                                                                                   | 10% (10)                                                           | 7            | All                       |
|                                                                         | Final Exam<br>الامتحان النهائي                        | 3 hrs                                                                                                                                                                                                                                                                                                                                                                                   | 50% (50)                                                           | 16           | All                       |
| Total Assessment / التقويم النهائي                                      |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         | 100% (100 Marks)                                                   |              |                           |
| Delivery Plan (Weekly Syllabus)                                         |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| المنهاج الاسبوعي النظري                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
|                                                                         | Material Covered / المواضيع المغطاة                   |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| Week 1                                                                  | مقدمة عن اللغة العربية وتعريف اللغة العربية ومميزاتها |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |
| Week 2                                                                  | قواعد نحوية: الفعل الماضي                             |                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |              |                           |

|         |                                                                     |
|---------|---------------------------------------------------------------------|
| Week 3  | قواعد نحوية: الفعل المضارع                                          |
| Week 4  | قواعد نحوية: الأفعال الخمسة                                         |
| Week 5  | تنمية القواعد النحوية: المثنى والجمع (المذكر السالم والمؤنث السالم) |
| Week 6  | تنمية القواعد النحوية: التعجب، الممنوع من الصرف والمجرد والمزيد     |
| Week 7  | الامتحان الفصلي                                                     |
| Week 8  | البلاغة والتطبيق: الاستعارة                                         |
| Week 9  | البلاغة والتطبيق: الجناس                                            |
| Week 10 | البلاغة والتطبيق: الطباق                                            |
| Week 11 | البلاغة والتطبيق: التشبيه                                           |
| Week 12 | الأخطاء الإملائية                                                   |
| Week 13 | المخاطبات الإدارية                                                  |
| Week 14 | قواعد واحكام العد والمعدود                                          |
| Week 15 | قواعد واحكام العد والمعدود                                          |
| Week 16 | الامتحان النهائي                                                    |

### Delivery Plan (Weekly Lab. Syllabus)

|        | Material Covered / المواضيع المغطاة |
|--------|-------------------------------------|
| Week 1 | لا يوجد                             |
| Week 2 | لا يوجد                             |
| Week 3 | لا يوجد                             |
| Week 4 | لا يوجد                             |
| Week 5 | لا يوجد                             |
| Week 6 | لا يوجد                             |
| Week 7 | لا يوجد                             |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                                              | Text<br>الاسم                                                                                                                                             | Available in the Library?<br>هل متوفر في المكتبة؟ |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Required Texts</b><br>المنهج المطلوب      | جامع الدروس العربية / مصطفى الغلاييني                                                                                                                     | نعم                                               |
| <b>Recommended Texts</b><br>المنهج الموصى به | النحو الوافي / عباس حسن                                                                                                                                   | نعم                                               |
| <b>Websites</b><br>المواقع الالكترونية       | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                                                   |

### Grading Scheme

مخطط الدرجات

| Group                              | Grade         | التقدير | Marks %  | Definition                     |
|------------------------------------|---------------|---------|----------|--------------------------------|
| <b>Success Group</b><br>(50 - 100) | A - Excellent | امتياز  | 90 - 100 | Outstanding Performance        |
|                                    | B - Very Good | جيد جدا | 80 - 89  | Above average with some errors |

|                                |                  |                     |         |                                       |
|--------------------------------|------------------|---------------------|---------|---------------------------------------|
|                                | C - Good         | جيد                 | 70 - 79 | Sound work with notable errors        |
|                                | D - Satisfactory | متوسط               | 60 - 69 | Fair but with major shortcomings      |
|                                | E - Sufficient   | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b> | <b>FX – Fail</b> | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                | <b>F – Fail</b>  | راسب                | (0-44)  | Considerable amount of work required  |
|                                |                  |                     |         |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                        |                                                         |                                   |                                                                                                                                                                                                                                          |
|-------------------------------------------|---------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية                   |                                                         |                                   |                                                                                                                                                                                                                                          |
| Module Title<br>اسم المنهج                | الديمقراطية وحقوق الانسان<br>Democracy and Human Rights |                                   | Module Delivery                                                                                                                                                                                                                          |
| Module Type<br>نوع المنهج                 | اساسي                                                   |                                   | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code<br>رمز المنهج                 | UOM1040                                                 |                                   |                                                                                                                                                                                                                                          |
| ECTS Credits<br>عدد الوحدات               | 2                                                       |                                   |                                                                                                                                                                                                                                          |
| SWL (hr/sem)<br>الحمل الكلي               | 50                                                      |                                   |                                                                                                                                                                                                                                          |
| Module Level / المستوى                    | 1                                                       | Semester of Delivery / سحب المنهج | 1                                                                                                                                                                                                                                        |
| Administering Department<br>القسم الإداري | ENV8                                                    | College<br>الكلية                 | ENG4                                                                                                                                                                                                                                     |
| Module Leader<br>اسم التدريسي             | نهال عبد الوهاب حامد                                    |                                   | e-mail<br>البريد الالكتروني<br><a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                                |
| Module Leader's Acad. Title               | مدرس مساعد<br>Assistant Lecture                         | Module Leader's Qualification     | ماجستير<br>MS. C.                                                                                                                                                                                                                        |
| Module Tutor                              | نهال عبد الوهاب حامد                                    | e-mail                            | <a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                                                               |
| Peer Reviewer Name                        | نهال عبد الوهاب حامد                                    | e-mail                            | <a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                                                               |
| Scientific Committee Approval Date        | 26/10/2024                                              | Version Number                    | 1.0                                                                                                                                                                                                                                      |
| Relation with other Modules               |                                                         |                                   |                                                                                                                                                                                                                                          |
| العلاقة مع المواد الدراسية الأخرى         |                                                         |                                   |                                                                                                                                                                                                                                          |
| Prerequisite module                       | لا يوجد                                                 | Semester                          |                                                                                                                                                                                                                                          |
| Co-requisites module                      | لا يوجد                                                 | Semester                          |                                                                                                                                                                                                                                          |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
| Module Objectives<br>أهداف المادة الدراسية                | 1. تعريف الطالب بمفهوم حقوق الانسان<br>2. تعريف الطالب بالتطور التاريخي لحقوق الانسان<br>3. تعريف الطالب بمصادر حقوق الانسان<br>4. تعريف الطالب بالمصادر الدينية لحقوق الانسان<br>5. تعريف الطالب بالحقوق والحريات التي نص عليها الدستور العراقي                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      |     |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | CLO1: المعرفة والفهم<br>CLO2: معرفة جذور حقوق الانسان<br>CLO3: معرفة المصادر الدولية (العالمية والاقليمية)<br>CLO4: التعرف على الاعلانات والاتفاقيات المنظمة لحقوق الانسان<br>CLO5: تنمية مهارات البحث والتعلم لدى الطلبة فيما يتعلق بموضوع المادة<br>CLO6: تعزيز قدرة الطالب التحليلية بتدريبه على كيفية توظيف ما يتوفر لديه من معلومات في دراسته                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |     |
| Indicative Contents<br>المحتويات الإرشادية                | <b>الديمقراطية وحقوق الانسان</b><br><b>المطلب الاول:</b> حقوق الانسان والحريات العامة: إطار مفاهيمي. (8 ساعات)<br>أولاً: الحق والحرية لغة واصطلاحاً<br>ثانياً: خصائص حقوق الانسان<br>ثالثاً: انواع حقوق الانسان<br><b>المطلب الثاني:</b> التطور التاريخي لحقوق الانسان (8 ساعات)<br>أولاً: حقوق الانسان في حضارة بلاد ما بين النهرين<br>ثانياً: حقوق الانسان في الحضارة الاغريقية<br>ثالثاً: حقوق الانسان في العصر الحديث<br><b>المطلب الثالث:</b> حقوق الانسان في الشرائع السماوية (8 ساعات)<br>أولاً: الديانة اليهودية<br>ثانياً: الديانة المسيحية<br>ثالثاً: الدين الاسلامي<br><b>المطلب الرابع:</b> الحقوق والحريات في الدستور العراقي لعام 2005 (9 ساعات)<br>أولاً: الحقوق المدنية<br>ثانياً: الحقوق والحريات الفكرية<br>ثالثاً: الحقوق السياسية<br>رابعاً: الحقوق الاقتصادية والاجتماعية والثقافية. |                      |     |
| Learning and Teaching Strategies                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
| استراتيجيات التعلم والتعليم                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
| Strategies<br>الاستراتيجيات                               | توسيع مدارك الطالب لمادة الديمقراطية وحقوق الانسان، والالمام بالحقوق الاساسية التي يجب ان يتمتع بها الفرد، والقدرة على التمييز بين الحقوق والواجبات، من خلال المحاضرات فضلاً عن الاختبارات اليومية والفصلية                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |     |
| Student Workload (SWL)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |     |
| Structured SWL (h/sem)                                    | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Structured SWL (h/w) | 2.2 |

|                                                                                |    |                                                                           |     |
|--------------------------------------------------------------------------------|----|---------------------------------------------------------------------------|-----|
| الحمل الدراسي المنتظم للطالب خلال الفصل                                        |    | الحمل الدراسي المنتظم للطالب أسبوعيا                                      |     |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 17 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 50 |                                                                           |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                                                 |                                              | Time/Number | Weight (Marks)   | Week Due  | Relevant Learning Outcome |
|-------------------------------------------------|----------------------------------------------|-------------|------------------|-----------|---------------------------|
| <b>Formative Assessment</b><br>التقويم التكويني | <b>Quizzes</b><br>الكويز                     | 2           | 7% (14)          | 5, and 12 | CLO4, CLO6                |
|                                                 | <b>Assignments</b><br>الواجبات               | 1           | 6% (6)           | 9         | CLO5                      |
|                                                 | <b>Seminars</b><br>السمنار                   | 1           | 10% (10)         | 13        | CLO6                      |
|                                                 | <b>Report</b><br>التقارير                    | 1           | 10% (10)         | 6         | CLO2, CLO3, and CLO4      |
|                                                 | <b>Onsite Assignment</b><br>واجبات داخل الصف | 0           | 0                | 0         |                           |
| <b>Summative Assessment</b><br>التقويم التلخيصي | <b>Midterm Exam</b><br>امتحان نصف الفصل      | 2 hrs       | 10% (10)         | 7         | All                       |
|                                                 | <b>Final Exam</b><br>الامتحان النهائي        | 3 hrs       | 50% (50)         | 16        | All                       |
| <b>Total Assessment /</b> التقويم النهائي       |                                              |             | 100% (100 Marks) |           |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|               | Material Covered / المواضيع المغطاة                |
|---------------|----------------------------------------------------|
| <b>Week 1</b> | تعريف الحق والحرية لغة واصطلاحا                    |
| <b>Week 2</b> | خصائص حقوق الانسان                                 |
| <b>Week 3</b> | انواع حقوق الانسان                                 |
| <b>Week 4</b> | حقوق الانسان في حضارة بلاد ما بين النهرين          |
| <b>Week 5</b> | حقوق الانسان في الحضارة الاغريقية                  |
| <b>Week 6</b> | حقوق الانسان في العصر الحديث                       |
| <b>Week 7</b> | الامتحان الفصلي                                    |
| <b>Week 8</b> | حقوق الانسان في الشرائع السماوية: الديانة اليهودية |
| <b>Week 9</b> | حقوق الانسان في الشرائع السماوية: الديانة المسيحية |

|         |                                                  |
|---------|--------------------------------------------------|
| Week 10 | حقوق الانسان في الشرائع السماوية: الدين الاسلامي |
| Week 11 | الحقوق المدنية                                   |
| Week 12 | الحقوق والحريات الفكرية                          |
| Week 13 | الحقوق السياسية                                  |
| Week 14 | الحقوق الاقتصادية والاجتماعية والثقافية          |
| Week 15 | الحقوق الاقتصادية والاجتماعية والثقافية          |
| Week 16 | الامتحان النهائي                                 |

### Delivery Plan (Weekly Lab. Syllabus)

|        | Material Covered / المواضيع المغطاة |
|--------|-------------------------------------|
| Week 1 | لا يوجد                             |
| Week 2 | لا يوجد                             |
| Week 3 | لا يوجد                             |
| Week 4 | لا يوجد                             |
| Week 5 | لا يوجد                             |
| Week 6 | لا يوجد                             |
| Week 7 | لا يوجد                             |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                                              | Text<br>الاسم                                                                                                                                             | Available in the Library?<br>هل متوفر في المكتبة؟ |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Required Texts</b><br>المنهج المطلوب      | حقوق الإنسان، جعفر صادق مهدي                                                                                                                              |                                                   |
| <b>Recommended Texts</b><br>المنهج الموصى به | حقوق الإنسان (تطورها ومضامينها وحمايتها)، رياض عزيز هادي                                                                                                  |                                                   |
| <b>Websites</b><br>المواقع الالكترونية       | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                                                   |

### Grading Scheme

#### مخطط الدرجات

| Group                              | Grade            | التقدير             | Marks %  | Definition                            |
|------------------------------------|------------------|---------------------|----------|---------------------------------------|
| <b>Success Group</b><br>(50 - 100) | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                    | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                    | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                    | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                    | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group</b><br>(0 - 49)      | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                    | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                    |                  |                     |          |                                       |



**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                            |                      |                                                                                                                                                                                                                                          |                                                                                                                                                            |
|------------------------------------|--------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                            |                      |                                                                                                                                                                                                                                          |                                                                                                                                                            |
| Module Title                       | Calculus                                   |                      | Module Delivery                                                                                                                                                                                                                          |                                                                                                                                                            |
| Module Type                        | Support or related learning activity       |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                                                                                            |
| Module Code                        | ENV121                                     |                      |                                                                                                                                                                                                                                          |                                                                                                                                                            |
| ECTS Credits                       | 6                                          |                      |                                                                                                                                                                                                                                          |                                                                                                                                                            |
| SWL (hr/sem)                       | 150                                        |                      |                                                                                                                                                                                                                                          |                                                                                                                                                            |
| Module Level                       | 1                                          | Semester of Delivery |                                                                                                                                                                                                                                          | 2                                                                                                                                                          |
| Administering Department           | ENV8                                       | College              | ENG4                                                                                                                                                                                                                                     |                                                                                                                                                            |
| Module Leader                      | Mayada Hazim                               |                      | e-mail                                                                                                                                                                                                                                   | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a>                                                                                 |
| Module Leader's Acad. Title        | Lecturer                                   |                      | Module Leader's Qualification                                                                                                                                                                                                            | M.Sc.                                                                                                                                                      |
| Module Tutor                       | Abeer Khalil Ibrahim<br>Aya Thamer Ibrahim |                      | e-mail                                                                                                                                                                                                                                   | <a href="mailto:abeer.alsaraf@uomosul.edu.iq">abeer.alsaraf@uomosul.edu.iq</a><br><a href="mailto:aya.thamer@uomosul.edu.iq">aya.thamer@uomosul.edu.iq</a> |
| Peer Reviewer Name                 | Mayada Hazim                               |                      | e-mail                                                                                                                                                                                                                                   | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a>                                                                                 |
| Scientific Committee Approval Date | 19/9/2024                                  |                      | Version Number                                                                                                                                                                                                                           | 2.0                                                                                                                                                        |

| Relation with other Modules       |      |  |          |
|-----------------------------------|------|--|----------|
| العلاقة مع المواد الدراسية الأخرى |      |  |          |
| Prerequisite module               | None |  | Semester |
| Co-requisites module              | None |  | Semester |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>The aim of this course is to introduce the students to the main topics of Calculus. The course will cover Integration, Applications of Definite Integrals, The Calculus of Transcendental Function, Techniques of Integration and Polar Coordinates. At the end of the course, students will have a broad knowledge of the basic concepts of integration, techniques of integration, applications of definite integrals, and Polar coordinates. This will be achieved through theoretical lectures, tutorials and homework.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Recognize indefinite integrals and definite integral and know the basic properties(i).</p> <p><b>CLO-2:</b> Use applications of definite integral to find areas between curves, volumes, lengths of plane curves and areas of surfaces of revolution(ii).</p> <p><b>CLO-3:</b> Identified and understand of transcendental functions and know the basic properties(i).</p> <p><b>CLO-4:</b> Applied techniques of integration to change unfamiliar integrals into integrals we can recognize and solve(i).</p> <p><b>CLO-5:</b> Identified and understand of Polar Coordinates and know the basic properties(i).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b>Indicative content includes the following.</b></p> <p><u>Part A – Integration</u><br/> Calculus and Area, Formulas for Finite sums, Definite Integrals, The Fundamental Theorems of Integral Calculus, Indefinite Integrals, Integration by Substitution –Running the Chain Rule Backward(10 hrs).</p> <p><u>Part B –Applications of Definite Integrals</u><br/> Areas between Curves, Calculus and Area, Volumes of Solids of Revolution-Disks and Washers, Cylindrical Shells-An Alternative to Washers, Lengths of Curves in the Plane, Areas of Surfaces of Revolution(15 hrs).</p> <p><u>Part C –The Calculus of Transcendental Function</u><br/> Inverse Function and Their Derivatives, <math>\ln x</math>, <math>e^x</math>, and Logarithmic Differentiation, Indeterminate Forms and Hospital's Rule, Other Exponential and Logarithmic Function, The Inverse Trigonometric Function, Derivatives of Inverse Trigonometric Functions(15 hrs).</p> <p><u>Part D - Techniques of Integration</u><br/> Basic Integration Formulas, Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions, Rational Functions and Partial Fractions, Using Integral Tables. Improper Integrals. (20 hrs).</p> |

|                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                           |     |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----|
|                                                                                | <u>Part E - Plane Curves and Polar Coordinates</u><br>Polar Coordinates: Definition of Polar Coordinates, Negative Values of r, Changing to Radian Measure, The Use of Radian Measure, Elementary Coordinate Equations and Inequalities, Cartesian Versus Polar Coordinates, Graphing in Polar Coordinates: Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect. (15 hrs).                                                 |                                                                           |     |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم         |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                           |     |
| <b>Strategies</b><br>الاستراتيجيات                                             | Expanding students' perceptions of Calculus, familiarity with basic Calculus concepts and principles, and the ability to distinguish between different mathematical concepts. This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam. |                                                                           |     |
| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا       |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 80                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 5.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4.7 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                           |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |             |                  |                    |                                    |
|---------------------------------------------------|--------------------|-------------|------------------|--------------------|------------------------------------|
|                                                   |                    | Time/Number | Weight (Marks)   | Week Due           | Relevant Learning Outcome          |
| Formative assessment                              | Quizzes            | 5           | 5% (25)          | 3, 5, ,8,11 and 14 | CLO-1, CLO-2, CLO-3, CLO-4, CLO-5  |
|                                                   | Online Assignments | 1           | 3% (3)           | 6                  | CLO-1, CLO-2.                      |
|                                                   | Onsite Assignment  | 4           | 2% (8)           | 3, 6, 9, 12 and 15 | CLO-1, CLO-2, CLO-3, CLO-4, CLO-5. |
|                                                   | Projects / Lab.    | 0           | 0                | 0                  |                                    |
|                                                   | Report             | 1           | 4% (4)           | 12                 | CLO-1, CLO-2, CLO-3, CLO-4.        |
| Summative assessment                              | Midterm Exam       | 2hrs        | 10% (10)         | 9                  | CLO-1, CLO -2, CLO -3,             |
|                                                   | Final Exam         | 3hrs        | 50% (50)         | 16                 | All                                |
| Total assessment                                  |                    |             | 100% (100 Marks) |                    |                                    |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                                                       |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
|                                                                   | Material Covered                                                                                                                      |
| <b>Week 1</b>                                                     | Calculus and Area, Formulas for Finite sums, Definite Integrals, The Fundamental Theorems of Integral Calculus, Indefinite Integrals, |
| <b>Week 2</b>                                                     | Integration by Substitution –Running the Chain Rule Backward.                                                                         |
| <b>Week 3</b>                                                     | Areas between Curves, Calculus and Area.                                                                                              |
| <b>Week 4</b>                                                     | Volumes of Solids of Revolution-Disks and Washers, Cylindrical Shells-An Alternative to Washers.                                      |
| <b>Week 5</b>                                                     | Lengths of Curves in the Plane, Areas of Surfaces of Revolution                                                                       |
| <b>Week 6</b>                                                     | Inverse Function and Their Derivatives, $\ln x$ , $e^x$ , and Logarithmic Differentiation                                             |
| <b>Week 7</b>                                                     | Indeterminate Forms and Hospital's Rule, Other Exponential and Logarithmic Function.                                                  |
| <b>Week 8</b>                                                     | The Inverse Trigonometric Function, Derivatives of Inverse Trigonometric Functions.                                                   |
| <b>Week 9</b>                                                     | Basic Integration Formulas, Integration by Parts.                                                                                     |
| <b>Week 10</b>                                                    | Trigonometric Integrals, Trigonometric Substitutions.                                                                                 |
| <b>Week 11</b>                                                    | Rational Functions and Partial Fractions.                                                                                             |
| <b>Week 12</b>                                                    | Using Integral Tables. Improper Integrals.                                                                                            |
| <b>Week 13</b>                                                    | Polar Coordinates: Definition of Polar Coordinates, Negative Values of $r$ , Changing to Radian Measure, The Use of Radian Measure.   |
| <b>Week 14</b>                                                    | Elementary Coordinate Equations and Inequalities, Cartesian Versus Polar Coordinates,                                                 |
| <b>Week 15</b>                                                    | Graphing in Polar Coordinates: Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect.                        |
| <b>Week 16</b>                                                    | <b>Preparatory week before the final Exam</b>                                                                                         |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                  |
|-------------------------------------------------------------------------|------------------|
|                                                                         | Material Covered |
| <b>Week 1</b>                                                           |                  |
| <b>Week 2</b>                                                           |                  |
| <b>Week 3</b>                                                           |                  |
| <b>Week 4</b>                                                           |                  |
| <b>Week 5</b>                                                           |                  |
| <b>Week 6</b>                                                           |                  |
| <b>Week 7</b>                                                           |                  |

| Learning and Teaching Resources                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|---------------------------------------|
| مصادر التعلم والتدريس                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |                     |          |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                      | Text                                                                                                                                                      |                     |          | Available in the Library?             |
| Required Texts                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"><li>Finney, R.L. &amp; Thomas, G.B, "Calculus" Addison. Wesley publishing company, USA,11th,2011.</li></ul>             |                     |          | Yes                                   |
| Recommended Texts                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.</li></ul>           |                     |          | Yes                                   |
| Websites                                                                                                                                                                                                                                                                                                                                                                             | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                     |          |                                       |
| Grading Scheme                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                           |                     |          |                                       |
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                           |                     |          |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                                                                                                                                                     | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent                                                                                                                                             | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good                                                                                                                                             | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good                                                                                                                                                  | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory                                                                                                                                          | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient                                                                                                                                            | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail                                                                                                                                                 | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail                                                                                                                                                  | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                           |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                                                                                                                                                           |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                |                               |                                                                                                                                                                                                                                          |
|------------------------------------|--------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Engineering Mechanics-Dynamics |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Support                        |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV122                         |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 5                              |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 125                            |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 1                              | Semester of Delivery          | 2                                                                                                                                                                                                                                        |
| Administering Department           | ENV8                           | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Salim Yousef                   | e-mail                        | <a href="mailto:sua@uomosul.edu.iq">sua@uomosul.edu.iq</a>                                                                                                                                                                               |
| Module Leader's Acad. Title        | Lecturer                       | Module Leader's Qualification | Phd                                                                                                                                                                                                                                      |
| Module Tutor                       | Salim Yousef                   | e-mail                        |                                                                                                                                                                                                                                          |
| Peer Reviewer Name                 | Salim Yousef                   | e-mail                        | E-mail                                                                                                                                                                                                                                   |
| Scientific Committee Approval Date | 17/09/2024                     | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |      |          |   |
|-----------------------------------|------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |      |          |   |
| Prerequisite module               | None | Semester | 0 |
| Co-requisites module              | None | Semester |   |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <ul style="list-style-type: none"> <li>To learn basic concepts and system of forces.</li> <li>To enable students to understand the relationship of physical processes, kinetics and kinematics.</li> <li>To develop skills to use the basic principles of mechanics in engineering applications.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO#1:</b> To define and explain principles of engineering mechanics (dynamics) related to experimental engineering domain.</p> <p><b>CLO#2:</b> The ability to draw Free Body Diagram and label the reactions on it</p> <p><b>CLO#3:</b> To solve problems of dynamics using principles of engineering mechanics.</p> <p><b>CLO#4:</b> To discuss and clarify concepts of principles of engineering mechanics (dynamics) for different simple situations.</p> <p><b>CLO#5:</b> To prepare free body diagrams of real case phenomenon considering engineering mechanics point of view.</p> <p><b>CLO#6:</b> To understand Newton's law in motion and recognize different kinds of particle motions.</p> <p><b>CLO#7:</b> To understand the principle of Newton's second law, work, power, and efficiency.</p> <p><b>CLO#8:</b> To understand the principle of Linear Impulse and Momentum for a System of Particles, and the concept of a conservative force.</p> <p><b>CLO#9:</b> Application of principles of work-Energy and Impulse-momentum in the dynamic analysis.</p> <p><b>CLO#10:</b> An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.</p> <p><b>CLO#11:</b> An ability to acquire and apply new knowledge and using appropriate learning strategies.</p> <p><b>CLO#12:</b> An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.</p> |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b><u>Part A: Basic Considerations</u></b></p> <ul style="list-style-type: none"> <li>To introduce the concepts of position, displacement, velocity, and acceleration.</li> <li>Vector Operations <ul style="list-style-type: none"> <li>Algebra and Computations</li> <li>Vector Calculus—Velocity and Acceleration</li> </ul> </li> <li>Newtonian Mechanics <ul style="list-style-type: none"> <li>Newton's Laws</li> <li>Systems of Units</li> <li>Energy and Momentum</li> </ul> </li> </ul> <p><b><u>Part B: Particle Kinematics</u></b></p> <ul style="list-style-type: none"> <li>Rectilinear Kinematics: Continuous Motion</li> <li>Curvilinear Motion: <ul style="list-style-type: none"> <li>Rectangular Components</li> <li>Normal and Tangential Components</li> </ul> </li> <li>Rectangular Cartesian Coordinates</li> <li>Curvilinear Coordinates <ul style="list-style-type: none"> <li>Cylindrical and Polar Coordinates</li> <li>Spherical Coordinates</li> <li>Arbitrary Curvilinear Coordinates</li> </ul> </li> <li>Motion of a Projectile</li> <li>Absolute Dependent Motion Analysis of Two Particles</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Part C: Relative Motion</b></p> <ul style="list-style-type: none"> <li>• Coordinate Transformations <ul style="list-style-type: none"> <li>◦ Rotation Transformations</li> <li>◦ Rotation Sequences</li> </ul> </li> <li>• Displacement</li> <li>• Time Derivatives <ul style="list-style-type: none"> <li>◦ Angular Velocity and Acceleration</li> <li>◦ Analytical Description</li> </ul> </li> <li>• Velocity and Acceleration Analysis Using a Moving Reference Frame</li> <li>• Observations from a Moving Reference Frame.</li> </ul> <p><b>Part D – Particle Kinetics</b></p> <ul style="list-style-type: none"> <li>• Newton's Second Law of Motion</li> <li>• Equation of Motion: Rectangular Coordinates</li> <li>• Investigate central-force motion and apply it to problems in space mechanics.</li> <li>• The principle of work and energy</li> <li>• Power and Efficiency</li> <li>• Principle of Linear Impulse and Momentum for a System of Particles</li> <li>• The concept of a conservative force</li> <li>• Theorem of conservation of energy to solve kinetic problems.</li> <li>• Friction Forces and Spring Forces.</li> </ul> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | This course has several components that include lectures, individual & group assignments, Exercises. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا       |            |                                                                           |     |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 50         | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 3.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 75         | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 5.0 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | <b>125</b> |                                                                           |     |

| Module Evaluation     |                     |             |                  |                   |                                                                   |
|-----------------------|---------------------|-------------|------------------|-------------------|-------------------------------------------------------------------|
| تقييم المادة الدراسية |                     |             |                  |                   |                                                                   |
|                       |                     | Time/Number | Weight (Marks)   | Week Due          | Relevant Learning Outcome                                         |
| Formative assessment  | Quizzes             | 5           | 3% (15)          | 3,5,10,12, and 14 | CLO#2, CLO#3, CLO#4, CLO#6, CLO#7, CLO#8, and CLO#9               |
|                       | On-site Assignments | 5           | 2% (10)          | 2,4,9,11, and 13  | CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, CLO#6, CLO#7, CLO#8, and CLO#9 |
|                       | Report              | 1           | 5% (5)           | 6                 | CLO#10, CLO#11, and CLO#12                                        |
|                       | Online Assignment   | 5           | 2% (10)          | 2,4,9,11, and 13  | CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, CLO#6, CLO#7, CLO#8, and CLO#9 |
| Summative assessment  | Midterm Exam        | 2hr         | 10% (10)         | 7                 | CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, and CLO#6                      |
|                       | Final Exam          | 3hr         | 50% (50)         | 16                | All                                                               |
| Total assessment      |                     |             | 100% (100 Marks) |                   |                                                                   |

| Delivery Plan (Weekly Syllabus) |                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                                                                                |
|                                 | Material Covered                                                                                                                                               |
| Week 1                          | Introduction to concepts of position, displacement, velocity, and acceleration.                                                                                |
| Week 2                          | Vector Operations: Algebra and Computations and Vector Calculus—Velocity and Acceleration.                                                                     |
| Week 3                          | Newtonian Mechanics: Newton's Laws, Systems of Units, and Energy and Momentum                                                                                  |
| Week 4                          | Rectilinear Kinematics: Continuous Motion.<br>Curvilinear Motion: Rectangular Components, and Normal and Tangential Components                                 |
| Week 5                          | Rectangular Cartesian Coordinates<br>Curvilinear Coordinates: Cylindrical and Polar Coordinates, Spherical Coordinates, and Arbitrary Curvilinear Coordinates. |
| Week 6                          | Motion of a Projectile and Absolute Dependent Motion Analysis of Two Particles.                                                                                |
| Week 7                          | Coordinate Transformations: Rotation Transformations, and Rotation Sequences                                                                                   |
| Week 8                          | Displacement, Time Derivatives: Angular Velocity and Acceleration, and Analytical Description.                                                                 |
| Week 9                          | Velocity and Acceleration Analysis Using a Moving Reference Frame.                                                                                             |

|                |                                                                                                              |
|----------------|--------------------------------------------------------------------------------------------------------------|
| <b>Week 10</b> | Observations from a Moving Reference Frame.                                                                  |
| <b>Week 11</b> | Newton's Second Law of Motion and Equation of Motion: Rectangular Coordinates                                |
| <b>Week 12</b> | Investigate central-force motion and apply it to problems in space mechanics.                                |
| <b>Week 13</b> | The principle of work and energy, and Power and Efficiency                                                   |
| <b>Week 14</b> | Principle of Linear Impulse and Momentum for a System of Particles, and the concept of a conservative force. |
| <b>Week 15</b> | Theorem of conservation of energy to solve kinetic problems, and Friction Forces and Spring Forces.          |
| <b>Week 16</b> | Final Exam of the semester                                                                                   |

### Delivery Plan (Weekly Lab. Syllabus)

|               | Material Covered |
|---------------|------------------|
| <b>Week 1</b> | N/A              |
| <b>Week 2</b> | N/A              |
| <b>Week 3</b> | N/A              |
| <b>Week 4</b> | N/A              |
| <b>Week 5</b> | N/A              |
| <b>Week 6</b> | N/A              |
| <b>Week 7</b> | N/A              |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                          | Text                                                                                                                                                                               | Available in the Library? |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | <ul style="list-style-type: none"> <li>Hibbeler, R.C. " ENGINEERING MECHANICS – DYNAMIC 14<sup>TH</sup> EDITION 2016" Pearson Prentice Hall</li> </ul>                             | Yes                       |
| <b>Required Texts</b>    | <ul style="list-style-type: none"> <li>MERIAM J.L., KRAIGE L.G., BOLTON J.N. " Engineering Mechanics Volume 2 Dynamics " Ninth Edition 2018 John Wiley &amp; Sons, Inc.</li> </ul> | Yes                       |
| <b>Recommended Texts</b> | د.نزار جبرائيل - فخري ياسين – د.هشام العناز "الميكانيك الهندسي"                                                                                                                    | Yes                       |
| <b>Recommended Texts</b> | MERIAM J.L., KRAIGE L.G., BOLTON J.N. " Engineering Mechanics Volume 2 Dynamics " Ninth Edition 2018 John Wiley & Sons, Inc.                                                       | No                        |
| <b>Websites</b>          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a>                          |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                                         |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|-----------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                         |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | Principles of environmental engineering |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | core                                    |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code                        | ENV123                                  |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | 4                                       |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | 100                                     |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 1                                       | Semester of Delivery          | 2                                                                                                                                                                                                                                                   |
| Administering Department           | Environmental Engineering (EE)          | College                       | College of Engineering                                                                                                                                                                                                                              |
| Module Leader                      | Hanan Haqi Ismael                       | e-mail                        | hanan.eng2014@uomosul.edu.iq                                                                                                                                                                                                                        |
| Module Leader's Acad. Title        | Lecturer                                | Module Leader's Qualification | MSC                                                                                                                                                                                                                                                 |
| Module Tutor                       | Thura Azzam Abed                        | e-mail                        | thura.azzam@uomosul.edu.iq                                                                                                                                                                                                                          |
| Peer Reviewer Name                 | Dr. Amar Thamer                         | e-mail                        | Dr.ammarthamir@uomosul.edu.iq                                                                                                                                                                                                                       |
| Scientific Committee Approval Date | 15/9/2024                               | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module Aims<br>أهداف المادة الدراسية                     | <p>The aim of the course is to introduce the student to the main principles of environmental engineering and everything related to environmental pollution: an introduction to the environment, environmental pollution, and the factors that lead to environmental deterioration. Types of pollution (water pollution, air pollution, noise pollution, thermal pollution, water pollution, water sources and their characteristics, Chemical and physical properties of water, water quality, surface water pollution and its sources, groundwater pollution and its sources, treatment of water for drinking purposes with a table of units and a brief explanation of each unit, Treatment and disposal of waste water,</p> |

|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                      | characteristics of waste water, treatment objective, plan of waste water treatment units<br>Treatment and disposal of waste water, characteristics of waste water, treatment goal, plan of waste water treatment units, with site visits being conducted to identify the treatment units and environmental projects established and under implementation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Module Learning Outcomes</b><br><br>مخرجات التعلم للمادة الدراسية | 1. Understanding the environment, its surrounding factors, types of pollution, and how to preserve it architecturally.<br>2. Summarizing the common types of pollution (water pollution, air pollution, etc.)<br>3. Explaining each type of environmental pollution with ways to treat it or reduce its effects on the environment.<br>4. Introducing the student to many environmental terms.<br>5. Analyzing some environmental problems using engineering methods.<br>6. Finding engineering solutions that are compatible with available capabilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Indicative Contents</b><br><br>المحتويات الإرشادية                | 1. Introduction to the environment and environmental pollution CLO1 2 hours.<br>2. Surface and groundwater pollution with treatment units. CLO2.<br>Water sources and their characteristics, chemical and physical properties of water. Surface water pollution and its sources, groundwater pollution and its sources. Treatment of water for drinking purposes with a table of units and a brief explanation of each unit. Solving problems using the mass balance method. 10 hours.<br>3. Environmental pollution with solid waste. CLO3<br>Introduction, sources and characteristics of solid waste, solid waste, solid waste collection, solid waste disposal methods. Finding the area of the sanitary landfill site with drawing typical sections. 10 hours.<br>4. air pollution. CLO4<br>Introduction to air pollution, its sources and effects, characteristics of pollutants, air pollutant removal units. 5 hours<br>5. Noise, thermal and radiation pollution. CLO5 10 hours<br>Introduction to noise pollution, its sources, how to calculate noise, introduction to thermal pollution, sources of thermal pollution, the effect of thermal emissions on the environment. Radioactive pollution, its sources and types. |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | This course will include many in-person and electronic lectures. The student will also be assigned assignments and reports. Field visits will be conducted for students to some environmental projects. The language of instruction will be in Arabic, and Arabic and English methodical books will be approved. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً      |     |                                                                            |     |
|--------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 4.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                            |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                          |             |                  |            |                                   |
|---------------------------------------------------|--------------------------|-------------|------------------|------------|-----------------------------------|
|                                                   |                          | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome         |
| <b>Formative assessment</b>                       | <b>Quizzes</b>           | 4           | 20%              | 4, 8,10,12 | CLO-1, CLO-1, CLO-2, CLO-2        |
|                                                   | <b>Homework</b>          | 3           | 12%              | 5, 7,9,11  | CLO-2, CLO-2, CLO-3, CLO-2, CLO-3 |
|                                                   | <b>Report</b>            | 1           | 4%               | 13-1       | CLO-2 to CLO-5                    |
|                                                   | <b>Class assignments</b> | 1           | 4%               | 12-4       | CLO-2 to CLO-5                    |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>      | 1.5 hr      | 10%              | 6          | All                               |
|                                                   | <b>Final Exam</b>        | 3hr         | 50%              | 16         | CLO-1, CLO -2 and CLO-3           |
| <b>Total assessment</b>                           |                          |             | 100% (100 Marks) |            | All                               |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري والالكتروني |                                                                                                                                                                                         |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | <b>Week Material Covered</b>                                                                                                                                                            |
| <b>Week 1</b>                                                                 | The environment, the factors that led to its deterioration, the role of the environmental engineer to reduce pollution, types of environmental pollution.                               |
| <b>Week 2</b>                                                                 | Water pollution: sources of water and their characteristics, chemical and physical properties of water, surface water pollution and its sources, groundwater pollution and its sources. |
| <b>Week 3</b>                                                                 | Mass balance, lakes, the phenomenon of thermal stratification, nutrients, seasonal reversals, solving mathematical problems. Concentrations of pollutants in lakes are not found.       |
| <b>Week 4</b>                                                                 | Drinking water treatment plant, factors that must be studied to select units.                                                                                                           |
| <b>Week 5</b>                                                                 | Drawing of a typical treatment unit for treating surface and ground drinking water, with a simplified explanation of each unit.                                                         |
| <b>Week 6</b>                                                                 | Wastewater treatment units, their sources and characteristics, a simplified explanation of a typical treatment unit.                                                                    |
| <b>Week 7</b>                                                                 | Exam 1                                                                                                                                                                                  |
| <b>Week 8</b>                                                                 | Environmental pollution with solid waste, introduction, sources and characteristics of solid waste, solid waste, solid waste collection.                                                |
| <b>Week 9</b>                                                                 | Solid waste disposal methods. Calculating the area of the sanitary tract site with a typical section                                                                                    |

|                |                                                                                                                                             |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                | drawing.                                                                                                                                    |
| <b>Week 10</b> | Air pollution, introduction to air pollution, its sources and effects, characteristics of pollutants.                                       |
| <b>Week 11</b> | Units for removing air pollutants and particles, solving mathematical problems.                                                             |
| <b>Week 12</b> | Noise pollution, introduction to noise pollution, its sources, how to calculate noise.                                                      |
| <b>Week 13</b> | Exam 2                                                                                                                                      |
| <b>Week 14</b> | Thermal pollution, Introduction to thermal pollution, sources of thermal pollution, and the effect of thermal emissions on the environment. |
| <b>Week 15</b> | <b>Radioactive pollution. Its sources. Types of radiation that are harmful to the environment. Methods of prevention.</b>                   |
| <b>Week 16</b> | <b>Preparing for the final exam.</b>                                                                                                        |

| Learning and Teaching Resources |                                                                                                                                                           |                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| مصادر التعلم والتدريس           |                                                                                                                                                           |                           |
|                                 | Text                                                                                                                                                      | Available in the Library? |
| <b>Required Texts</b>           | Environmental Technology Dr. Tariq Muhammad Saeed                                                                                                         |                           |
| <b>Recommended Texts</b>        | Metcalf and Eddy "Wastewater engineering, treatment and resource recovery", McGraw hill, New York, 2014.                                                  |                           |
| <b>Websites</b>                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme                                                                                                                                                                                                                                                                                                                                                                       |                         |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|-----------|---------------------------------------|
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                         |                     |           |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks (%) | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A - Excellent</b>    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |           |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |           |                                       |



# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                       |                      |                                                                                                                                                                                                                                          |                                |
|------------------------------------|-----------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| معلومات المادة الدراسية            |                       |                      |                                                                                                                                                                                                                                          |                                |
| Module Title                       | Environmental Geology |                      | Module Delivery                                                                                                                                                                                                                          |                                |
| Module Type                        | Supported             |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input checked="" type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                |
| Module Code                        | ENV124                |                      |                                                                                                                                                                                                                                          |                                |
| ECTS Credits                       | 3                     |                      |                                                                                                                                                                                                                                          |                                |
| SWL (hr/sem)                       | 75                    |                      |                                                                                                                                                                                                                                          |                                |
| Module Level                       | 1                     | Semester of Delivery |                                                                                                                                                                                                                                          | 2                              |
| Administering Department           | ENV8                  | College              | ENG4                                                                                                                                                                                                                                     |                                |
| Module Leader                      | Dr. Mohammed          |                      | e-mail                                                                                                                                                                                                                                   | mohammed1979eng@uomosul.edu.iq |
| Module Leader's Acad. Title        | Assist. Professor     |                      | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                          |
| Module Tutor                       | -----                 |                      | e-mail                                                                                                                                                                                                                                   | E-mail                         |
| Peer Reviewer Name                 | -----                 |                      | e-mail                                                                                                                                                                                                                                   | E-mail                         |
| Scientific Committee Approval Date | 12/09/2024            |                      | Version Number                                                                                                                                                                                                                           | 1.0                            |

| Relation with other Modules       |      |  |          |  |
|-----------------------------------|------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |  |          |  |
| Prerequisite module               | None |  | Semester |  |
| Co-requisites module              | None |  | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>This course aims to introduce the students to the category of Environmental Geology. Geology –is the study of the earth, its materials and their properties, its internal and external physical, chemical, and biological properties, and its history. Environment – anything, living or nonliving that surrounds and influences living organisms. Environmental Geology – the application of geology to environmental concerns. This will be achieved through descriptive lectures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p>Important: Write at least 6 Learning Outcomes, it is better to be equal to the number of study weeks.</p> <p><b>CLO-1:</b> The students will learn and take some information on the principles of geology, especially the earth's materials and compounds. (i)</p> <p><b>CLO-2:</b> The students will be able to distinguish the different types of rocks and soils(ii)</p> <p><b>CLO-3:</b> apply the principles of the contour line to draw topographic maps (iii)</p> <p><b>CLO-4:</b> The student who completes the course can communicate orally with others about some topics related to the relationship between environment and earth science and write some simple reports in this regard (v)</p> <p><b>CLO-5:</b> Report the data obtained from the selective topics of environmental geology given and organized during the course (iv)</p> <p><b>CLO-6:</b> Creating some opinions about the emerging environmental issues and trying to give some solutions compatible with the problems related to environmental geology (vii)</p> |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p>Indicative content includes the following.</p> <p><u>Part A Introduction</u><br/> Introduction, objectives, the general definition of environmental geology<br/> Historical geology (4 hrs)</p> <p><u>Part B – Structural Geology</u><br/> Composition, formation of the earth's crust, types of rocks (8 hrs)</p> <p><u>Part C – Geology of water</u><br/> Geology of water supply, (part1) Surface Water, (part2) Ground Water<br/> Geology of dams and reservoirs (8 hrs)</p> <p><u>Part D – materials and maps geology</u><br/> Geology of building materials<br/> Topographical and geological maps<br/> Environmental geology: special subjects (10 hrs)</p>                                                                                                                                                                                                                                                                                                                                                                               |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <p>This course has several components that include lectures, individual or group assignments, rock lab visits, and e-learning platforms. The course will be taught in Arabic and English, and all mandatory reports have to be submitted within the deadlines.</p> |

| Student Workload (SWL)                                                         |    |                                                                           |     |
|--------------------------------------------------------------------------------|----|---------------------------------------------------------------------------|-----|
| الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا                                        |    |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 33 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 2.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 42 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 2.8 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 50 |                                                                           |     |

| Module Evaluation     |                 |             |                  |          |                            |
|-----------------------|-----------------|-------------|------------------|----------|----------------------------|
| تقييم المادة الدراسية |                 |             |                  |          |                            |
|                       |                 | Time/Number | Weight (Marks)   | Week Due | Relevant Learning Outcome  |
| Formative assessment  | Quizzes         | 3           | 25 % (25)        | 3, 6, 9  | CLO-1, CLO-1, CLO-2, CLO-4 |
|                       | Assignments     |             | 5% (5)           |          |                            |
|                       | Projects / Lab. |             |                  |          |                            |
|                       | Report          | 1           | 10 % (10)        |          | All                        |
| Summative assessment  | Midterm Exam    | 2hr         | 10% (10)         | 7        | CLO-1, CLO -2 and CLO-3    |
|                       | Final Exam      | 3hr         | 50% (50)         | 16       | All                        |
| Total assessment      |                 |             | 100% (100 Marks) |          |                            |

| Delivery Plan (Weekly Syllabus) |                                                                       |
|---------------------------------|-----------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                       |
|                                 | Material Covered                                                      |
| Week 1                          | Introduction, objectives, general definition of environmental geology |
| Week 2                          | Historical geology                                                    |
| Week 3                          | Composition, formation of the earth's crust                           |
| Week 4                          | Composition, formation of the earth's crust                           |
| Week 5                          | Structural geology, rocks                                             |

|                |                                                |
|----------------|------------------------------------------------|
| <b>Week 6</b>  | Structural geology, rocks                      |
| <b>Week 7</b>  | Geology of water supply, (part1) Surface Water |
| <b>Week 8</b>  | Geology of water supply,, (part2) Ground Water |
| <b>Week 9</b>  | Environmental geology: special subjects        |
| <b>Week 10</b> | Geology of dams and reservoirs                 |
| <b>Week 11</b> | Geology of dams and reservoirs                 |
| <b>Week 12</b> | Geology of building materials                  |
| <b>Week 13</b> | Topographical and geological maps              |
| <b>Week 14</b> | Topographical and geological maps              |
| <b>Week 15</b> | Environmental geology: special subjects        |
| <b>Week 16</b> | <b>Preparatory week before the Final Exam</b>  |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المناهج الاسبوعي للمختبر |                  |
|-------------------------------------------------------------------------|------------------|
|                                                                         | Material Covered |
| <b>Week 1</b>                                                           |                  |
| <b>Week 2</b>                                                           |                  |
| <b>Week 3</b>                                                           |                  |
| <b>Week 4</b>                                                           |                  |
| <b>Week 5</b>                                                           |                  |
| <b>Week 6</b>                                                           |                  |
| <b>Week 7</b>                                                           |                  |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                 | Text                                                                                                                                                      | Available in the Library? |
| <b>Required Texts</b>                                           | Ghazi Atia Zarraq, Dr.Lafta Salman Kadhim, Dr.Mahmood Fadhil Abid, " Environmental Geology ", Iraq, 2016                                                  | No.                       |
| <b>Recommended Texts</b>                                        | <ul style="list-style-type: none"> <li>Courses from theinternet</li> </ul>                                                                                | Yes                       |
| <b>Websites</b>                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

|                       |
|-----------------------|
| <b>Grading Scheme</b> |
|-----------------------|

| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                         |                     |          |                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|------------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                               |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance                  |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors           |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors           |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings         |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria              |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work is required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | A considerable amount of work required   |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                          |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                          |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                     |                               |                                                                                                                                                                                                                                          |
|------------------------------------|---------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                     |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Drawing by Computer |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Support             |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV125              |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 7                   |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 175                 |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 1                   | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department           | ENV8                | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Mohammed Hisham     | e-mail                        | <a href="mailto:m.h.alkafaf@uomosul.edu.iq">m.h.alkafaf@uomosul.edu.iq</a>                                                                                                                                                               |
| Module Leader's Acad. Title        | Lectures            | Module Leader's Qualification | MSC                                                                                                                                                                                                                                      |
| Module Tutor                       | Ayad Abdullah       | e-mail                        | <a href="mailto:ayad_engineer@uomosul.edu.iq">ayad_engineer@uomosul.edu.iq</a>                                                                                                                                                           |
|                                    | Abeer Khalil        |                               | <a href="mailto:abeer.khalil@uomosul.edu.iq">abeer.khalil@uomosul.edu.iq</a>                                                                                                                                                             |
| Peer Reviewer Name                 | Ammar Mohamed       | e-mail                        | E-mail                                                                                                                                                                                                                                   |
| Scientific Committee Approval Date | 12/09/2024          | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |                     |          |   |
|-----------------------------------|---------------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                     |          |   |
| Prerequisite module               | Engineering Drawing | Semester | 1 |
| Co-requisites module              | None                | Semester |   |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | This course contains comprehensive training in AutoCAD. It incorporates the features, commands, and techniques for creating, editing, and printing 2D drawings with AutoCAD LT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <b>CLO-1:</b> Become familiar with the AutoCAD user interface. (i)<br><br><b>CLO-2:</b> Understand the fundamental concepts and features of AutoCAD. (i)<br><br><b>CLO-3:</b> Use the precision drafting tools in AutoCAD to develop accurate technical drawings. (i)<br><br><b>CLO-4:</b> Present drawings in a detailed and visually impressive manner. (ii)                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p style="text-align: center;"><b>Indicative content includes the following.</b></p> <p><u>Part A</u><br/>Getting started with AutoCAD (4 hrs)</p> <p><u>Part B</u><br/>Basic drawing and editing commands (drawing lines, erasing objects, drawing vertical lines, drawing rectangles, drawing circles, undo and redo actions) (8 hrs)</p> <p><u>Part C</u><br/>Create a simple drawing (4 hrs)</p> <p><u>Part D</u><br/>Making changes in your drawing (selecting objects for editing, moving objects, copying rotating objects, scaling objects, mirroring objects) (12 hrs)</p> <p><u>Part E</u><br/>Annotation commands; Hatch , hatch edit , Image draw order (24 hrs)</p> <p><u>Part F</u><br/>Organizing drawing with layers , creating new drawings with templates , layer states (8 hrs)</p> |
| <b>Strategies</b>                                                                                                                | This course has several components that include lectures, classwork, homework and quiz. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Student Workload (SWL)                                                         |            |                                                                           |            |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا                                        |            |                                                                           |            |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | <b>87</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | <b>5.8</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | <b>150</b> |                                                                           |            |

| Module Evaluation     |              |             |                  |                     |                           |
|-----------------------|--------------|-------------|------------------|---------------------|---------------------------|
| تقييم المادة الدراسية |              |             |                  |                     |                           |
|                       |              | Time/Number | Weight (Marks)   | Week Due            | Relevant Learning Outcome |
| Formative assessment  | Quizzes      | 2           | 20 % (20)        | 6, 10               | All                       |
|                       | Classwork    | 7           | 12 % (12)        | 2, 3, 4, 9,11,12,13 | All                       |
|                       | homework     | 2           | 8 % (8)          | 5,8                 | All                       |
| Summative assessment  | Midterm Exam | 2hr         | 10% (10)         | 7                   | All                       |
|                       | Exp. exam    | 1 hr        | 10 % (10)        | 15                  | All                       |
|                       | Final Exam   | 3hr         | 40% (40)         | 16                  | All                       |
| Total assessment      |              |             | 100% (100 Marks) |                     |                           |

| Delivery Plan (Weekly Lab. Syllabus) |                                                                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي للمختبر             |                                                                                                                                   |
|                                      | Material Covered                                                                                                                  |
| Week 1                               | Getting started with AutoCAD                                                                                                      |
| Week 2 - 5                           | drawing lines, erasing objects, drawing vertical and horizontal lines, drawing rectangles, drawing circles, undo and redo actions |
| Week 6                               | Create a simple drawing                                                                                                           |
| Week 8-13                            | Annotation commands; Hatch, hatch edit, Image draw order                                                                          |
| Week 14-15                           | Organizing drawing with layers , creating new drawings with templates, layer states                                               |



| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                      | Available in the Library? |
| Required Texts                                           | Autodesk AutoCAD 2018 online Help                                                                                                                         | Yes                       |
| Websites                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                       |                               |                                                                                                                                                                                                                                          |
|------------------------------------|-----------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                       |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Computer1             |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Basic                 |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | UOM 1031              |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 3                     |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 75                    |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 1                     | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department           | ENV8                  | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Abeer Khalil Ibraheem | e-mail                        | Abeer.alsaraf@uomosul.edu.iq                                                                                                                                                                                                             |
| Module Leader's Acad. Title        | Assist Lecturer       | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                    |
| Module Tutor                       | Abeer Khalil Ibrahim  | e-mail                        | <a href="mailto:abeer.alsaraf@uomosul.edu.iq">abeer.alsaraf@uomosul.edu.iq</a>                                                                                                                                                           |
| Peer Reviewer Name                 | Abeer Khalil Ibraheem | e-mail                        | Abeer.alsaraf@uomosul.edu.iq                                                                                                                                                                                                             |
| Scientific Committee Approval Date | 19/9/2024             | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                             |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                             |
| Module Aims<br>أهداف المادة الدراسية                     | The Module aim is to prepare student to deal with computers. In addition to, teach the student the fundamentals of computers and its components. Furthermore, learning how to use two of Microsoft Office applications (Word and Excel).    |
| Module Learning Outcomes                                 | 1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.<br>2. An ability to acquire and apply new knowledge and using appropriate learning strategies. |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>مخرجات التعلم للمادة الدراسية</p>                      | <p>3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.</p> <p>It is expected from the student who passes this module learn the following topics:</p> <ol style="list-style-type: none"> <li>1. Introduction to computer</li> <li>2. Data and information</li> <li>3. Computer components</li> <li>4. Memory type</li> <li>5. Operating System and Graphical user interface</li> <li>6. Exploring Microsoft Office 2013</li> <li>7. Getting Started with Word Essentials</li> <li>8. Monthly LAB Exam</li> <li>9. Editing and Formatting Documents</li> <li>10. Getting Started with Excel Essentials</li> <li>11. Organizing and Enhancing Worksheets</li> <li>12. Creating Formulas and Charting Data</li> </ol> |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p> | <p>Introduction to computer [4 hr]<br/>Data and information [4 hr]<br/>Computer components [6 hr]<br/>Memory type [6 hr]<br/>Operating System and Graphical user interface [6 hr]<br/>Exploring Microsoft Office 2013 [6 hr]<br/>Getting Started with Word Essentials [6 hr]<br/>Monthly LAB Exam [3 hr]<br/>Editing and Formatting Documents [4 hr]<br/>Getting Started with Excel Essentials [6 hr]<br/>Organizing and Enhancing Worksheets [3 hr]<br/>Creating Formulas and Charting Data [3 hr]</p>                                                                                                                                                                                                                                                                                         |

| <p><b>Learning and Teaching Strategies</b><br/>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Strategies</b></p>                                                       | <p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students.</p> |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً      |    |                                                                            |     |
|--------------------------------------------------------------------------------|----|----------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 50 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 3.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 25 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 1.7 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 75 |                                                                            |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |              |             |                |          |                           |
|---------------------------------------------------|--------------|-------------|----------------|----------|---------------------------|
|                                                   |              | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment                              | Quizzes      | 2           | 6% (12)        | 4, 11    | LO #Q1: 1-2, Q2: 7-9      |
|                                                   | Assignments  | 2           | 3% (6)         | 3, 10    | LO #A1: 1-2, A2: 7-9      |
|                                                   | Lab.         | 3           | 6% (18)        | 5,8,12   | All                       |
|                                                   | Report       | 1           | 4% (4)         | 11       | All                       |
| Summative assessment                              | Midterm Exam | 2 hr        | 10% (10)       | 9        | All                       |
|                                                   | Final Exam   | 3hr         | 50% (50)       |          |                           |
| Total assessment                                  |              |             | (100 Marks)    |          |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                                                                                                       |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                   | Material Covered                                                                                                                                                                      |
| Week 1                                                            | Introduction to computer , concept of hardware and software, Software and Hardware Interaction                                                                                        |
| Week 2                                                            | Data and information , connecting input / output devices , and peripherals to CPU                                                                                                     |
| Week 3                                                            | Computer components, computer portion, hardware part, I/O units,                                                                                                                      |
| Week 4                                                            | Memory type, CPU components , personal computer                                                                                                                                       |
| Week 5                                                            | Operating System and Graphical user interface, basic of common operating system                                                                                                       |
| Week 6                                                            | Windows File Management , concept of folders and directories                                                                                                                          |
| Week 7                                                            | Exploring Microsoft Office 2013 , Getting Started with Word Essentials , basic of Word processing , opening and closing of documents, text creation, Editing and Formatting Documents |
| Week 8                                                            | Word processing (continued)                                                                                                                                                           |

|                |                                                                          |
|----------------|--------------------------------------------------------------------------|
| <b>Week 9</b>  | Monthly Exam                                                             |
| <b>Week 10</b> | Spread sheet basic of spread sheet, editing and printing of spread sheet |
| <b>Week 11</b> | Presentation software, basic of Presentation software creating software  |
| <b>Week 12</b> | Getting Started with Excel Essentials                                    |
| <b>Week 13</b> | Getting Started with Excel Essentials (continued)                        |
| <b>Week 14</b> | Introduction to internet and Web browsers , computer network basic ,     |
| <b>Week 15</b> | Concept of internets and its application                                 |
| <b>Week 16</b> | <b>Preparatory week before the final Exam</b>                            |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|                      | Material Covered                                                                                                                                                                      |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1, 2</b>     | Introduction to computer , concept of hardware and software, Software and Hardware Interaction                                                                                        |
| <b>Week 3, 4</b>     | Computer components, computer portion, hardware part, I/O units,                                                                                                                      |
| <b>Week 5</b>        | Operating System and Graphical user interface, basic of common operating system                                                                                                       |
| <b>Week 6,7</b>      | Windows File Management , concept of folders and directories , Editing and Formatting Documents                                                                                       |
| <b>Week 8, 9,10</b>  | Exploring Microsoft Office 2013 , Getting Started with Word Essentials , basic of Word processing , opening and closing of documents, text creation, Editing and Formatting Documents |
| <b>Week 11,12,13</b> | Getting Started with Excel Essentials                                                                                                                                                 |
| <b>Week 14</b>       | Organizing and Enhancing Worksheets                                                                                                                                                   |
| <b>Week 15</b>       | Creating Formulas and Charting Data                                                                                                                                                   |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                          | Text                                                                                                                                              | Available in the Library? |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | 2015 Computer Literacy BASICS: A Comprehensive Guide to IC3<br>Connie Morrison, Dolores Wells, Lisa Ruffolo<br>Cengage Learning. ISBN: 128576658X | Available as PDF          |
| <b>Recommended Texts</b> | IC3 GS5 Certification Guide Using Windows 10 & Office 2016                                                                                        | Available as PDF          |
| <b>Websites</b>          | Google Classroom                                                                                                                                  |                           |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks (%) | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |           |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |           |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                |                               |                                                                                                                                                                                                                                                                |
|------------------------------------|--------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                |                               |                                                                                                                                                                                                                                                                |
| Module Title                       | English 1                      |                               | Module Delivery                                                                                                                                                                                                                                                |
| Module Type                        | Support                        |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input checked="" type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code                        | UOM1021                        |                               |                                                                                                                                                                                                                                                                |
| ECTS Credits                       | 2                              |                               |                                                                                                                                                                                                                                                                |
| SWL (hr/sem)                       | 50                             |                               |                                                                                                                                                                                                                                                                |
| Module Level                       | 1                              | Semester of Delivery          |                                                                                                                                                                                                                                                                |
| Administering Department           | Environmental Engineering (EE) | College                       | College of Eng.                                                                                                                                                                                                                                                |
| Module Leader                      | Dr. Mustafa Siham              | e-mail                        | Mustafa.qassab@uomosul.edu.iq                                                                                                                                                                                                                                  |
| Module Leader's Acad. Title        | Lecturer                       | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                                          |
| Module Tutor                       | Name (if available)            | e-mail                        | E-mail                                                                                                                                                                                                                                                         |
| Peer Reviewer Name                 | Name                           | e-mail                        | E-mail                                                                                                                                                                                                                                                         |
| Scientific Committee Approval Date | 01/10/2024                     | Version Number                | 1.0                                                                                                                                                                                                                                                            |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | <p>This course develops further knowledge of the grammar and of essential vocabulary in order to lead the students to an advanced level of proficiency. Emphasis is placed on developing listening, speaking, reading and writing skills through an integrated approach. It focuses on grammar and fundamental writing skills.</p> <p>By the end of the course, students are expected to: 1. Understand the main ideas of a variety of written and spoken texts 2. Participate effectively in a short conversation using appropriate language 3. Produce a range of text types in the form of a logical and cohesive paragraph 4. Select appropriate vocabulary to talk about feelings, opinions and experiences. 5. Recognize, understand and use a number of phrasal verbs and collocations. 6. Use effective organizational strategies that include introductions, paragraphs, transitions, and conclusion</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | <p>CLO 1: An ability to acquire and apply new knowledge and using appropriate learning strategies.</p> <p>CLO 2: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.</p> <p>CLO 3: Comprehend and analyze various written and spoken texts:<br/>Demonstrate the ability to understand the main ideas, key details, and nuances of different types of texts, including articles, essays, speeches, and dialogues.</p> <p>CLO 4: Communicate effectively in spoken interactions:<br/>Engage in short conversations using appropriate language and effective communication strategies.<br/>Express ideas, opinions, and experiences clearly and coherently.<br/>Demonstrate active listening skills and respond appropriately to others.</p> <p>CLO 5: Produce well-structured written texts:<br/>Generate logically organized and cohesive paragraphs in written assignments. Apply appropriate grammar, vocabulary, and sentence structures to enhance clarity and coherence.<br/>Use effective writing strategies such as introductions, topic sentences, transitions, and conclusions.</p> <p>CLO 6: Employ appropriate vocabulary and expressions:<br/>Select and use a wide range of vocabulary to accurately express feelings, opinions, and personal experiences.<br/>Recognize, understand, and utilize phrasal verbs and collocations to enhance language fluency and natural expression.</p> <p>CLO 7: Apply effective language organization and coherence:</p> |



|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | <p>Demonstrate the ability to structure and organize written and spoken communication effectively.</p> <p>Use appropriate discourse markers and transitional words to establish coherence and facilitate smooth flow of ideas.</p> <p>These course learning outcomes aim to develop the students' overall English language proficiency and skills in listening, speaking, reading, and writing. By the end of the course, students should be able to understand and analyze various texts, participate actively in conversations, produce well-structured written texts, employ appropriate vocabulary and expressions, and demonstrate effective language organization and coherence.</p> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | Grammar<br>Vocabulary<br>Everyday English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Strategies</b>                                                      | <p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>                                                                                                                                                                                                                                                                                        |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا       |    |                                                                           |      |
|--------------------------------------------------------------------------------|----|---------------------------------------------------------------------------|------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 33 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 2.2  |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 17 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 1.13 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 50 |                                                                           |      |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |             |                |          |                           |  |
|---------------------------------------------------|-------------|----------------|----------|---------------------------|--|
|                                                   | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |  |
| Quizzes                                           | 3           | 12% (12)       | 4, 7, 10 | LO #1, 3, 5, 6            |  |

|                             |                          |      |                     |                |                   |
|-----------------------------|--------------------------|------|---------------------|----------------|-------------------|
| <b>Formative assessment</b> | <b>Assignments</b>       | 3    | 9% (9)              | 2,4,6          | LO #1, 5, 6       |
|                             | <b>Reports</b>           | 1    | 9% (9)              | 9              | LO #4, 5, 7       |
|                             | <b>Online Assessment</b> | 1    | 10% (10)            | 10, 11, 12, 13 | LO #1, 2, 4, 5, 7 |
| <b>Summative assessment</b> | <b>Midterm Exam</b>      | 2 hr | 10% (10)            | 15             | LO # 1-6          |
|                             | <b>Final Exam</b>        | 3 hr | 50% (50)            | 16             | All               |
| <b>Total assessment</b>     |                          |      | 100%<br>(100 Marks) |                |                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                              |
|-------------------------------------------------------------------|----------------------------------------------|
|                                                                   | <b>Material Covered</b>                      |
| <b>Week 1</b>                                                     | UNIT 1 A world of difference: part 1         |
| <b>Week 2</b>                                                     | UNIT 1 A world of difference: part 2         |
| <b>Week 3</b>                                                     | UNIT 1 A world of difference: part 3         |
| <b>Week 4</b>                                                     | UNIT 2 The working week: part 1.             |
| <b>Week 5</b>                                                     | UNIT 2 The working week: part 2.             |
| <b>Week 6</b>                                                     | UNIT 2 The working week: part 3.             |
| <b>Week 7</b>                                                     | UNIT 3 Good times, bad times: part 1.        |
| <b>Week 8</b>                                                     | UNIT 3 Good times, bad times: part 2.        |
| <b>Week 9</b>                                                     | UNIT 3 Good times, bad times: part 3.        |
| <b>Week 10</b>                                                    | Online assessment Group1.                    |
| <b>Week 11</b>                                                    | Online assessment Group2.                    |
| <b>Week 12</b>                                                    | Online assessment Group3.                    |
| <b>Week 13</b>                                                    | Online assessment Group4.                    |
| <b>Week 14</b>                                                    | Reviewing the Units 1-3 and open discussion. |
| <b>Week 15</b>                                                    | Midterm exam.                                |
| <b>Week 16</b>                                                    | Final Exam                                   |

| Delivery Plan (Weekly Lab. Syllabus) |                                                                                                                   |                           |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------|
| المنهاج الاسبوعي للمختبر             |                                                                                                                   |                           |
|                                      | Material Covered                                                                                                  |                           |
| Week 1                               |                                                                                                                   |                           |
| Week 2                               |                                                                                                                   |                           |
| Week 3                               |                                                                                                                   |                           |
| Week 4                               |                                                                                                                   |                           |
| Week 5                               |                                                                                                                   |                           |
| Week 6                               |                                                                                                                   |                           |
| Week 7                               |                                                                                                                   |                           |
| Learning and Teaching Resources      |                                                                                                                   |                           |
| مصادر التعلم والتدريس                |                                                                                                                   |                           |
|                                      | Text                                                                                                              | Available in the Library? |
| Required Texts                       | SOARS, J. & SOARS, L. 2014. New Headway: Intermediate Fourth Edition: Student's Book and iTutor Pack, OUP Oxford. | No                        |
| Recommended Texts                    |                                                                                                                   |                           |
| Websites                             |                                                                                                                   |                           |

| Grading Scheme                                                                                                                                                                                                                                                                                                                                                                       |                  |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|-----------|---------------------------------------|
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |           |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |           |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |           |                                       |

Course Description  
Environmental Engineering  
Department  
College of Engineering  
University of Mosul  
Second Year / Bologna Process

## 2<sup>nd</sup> Level

| Level | Semester | No. | Module Code | Module Name in English           | اسم المادة الدراسية                      | Language | SSWL (hr/w) |             |            |           |            |             | Exam<br>hr/sem | SSWL<br>hr/sem | USSWL<br>hr/sem | SWL<br>hr/sem | ECTS  | Module Type | Prerequisite Module(s) Code |
|-------|----------|-----|-------------|----------------------------------|------------------------------------------|----------|-------------|-------------|------------|-----------|------------|-------------|----------------|----------------|-----------------|---------------|-------|-------------|-----------------------------|
|       |          |     |             |                                  |                                          |          | CL (hr/w)   | Lect (hr/w) | Lab (hr/w) | Pr (hr/w) | Tut (hr/w) | Semn (hr/w) |                |                |                 |               |       |             |                             |
| UGII  | Three    | 1   | ENV211      | Engineering Mathematics          | الرياضيات الهندسية                       | English  | 3           |             |            |           | 2          |             | 3              | 78             | 72              | 150           | 6.00  | S           | ENV121                      |
|       |          | 2   | ENV212      | Fluids Mechanics                 | ميكانيك الموائع                          | English  | 2           |             | 2          |           | 2          |             | 3              | 93             | 57              | 150           | 6.00  | C           |                             |
|       |          | 3   | ENV213      | Environmental Chemistry          | كيمياء البيئة                            | English  | 2           |             | 2          |           |            |             | 3              | 63             | 37              | 100           | 4.00  | S           |                             |
|       |          | 4   | ENV214      | Engineering Surveying            | المساحة الهندسية                         | English  | 3           |             | 3          |           |            |             | 3              | 93             | 32              | 125           | 5.00  | S           |                             |
|       |          | 5   | ENV215      | Strength of Materials            | مقاومة المواد                            | English  | 2           |             |            |           | 1          |             | 3              | 48             | 52              | 100           | 4.00  | S           | ENV112                      |
|       |          | 6   | ENV216      | Engineering Hydrology            | علم المياه                               | English  | 2           |             |            |           |            |             | 3              | 33             | 42              | 75            | 3.00  | S           |                             |
|       |          | 7   | UOM201      | Crimes of Baath Party            | جرائم حزب البعث                          | Arabic   | 2           |             |            |           |            |             | 3              | 33             | 17              | 50            | 2.00  | B           |                             |
|       |          |     |             |                                  | Total                                    |          | 16          | 0           | 7          | 0         | 5          | 0           | 21             | 441            | 309             | 750           | 30.00 |             |                             |
|       |          |     |             |                                  |                                          |          |             |             |            |           |            |             |                | 28             |                 |               |       |             |                             |
|       | Semester | No. | Module Code | Module Name in English           | اسم المادة الدراسية                      | Language | SSWL (hr/w) |             |            |           |            |             | Exam<br>hr/sem | SSWL<br>hr/sem | USSWL<br>hr/sem | SWL<br>hr/sem | ECTS  | Module Type | Prerequisite Module(s) Code |
|       | Four     | 1   | ENV221      | Water Quality Engineering        | هندسة نوعية المياه                       | English  | 3           |             | 2          |           |            |             | 3              | 78             | 72              | 150           | 6.00  | C           |                             |
|       |          | 4   | ENV222      | Concrete and Building Technology | تكنولوجيا الخرسانة والبناء               | English  | 4           |             | 2          |           |            |             | 3              | 93             | 57              | 150           | 6.00  | S           |                             |
|       |          | 3   | ENV223      | Noise Pollution                  | تلوث الضوضاء                             | English  | 2           |             |            |           |            |             | 3              | 33             | 67              | 100           | 4.00  | C           |                             |
|       |          | 4   | ENV224      | Surv Applications and GIS        | تطبيقات المساحة ونظم المعلومات الجغرافية | English  | 2           |             | 3          |           |            |             | 3              | 78.00          | 72              | 150.00        | 6.00  | S           |                             |
|       |          | 5   | ENV225      | Engineering Analysis             | تحليلات هندسية                           | English  | 2           |             |            |           |            |             | 3              | 33.00          | 67              | 100.00        | 4.00  | S           |                             |
|       |          | 6   | ENV226      | Microbiology                     | احياء مجهرية                             | English  | 2           |             | 2          |           |            |             | 3              | 63             | 37              | 100           | 4.00  | S           |                             |
|       |          |     |             |                                  | Total                                    |          | 15          | 0           | 9          | 0         | 0          | 0           | 18             | 378            | 372             | 750           | 30.00 |             |                             |
|       |          |     |             |                                  |                                          |          |             |             |            |           |            |             |                | 24             |                 |               |       |             |                             |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                      |                      |                                                                                                                                                                                                                                                     |                                                                                |
|------------------------------------|--------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                      |                      |                                                                                                                                                                                                                                                     |                                                                                |
| Module Title                       | Engineering mathematics              |                      | Module Delivery                                                                                                                                                                                                                                     |                                                                                |
| Module Type                        | Support or related learning activity |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |                                                                                |
| Module Code                        | ENV211                               |                      |                                                                                                                                                                                                                                                     |                                                                                |
| ECTS Credits                       | 6                                    |                      |                                                                                                                                                                                                                                                     |                                                                                |
| SWL (hr/sem)                       | 150                                  |                      |                                                                                                                                                                                                                                                     |                                                                                |
| Module Level                       | 2                                    | Semester of Delivery |                                                                                                                                                                                                                                                     | 3                                                                              |
| Administering Department           | ENV8                                 | College              | ENG4                                                                                                                                                                                                                                                |                                                                                |
| Module Leader                      | Nadia Afram Yaqoob                   |                      | e-mail                                                                                                                                                                                                                                              | <a href="mailto:n.alrhmany@uomosul.edu.iq">n.alrhmany@uomosul.edu.iq</a>       |
| Module Leader's Acad. Title        | Lecturer                             |                      | Module Leader's Qualification                                                                                                                                                                                                                       | M.Sc.                                                                          |
| Module Tutor                       | Abeer Khalil Ibrahim                 |                      | e-mail                                                                                                                                                                                                                                              | <a href="mailto:abeer.alsaraf@uomosul.edu.iq">abeer.alsaraf@uomosul.edu.iq</a> |
| Peer Reviewer Name                 | Nadia Afram Yaqoob                   |                      | e-mail                                                                                                                                                                                                                                              | <a href="mailto:n.alrhmany@uomosul.edu.iq">n.alrhmany@uomosul.edu.iq</a>       |
| Scientific Committee Approval Date | 17/09/2024                           | Version Number       | 1.0                                                                                                                                                                                                                                                 |                                                                                |

| Relation with other Modules       |          |          |   |
|-----------------------------------|----------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |          |          |   |
| Prerequisite module               | Calculus | Semester | 1 |
| Co-requisites module              | None     | Semester |   |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>This course provides students with the fundamentals for plane analytic geometry (Circle, parabola, Ellipse, Hyperbola), partial derivatives for Functions of two or more variables, Hyperbolic function, Catenary, Multiple Integration and Differential equations (1<sup>st</sup> order 1<sup>st</sup> degree).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Identify the fundamentals for plane analytic geometry (Circle, parabola, Ellipse, Hyperbola) (i)</p> <p><b>CLO-2:</b> Identify and understand the partial derivatives for function of two or more variable. (i)</p> <p><b>CLO-3:</b> Find the error in the dimension, area and volume and estimate the least amount of material for constructions tanks by using total differentiation for functions of two or more variable. (ii)</p> <p><b>CLO-4:</b> Use the partial derivatives to find the maximum and minimum of functions of several independent variables (Lagrange multipliers method). (ii)</p> <p><b>CLO-5:</b> Identify the hyperbolic function, their graphs, their derivatives, their integrals, and their inverse functions. (i)</p> <p><b>CLO-6:</b> Applied the hyperbolic function in catenary of cable. (ii)</p> <p><b>CLO-7:</b> Find the area, volume, mass, center of gravity, moment and moment of inertia of the functions by using multiple integration (ii)</p> <p><b>CLO-8:</b> Use double integral in polar coordinate to find the area and volume of the functions. (ii)</p> <p><b>CLO-9:</b> Understand the formation and solution of ordinary differential equation 1<sup>st</sup> order 1<sup>st</sup> degree. (i)</p> |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b>Indicative content includes the following</b></p> <p><u>Part A –Plan analytic Geometry/conic section</u> Circle, Parabola, Ellipse, Hyperbola. (5 hrs.)</p> <p><u>Part B – partial derivative</u> Functions of two or more variables, Domain and range for functions of two or more variables, Limits and Continuity for functions of two or more variables, Partial derivatives for functions of two or more variables, Chain rule, Total differentiation for Functions of two or more variables, Max. and min. of function of several independent variables, Max. and min. of function of several independent variables (method of Lagrange multipliers). (20 hrs.)</p> <p><u>Part C – Hyperbolic function</u> Hyperbolic function identities, Derivatives and Integration of hyperbolic function, Graphs of hyperbolic functions, Invers of hyperbolic function, Graphs of hyperbolic functions in invers, Differentials and integrations of hyperbolic functions in invers, catenary of cable (10 hrs.)</p>                                                                                                                                                                                                                                                                                                                                                                 |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Part D - Multiple Integration</u> Double Integration, Revised Integration, Physical Applications of the Double Integration, Double Integration in Polar Form, Triple Integration. (20 hrs.)</p> <p><u>Part E - Differential Equations (D.E.)</u> Formation of D.E., The Solution of 1st order 1st degree D.E. (Variable Separable Method, Homogenous Method, Linear Method, Exact Method). (20 hrs.)</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | <p>This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam.</p> |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا        |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 78  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 72  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4.8 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 150 |                                                                           |     |



| Module Evaluation     |                    |             |                |                  |                                                               |
|-----------------------|--------------------|-------------|----------------|------------------|---------------------------------------------------------------|
| تقييم المادة الدراسية |                    |             |                |                  |                                                               |
|                       |                    | Time/Number | Weight (Marks) | Week Due         | Relevant Learning Outcome                                     |
| Formative assessment  | Quizzes            | 5           | 6 % (30)       | 5,7,10,11 and 15 | CLO-1, CLO-2, CLO-3, CLO-4, CLO-5, CLO-6, CLO-7, CLO-8, CLO-9 |
|                       | Online Assignments | 1           | 2 % (2)        | 6                | CLO-1, CLO-2, CLO-3                                           |
|                       | Onsite Assignments | 3           | 2 % (6)        | 9,11 and 15      | CLO-2, CLO-7, CLO-8, CLO-9                                    |
|                       | Projects/Lab       | 0           | 0              |                  |                                                               |
|                       | Report             | 1           | 2% (2)         | 12               | CLO-2, CLO-3, CLO-4, CLO-7, CLO-8                             |
| Summative assessment  | Midterm Exam       | 2hr         | 10% (10)       | 9                | CLO-1 to CLO-7                                                |
|                       | Final Exam         | 3hr         | 50% (50)       | 16               | All                                                           |
| Total assessment      |                    |             | (100 Marks)    |                  |                                                               |

| Delivery Plan (Weekly Syllabus) |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                                                                                                              |
|                                 | Material Covered                                                                                                                                                                             |
| Week 1                          | Plan analytic Geometry / conic section (Circle, Parabola, Ellipse, Hyperbola).                                                                                                               |
| Week 2                          | Functions of two or more variables, Domain and range of two or more variables                                                                                                                |
| Week 3                          | Limits and Continuity for functions of two or more variables, Chain rule,                                                                                                                    |
| Week 4                          | Total differentiation for Functions of two or more variables, Max. and min. of function of several independent variables,                                                                    |
| Week 5                          | Max. and min. of function of several independent variables (method of Lagrange multipliers)                                                                                                  |
| Week 6                          | Hyperbolic function identities, Derivatives and Integration of hyperbolic function, Graphs of hyperbolic functions, Invers of hyperbolic function, Graphs of hyperbolic functions in invers. |
| Week 7                          | Differentials and integrations of hyperbolic functions in invers, catenary of cable.                                                                                                         |
| Week 8                          | Double Integration, Revised Integration.                                                                                                                                                     |

|                |                                                                                            |
|----------------|--------------------------------------------------------------------------------------------|
| <b>Week 9</b>  | Physical Applications of the Double Integration.                                           |
| <b>Week 10</b> | Double Integration in Polar Form.                                                          |
| <b>Week 11</b> | Triple Integration.                                                                        |
| <b>Week 12</b> | Differential Equations (D.E.), Formation of D.E.                                           |
| <b>Week 13</b> | The Solution of 1st order 1st degree D.E. by Variable Separable Method, Homogenous Method. |
| <b>Week 14</b> | The Solution of 1st order 1st degree D.E. by Linear Method.                                |
| <b>Week 15</b> | The Solution of 1st order 1st degree D.E. by Exact Method.                                 |
| <b>Week 16</b> | <b>Preparatory week before the final Exam</b>                                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المناهج الاسبوعي للمختبر |                  |
|-------------------------------------------------------------------------|------------------|
|                                                                         | Material Covered |
| <b>Week 1</b>                                                           |                  |
| <b>Week 2</b>                                                           |                  |
| <b>Week 3</b>                                                           |                  |
| <b>Week 4</b>                                                           |                  |
| <b>Week 5</b>                                                           |                  |
| <b>Week 6</b>                                                           |                  |
| <b>Week 7</b>                                                           |                  |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                 | Text                                                                                                                                                      | Available in the Library? |
| <b>Required Texts</b>                                           | <ul style="list-style-type: none"> <li>Finney, R.L,&amp; Thomas ,G.B, "Calculus" Addison. Wesley publishing company, USA,11<sup>th</sup>,2011.</li> </ul> | Yes                       |
| <b>Recommended Texts</b>                                        | <ul style="list-style-type: none"> <li>Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.</li> </ul>         | Yes                       |
| <b>Websites</b>                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> – Excellent    | امتياز              | 90 – 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 – 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> – Good         | جيد                 | 70 – 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 – 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> – Sufficient   | مقبول               | 50 – 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                        |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                        |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | Fluid Mechanics        |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | Core                   |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV212                 |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | 5                      |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | 125                    |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                      | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | ENV8                   | College                       | ENG4                                                                                                                                                                                                                                                |
| Module Leader                      | Mohammed Salim Mahmood | e-mail                        | <a href="mailto:Mohammedsalim@uomosul.edu.iq">Mohammedsalim@uomosul.edu.iq</a>                                                                                                                                                                      |
| Module Leader's Acad. Title        | Assist. Lecturer       | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                               |
| Module Tutor                       | -----                  | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Peer Reviewer Name                 | -----                  | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Scientific Committee Approval Date | 12/9/2024              | Version Number                | 2                                                                                                                                                                                                                                                   |

| Relation with other Modules       |                       |          |   |
|-----------------------------------|-----------------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                       |          |   |
| Prerequisite module               | Engineering mechanics | Semester | 2 |
| Co-requisites module              |                       | Semester |   |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>Fluid mechanics deals with the fluid while it is in its static and motion conditions, as the curriculum deals with the basic principles and laws derived on the basis of these principles that govern the fluid in each case. The focus is on the fluid, which is in its liquid state, especially water, as the environmental engineer deals with water in various engineering aspects in the applied field. The application of the laws is clarified through various mathematical examples with their illustrations, after the mathematical formulas for these laws are derived. The curriculum also includes deepening the understanding and assimilation of the theoretical side through practical application by conducting laboratory experiments on a number of the main topics of the subject.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Defining the formulas that give the main parameters of fluids (i).<br/> <b>CLO-2 :</b> Defining the basic laws that control the behave of fluids in static and dynamics state (i).<br/> <b>CLO-3:</b> Formulate the main equations that cover the fundamentals of concern fields (i).<br/> <b>CLO-4 :</b> Applying the formulas and equations to solve different problems in various fields to give the results that can be used in different sides of engineering (ii).<br/> <b>CLO-5:</b> Applying a certain design procedures for special cases of problems.<br/> <b>CLO-6 :</b> Correlating the theoretical principles with practical by carrying out laboratory experiments with analysis of results and discussion (iii).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b>Indicative content includes the following.</b></p> <p>1. Theoretical part:</p> <ul style="list-style-type: none"> <li>• Fluids properties, Fluid statics: Pressure in fluid; Types of pressure; Pressure measuring devices.(15 hrs)</li> <li>• Pressure force on submerged plane surface; Pressure force on submerged curved surface. (10 hrs)</li> <li>• Fluid Kinematics: Flow patterns; Continuity equation and its applications. (10 hrs)</li> <li>• Bernoulli's equation and its applications. (10 hrs)</li> <li>• Momentum equation and its applications. (10 hrs)</li> <li>• Flow of real fluid in pipe, friction loss, types of problems, minor losses. (10 hrs)</li> <li>• Pipes in series and parallel. (10 hrs)</li> </ul> <p>2. Laboratory part:</p> <ul style="list-style-type: none"> <li>• Determine the force exerted on submerged plane surface. (2 hrs)</li> <li>• Prove the Bernoulli equation. (2 hrs)</li> <li>• Determine the Reynold number. (2 hrs)</li> <li>• Study flow through orifice in tank. (2 hrs)</li> <li>• Calculate the discharge in pipe using Venturi meter and orifice meter. (2 hrs)</li> <li>• Calculate the discharge through open channel using rectangular and triangle weir. (2 hrs)</li> <li>• Determine the force exerted by water jet on plane and curved surface. (2 hrs)</li> <li>• Determine the friction factor in pipe. (2 hrs)</li> </ul> |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                               | This course has several components that include lectures, individual & group assignments, field visits and e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا              |            |                                                                           |     |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>78</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>47</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>125</b> |                                                                           |     |

| Module Evaluation<br>تقييم المادة الدراسية |                            |             |                  |                         |                                                 |
|--------------------------------------------|----------------------------|-------------|------------------|-------------------------|-------------------------------------------------|
|                                            |                            | Time/Number | Weight (Marks)   | Week Due                | Relevant Learning Outcome                       |
| <b>Formative assessment</b>                | <b>Quizzes</b>             | 5           | 5% (25)          | 4,6,10,12 and 14        | CLO-1, CLO-1, CLO-2, CLO-2 ,CLO-3 ,CLO-3 ,CLO-5 |
|                                            | <b>Online assignments</b>  | 2           | 1% (2)           | 6, and 12               | CLO-1,CLO-2, CLO-2, CLO-3                       |
|                                            | <b>On site assignments</b> | 5           | 1% (5)           | 2,6,8,10,14             | CLO-1, CLO-2, CLO-2 ,CLO-3 ,CLO-3               |
|                                            | <b>Report / Lab.</b>       | 8           | 1% (8)           | 3, ,5,6,7, 9, 11, 12,13 | CLO-4, CLO-6                                    |
| <b>Summative assessment</b>                | <b>Midterm Exam</b>        | 2hr         | 10% (10)         | 8                       | CLO-1, CLO -2 and CLO-3                         |
|                                            | <b>Final Exam</b>          | 3hr         | 50% (50)         | 16                      | All                                             |
| <b>Total assessment</b>                    |                            |             | 100% (100 Marks) |                         |                                                 |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                    |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                                                                   | Material Covered                                                                                   |
| Week 1-2                                                          | Fluids properties, Fluid statics: Pressure in fluid; Types of pressure; Pressure measuring devices |
| Week 3-4                                                          | Pressure force on submerged plane surface; Pressure force on submerged curved surface              |
| Week 4-5                                                          | Fluid Kinematics: Flow patterns; Continuity equation and its applications                          |
| Week 6-8                                                          | Bernoulli's equation and its applications                                                          |
| Week 9-10                                                         | Momentum equation and its applications                                                             |
| Week 11-12                                                        | Flow of real fluid in pipe, friction loss, types of problems, minor losses                         |
| Week 13-15                                                        | Pipes in series and parallel                                                                       |
| Week 16                                                           | Preparatory week before the final Exam                                                             |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                                       |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                                                                         | Material Covered                                                      |
| Week 1-2                                                                | Determine the force exerted on submerged plane surface                |
| Week 3-4                                                                | Determine the friction factor in pipe                                 |
| Week 5-6                                                                | Prove the Bernoulli equation                                          |
| Week 7-8                                                                | Determine the Reynold number                                          |
| Week 9-10                                                               | Calculate the discharge in pipe using orifice meter                   |
| Week 11-12                                                              | Calculate the discharge in pipe using Venturi meter and orifice meter |
| Week 13-15                                                              | Determine the force exerted by water jet on plane and curved surface  |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |
|-----------------------------------------------------------------|
|-----------------------------------------------------------------|

|                          | Text                                                                                                                                                       | Available in the Library? |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | <ul style="list-style-type: none"> <li>Esposito, A., 1998, Fluid Mechanics with applications, Prentice Hall, Inc.</li> </ul>                               | yes                       |
| <b>Recommended Texts</b> | <ul style="list-style-type: none"> <li>Cengel Y. and Cimbala J., 2014, Fluid Mechanics Fundamentals and Applications, 4th edition, McGraw Hill.</li> </ul> | Yes                       |
| <b>Websites</b>          |                                                                                                                                                            |                           |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |



# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                                                    |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|--------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                                                    |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | Environmental Chemistry                                            |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | Core                                                               |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input checked="" type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV213                                                             |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | 4                                                                  |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | 100                                                                |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                                                                  | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | ENV8                                                               | College                       | ENG4                                                                                                                                                                                                                                                |
| Module Leader                      | Waad Mohammed Ali (Theoretical)<br>Abeer Hashim Hassan (practical) |                               | e-mail<br><a href="mailto:waadd1976@uomosul.edu.iq">waadd1976@uomosul.edu.iq</a><br><a href="mailto:abeerhashim2014@uomosul.edu.iq">abeerhashim2014@uomosul.edu.iq</a>                                                                              |
| Module Leader's Acad. Title        | Lecturer                                                           | Module Leader's Qualification | M.S.C                                                                                                                                                                                                                                               |
| Module Tutor                       | -----                                                              | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Peer Reviewer Name                 | -----                                                              | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Scientific Committee Approval Date | 16/09/2024                                                         | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module Objectives</b><br>أهداف المادة الدراسية                | <p>The aim of this course is to introduce the students to the area of environmental chemistry. The course will cover the chemistry of the air, water and soil and examine the environmental fate of anthropogenic chemicals released into the environment. We will see how chemical principles can be used to explain and predict reactions, partitioning, and concentrations of anthropogenic chemicals in different environmental compartments. We will examine some of the effects of pollutants on humans, other animals, plants and the nonliving parts of the earth. And, we will consider possible green chemistry, engineering and societal approaches to mitigating deleterious effects of pollution. The course will be beneficial to chemists, chemical and environmental engineers, and environmental scientists.</p>                                                                                                                                                                                                                                                                                                               |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Identify and evaluate the relative importance of various reactions, physical processes and</p> <p><b>CLO-2:</b> Demonstrate an understanding of atmospheric chemistry and air pollution</p> <p><b>CLO-3:</b> Solve problems involving the principles of chemical kinetics.</p> <p><b>CLO-4:</b> Describe the greenhouse effect, climate change; and distinguish between fossil fuels and renewable energy technologies.</p> <p><b>CLO-5:</b> Describe chemical reactions and processes responsible for creating the “ozone hole”.</p> <p><b>CLO-6:</b> Describe the scientific basis underlying global climate change and the American Chemical Society position and recommendations regarding climate change.</p> <p><b>CLO-7:</b> Calculate equilibrium concentrations of organic pollutants in environmental compartments based on partition coefficients. Assess the advantages and limitations of such calculations.</p> <p><b>CLO-8:</b> Explain basic concepts of water chemistry and water pollution</p> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | <p><b>Indicative content includes the following.</b></p> <p><u>Part A – Atmospheric Chemistry and Air Pollution</u></p> <p>· Stratospheric Chemistry: The Ozone Layer · The Ozone Holes · The Chemistry of Ground-Level Air Pollution · The Environmental and Health Consequences of Polluted Air— Outdoors and Indoors</p> <p><u>Part B – The Greenhouse Effect, Climate Change, Fossil Fuels and CO<sub>2</sub></u></p> <p>· The Greenhouse Effect · Energy Use, Fossil Fuels, CO<sub>2</sub> Emissions, and Global Climate Change · Biofuels and Other Alternative Fuels · Renewable Energy Technologies: Hydroelectric, Wind, Solar, Geothermal, and Marine Energy and Their Storage ·</p> <p><u>Part C – Toxic Organic Compounds</u></p> <p>Toxic Heavy metals · Pesticides · Dioxins, Furans, and PCBs Other Toxic Organic Compounds of Environmental Concern · Wastes, Soils and Sediment</p> <p><u>Part D – Water chemistry and Water Pollution</u></p> <p>The Chemistry of Natural Waters · The Pollution and Purification of Water</p>                                                                                                |

| Learning and Teaching Strategies |                                                                              |
|----------------------------------|------------------------------------------------------------------------------|
| استراتيجيات التعلم والتعليم      |                                                                              |
| <b>Strategies</b>                | This course has several components that include lectures, individual & group |

|  |                                                                                                                                                                                                                                                   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | assignments, field visits and e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. The basic laboratory work supports lecture topics. |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)                                                         |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا                                        |     |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 37  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 2.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 100 |                                                                           |     |

| Module Evaluation     |                    |             |                  |                                           |                                   |
|-----------------------|--------------------|-------------|------------------|-------------------------------------------|-----------------------------------|
| تقييم المادة الدراسية |                    |             |                  |                                           |                                   |
|                       |                    | Time/Number | Weight (Marks)   | Week Due                                  | Relevant Learning Outcome         |
| Formative assessment  | Quizzes            | 4           | 4% (16)          | 2, 3, ,12 and 14                          | CLO-1, CLO-2, CLO-3, CLO-5        |
|                       | Assignments        | 5           | 2% (10)          | 2, 3, 4, 6, and 10                        | CLO-2, CLO-2, CLO-3, CLO-2, CLO-3 |
|                       | Projects / Lab.    | 7           | 1% (7)           | 1,2,3,4,5,6,7,8,9, 10,11,12,13,14, and 15 | All                               |
|                       | Report Theoretical | 2           | 1% (2)           | 13                                        | CLO-1, CLO3, CLO8                 |
|                       | Report Practical   | 5           | 1% (5)           | 3,6,9,12,15                               | CLO-1, CLO3, CLO8                 |
| Summative assessment  | Midterm Exam       | 2hr         | 10% (10)         | 7                                         | CLO-1, CLO -2 and CLO-3           |
|                       | Final Exam         | 3hr         | 50% (50)         | 16                                        | All                               |
| Total assessment      |                    |             | 100% (100 Marks) |                                           |                                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                            |
|-------------------------------------------------------------------|--------------------------------------------|
|                                                                   | Material Covered                           |
| <b>Week 1</b>                                                     | Introduction to Environmental Chemistry    |
| <b>Week 2</b>                                                     | Basic Chemical Concepts                    |
| <b>Week 3</b>                                                     | Chemical Reactions and Stoichiometry       |
| <b>Week 4</b>                                                     | Acid Base Reactions                        |
| <b>Week 5</b>                                                     | Oxidation-Reduction Reactions              |
| <b>Week 6</b>                                                     | Reactions Involving gases                  |
| <b>Week 7</b>                                                     | Common Ion Effect                          |
| <b>Week 8</b>                                                     | Equilibrium Among Gases and Liquid         |
| <b>Week 9</b>                                                     | Reactions Kinetics                         |
| <b>Week 10</b>                                                    | Gas Transfer Across Air – water Interfaces |
| <b>Week 11</b>                                                    | Organic Chemistry                          |
| <b>Week 12</b>                                                    | Water Chemistry                            |
| <b>Week 13</b>                                                    | Buffers                                    |
| <b>Week 14</b>                                                    | Soil Chemistry                             |
| <b>Week 15</b>                                                    | Atmospheric Chemistry                      |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                                     |
|-------------------------------------------------------------------------|---------------------------------------------------------------------|
|                                                                         | Material Covered                                                    |
| <b>Week 1</b>                                                           | Safety in laboratories.                                             |
| <b>Week 2</b>                                                           | Introduction to chemical analyses.                                  |
| <b>Week 3</b>                                                           | Water and solutions.                                                |
| <b>Week 4</b>                                                           | Types of solutions.                                                 |
| <b>Week 5</b>                                                           | Distinguish between an acid and a base.                             |
| <b>Week 6 &amp; week 7</b>                                              | Methods for calculating the volume and concentrations of solutions. |
| <b>Week 8 &amp; week 9</b>                                              | Titration and the types of titrations.                              |
| <b>Week 10</b>                                                          | Types of indicators.                                                |
| <b>Week 11</b>                                                          | Titration of acids and base.                                        |
| <b>Week 12</b>                                                          | Alkalinity in water                                                 |
| <b>Week 13</b>                                                          | Acidity in water.                                                   |

|                   |                     |
|-------------------|---------------------|
| Week 14 & week 15 | Methods of analysis |
|-------------------|---------------------|

| Learning and Teaching Resources |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| مصادر التعلم والتدريس           |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |
|                                 | Text                                                                                                                                                                                                                                                                                                                                                                                                                              | Available in the Library? |
| Required Texts                  | <ul style="list-style-type: none"> <li>Gary W. vanLoon and Stephen J. Duffy "Environmental Chemistry: A Global Perspective" 3rd Edition, Oxford University Press, 2010</li> </ul>                                                                                                                                                                                                                                                 | Yes                       |
| Recommended Texts               | <ul style="list-style-type: none"> <li>Colin Baird and Michael Cann "Environmental Chemistry" 5th Edition, 2012.</li> <li>Lab Manual: Environmental Laboratory Exercise for Instrumental Analysis and Environmental Chemistry by Dunnivant, ISBN # 9780471488569, Publisher: Wiley</li> <li>APHA, AWWA and WPCF (1998). Standard Methods for the Examination of Water and Wastewater. 18th ed., APHA, Washington, D.C.</li> </ul> | Yes                       |
| Websites                        |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |

| Grading Scheme                                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |          |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A – Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C – Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E – Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                       |                      |                                                                                                                                                                                                                                          |                                |
|------------------------------------|-----------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| معلومات المادة الدراسية            |                       |                      |                                                                                                                                                                                                                                          |                                |
| Module Title                       | Engineering Surveying |                      | Module Delivery                                                                                                                                                                                                                          |                                |
| Module Type                        | Supported             |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                |
| Module Code                        | ENV214                |                      |                                                                                                                                                                                                                                          |                                |
| ECTS Credits                       | 4                     |                      |                                                                                                                                                                                                                                          |                                |
| SWL (hr/sem)                       | 100                   |                      |                                                                                                                                                                                                                                          |                                |
| Module Level                       | 2                     | Semester of Delivery |                                                                                                                                                                                                                                          | 3                              |
| Administering Department           | ENV8                  | College              | ENG4                                                                                                                                                                                                                                     |                                |
| Module Leader                      | Dr. Mohammed          |                      | e-mail                                                                                                                                                                                                                                   | mohammed1979eng@uomosul.edu.iq |
| Module Leader's Acad. Title        | Assist. Professor     |                      | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                          |
| Module Tutor                       | -----                 |                      | e-mail                                                                                                                                                                                                                                   | E-mail                         |
| Peer Reviewer Name                 | -----                 |                      | e-mail                                                                                                                                                                                                                                   | E-mail                         |
| Scientific Committee Approval Date | 12/09/2024            | Version Number       | 1.0                                                                                                                                                                                                                                      |                                |

| Relation with other Modules       |      |  |          |  |
|-----------------------------------|------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |  |          |  |
| Prerequisite module               | None |  | Semester |  |
| Co-requisites module              | None |  | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>This course aims to introduce the students to the category of Engineering surveying . Introductory and definitions, which are used in plane surveying: Instruments for measuring distance obstacles in measurements Instruments for setting out right angles, Tape corrections. Leveling, Areas, and volumes. Computation of volumes. The Theodolite and Traverse surveying. Tachometry. Curves. Total instrument station, GPS field procedure. This will be achieved through descriptive lectures.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p>Important: Write at least 6 Learning Outcomes, it is better to be equal to the number of study weeks.</p> <p><b>CLO-1:</b> The students will be able to define and distinguish the fundamentals of measuring. (i)</p> <p><b>CLO-2:</b> after taking analysis and synthesis design processes, the student can make a primary design of some issues of roads (ii)</p> <p><b>CLO-3:</b> The student will be able to conduct some tests and measurements of surveying, like elevations and coordinates using different devices. (iii)</p> <p><b>CLO-4:</b> The students will be able to make suitable judgments in engineering situations of surveying problems like road construction. (v)</p> <p><b>CLO-5:</b> Report the data obtained from the selective topics of surveying topics given and organized during the course (iv)</p> <p><b>CLO-6:</b> Creating some opinions about the emerging environmental issues and trying to give some solutions compatible with the problems related to surveying aspects (vii)</p> |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p>Indicative content includes the following.</p> <p><u>Part A Introduction</u><br/> Basic Definitions, Types of Surveying, Units, and conversions<br/> Linear measurements, tape measurements, and corrections (9 hrs)</p> <p><u>Part B – Leveling</u><br/> Leveling definitions and instruments, Leveling methods, Longitudinal and cross-sections, Contouring (21hrs)</p> <p><u>Part C – Theodolites</u><br/> Theodolites, Angles, bearings, coordinates (9 hrs)</p> <p><u>Part D – Surveying topics</u><br/> Total Station Surveying, GPS principles, Vertical Curves (6 hrs)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <p>This course has several components that include lectures, individual or group assignments, rock lab visits, and e-learning platforms. The course will be taught in Arabic and English, and all mandatory reports have to be submitted within the deadlines.</p> |

| Student Workload (SWL)                                                         |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا                                        |     |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 93  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 6.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 32  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                           |     |

| Module Evaluation     |                    |             |                  |                |                           |
|-----------------------|--------------------|-------------|------------------|----------------|---------------------------|
| تقييم المادة الدراسية |                    |             |                  |                |                           |
|                       |                    | Time/Number | Weight (Marks)   | Week Due       | Relevant Learning Outcome |
| Formative assessment  | Quizzes            | 3           | 18 % (18)        | 3, 6, 9 and 11 | CLO-1, CLO-2, CLO-4       |
|                       | Assignments Online | 7           | 7% (7)           | 2,4,8,10,12    | CLO-1, CLO-2, CLO-4       |
|                       | Quiz /Lab.         | 1           | 5% (5)           | 16             | CLO-3                     |
|                       | Report             | 10          | 10 % (10)        | All            | CLO-3                     |
| Summative assessment  | Midterm Exam       | 2hr         | 10% (10)         | 7              | CLO-1, CLO-2, CLO-4       |
|                       | Final Exam         | 3hr         | 50% (50)         | 16             | CLO-1, CLO-2, CLO-4       |
| Total assessment      |                    |             | 100% (100 Marks) |                |                           |

| Delivery Plan (Weekly Syllabus) |                                                               |
|---------------------------------|---------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                               |
|                                 | Material Covered                                              |
| Week 1                          | Basic Definitions, Types of Surveying, Units, and conversions |
| Week 2                          | Linear measurements                                           |



|                |                                                   |
|----------------|---------------------------------------------------|
| <b>Week 3</b>  | tape measurements                                 |
| <b>Week 4</b>  | corrections                                       |
| <b>Week 5</b>  | Leveling definitions and instruments              |
| <b>Week 6</b>  | Leveling methods                                  |
| <b>Week 7</b>  | Longitudinal and cross-sections                   |
| <b>Week 8</b>  | Contouring                                        |
| <b>Week 9</b>  | Contouring                                        |
| <b>Week 10</b> | Theodolites                                       |
| <b>Week 11</b> | Angles, bearings                                  |
| <b>Week 12</b> | coordinates                                       |
| <b>Week 13</b> | Total Station Surveying                           |
| <b>Week 14</b> | GPS principles                                    |
| <b>Week 15</b> | Vertical Curves                                   |
| <b>Week 16</b> | <b>The preparatory week before the Final Exam</b> |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                     |
|-------------------------------------------------------------------------|-----------------------------------------------------|
|                                                                         | <b>Material Covered</b>                             |
| <b>Week 1</b>                                                           | Area measurement by tape and guiding                |
| <b>Week 2</b>                                                           | Construct right angles in different ways            |
| <b>Week 3</b>                                                           | Projecting a building using a tape measure          |
| <b>Week 4</b>                                                           | Projecting a building using the polygon method      |
| <b>Week 5</b>                                                           | Leveling device installation                        |
| <b>Week 6</b>                                                           | Leveling the ground using a leveling device         |
| <b>Week 7</b>                                                           | Leveling the ground using a leveling device         |
| <b>Week 8</b>                                                           | Longitudinal section and cross-section              |
| <b>Week 9</b>                                                           | Longitudinal section and cross-section              |
| <b>Week 10</b>                                                          | Theodolite device installation                      |
| <b>Week 11</b>                                                          | Projecting a building using a Theodolite device     |
| <b>Week 12</b>                                                          | Projecting a building using a Theodolite device     |
| <b>Week 13</b>                                                          | Total station device installation                   |
| <b>Week 14</b>                                                          | Use the quick functions in the Total Station device |
| <b>Week 15</b>                                                          | Use the quick functions in the Total Station device |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                           |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                      | Available in the Library? |
| Required Texts                                           | B. Kavannagh. "Surveying with Construction Applications", 6th edition                                                                                     | yes                       |
| Recommended Texts                                        | Courses from internet                                                                                                                                     | Yes                       |
| Websites                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|------------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                               |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance                  |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors           |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors           |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings         |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria              |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work is required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | A considerable amount of work required   |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                          |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                       |                               |                                                                                                                                                                                                                                          |                         |
|------------------------------------|-----------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| معلومات المادة الدراسية            |                       |                               |                                                                                                                                                                                                                                          |                         |
| Module Title                       | Strength of materials |                               | Module Delivery                                                                                                                                                                                                                          |                         |
| Module Type                        | Support               |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                         |
| Module Code                        | ENV215                |                               |                                                                                                                                                                                                                                          |                         |
| ECTS Credits                       | 4                     |                               |                                                                                                                                                                                                                                          |                         |
| SWL (hr/sem)                       | 100                   |                               |                                                                                                                                                                                                                                          |                         |
| Module Level                       | 2                     | Semester of Delivery          |                                                                                                                                                                                                                                          | 3                       |
| Administering Department           | ENV8                  | College                       | ENG4                                                                                                                                                                                                                                     |                         |
| Module Leader                      | Rana Burhan           |                               | e-mail                                                                                                                                                                                                                                   | rn.burha@uomosul.edu.iq |
| Module Leader's Acad. Title        | Lecturer              | Module Leader's Qualification | MSc.                                                                                                                                                                                                                                     |                         |
| Module Tutor                       | -----                 |                               | e-mail                                                                                                                                                                                                                                   | E-mail                  |
| Peer Reviewer Name                 | -----                 |                               | e-mail                                                                                                                                                                                                                                   | E-mail                  |
| Scientific Committee Approval Date | 2/10/2024             | Version Number                | 1.0                                                                                                                                                                                                                                      |                         |

| Relation with other Modules       |                       |          |   |
|-----------------------------------|-----------------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                       |          |   |
| Prerequisite module               | Engineering Mechanics | Semester | 2 |
| Co-requisites module              | None                  | Semester |   |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>This course is a study of the effect of external loads on structural elements and the behavior of the elements under these loads. Determination of different types of stresses, strains and the relation between them, calculation of stresses in thin-walled pressure vessels, drawing shear and bending-moment diagrams of beams, calculation of bending and shear stresses in beams, and calculating deflections in beams using double integration method are explained in details. The course aims to expand the student's understanding of the structural elements behavior under different loads- that is essential to design and evaluate any structural member.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p><b>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</b></p> <p><b>CLO-1:</b> Explain the different types of stresses, the relation between them and Understanding how to calculate them (i).</p> <p><b>CLO-2:</b> Recognize the relation between stress and strain and explain how to calculate them (i).</p> <p><b>CLO-3:</b> Apply fundamental mechanics to evaluate the suitable structural element dimensions that can be applied without exceeding the stress and strain limits of member (ii).</p> <p><b>CLO-4:</b> Demonstrate an understanding of the assumptions and limitations of the theories used in mechanics of materials to draw the shear and moment diagrams for beams subjected to various loads (i)</p> <p><b>CLO-5:</b> Find the maximum shear value and maximum moment value for beams subjected to various loads (i)</p> <p><b>CLO-6:</b> Apply the theories of mechanics of materials to determine the bending and shear stresses for beams subjected to various loads (i)</p> <p><b>CLO-7:</b> Formulate deflection equations for beams subjected to various loads (i).</p> <p><b>CLO-8:</b> Demonstrate an understanding of theories of deflection to find deflection values for beams subjected to various loads (ii)</p> |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p><b>Indicative content includes the following.</b></p> <p><u>Part A – Simple Stresses</u><br/> Normal Stress, Shear Stress, Bearing Stress, Thin Walled Cylinders (Pressure Vessels) (9hrs)</p> <p><u>Part B – Simple Strain</u><br/> Strain (Simple Strain ,Stress-Strain Diagram, Hooke's Law, Poisson's Ratio, Statically Indeterminate Problems , Thermal Strain) (9 hrs)</p> <p><u>Part C – Shear and Moment in Beams</u><br/> Introduction, Supports and Load, Shear-Moment Equations, Area Method for Drawing Shear and Moment Diagram (9 hrs)</p> <p><u>Part D - Stresses in Beams</u><br/> Stresses in Beams(Shear and Flexural Stresses in Beams) (9 hrs)</p> <p><u>Part F - Beam Deflections</u><br/> Double Integration Method (9 hrs)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|  |  |
|--|--|
|  |  |
|--|--|

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | This course has several components that include lectures, individual & group assignments, field visits and e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا</b> |            |                                                                           |     |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 48         | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 3.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 52         | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 3.5 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | <b>100</b> |                                                                           |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                            |             |                |                      |                                            |
|----------------------------------------------------------|----------------------------|-------------|----------------|----------------------|--------------------------------------------|
|                                                          |                            | Time/Number | Weight (Marks) | Week Due             | Relevant Learning Outcome                  |
| <b>Formative assessment</b>                              | <b>Quizzes</b>             | 5           | 5 % (25)       | 4, 6, 8, 11 and 13   | CLO-1,3, CLO-2,3, CLO-4,5, CLO-6           |
|                                                          | <b>On line Assignments</b> | 1           | 2 % (2)        | 6                    | CLO-1,3, CLO-2,3, CLO-4,5, CLO-6 , CLO-7,8 |
|                                                          | <b>On site Assignments</b> | 5           | 2 % (10)       | 4, 6, 10, 12, and 14 | CLO-1,3, CLO-2,3, CLO-4,5, CLO-6 , CLO-7,8 |
|                                                          | <b>Projects / Lab.</b>     | 0           | 0% (0)         |                      |                                            |
|                                                          | <b>Report</b>              | 1           | 3 % (3)        | 10                   | CLO-1, CLO-2, CLO-3, CLO4                  |
| <b>Summative assessment</b>                              | <b>Midterm Exam</b>        | 2hr         | 10% (10)       | 14                   | CLO-1, CLO-2, CLO-3, CLO4, CLO5, CLO-6     |

|                         |                   |     |                  |    |     |
|-------------------------|-------------------|-----|------------------|----|-----|
|                         | <b>Final Exam</b> | 3hr | 50% (50)         | 16 | All |
| <b>Total assessment</b> |                   |     | 100% (100 Marks) |    |     |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                    |
|-------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                            |
| <b>Week 1</b>                                                     | Introduction to Strength of Materials                              |
| <b>Week 2</b>                                                     | Normal Stress                                                      |
| <b>Week 3</b>                                                     | Shear Stress, Bearing Stress                                       |
| <b>Week 4</b>                                                     | Thin Walled Cylinders (Pressure Vessels) + quiz                    |
| <b>Week 5</b>                                                     | Simple Strain , Stress-Strain Diagram, Hooke's Law                 |
| <b>Week 6</b>                                                     | Statically Indeterminate Problems                                  |
| <b>Week 7</b>                                                     | Statically Indeterminate Problems                                  |
| <b>Week 8</b>                                                     | Shear and Moment in Beams (Introduction, Supports and Load) + quiz |
| <b>Week 9</b>                                                     | Area Method for Drawing Shear and Moment Diagram                   |
| <b>Week 10</b>                                                    | Area Method for Drawing Shear and Moment Diagram                   |
| <b>Week 11</b>                                                    | Shear and stress in beams+ quiz                                    |
| <b>Week 12</b>                                                    | Shear Stresses in Beams                                            |
| <b>Week 13</b>                                                    | Flexural Stresses in Beams+ quiz                                   |
| <b>Week 14</b>                                                    | Beam Deflections (Double Integration Method) + term exam           |
| <b>Week 15</b>                                                    | Beam Deflections (Double Integration Method)                       |
| <b>Week 16</b>                                                    | <b>Preparatory week before the final Exam</b>                      |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                         |
|-------------------------------------------------------------------------|-------------------------|
|                                                                         | <b>Material Covered</b> |
| <b>Week 1</b>                                                           |                         |
| <b>Week 2</b>                                                           |                         |
| <b>Week 3</b>                                                           |                         |
| <b>Week 4</b>                                                           |                         |
| <b>Week 5</b>                                                           |                         |

|        |  |
|--------|--|
| Week 6 |  |
| Week 7 |  |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                      |                           |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                 | Available in the Library? |
| Required Texts                                           | <ul style="list-style-type: none"> <li>F. L. Singer and A. Pytel , Strength of materials , 3ed edition, 1980</li> </ul>                                                                                                              | Yes                       |
| Recommended Texts                                        | <ul style="list-style-type: none"> <li>Pytel and J. Kiusalaas, Mechanics of materials , 2nd edition ,2012, Library of Congress.</li> <li>K.S. Yadav , Strength of materials, 2nd edition , 2018, ISBN: 978-81-89401-50-4.</li> </ul> | Yes                       |
| Websites                                                 | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a>                                                                            |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                         |                      |                                                                                                                                                                                                                               |                                                                                                  |
|------------------------------------|-------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                         |                      |                                                                                                                                                                                                                               |                                                                                                  |
| Module Title                       | Engineering Hydrology   |                      | Module Delivery                                                                                                                                                                                                               |                                                                                                  |
| Module Type                        | Support                 |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                                  |
| Module Code                        | ENV216                  |                      |                                                                                                                                                                                                                               |                                                                                                  |
| ECTS Credits                       | 3                       |                      |                                                                                                                                                                                                                               |                                                                                                  |
| SWL (hr/sem)                       | 75                      |                      |                                                                                                                                                                                                                               |                                                                                                  |
| Module Level                       | 2                       | Semester of Delivery |                                                                                                                                                                                                                               | 3                                                                                                |
| Administering Department           | ENV8                    | College              | ENG4                                                                                                                                                                                                                          |                                                                                                  |
| Module Leader                      | Aaisha Mohand Almokhtar |                      | e-mail                                                                                                                                                                                                                        | <a href="mailto:aaisha.21enp45@student.uomosul.edu.iq">aaisha.21enp45@student.uomosul.edu.iq</a> |
| Module Leader's Acad. Title        |                         |                      | Module Leader's Qualification                                                                                                                                                                                                 |                                                                                                  |
| Module Tutor                       | -----                   |                      | e-mail                                                                                                                                                                                                                        |                                                                                                  |
| Peer Reviewer Name                 | -----                   |                      | e-mail                                                                                                                                                                                                                        |                                                                                                  |
| Scientific Committee Approval Date | 12/9/2024               | Version Number       | 1.0                                                                                                                                                                                                                           |                                                                                                  |

| Relation with other Modules       |      |          |       |
|-----------------------------------|------|----------|-------|
| العلاقة مع المواد الدراسية الأخرى |      |          |       |
| Prerequisite module               | None | Semester | ----- |
| Co-requisites module              | None | Semester |       |



| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | <p>The aim of this course is to introduce the students to the area of hydrological processes and practices including introduction to the Hydrology. The course will cover discussion of the basic physical principles of the water cycle, different climate factors and components (evaporation, condensation, precipitation, runoff, stream flow). At the end of the course the students will have a working knowledge for estimating Precipitation in different methods as well as Abstraction from Precipitation, Stream flow Measurement, Run-Off, Hydrograph, and Flood Routing and have the skills of analytical skills (analyze data collected in the field and examine the results) and Communication skills (prepare detailed reports that document their research methods and findings). This will be achieved through descriptive lectures with Preparing hydrological reporting and supervised tutorials.</p> |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p>CLO-1: Recognize the water issues and natural phenomena of different hydrologic process (i)<br/> CLO-2: Apply the basic engineering concepts to solve issues associated with hydrologic process (i)<br/> CLO-3: Organizing the needed solution, tabulation and calculation for the hydrological problems(i)<br/> CLO-4: Deriving standard hydrological relationship Using several methods (i).<br/> CLO-5: Report the data obtained from the site visits that will be organized during the Course(iv)<br/> CLO-6: Manage risk and uncertainty for flood measurement (vii)</p>                                                                                                                                                                                                                                   |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p>Indicative content includes the following.</p> <p><b><u>Part A – Introduction and Climate Factors</u></b><br/> An introduction to the Hydrology. Climate Factors, Precipitation, Abstraction from Precipitation (27 hrs)<br/> <b><u>Part B – Measurements</u></b><br/> Stream flow Measurement, Run-Off, (9 hrs)<br/> <b><u>Part C – hydrologic details</u></b><br/> Hydrograph, Flood Routing (9 hrs)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <p>This course has several components that include lectures, individual &amp; group assignments, field visits and e-learning platforms. Exercises involving the use of computer applications tools to understand the hydrologic processes. The course will be taught in English in addition to the Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.</p> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا</b>  |    |                                                                                  |     |
|---------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br><b>الحمل الدراسي المنتظم للطالب خلال الفصل</b> | 33 | <b>Structured SWL (h/w)</b><br><b>الحمل الدراسي المنتظم للطالب أسبوعيا</b>       | 2.2 |
| <b>Unstructured SWL (h/sem)</b><br><b>الحمل الدراسي غير المنتظم للطالب خلال</b> | 42 | <b>Unstructured SWL (h/w)</b><br><b>الحمل الدراسي غير المنتظم للطالب أسبوعيا</b> | 2.8 |

|                                                                   |           |  |  |
|-------------------------------------------------------------------|-----------|--|--|
| الفصل                                                             |           |  |  |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل | <b>75</b> |  |  |

| Module Evaluation<br>تقييم المادة الدراسية |                     |             |                |           |                            |
|--------------------------------------------|---------------------|-------------|----------------|-----------|----------------------------|
|                                            |                     | Time/Number | Weight (Marks) | Week Due  | Relevant Learning Outcome  |
| Formative assessment                       | Quizzes             | 4           | 4% (16)        | 4,6,11,14 | CLO-1, CLO-2, CLO-6        |
|                                            | Online assignments  | 4           | 2% (8)         | 4,7,12,14 | CLO-2, CLO-3, CLO-4, CLO-5 |
|                                            | On site assignments | 4           | 2% (8)         | 3,6,9,12  | CLO-1, CLO-2, CLO-3, CLO-4 |
|                                            | Report              | 2           | 4% (8)         | 7, and 14 | CLO-2, and CLO-6           |
| Summative assessment                       | Midterm Exam        | 2hr         | 10% (10)       | 10        | CLO-1, CLO-2, CLO-3, CLO-4 |
|                                            | Final Exam          | 3hr         | 50% (50)       | 16        | All                        |
| Total assessment                           |                     |             | 100%(100Marks) |           |                            |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                                                                                                                                                                |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                                                                                                                                               |
| <b>Week 1</b>                                              | Introduction, objectives, definition of hydrology, branch of Hydrology, hydrological cycle, Hydrological Budget Equation, Engineering Hydrology Application, Typical Failure Factors for Hydraulic Installations, Source of Data.              |
| <b>Week 2</b>                                              | Climate Factors, Temperature, Solar Radiation, Evaporation, Humidity, Vapor Pressure, Wind.                                                                                                                                                    |
| <b>Week 3</b>                                              | Precipitation, Forms of Precipitation, Measurement of precipitation, Types of rain gauge                                                                                                                                                       |
| <b>Week 4</b>                                              | Errors in rainfall measurement, Precipitation Gage Network, adequacy of rain measurement stations, Preparation of data, Methods for calculating missing information, Test for Consistency of Records.                                          |
| <b>Week 5</b>                                              | Average Precipitation over Area, Accumulated Rainfall, Hyetograph, Rainfall Intensity, Probable Maximum Precipitation, Point Rainfall, Depth- area- duration –Relationship, Depth-Area-Duration, Intensity –Duration – Return period relation. |
| <b>Week 6</b>                                              | Abstraction from Precipitation, Losses from precipitation, Evaporation, Evaporimeter, Types of evaporation                                                                                                                                     |

|                |                                                                                                                                                                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | meters, Class A Evaporation Pan, Pan Coefficient.                                                                                                                                                                                                  |
| <b>Week 7</b>  | Evaporation Measurement Stations, Empirical Evaporation Equations, Analytical methods for estimating evaporation, Types of evaporation meters, reducing evaporation from tanks                                                                     |
| <b>Week 8</b>  | Evapotranspiration, Potential Evapotranspiration, vapotranspiration Equations, Penman Equation, Blaney – Criddle formula, Evapotranspiration Equations                                                                                             |
| <b>Week 9</b>  | Infiltration, Measurement of Infiltration, Infiltration Capacity, Infiltration Capacity Values, Infiltration Indices.                                                                                                                              |
| <b>Week 10</b> | Stream flow measurement, Water stage, time curve-Stage , Stream measurement, Measurement of velocity, Calibration, Equalization of the current meter device, steps for measuring discharge by speed- area method.                                  |
| <b>Week 11</b> | chemical methods for measuring discharge, indirect method and classified into two types: 1- Flow measurement facilities 2- Slope- Area method, calibration curve in case of unsteady flow.                                                         |
| <b>Week 12</b> | Run – off, Factors affecting the volume of runoff, Direct Runoff, Base Flow, annual runoff volume, Empirical Equation, Rational method, Unit hydrograph, CN-SCS method, Flow- Duration Curve, Flow– Mass Curve, Calculation of Maintainable Demand |
| <b>Week 13</b> | Hydrograph, Surface Runoff, Inter Flow, Base Flow, Hydrograph component, Factors affecting flood hydrograph, Direct Runoff.                                                                                                                        |
| <b>Week 14</b> | Base Flow, Base Flow Separation, Effective Rain, Unit Hydrograph, Unit Hydrograph Assumptions, Unit Hydrograph Derivation, Unit Hydrograph for Different Duration, S - Curve Method , Uses and limitations of standard hydrograph.                 |
| <b>Week 15</b> | Flood Routing, Hydrologic Storage Routing, Hydrologic Channel Routing.                                                                                                                                                                             |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|                   | Material Covered |
|-------------------|------------------|
| <b>Week 1-2</b>   |                  |
| <b>Week 5-6</b>   |                  |
| <b>Week 7-8</b>   |                  |
| <b>Week 9-10</b>  |                  |
| <b>Week 10-11</b> |                  |
| <b>Week 13-14</b> |                  |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                       | Text                                                                                   | Available in the Library? |
|-----------------------|----------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b> | K. Subramana, “ENGINEERING HYDROLOGY”, Second Edition<br>Mc Graw hill, New Delhi, 1997 | Yes                       |

|                          |                                                                                                                                                           |     |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Recommended Texts</b> | Linsely , R.K., M .A . Kohlerand Paulhus. “HYDROLOGY OF ENGINEERING”, McGraw-Hill, Singapore, 1988                                                        | Yes |
| <b>Websites</b>          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |     |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                        |                                 |                                   |                                                                                                                                                                                                                               |
|-------------------------------------------|---------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية                   |                                 |                                   |                                                                                                                                                                                                                               |
| Module Title<br>اسم المنهج                | جرائم حزب البعث في العراق       |                                   | Module Delivery                                                                                                                                                                                                               |
| Module Type<br>نوع المنهج                 | اساسي                           |                                   | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code<br>رمز المنهج                 | UOM2050                         |                                   |                                                                                                                                                                                                                               |
| ECTS Credits<br>عدد الوحدات               | 2                               |                                   |                                                                                                                                                                                                                               |
| SWL (hr/sem)<br>الحمل الكلي               | 50                              |                                   |                                                                                                                                                                                                                               |
| Module Level / المستوى                    | UGII                            | Semester of Delivery / سحب المنهج |                                                                                                                                                                                                                               |
| Administering Department<br>القسم الإداري | ENV8                            | College<br>الكلية                 | ENG4                                                                                                                                                                                                                          |
| Module Leader<br>اسم التدريسي             | نهال عبد الوهاب حامد            |                                   | e-mail<br>البريد الإلكتروني<br><a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                     |
| Module Leader's Acad. Title               | مدرس مساعد<br>Assistant Lecture | Module Leader's Qualification     | ماجستير<br>MS. C.                                                                                                                                                                                                             |
| Module Tutor                              | نهال عبد الوهاب حامد            | e-mail                            | <a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                                                    |
| Peer Reviewer Name                        | نهال عبد الوهاب حامد            | e-mail                            | <a href="mailto:nehal.hamid@uomosul.edu.iq">nehal.hamid@uomosul.edu.iq</a>                                                                                                                                                    |
| Scientific Committee Approval Date        | 30/09/2024                      | Version Number                    |                                                                                                                                                                                                                               |
| Relation with other Modules               |                                 |                                   |                                                                                                                                                                                                                               |
| العلاقة مع المواد الدراسية الأخرى         |                                 |                                   |                                                                                                                                                                                                                               |
| Prerequisite module                       | لا يوجد                         | Semester                          |                                                                                                                                                                                                                               |
| Co-requisites module                      | لا يوجد                         | Semester                          |                                                                                                                                                                                                                               |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Module Objectives<br>أهداف المادة الدراسية                | 1- التعرف على الجرائم التي ارتكبتها النظام البعثي في العراق<br>2- الالمام بمعرفة الجرائم وأنواعها<br>3- التوعية والتعريف بخطورة الجرائم<br>4- تعزيز قدرة الطالب على تحليل سياسة النظام الحاكم                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | COL-1: توثيق الانتهاكات والجرائم التي ارتكبتها نظام البعث<br>COL-2: توضيح المعاناة التي مر بها الضحايا<br>COL-3: تعزيز القيم الانسانية مثل الديمقراطية وحقوق الانسان وسيادة القانون<br>COL-4: تعزيز ثقافة المساءلة عن الجرائم والانتهاكات مما يعزز من دور القانون في المجتمع                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Indicative Contents<br>المحتويات الإرشادية                | <p><b>الفصل الاول</b></p> <p><b>جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م</b></p> <p>1- مفهوم الجرائم واقسامها</p> <p>2- تعريف الجريمة لغة واصطلاحا</p> <p>3- اقسام الجرائم</p> <p>4- انواع الجرائم الدولية</p> <p>5- القرارات الصادرة من المحكمة الجنائية العليا</p> <p><b>الفصل الثاني</b></p> <p><b>الجرائم النفسية والاجتماعية وآثارها وابلرز انتهاكات النظام البعثي في العراق</b></p> <p>الجرائم النفسية</p> <p>آليات الجرائم النفسية</p> <p>آثار الجرائم النفسية</p> <p>الجرائم الاجتماعية</p> <p>عسكرة المجتمع</p> <p>موقف النظام البعثي من الدين</p> <p>انتهاكات القوانين العراقية</p> <p>صور انتهاكات حقوق الانسان وجرائم السلطة</p> <p>بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث</p> <p>أماكن السجون والاحتجاز لنظام البعث</p> <p><b>الفصل الثالث</b></p> <p><b>الجرائم البيئية لنظام البعث في العراق</b></p> <p>1- التلوث الحربي والاشعاعي وانفجار الالغام</p> <p>2- تدمير المدن والقرى (سياسة الارض المحروقة)</p> <p>3- تجفيف الاهوار</p> <p>4- تجريف بساتين النخيل والاشجار والمزروعات</p> <p><b>الفصل الرابع</b></p> <p>1- جرائم المقابر الجماعية</p> <p>2- أحداث مقابر الابادة الجماعية المرتكبة من النظام البعثي في العراق</p> <p>3- التصنيف الزمني لمقابر الابادة الجماعية في العراق للمدة 1963-2003م</p> |

|                                                                         |                                       |                                                                                                                                  |                                                                    |          |                            |
|-------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------|----------------------------|
|                                                                         |                                       |                                                                                                                                  |                                                                    |          |                            |
| Learning and Teaching Strategies                                        |                                       |                                                                                                                                  |                                                                    |          |                            |
| استراتيجيات التعلم والتعليم                                             |                                       |                                                                                                                                  |                                                                    |          |                            |
| Strategies<br>الاستراتيجيات                                             |                                       | توسيع مدارك الطالب لمفهوم الجريمة واسلوبها وطرق استخلاص الدروس والعبر من الجرائم والانتهاكات التي ارتكبت خلال فترة حكم حزب البعث |                                                                    |          |                            |
| Student Workload (SWL)                                                  |                                       |                                                                                                                                  |                                                                    |          |                            |
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا                                 |                                       |                                                                                                                                  |                                                                    |          |                            |
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       |                                       | 33                                                                                                                               | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       |          | 2.2                        |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل |                                       | 17                                                                                                                               | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا |          | 1.1                        |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              |                                       | 50                                                                                                                               |                                                                    |          |                            |
| Module Evaluation                                                       |                                       |                                                                                                                                  |                                                                    |          |                            |
| تقييم المادة الدراسية                                                   |                                       |                                                                                                                                  |                                                                    |          |                            |
|                                                                         |                                       | Time/Number                                                                                                                      | Weight% (Marks)                                                    | Week Due | Relevant Learning Outcome  |
| Formative Assessment<br>التقويم التكويني                                | Quizzes<br>الكويز                     | 2                                                                                                                                | 4% (8)                                                             | 3,6      | COL-1, COL-2               |
|                                                                         | Online Assignments                    | 4                                                                                                                                | 2% (8)                                                             | 3,5,6    | CLO-1, CLO-2, CLO-3, CLO-4 |
|                                                                         | Seminars<br>السمنار                   | 0                                                                                                                                | 0                                                                  | 0        | 0                          |
|                                                                         | Report<br>التقارير                    | 1                                                                                                                                | 10% (10)                                                           | 4        | CLO-1, CLO-2, CLO-3, CLO-4 |
|                                                                         | Onsite Assignment<br>واجبات داخل الصف | 1                                                                                                                                | 6% (6)                                                             | 5        | COL-2 ,COL-3               |
| Summative Assessment<br>التقويم التلخيصي                                | Midterm Exam<br>امتحان نصف الفصل      | 2 hrs                                                                                                                            | 10% (10)                                                           | 9        | CLO-1 to CLO-7             |
|                                                                         | Final Exam<br>الامتحان النهائي        | 3 hrs                                                                                                                            | 50% (50)                                                           | 16       | All                        |
| Total Assessment / التقويم النهائي                                      |                                       |                                                                                                                                  | 100% (100 Marks)                                                   |          | (100 Marks)                |
| Delivery Plan (Weekly Syllabus)                                         |                                       |                                                                                                                                  |                                                                    |          |                            |
| المنهاج الاسبوعي النظري                                                 |                                       |                                                                                                                                  |                                                                    |          |                            |
|                                                                         | Material Covered / المواضيع المغطاة   |                                                                                                                                  |                                                                    |          |                            |
| Week 1                                                                  | مفهوم الجرائم واقسامها                |                                                                                                                                  |                                                                    |          |                            |

|         |                                                                     |
|---------|---------------------------------------------------------------------|
| Week 2  | انواع الجرائم الدولية                                               |
| Week 3  | الجريمة السياسية                                                    |
| Week 4  | الجريمة الاجتماعية                                                  |
| Week 5  | جريمة قمع الانتفاضة الشعبانية                                       |
| Week 6  | الجرائم النفسية وآثارها                                             |
| Week 7  | جريمة قمع الانتفاضة الشعبانية                                       |
| Week 8  | الجرائم النفسية وآثارها                                             |
| Week 9  | جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا 2005    |
| Week 10 | جرائم أحداث الجمعة                                                  |
| Week 11 | جرائم المقابر الجماعية وقصف العتبات المقدسة                         |
| Week 12 | الهجوم الكيميائي على حلبجة                                          |
| Week 13 | استخدام الاسلحة المحرمة دوليا                                       |
| Week 14 | الجرائم البيئية لنظام البعث في العراق                               |
| Week 15 | أحداث المقابر والابادة الجماعية المرتكبة في النظام البعثي في العراق |
| Week 16 | Preparatory week before the final Exam                              |

### Delivery Plan (Weekly Lab. Syllabus)

|        | المواضيع المغطاة / Material Covered |
|--------|-------------------------------------|
| Week 1 |                                     |
| Week 2 |                                     |
| Week 3 |                                     |
| Week 4 |                                     |
| Week 5 |                                     |
| Week 6 |                                     |
| Week 7 |                                     |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                                              | Text<br>الاسم                                                                                                                                             | Available in the Library?<br>هل متوفر في المكتبة؟ |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Required Texts</b><br>المنهج المطلوب      | جرائم نظام البعث في العراق                                                                                                                                |                                                   |
| <b>Recommended Texts</b><br>المنهج الموصى به | من قبل وزارة التعليم                                                                                                                                      |                                                   |
| <b>Websites</b><br>المواقع الالكترونية       | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                                                   |

### Grading Scheme

مخطط الدرجات

| Group         | Grade         | التقدير | Marks %  | Definition              |
|---------------|---------------|---------|----------|-------------------------|
| Success Group | A - Excellent | امتياز  | 90 - 100 | Outstanding Performance |



|                                |                         |                     |         |                                       |
|--------------------------------|-------------------------|---------------------|---------|---------------------------------------|
| <b>(50 - 100)</b>              | <b>B - Very Good</b>    | جيد جدا             | 80 - 89 | Above average with some errors        |
|                                | <b>C - Good</b>         | جيد                 | 70 - 79 | Sound work with notable errors        |
|                                | <b>D - Satisfactory</b> | متوسط               | 60 - 69 | Fair but with major shortcomings      |
|                                | <b>E - Sufficient</b>   | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b> | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                | <b>F – Fail</b>         | راسب                | (0-44)  | Considerable amount of work required  |
|                                |                         |                     |         |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                      |                      |                                                                                                                                                                             |                               |
|------------------------------------|--------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| معلومات المادة الدراسية            |                                      |                      |                                                                                                                                                                             |                               |
| Module Title                       | English Language-2                   |                      | Module Delivery                                                                                                                                                             |                               |
| Module Type                        | Support or related learning activity |                      | Theory<br><input checked="" type="checkbox"/> Lecture<br>Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                               |
| Module Code                        | UOM2022                              |                      |                                                                                                                                                                             |                               |
| ECTS Credits                       | 2                                    |                      |                                                                                                                                                                             |                               |
| SWL (hr/sem)                       | 50                                   |                      |                                                                                                                                                                             |                               |
| Module Level                       | UGII                                 | Semester of Delivery | 3                                                                                                                                                                           |                               |
| Administering Department           | ENV                                  | College              | ENG                                                                                                                                                                         |                               |
| Module Leader                      | Dr. Hamid Adrees Al-Khashab          |                      | e-mail                                                                                                                                                                      | hamidalkhashab@uomosul.edu.iq |
| Module Leader's Acad. Title        | Instructor                           |                      | Module Leader's Qualification                                                                                                                                               | Ph.D.                         |
| Module Tutor                       |                                      |                      | e-mail                                                                                                                                                                      |                               |
| Peer Reviewer Name                 |                                      |                      | e-mail                                                                                                                                                                      |                               |
| Scientific Committee Approval Date | 01/10/2024                           | Version Number       | 2.0                                                                                                                                                                         |                               |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Aims</b><br><b>أهداف المادة الدراسية</b>                                                                               | <ol style="list-style-type: none"> <li>1. Study grammar, (verb tenses, structure sentence, question words, adverbs and adjectives, quantity, articles, verb pattern, prepositions, comparative and superlative).</li> <li>2. Learn Vocabulary, focus on all academic words specifically in environmental engineering field.</li> <li>3. Study comprehensive reading in variety subjects.</li> <li>4. Focus on listening and speaking using videos and conversation between students in class.</li> <li>5. Study how to write an academic paragraph.</li> </ol> |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | <ol style="list-style-type: none"> <li>1. Learn grammar specifically that help student to write and speak.</li> <li>2. Learn new vocabulary and focus on academic word that related in environmental engineering field.</li> <li>3. Learn the comprehensive reading.</li> <li>4. Practice more on listening and speaking.</li> <li>5. Learn how to write an academic paragraph.</li> </ol>                                                                                                                                                                     |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <p>Indicative content includes the following.</p> <p>– <u>English Language</u></p> <ul style="list-style-type: none"> <li>• Grammar/ Verb tenses and examples, structure sentence, question words, adverb and adjectives, articles, quantity, phrasal verbs, and comparative &amp; superlatives, and certainty. [18 hrs.]</li> <li>• Practice on comprehensive reading. [4 hrs.]</li> <li>• Practice on Listening and Speaking. [4 hrs.]</li> <li>• Writing an academic paragraph and paraphrasing. [6hrs.]</li> </ul>                                         |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <p>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p> |

| Student Workload (SWL)                                                         |    |                                                                           |   |
|--------------------------------------------------------------------------------|----|---------------------------------------------------------------------------|---|
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا                                        |    |                                                                           |   |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 33 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 17 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 50 |                                                                           |   |

| Module Evaluation               |                         |                 |                  |             |                              |
|---------------------------------|-------------------------|-----------------|------------------|-------------|------------------------------|
| تقييم المادة الدراسية           |                         |                 |                  |             |                              |
|                                 |                         | Time/N<br>umber | Weight (Marks)   | Week Due    | Relevant Learning<br>Outcome |
| <b>Formative<br/>assessment</b> | <b>Quizzes</b>          | 2               | 10% (10)         | 8.11        | LO #1, 3, and 5              |
|                                 | <b>Assignments</b>      | 2               | 10% (10)         | 2, 5, 8, 12 | All                          |
|                                 | <b>OnsitAssignments</b> | 1               | 10%              |             |                              |
|                                 | حلقات دراسية            | 1               | 10               |             |                              |
| <b>Summative<br/>assessment</b> | <b>Midterm Exam</b>     | 1 hr            | 10% (10)         | 9           | LO # 1-3                     |
|                                 | <b>Final Exam</b>       | 3hr             | 50% (60)         | 16          | All                          |
| <b>Total assessment</b>         |                         |                 | 100% (100 Marks) |             |                              |

| Delivery Plan (Weekly Syllabus) |                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                        |
|                                 | Material Covered                                                                                       |
| <b>Week 1</b>                   | Grammar / Verb tenses and examples (present, past, future) / Vocabulary / Reading, listening, speaking |
| <b>Week 2</b>                   | Grammar/ Verb tenses and examples (present) / Vocabulary / Reading, listening, speaking                |
| <b>Week 3</b>                   | Grammar/ Verb tenses and examples (past) / Vocabulary / Reading, listening, speaking                   |
| <b>Week 4</b>                   | Grammar/ Quantity/ Vocabulary / Reading, listening, speaking                                           |
| <b>Week 5</b>                   | Grammar/ Verb tenses and examples (future) / Vocabulary / Reading, listening, speaking                 |
| <b>Week 6</b>                   | Grammar/ Comparative & Superlatives / Vocabulary / Reading, listening, speaking                        |
| <b>Week 7</b>                   | Grammar/ Verb tenses and examples (present perfect) / Vocabulary / Reading, listening, speaking        |
| <b>Week 8</b>                   | Grammar/ have to, should / Vocabulary / Reading, listening, speaking                                   |
| <b>Week 9</b>                   | Midterm Exam                                                                                           |

|                |                                                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------|
| <b>Week 10</b> | Grammar/ Verb tenses and examples (past perfect) / Vocabulary / Reading, listening, speaking               |
| <b>Week 11</b> | Grammar/ Verb tenses and examples (passive) / Vocabulary / Reading, listening, speaking                    |
| <b>Week 12</b> | Grammar/ Verb tenses and examples (present perfect continuous) / Vocabulary / Reading, listening, speaking |
| <b>Week 13</b> | Writing an academic paragraph / Reading, listening, speaking                                               |
| <b>Week 14</b> | Grammar/ if condition / Vocabulary / Reading, listening, speaking                                          |
| <b>Week 15</b> | Writing / Paraphrasing / Reading, listening, speaking                                                      |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                         |                                  |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                             | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Headway Pre-Intermediate Student's Book-Fourth Edition                                  | Yes (text book)                  |
|                                                                        | Headway Pre-Intermediate Student's Book-Fourth Edition                                  | Yes                              |
| <b>Websites</b>                                                        | <a href="https://meet.google.com/yof-ngkn-ssc">https://meet.google.com/yof-ngkn-ssc</a> |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |                  |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|------------------|---------------------------------------|
| <b>Group</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks (%)</b> | <b>Definition</b>                     |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A - Excellent</b>    | امتياز              | 90 - 100         | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89          | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79          | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69          | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59          | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)          | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)           | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |                  |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                             |                               |                                                                                                                                                                                                                                                     |                                                                                                                                                          |
|------------------------------------|---------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                             |                               |                                                                                                                                                                                                                                                     |                                                                                                                                                          |
| Module Title                       | Water quality Engineering                   |                               | Module Delivery                                                                                                                                                                                                                                     |                                                                                                                                                          |
| Module Type                        | Core                                        |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |                                                                                                                                                          |
| Module Code                        | ENV221                                      |                               |                                                                                                                                                                                                                                                     |                                                                                                                                                          |
| ECTS Credits                       | 7                                           |                               |                                                                                                                                                                                                                                                     |                                                                                                                                                          |
| SWL (hr/sem)                       | 175                                         |                               |                                                                                                                                                                                                                                                     |                                                                                                                                                          |
| Module Level                       | 2                                           | Semester of Delivery          |                                                                                                                                                                                                                                                     | 4                                                                                                                                                        |
| Administering Department           | ENV8                                        | College                       | ENG4                                                                                                                                                                                                                                                |                                                                                                                                                          |
| Module Leader                      | Mayada Hazim Mohammed<br>Nadia Afram Yaqoob |                               | e-mail                                                                                                                                                                                                                                              | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a> ,<br><a href="mailto:n.alrhmany@uomosul.edu.iq">n.alrhmany@uomosul.edu.iq</a> |
| Module Leader's Acad. Title        | Lecturer                                    | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                               |                                                                                                                                                          |
| Module Tutor                       | -----                                       |                               | e-mail                                                                                                                                                                                                                                              | E-mail                                                                                                                                                   |
| Peer Reviewer Name                 | Mayada Hazim                                | e-mail                        | <a href="mailto:mayada.hmah@uomosul.edu.iq">mayada.hmah@uomosul.edu.iq</a>                                                                                                                                                                          |                                                                                                                                                          |
| Scientific Committee Approval Date | 26/11/2024                                  | Version Number                | 1.0                                                                                                                                                                                                                                                 |                                                                                                                                                          |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

|                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Module Objectives</b></p> <p>أهداف المادة الدراسية</p>                | <p>The aim of this course is to introduce the students to basic concepts on Water Quality Engineering. The course will cover water resources, principal sources of water pollution, Water Quality Management (rivers, lakes and ground water) , Water quality criteria and standards, Laws and Regulations, Mechanism of pollutant fate in the environment, Modeling of water quality in natural systems. The Lab part : the main goal of this part is to equip students with the expertise and skills necessary for monitoring water quality and analyzing it quantitatively. Also, it incorporates the chemical concepts necessary for managing water quality and reducing pollution.</p> <p>At the end of the course, students will learn how to analyze different water samples and will acquire the necessary expertise and skills to monitor and analyze water quality. This will be achieved through lectures, laboratories and tutorials.</p>                                                                                                                                                                                                                                           |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p> | <p><b>CLO-1:</b> Identify Principal sources of water pollution (i).<br/> <b>CLO-2:</b> Describe the physical, chemical and biological characteristics of water quality and Water quality standards. (i).<br/> <b>CLO-3:</b> Apply the principle of mass balance to calculate DO Sag in river (ii).<br/> <b>CLO-4:</b> Apply the principle of mass balance of water quality modeling in lake (ii)<br/> <b>CLO-5:</b> Understand the Mechanism of pollutant Fate in the environment and Transport processes of pollutants (ii).<br/> <b>CLO-6:</b> Understand the modeling of water quality in rivers (i)<br/> <b>CLO-7:</b> Reporting information related to one of the topics of water quality (iv)<br/> <b>CLO-8:</b> Ability to perform and carryout proper measurement and tests. (iii)</p>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                | <p><u><b>Theoretical lectures</b></u></p> <p><u><b>Part A – Water resources and Sources of water pollution</b></u><br/> Surface water and Ground water, Point sources and non-point sources, Common impurities in water (6 hrs).</p> <p><u><b>Part B – Water quality standards and Regulations</b></u><br/> Physical, chemical and Biological characteristics; Criteria and standards; Law and Regulation clean water Act , Safe drinking water Act , Drinking-water standards(9 hrs)</p> <p><u><b>Part C - Water quality management in rivers</b></u><br/> Assimilative capacity , Waste discharges and receiving water ,Management of waste loads and assimilative capacity of receiving waters. DO Sag curve, Mass-Balance Approach, DO Sag Equations, Management Strategy of water quality (9 hrs).</p> <p><u><b>Part D - Water quality management in Lakes</b></u><br/> Thermal Stratification of lakes and turn over, Lake productivity, Eutrophication, Control of phosphorus in lakes; Water quality model in lake(6 hrs).</p> <p><u><b>Part E- Ground water quality</b></u><br/> Types of contaminants that can pollute an aquifer, Contaminant Migration in Groundwaters (3 hrs).</p> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Part F- Mechanism of pollutant Fate in the environment</u><br/>mechanisms responsible for transporting pollutants in the river; Transport processes; initial mixing; Longitudinal dispersion; Governing equation (6 hrs).</p> <p><u>Part G- Modeling of water quality in natural systems</u><br/>Types of water quality models, water quality modelling in riverine systems and Water quality index (6 hrs).</p> <p><u>Practical labs</u><br/> <u>Part A-</u> Introduction, sampling and River, lake and industrial waste samples collection (4 hrs).<br/> <u>Part B- Physical tests</u><br/>Total Solid, Dissolved Solid, Suspended Solid, PH-meter, Electrical Conductivity, Turbidity, (12 hrs).<br/> <u>Part C- Chemical tests</u><br/>Hardness, <math>\text{Ca}^{+2}</math>, and <math>\text{Mg}^{+2}</math> , Sulphates, Chlorides, Alkalinity, Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Biochemical oxygen Demand (BOD), Nitrate and Phosphate(14 hrs).</p> |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | This will be achieved through lectures, labs, individual & group assignments and e-learning platforms and tutorials. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا       |            |                                                                           |     |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 78         | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 97         | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 6.5 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | <b>175</b> |                                                                           |     |



| Module Evaluation     |              |             |                  |                 |                                     |
|-----------------------|--------------|-------------|------------------|-----------------|-------------------------------------|
| تقييم المادة الدراسية |              |             |                  |                 |                                     |
|                       |              | Time/Number | Weight (Marks)   | Week Due        | Relevant Learning Outcome           |
| Formative assessment  | Quizzes      | 4           | 16 % (4)         | 2, 4, ,8 and 10 | CLO-1, CLO-2, CLO-3, CLO-4          |
|                       | Assignments  | 3           | 6 % (2)          | 3,8 and 11      | CLO-2, CLO-3, CLO-4, CLO-5and CLO-6 |
|                       | Lab.         | 1           | 15 % (15)        | 13              | All                                 |
|                       | Report       | 1           | 3 % (3)          |                 | All                                 |
| Summative assessment  | Midterm Exam | 2hr         | 10% (10)         | 10              | CLO-1, CLO -2 and CLO-3             |
|                       | Final Exam   | 3hr         | 50% (50)         | 16              | All                                 |
| Total assessment      |              |             | 100% (100 Marks) |                 |                                     |

| Delivery Plan (Weekly Syllabus) |                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                                                                                                          |
|                                 | Material Covered                                                                                                                                                                         |
| Week 1                          | Water resources: Introduction, Surface water (rivers, lakes, reservoirs, streams) Ground water (wells, springs).                                                                         |
| Week 2                          | Sources of water pollution: Point sources and non-point sources, Common impurities in water.                                                                                             |
| Week 3                          | Physical, chemical and Biological characteristics, Criteria and standards.                                                                                                               |
| Week 4                          | Irrigation water quality of Criteria and standards, Radioactivity in water.                                                                                                              |
| Week 5                          | Law and Regulation, clean water Act, Safe drinking water Act, Drinking-water standards.                                                                                                  |
| Week 6                          | Management of waste loads and assimilative capacity of receiving waters. Effects of pollutant in rivers, Total maximum daily loads (TMDL), Effects of Oxygen –Demanding waste on rivers. |
| Week 7                          | Biochemical oxygen-demand, Chemical oxygen demand (COD), Laboratory measurement of biochemical oxygen demand, Addition notes on Biochemical Oxygen Demand, Nitrogen oxidation.           |
| Week 8                          | DO Sag curve, Mass-Balance Approach, DO Sag Equation, Management Strategy, Nitrogenous BOD, Effect of Nutrients on water quality in rivers.                                              |
| Week 9                          | Thermal Stratification of lakes and turn over, Biological zones, Lake productivity, Eutrophication, Algal growth requirement, Control of phosphorus in lakes.                            |
| Week 10                         | Water quality model in lake.                                                                                                                                                             |

|                |                                                                                                                                                           |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 11</b> | Ground water, Types of contaminants that can pollute an aquifer, Darcy equation, Contaminant Migration in Groundwaters.                                   |
| <b>Week 12</b> | Mechanism of pollutant Fate in the environment: mechanisms responsible for transporting pollutants in the river, Transport processes.                     |
| <b>Week 13</b> | Initial mixing, Turbulent Diffusion, Longitudinal Dispersion waste; Governing equation.                                                                   |
| <b>Week 14</b> | Modeling of water quality in natural systems: Types of water quality models, An elementary water quality model, water quality modelling in river systems. |
| <b>Week 15</b> | Water Quality Index, indices of pollution, Formulas use in Determination water quality index; classification of water quality index.                      |
| <b>Week 16</b> | <b>Preparatory week before the final Exam</b>                                                                                                             |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|                | <b>Material Covered</b>                                    |
|----------------|------------------------------------------------------------|
| <b>Week 1</b>  | Lab 1: Introduction, sampling.                             |
| <b>Week 2</b>  | Lab 2: River, lake and industrial waste samples collection |
| <b>Week 3</b>  | Lab 3: Total Solid.                                        |
| <b>Week 4</b>  | Lab 4: Dissolved Solid, Suspended Solid.                   |
| <b>Week 5</b>  | Lab 5: PH-meter, Electrical Conductivity                   |
| <b>Week 6</b>  | Lab 6: Turbidity.                                          |
| <b>Week 7</b>  | Lab 7: Hardness, $\text{Ca}^{+2}$ , and $\text{Mg}^{+2}$   |
| <b>Week 8</b>  | Lab 8: Sulphates                                           |
| <b>Week 9</b>  | Lab 9: Chlorides.                                          |
| <b>Week 10</b> | Lab 10: Alkalinity                                         |
| <b>Week 11</b> | Lab 11: Chemical Oxygen Demand (COD)                       |
| <b>Week 12</b> | Lab 12: Dissolved Oxygen (DO).                             |
| <b>Week 13</b> | Lab 13: Biochemical oxygen Demand (BOD).                   |
| <b>Week 14</b> | Lab 14: Nitrate.                                           |
| <b>Week 15</b> | Lab 15: Phosphate.                                         |

### Learning and Teaching Resources

| مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                         |                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                       | Text                                                                                                                                                                                                                                                                                    | Available in the Library? |
| Required Texts        | <ul style="list-style-type: none"> <li>Mackenzie L. Davis and Susan J.Masten "Principles of Environmental Engineering and Science", McGraw hill, USA, 3th,2004</li> <li>APHA, AWWA, WPCF "Standard method for the examination of water and wastewater", 1985.</li> </ul>                | Yes                       |
| Recommended Texts     | <ul style="list-style-type: none"> <li>David A. Chin "Water quality engineering in natural system", John Wiley &amp; Sons, Inc.,2006.</li> <li>عباوي , سعاد عبد و حسن , محمد سليمان "الهندسة العملية للبيئة -فحوصات الماء" دار ابن الاثير للطباعة للنشر -جامعة الموصل , 1990</li> </ul> | Yes                       |
| Websites              | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a>                                                                                                                               |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                                           |                      |                                                                                                                                                                                                                                          |                                                                   |
|------------------------------------|-----------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                                           |                      |                                                                                                                                                                                                                                          |                                                                   |
| Module Title                       | Concrete & Building Technology                            |                      | Module Delivery                                                                                                                                                                                                                          |                                                                   |
| Module Type                        | Support                                                   |                      | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                   |
| Module Code                        | ENV222                                                    |                      |                                                                                                                                                                                                                                          |                                                                   |
| ECTS Credits                       | 6                                                         |                      |                                                                                                                                                                                                                                          |                                                                   |
| SWL (hr/sem)                       | 150                                                       |                      |                                                                                                                                                                                                                                          |                                                                   |
| Module Level                       | 2                                                         | Semester of Delivery |                                                                                                                                                                                                                                          | 4                                                                 |
| Administering Department           | ENV8                                                      | College              | ENG4                                                                                                                                                                                                                                     |                                                                   |
| Module Leader                      | (1) Dr. Omar M. Abdulkareem<br>(2) Mohammed Hisham Shukur |                      | e-mail                                                                                                                                                                                                                                   | (1) omaralhakeem@uomosul.edu.iq<br>(2) M.h.alkafaf@uomosul.edu.iq |
| Module Leader's Acad. Title        | (1) Assistant Professor<br>(2) Lecturer                   |                      | Module Leader's Qualification                                                                                                                                                                                                            | (1) Ph.D.<br>(2) M. Sc.                                           |
| Module Tutor                       | -----                                                     |                      | e-mail                                                                                                                                                                                                                                   | E-mail                                                            |
| Peer Reviewer Name                 | -----                                                     |                      | e-mail                                                                                                                                                                                                                                   | E-mail                                                            |
| Scientific Committee Approval Date | 26/11/2024                                                |                      | Version Number                                                                                                                                                                                                                           | 1.0                                                               |

| Relation with other Modules       |      |  |          |
|-----------------------------------|------|--|----------|
| العلاقة مع المواد الدراسية الأخرى |      |  |          |
| Prerequisite module               | None |  | Semester |
| Co-requisites module              | None |  | Semester |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                       |
| Module Objectives<br>أهداف المادة الدراسية               | <p>This course is aimed principally at university and college students who wish understand the concrete for the purpose of using it in professional practice. The students must take sufficient care to ensure the selection of correct ingredients, for concrete making to achieve a suitable mix, and to obtain a technically sound execution of concrete works. They must also</p> |

|                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <p>have an intimate knowledge of the interaction between the different components that go into making concrete, whether in a fresh state or in a hardened state. This knowledge is necessary for students to be competent engineers in their dealings with the concrete and construction materials that go into their manufacture.</p> <p>Moreover, this course aims to introduce students to the principles of building systems, construction methods and techniques, starting from the idea, feasibility study, preparation of plans, methods of implementation, and excavation. Besides that, the equipment and methods of transporting and compacting of concrete with its determinants, and an explanation of masonry units with their properties and methods of construction with them. The course aims to get students familiarized with structural as well as finish works to be implemented in construction process for the floors, walls, ceilings, with the construction problems &amp; methods of treatment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Module Learning Outcomes</b><br/>مخرجات التعلم للمادة الدراسية</p> | <p><b>CLO-1:</b> Identify the concrete composition, classification, characteristics, and mix proportioning (i).</p> <p><b>CLO-2:</b> Recognize the constituent materials (cement, water, fine and coarse aggregates, and admixtures) in concrete and evaluate how their engineering properties influence the behaviour and performance of the resulting concrete (i).</p> <p><b>CLO-3:</b> Able to determine the fresh and the hardened properties of the concrete, and understanding concrete performance as a good basics for the building construction and the structural design (ii).</p> <p><b>CLO-4:</b> Practicing laboratory experiments with execution, compilation and analysis on concrete and its ingredients in addition to the other construction materials (iii).</p> <p><b>CLO-5:</b> Identify the concepts and principles associated with the building, and technology of construction and be able to evaluate and interpret them using sketches, drawings or in written form (i).</p> <p><b>CLO-6:</b> Recognize building elements and components in specific situations; how, when and where they would be favoured; and the construction sequence for simple buildings (i).</p> <p><b>CLO-7:</b> Evaluate the appropriateness of different approaches, materials and construction in simple construction in accordance with building and technology theories and standards, in proportion to the requirements for the structural integrity of buildings (i).</p> |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p>                | <p><b>1- Concrete Technology Topics:</b></p> <p><b>a- Topics of Theoretical Part:</b></p> <ul style="list-style-type: none"> <li>- Introduction to Concrete: Concrete definition, Concrete composition, Concrete classification, Concrete characteristics, Concrete mix ratios (Conservation of mix weight ratios to volume ratios, Rich and lean concrete mixes) (2 hrs).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

- Cement: Cement definition, Manufacture of Portland cement, Chemical composition of Portland cement clinker, Control Ratios, Phase composition of Portland cement clinker, Physical properties of cement (Compressive strength, Setting time, Early stiffening (False set and flash set), Particle size and fineness, Soundness, Consistency, Heat of hydration, Loss on ignition, Density and relative density (Specific gravity), Bulk density), Types of Portland cement (Main types, Blended cements, Special cements) (4 hrs).

- Mixing Water for Concrete: Introduction, Effects of impurities in mixing water on concrete properties (Alkali carbonate and bicarbonate, Chloride, Sulfates, Miscellaneous inorganic salts, Acid waters, Alkaline waters, suspended particles), Organic impurities (Waters carrying sanitary sewage, Sugar, Algae) (2 hrs).

- Aggregates in Concrete: Definition, Characteristics (Particle shape, Surface texture, Bulk density (unit weight) and voids, Relative density (Specific gravity), Absorption and moisture conditions, Alkali-silica reaction (ASR), Sampling, Grading) (4 hrs).

- Chemical Admixtures for Concrete: Definition, Reasons, Classes (Retarding admixtures, Accelerating admixtures, Water-reducing admixtures) (2 hrs).

- Fresh Properties of Concrete: Introduction, Fresh properties (Workability (Factors affecting, Measurement), Segregation, Bleeding, Plastic shrinkage), Composition of fresh concrete (Unit weight (Density), Yield, Cement factor) (6 hrs).

- Hardened Properties of Concrete: Strength (Compressive strength, Factors affecting compressive strength, Tensile strength, Flexure strength, Modulus of elasticity, Poisson's ratio, Shrinkage, Creep) (8 hrs).

#### **b- Topics of Experimental Part:**

- An exploratory tour of the construction materials testing laboratory to identify the devices and tests available there in, in addition to how to prepare the engineering report for the experiment according to the relevant structure (2 hrs).

- Standard consistency and initial setting time of the cement paste using Vicat apparatus (2 hrs).

- Compressive strength of the cement mortar cubes and tensile strength of the cement mortar brackets (2 hrs).

- Sieve analysis of the aggregate (Fine and Coarse) (2 hrs).

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>- Specific gravity, unit weight, surface moisture, and absorption capacity of the aggregate (4 hrs).</li> <li>- Properties of the fresh concrete (Workability, Proportion of sand, Unit weight) (2 hrs).</li> <li>- Capping, Relationship between the compressive strength of cubic specimen and compressive strength of cylindrical specimen (2 hrs).</li> <li>- Steel reinforcement test (2 hrs).</li> <li>- Masonry units tests (Red clay brick, Concrete block, Terrazzo, and Ceramic tiles) (4 hrs).</li> <li>- Non-destructive tests (Rebound hammer, Core test, Ultrasonic pulse velocity test, Load test) (6 hrs).</li> </ul> <p><b>2- Building Technology Topics:</b></p> <ul style="list-style-type: none"> <li>- General introduction of buildings, Stage of construction buildings, Steps to achieve any engineering project, Development of building construction, Definition and importance of feasibility study (2 hrs).</li> <li>- Earth excavations, Cracking rocks, Groundwater drainage, Soil fillings &amp; compaction (4 hrs).</li> <li>- Foundation depth, Soil &amp; foundation, Types of foundation, Settlement of foundation (4 hrs).</li> <li>- Concrete production: Mixing, Transporting, Placing, Compaction and finishing, Curing, Specifications and precautions (4 hrs).</li> <li>- Types of bricks, Manufacture of bricks, Blocks, Types of build in brick &amp; block, Types of binders (2 hrs).</li> <li>- Types of molds, Loads on mold, Types of scaffolding, Special types of molds (2 hrs).</li> <li>- Lintels, Type of lintels, Columns, Classification of columns (2 hrs).</li> <li>- Load on floors &amp; slabs, Finishing of floors &amp; slabs (2 hrs).</li> <li>- Moisture damages, Moisture proof materials, Treatment of moisture in old buildings (2 hrs).</li> <li>- Finishing of walls from inside &amp; outside, Paintings, General notes of finishing (2 hrs).</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                              |
|--|--------------------------------------------------------------|
|  | - Stairs, types of stairs, Moving stairs, Elevators (2 hrs). |
|--|--------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | This course has several components that include lectures, laboratory and field visits. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا       |            |                                                                           |     |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 93         | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 6.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 57         | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3.8 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>151</b> |                                                                           |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                         |             |                |                                              |                           |
|---------------------------------------------------|-------------------------|-------------|----------------|----------------------------------------------|---------------------------|
|                                                   |                         | Time/Number | Weight (Marks) | Week Due                                     | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>          | 12          | 24% (2)        | 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, and 15 | All                       |
|                                                   | <b>Seminar</b>          | 1           | 3% (3)         | 10                                           | All                       |
|                                                   | <b>Lab./Report</b>      | 5           | 5% (1)         | 1,2,3,4,5,6, 7,8,9,10, 11,12,13,14, and 15   | All                       |
|                                                   | <b>Practical Report</b> | 8           | 8% (1)         | 1,2,3,4,5,6, 7,8,9,10, 11,12,13,14, and 15   | All                       |
| <b>Summative</b>                                  | <b>Midterm</b>          | 2hr         | 10% (10)       | 7                                            | CLO-1, CLO-2,             |



|                  |            |     |                  |    |              |
|------------------|------------|-----|------------------|----|--------------|
| assessment       | Exam       |     |                  |    | CLO-5, CLO-6 |
|                  | Final Exam | 3hr | 50% (50)         | 16 | All          |
| Total assessment |            |     | 100% (100 Marks) |    |              |

| Delivery Plan (Weekly Syllabus)      |                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري              |                                                                                                                                                                                                                                                                                                                      |
|                                      | Material Covered                                                                                                                                                                                                                                                                                                     |
| <b>Week 1</b><br>Concrete Technology | Introduction to Concrete: Concrete definition, Concrete composition, Concrete classification, Concrete characteristics, Concrete mix ratios (Conservation of mix weight ratios to volume ratios, Rich and lean concrete mixes).                                                                                      |
| <b>Week 1</b><br>Building Technology | General introduction of buildings, Stage of construction buildings, Steps to achieve any engineering project, Development of building construction, Definition and importance of feasibility study.                                                                                                                  |
| <b>Week 2</b><br>Concrete Technology | Cement: Cement definition, Manufacture of Portland cement, Chemical composition of Portland cement clinker, Control Ratios, Phase composition of Portland cement clinker, Physical properties of cement (Compressive strength, Setting time, Early stiffening (False set and flash set), Particle size and fineness. |
| <b>Week 2</b><br>Building Technology | Earth excavations, Cracking rocks.                                                                                                                                                                                                                                                                                   |
| <b>Week 3</b><br>Concrete Technology | Cement: Soundness, Consistency, Heat of hydration, Loss on ignition, Density and relative density (Specific gravity), Bulk density), Types of Portland cement (Main types, Blended cements, Special cements).                                                                                                        |
| <b>Week 3</b><br>Building Technology | Groundwater drainage, Soil fillings & compaction.                                                                                                                                                                                                                                                                    |
| <b>Week 4</b><br>Concrete Technology | Mixing Water for Concrete: Introduction, Effects of impurities in mixing water on concrete properties (Alkali carbonate and bicarbonate, Chloride, Sulfates, Miscellaneous inorganic salts, Acid waters, Alkaline waters, suspended particles), Organic impurities (Waters carrying sanitary sewage, Sugar, Algae).  |
| <b>Week 4</b><br>Building Technology | Foundation depth, Soil & foundation.                                                                                                                                                                                                                                                                                 |
| <b>Week 5</b><br>Concrete Technology | Aggregates in Concrete: Definition, Characteristics (Particle shape, Surface texture, Bulk density (unit weight) and voids, Relative density (Specific gravity).                                                                                                                                                     |
| <b>Week 5</b><br>Building Technology | Types of foundation, Settlement of foundation.                                                                                                                                                                                                                                                                       |
| <b>Week 6</b><br>Concrete Technology | Aggregates in Concrete: Absorption and moisture conditions, Alkali-silica reaction (ASR), Sampling, Grading.                                                                                                                                                                                                         |
| <b>Week 6</b><br>Building Technology | Concrete production: Mixing, Transporting, Placing.                                                                                                                                                                                                                                                                  |

|                                       |                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Technology</b>                     |                                                                                                                                            |
| <b>Week 7</b><br>Concrete Technology  | Chemical Admixtures for Concrete: Definition, Reasons, Classes (Retarding admixtures, Accelerating admixtures, Water-reducing admixtures). |
| <b>Week 7</b><br>Building Technology  | Concrete production: Compaction and finishing, Curing, Specifications and precautions                                                      |
| <b>Week 8</b><br>Concrete Technology  | Fresh Properties of Concrete: Introduction, Fresh properties (Workability (Factors affecting, Measurement).                                |
| <b>Week 8</b><br>Building Technology  | Types of bricks, Manufacture of bricks, Blocks, Types of build in brick & block, Types of binders.                                         |
| <b>Week 9</b><br>Concrete Technology  | Fresh Properties of Concrete: Segregation, Bleeding.                                                                                       |
| <b>Week 9</b><br>Building Technology  | Types of molds, Loads on mold, Types of scaffolding, Special types of molds.                                                               |
| <b>Week 10</b><br>Concrete Technology | Fresh Properties of Concrete: Plastic shrinkage, Composition of fresh concrete (Unit weight (Density), Yield, Cement factor).              |
| <b>Week 10</b><br>Building Technology | Lintels, Type of lintels, Columns, Classification of columns.                                                                              |
| <b>Week 11</b><br>Concrete Technology | Hardened Properties of Concrete: Strength (Compressive strength, Factors affecting compressive strength).                                  |
| <b>Week 11</b><br>Building Technology | Load on floors & slabs, Finishing of floors & slabs.                                                                                       |
| <b>Week 12</b><br>Concrete Technology | <b>Scientific Visit.</b>                                                                                                                   |
| <b>Week 12</b><br>Building Technology |                                                                                                                                            |
| <b>Week 13</b><br>Concrete Technology | Hardened Properties of Concrete: Tensile strength, Flexure strength, Modulus of elasticity, Poisson's ratio.                               |
| <b>Week 13</b><br>Building Technology | Moisture damages, Moisture proof materials, Treatment of moisture in old buildings.                                                        |
| <b>Week 14</b><br>Concrete Technology | Hardened Properties of Concrete: Shrinkage, Creep.                                                                                         |
| <b>Week 14</b><br>Building Technology | Finishing of walls from inside & outside, Paintings, General notes of finishing.                                                           |
| <b>Week 15</b>                        | Hardened Properties of Concrete: Creep.                                                                                                    |

|                                       |                                                    |
|---------------------------------------|----------------------------------------------------|
| Concrete Technology                   |                                                    |
| <b>Week 15</b><br>Building Technology | Stairs, types of stairs, Moving stairs, Elevators. |
| <b>Week 16</b>                        | <b>Final Exam.</b>                                 |

| Delivery Plan (Weekly Lab. Syllabus) |                                                                                                                                                                                                                                                           |                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| المنهاج الاسبوعي للمختبر             |                                                                                                                                                                                                                                                           |                           |
|                                      | Material Covered                                                                                                                                                                                                                                          |                           |
| Week 1                               | An exploratory tour of the construction materials testing laboratory to identify the devices and tests available there in, in addition to how to prepare the engineering report for the experiment according to the relevant structure.                   |                           |
| Week 2                               | Standard consistency and initial setting time of the cement paste using Vicat apparatus.                                                                                                                                                                  |                           |
| Week 3                               | Compressive strength of the cement mortar cubes and tensile strength of the cement mortar brackets.                                                                                                                                                       |                           |
| Week 4                               | Sieve analysis of the aggregate (Fine and Coarse).                                                                                                                                                                                                        |                           |
| Week 5                               | Specific gravity, unit weight, surface moisture, and absorption capacity of the aggregate.                                                                                                                                                                |                           |
| Week 6                               |                                                                                                                                                                                                                                                           |                           |
| Week 7                               | Properties of the fresh concrete (Workability, Proportion of sand, Unit weight).                                                                                                                                                                          |                           |
| Week 8                               | Capping, Relationship between the compressive strength of cubic specimen and compressive strength of cylindrical specimen.                                                                                                                                |                           |
| Week 9                               | Steel reinforcement test.                                                                                                                                                                                                                                 |                           |
| Week 10                              | Masonry units tests (Red clay brick, Concrete block, Terrazzo, and Ceramic tiles).                                                                                                                                                                        |                           |
| Week 11                              |                                                                                                                                                                                                                                                           |                           |
| Week 12                              | Scientific Visit.                                                                                                                                                                                                                                         |                           |
| Week 13                              | Non-destructive tests (Rebound hammer test).                                                                                                                                                                                                              |                           |
| Week 14                              | Non-destructive tests (Core test).                                                                                                                                                                                                                        |                           |
| Week 15                              | Non-destructive tests (Ultrasonic pulse velocity test, Load test).                                                                                                                                                                                        |                           |
| Learning and Teaching Resources      |                                                                                                                                                                                                                                                           |                           |
| مصادر التعلم والتدريس                |                                                                                                                                                                                                                                                           |                           |
|                                      | Text                                                                                                                                                                                                                                                      | Available in the Library? |
| Required Texts                       | <ul style="list-style-type: none"><li>S. H. Kosmatka and M. L. Wilson, Design and Control of Concrete Mixtures, Portland Cement Association, Fifteenth Edition Print History, USA, 2011.</li><li>Z. Sacko and A. Levon, Buildings Construction,</li></ul> | Yes                       |

|                          |                                                                                                                                                                                                               |     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                          | University of Baghdad, College of Engineering, Department of Civil Engineering, Iraq, 2007.                                                                                                                   |     |
| <b>Recommended Texts</b> | <ul style="list-style-type: none"> <li>G. Owens, Fulton's Concrete Technology, Cement &amp; Concrete Institute, Printing and Binding by Intrepid Printers (Pty) LTD, Midrand (South Africa), 2009.</li> </ul> | Yes |
| <b>Websites</b>          | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a>                                                     |     |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                                    |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|----------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                                    |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | Survey Applications and GIS                        |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | S                                                  |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | ENV223                                             |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | 6                                                  |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | 150                                                |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | LEVEL 2                                            | Semester of Delivery          | 4                                                                                                                                                                                                                                                   |
| Administering Department           | ENV8                                               | College                       | ENG4                                                                                                                                                                                                                                                |
| Module Leader                      | Dr. Kaythar A. Ibrahim                             | e-mail                        | Kaythar6871@uomosul.edu.iq                                                                                                                                                                                                                          |
| Module Leader's Acad. Title        | Assistant Profissor                                | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Prof. Sabah Hussein Ali<br>Mr. Ahmed Yassen Shehab | e-mail                        | sabah196004@uomosul.edu.iq                                                                                                                                                                                                                          |
| Peer Reviewer Name                 |                                                    | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 1/12/2024                                          | Version Number                | 1                                                                                                                                                                                                                                                   |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Objectives</b><br>أهداف المادة الدراسية                | The semester aims to teach students how to deal with an ArcGIS10.6 program So that the student can open the windows of the program, import spatial and vector data, and editing this data, as well as adding and updating new field data. In addition, semester aims to teach students global position systems (GIS). The course also aims to teach students how to use the total station device to upload surveys and drop maps |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <b>CLO-1</b> Learning maps modeling through the elements of the arcgis10.6 program<br><b>CLO-2</b> Learning how to adjust the geodes system of maps and site using GPS<br><b>CLO-3</b> Using Total Station in surveying works.                                                                                                                                                                                                   |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | GIS was created to solve problems. Using GIS in education helps students frame, visualize, and grapple with problems. It even enables students to create solutions to those problems, whether they are about natural hazards, climate, urban greenways, litter, energy, social inequity, or other complex issues of our day                                                                                                      |

| Learning and Teaching Strategies |                                                                                                                        |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| استراتيجيات التعلم والتعليم      |                                                                                                                        |
| <b>Strategies</b>                | This course has several components that include classes & lecture exams. The Arabic language is adopted in this course |

| Student Workload (SWL)                                                         |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا                                        |     |                                                                           |     |
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 78  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4.8 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                           |     |

| Module Evaluation     |                     |             |                  |          |                           |
|-----------------------|---------------------|-------------|------------------|----------|---------------------------|
| تقييم المادة الدراسية |                     |             |                  |          |                           |
|                       |                     | Time/Number | Weight (Marks)   | Week Due | Relevant Learning Outcome |
| Formative assessment  | Quizzes             | 2           | 10% (10)         |          | CLO-1, CLO-2              |
|                       | Online assignments  | 2           | 10%( 10)         |          | CLO-1, CLO-2              |
|                       | On site assignments | 0           |                  |          |                           |
|                       | Projects / Lab.     | 5           | 20% (20)         |          | ALL                       |
| Summative assessment  | Midterm Exam        |             | 10% (10)         |          | CLO-1, CLO-2              |
|                       | Final Exam          |             | 50%(50)          |          | All                       |
| Total assessment      |                     |             | 100% (100 Marks) |          |                           |

| Delivery Plan (Weekly Syllabus) |                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                    |
|                                 | Material Covered (Surveying Application)                                                           |
| Week 1-2                        | Introduction to the total station. How to calculate coordinates and Total Station                  |
| Week 3-4                        | Explaining the main components of Total station and how to prepare it for work                     |
| Week 5-6                        | Setting up the total station through the station's coordinates and angle.                          |
| Week 7-8                        | Setting up the total station through the station's coordinates and another point                   |
| Week 9-10                       | Setting up the total station through required point and angle (Local Resection)                    |
| Week 11-12                      | Setting up the total station through two points coordinates (Resection)<br>Surveying & setting out |
| Week 13-15                      | Surveying & setting out                                                                            |

| Delivery Plan (Weekly Syllabus) |                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------|
| المنهاج الاسبوعي النظري         |                                                                                                   |
|                                 | Material Covered (GIS)                                                                            |
| Week 1-2                        | Introduction to GIS What's GIS, the historical development, the application and Importance of GIS |
| Week 3-4                        | Difference between Raster and vector                                                              |
| Week 5-6                        | Review of the ArcGIS10.6 windows and the installation methods                                     |

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| <b>Week 7-8</b>   | Created shape files of line, polyline and polygon for wells and towers |
| <b>Week 9-10</b>  | Spatial and attribute tables                                           |
| <b>Week 11-12</b> | How to add field to attribute tables                                   |
| <b>Week 13-15</b> | GPS and geodetic system                                                |
| <b>Week 16</b>    | Preparatory week before the final Exam                                 |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                |                                  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                    | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Geographical Information System ( Arabia Saudi ).<br>Leica FlexLine TS02/TS06/TS09 User manual |                                  |
| <b>Recommended Texts</b>                                               | GIS and Remote sensing .. principle and application                                            |                                  |
| <b>Websites</b>                                                        | <a href="https://www.facebook.com/Hatem.Tarek.G">https://www.facebook.com/Hatem.Tarek.G</a>    |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |                |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------------|---------------------------------------|
| <b>Group</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A - Excellent</b>    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)         | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |                |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |                |                                       |



# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                                                                            |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                                                                            |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| Module Title                       | Microbiology                                                                               | Module Delivery                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| Module Type                        | Support                                                                                    | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                                                                                                                                                                                                                                                      |
| Module Code                        | ENV224                                                                                     |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| ECTS Credits                       | 6                                                                                          |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| SWL (hr/sem)                       | 150                                                                                        |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| Module Level                       | 2                                                                                          |                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                      |
| Administering Department           | ENV8                                                                                       | College                                                                                                                                                                                                                                  | ENG4                                                                                                                                                                                                                                                                                                                 |
| Module Leader                      | Dr. Shafaq Tariq Burhan                                                                    | e-mail                                                                                                                                                                                                                                   | <a href="mailto:Shasbio108@uomosul.edu.iq">Shasbio108@uomosul.edu.iq</a>                                                                                                                                                                                                                                             |
| Module Leader's Acad. Title        | Lecturer                                                                                   | Module Leader's Qualification                                                                                                                                                                                                            | PhD                                                                                                                                                                                                                                                                                                                  |
| Module Tutor                       | Waad Mohammed Ali Abbas<br>Nadia Afram Yaqoob<br>Aya Thamer Ibrahim<br>Aisha Mohanad Yahya | e-mail                                                                                                                                                                                                                                   | <a href="mailto:waadd1976@uomosul.edu.iq">waadd1976@uomosul.edu.iq</a><br><a href="mailto:n.alrhmany@uomosul.edu.iq">n.alrhmany@uomosul.edu.iq</a><br><a href="mailto:aya.thamer@uomosul.edu.iq">aya.thamer@uomosul.edu.iq</a><br><a href="mailto:aisha.almokhtar@uomosul.edu.iq">aisha.almokhtar@uomosul.edu.iq</a> |
| Peer Reviewer Name                 | -----                                                                                      | e-mail                                                                                                                                                                                                                                   | E-mail                                                                                                                                                                                                                                                                                                               |
| Scientific Committee Approval Date | 12/10/2024                                                                                 | Version Number                                                                                                                                                                                                                           | 1.0                                                                                                                                                                                                                                                                                                                  |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b> أهداف<br>المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                         | In Environmental Microbiology, initially students will learn how to deal with different types of microorganisms and it's useful in designing wastewater and water treatment plant .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | <p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p>CLO-1: How classify the microorganism.</p> <p>CLO-2: The structure of microorganism.</p> <p>CLO-3: Bacterial Morphologies.</p> <p>CLO-4: Identification of microorganisms and their activities.</p> <p>CLO-5: How to disinfect drinking water from pathogens.</p> <p>CLO-6: How to induce water pollution by pathogens.</p> <p>CLO-7: How waste water is treated biologically using microorganisms.</p> <p>CLO-8: Factors affecting on microorganisms.</p> <p>CLO-9: Learning everything regarding microorganisms that may be need them in other environmental engineering subjects in next stages.</p> <p>CLO-10: How to use the microscope.</p> <p>CLO-11: How to test the pollution indicators in water.</p> <p>CLO-12: How to test E. Coli in water samples.</p> <p>CLO-13: Gram staining procedure.</p> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | <p style="color: red;">Indicative content includes the following.</p> <p><b>Part A:</b> Introduction to Microbiology as a science<br/> Microorganisms as cells<br/> Microorganisms and their natural environments<br/> Impact of microorganisms on humans<br/> A brief history of microbiology and recent advances.</p> <p><b>Part B:</b> The scope of microbial diversity is enormous and microorganisms have exploited every means of making a living consistent with the laws of chemistry and physics</p> <p><b>Part C:</b> The “Central Dogma” relates how biological information flows through a cell by a series of macromolecules that are governed by chemical actions.</p> <p><b>Part D:</b> Microbial ecology – study of the interaction of microorganisms with each other and their environment .</p>                                                                                                      |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | To enhance the understanding of microbial function in engineering system, initially students must be learned how to deal with different types of microorganisms and it's useful in designing wastewater and water treatment plant. Also microorganisms play an important role in the protection of humans, animals, plants, air, soil, and engineer in systems from chemical or biological pollution, deterioration, and corrosion, and in the restoration polluted and degraded environments. |

| Student Workload (SWL)                                                  |     |                                                                    |     |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا                                 |     |                                                                    |     |
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4.1 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                    |     |

| Module Evaluation     |                 |             |                  |                    |                                   |
|-----------------------|-----------------|-------------|------------------|--------------------|-----------------------------------|
| تقييم المادة الدراسية |                 |             |                  |                    |                                   |
|                       |                 | Time/Number | Weight (Marks)   | Week Due           | Relevant Learning Outcome         |
| Formative assessment  | Quizzes         | 4           | 16 % (16)        | 2, 3, ,12 and 14   | CLO-1, CLO-2, CLO-3, CLO-5        |
|                       | Assignments     | 5           | 10 % (10)        | 2, 3, 4, 6, and 10 | CLO-2, CLO-2, CLO-3, CLO-2, CLO-3 |
|                       | Projects / Lab. | 6           | 10% (10)         | 13                 | CLO-2 to CLO-6                    |
|                       | Report          | 1           | 4 % (4)          |                    | All                               |
| Summative assessment  | Midterm Exam    | 2hr         | 10% (10)         | 7                  | CLO-1, CLO -2 and CLO-3           |
|                       | Final Exam      | 3hr         | 50% (50)         | 16                 | All                               |
| Total assessment      |                 |             | 100% (100 Marks) |                    |                                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                                                                                                                                                                                                                    |
| <b>Week 1&amp;2</b>                                               | <b>Introduction to Microbiology</b><br>Why we are concerning for studying Environmental Microbiology, and Germ theory.                                                                                                                                     |
| <b>Week 3</b>                                                     | <b>Classification the microorganisms</b><br>Studying different types of classifications of microorganisms and Bacterial morphologies.                                                                                                                      |
| <b>Week 4&amp;5</b>                                               | <b>Bacterial cell chemistry</b><br>Studying microorganisms cell structure and cell chemistry.                                                                                                                                                              |
| <b>Week 6&amp;7</b>                                               | <b>Bacterial growth in batch system and continuous flow system</b><br>Expecting the number of generated bacteria and effect of reactor type on it, also substrate and other components effects on the microorganism's activities, as well as mass balance. |
| <b>Week 8</b>                                                     | <b>Microorganisms in water and bacterial content</b><br>The types of pathogens and its indicators, standards specifications of drinking water.                                                                                                             |
| <b>Week 9</b>                                                     | <b>Detection of evidence of water contamination</b> Coliform and fecal bacteria, viruses.                                                                                                                                                                  |
| <b>Week 10&amp;11</b>                                             | <b>Use the microscope and prepare the slides for examination</b> Laboratory lectures for practical testing.                                                                                                                                                |
| <b>Week 12</b>                                                    | <b>Most probability number test for coiform bacteria</b><br>The most important test for environmental engineers for pollution indicators                                                                                                                   |
| <b>Week 13&amp;14</b>                                             | <b>Biological treatment</b><br>Role of microorganisms in biological treatment of wastewater and the factors that effect on microorganisms activities in wastewater.                                                                                        |
| <b>Week 15</b>                                                    | <b>Review before the final Exam</b>                                                                                                                                                                                                                        |

| Delivery Plan (Weekly Lab. Syllabus) |                                                                                                                                                                                                           |                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| المنهاج الاسبوعي للمختبر             |                                                                                                                                                                                                           |                           |
|                                      | Material Covered                                                                                                                                                                                          |                           |
| Week 1                               | Laboratory Safety                                                                                                                                                                                         |                           |
| Week 2                               | Sterilization and Disinfection                                                                                                                                                                            |                           |
| Week 3                               | The microscope                                                                                                                                                                                            |                           |
| Week 4 & 5                           | Shapes of bacteria                                                                                                                                                                                        |                           |
| Week 6 & 7                           | Gram staining procedure                                                                                                                                                                                   |                           |
| Week 8 & 9                           | Handling of bacteria cultures                                                                                                                                                                             |                           |
| Week 10 & 11                         | Examination of indicator organisms in water                                                                                                                                                               |                           |
| Week 12 & 13                         | Final exam                                                                                                                                                                                                |                           |
| Learning and Teaching Resources      |                                                                                                                                                                                                           |                           |
| مصادر التعلم والتدريس                |                                                                                                                                                                                                           |                           |
|                                      | Text                                                                                                                                                                                                      | Available in the Library? |
| Required Texts                       | ● Environmental Microbiology for Engineers’ by Volodymyr Ivanov.                                                                                                                                          | Yes                       |
| Recommended Texts                    | ● Environmental microbiology-Academic Press (2014), by Ian L Pepper, Charles P Gerba and Terry J Gentry<br>● Principles of Environmental Engineering and Science, Mackenzie L. Davis and Susan J. Masten. | Yes                       |
|                                      | APHA, AWWA, WPCF “Standard method for the examination of water and wastewater”, 1985.                                                                                                                     |                           |
|                                      | Laboratory Exercises in Microbiology , Joan Petersen and Susan McLaughlin, City University of New York, CUNY Academic Works , 2016                                                                        |                           |
|                                      | "Practical Microbial physiology", Nawal M. Otba and et. al., Department of Biology, College of Science, University of Baghdad, 2021.                                                                      |                           |
| Websites                             |                                                                                                                                                                                                           |                           |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A</b> – Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> – Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> – Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                        |                               |                                   |                                                                                                                                                                                                                                          |
|-------------------------------------------|-------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية                   |                               |                                   |                                                                                                                                                                                                                                          |
| Module Title<br>اسم المنهج                | اللغة العربية                 |                                   | Module Delivery                                                                                                                                                                                                                          |
| Module Type<br>نوع المنهج                 | اساسي                         |                                   | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code<br>رمز المنهج                 | UOM2012                       |                                   |                                                                                                                                                                                                                                          |
| ECTS Credits<br>عدد الوحدات               | 2                             |                                   |                                                                                                                                                                                                                                          |
| SWL (hr/sem)<br>الحمل الكلي               | 50                            |                                   |                                                                                                                                                                                                                                          |
| Module Level / المستوى                    | 2                             | Semester of Delivery / سحب المنهج |                                                                                                                                                                                                                                          |
| Administering Department<br>القسم الإداري | هندسة السدود والموارد المائية | College<br>الكلية                 | الهندسة                                                                                                                                                                                                                                  |
| Module Leader<br>اسم التدريسي             | هدى رعد شريف                  | e-mail<br>البريد الالكتروني       | huda.shareef@uomosul.edu.iq                                                                                                                                                                                                              |
| Module Leader's Acad. Title               | -----                         | Module Leader's Qualification     | -----                                                                                                                                                                                                                                    |
| Module Tutor                              | -----                         | e-mail                            | -----                                                                                                                                                                                                                                    |
| Peer Reviewer Name                        | -----                         | e-mail                            | E-mail-----                                                                                                                                                                                                                              |
| Scientific Committee Approval Date        | 21/10/2024                    | Version Number                    | 2.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |         |          |  |
|-----------------------------------|---------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |         |          |  |
| Prerequisite module               | لا يوجد | Semester |  |
| Co-requisites module              | لا يوجد | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Module Objectives</b><br>أهداف المادة الدراسية                | الهدف من هذا الفصل الدراسي هو تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتصال مع الآخرين؛ كالسرعة وجودة الإلقاء وحسن التعبير، وتعويدده حسن الاستماع وتنمية الذوق الأدبي لدى الطالب وتعويدده على التعبيرات السليمة الواضحة.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <p><b>CLO1:</b> تعريف الطالب بضرورة ممارسة قواعد الكتابة والكلام باللغة العربية الفصيحة.</p> <p><b>CLO2:</b> تعريف الطالب بمستويات نظام اللغة العربية</p> <p><b>CLO3:</b> تعميق اتصال الطالب بالتراث العربي والإسلامي.</p> <p><b>CLO4:</b> تعزيز البحث العلمي في مجال اللغة العربية وعلومها لإعداد الدراسات والبحوث.</p> <p><b>CLO5:</b> إظهار جمال اللغة العربية واتساع معانيها واساليبها الإنشائية.</p> <p><b>CLO6:</b> تمكين الطالب من تجاوز الأخطاء اللغوية وتصحيحها.</p> <p><b>CLO7:</b> تنمية الذوق الأدبي لدى الطالب لإدراك النواحي الجمالية في أسلوب الكلام وصوره ومعانيه.</p> <p><b>CLO8:</b> التعريف بأبرز شعراء العصر العباسي.</p>                                                                                                                                                                                              |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | <p><b>الجزء الأول: (6 ساعات)</b></p> <ul style="list-style-type: none"> <li>• قواعد اللغة العربية (النحو)</li> <li>• المبتدأ والخبر</li> <li>• نواسخ المبتدأ والخبر</li> </ul> <p><b>الجزء الثاني: (6 ساعات)</b></p> <ul style="list-style-type: none"> <li>• كان واخواتها</li> <li>• إن واخواتها</li> <li>• ظن واخواتها</li> </ul> <p><b>الجزء الثالث: (6 ساعات)</b></p> <ul style="list-style-type: none"> <li>• الامتحان الفصلي</li> <li>• الأسماء المنصوبة</li> <li>• المفعول المطلق</li> </ul> <p><b>الجزء الرابع: (4 ساعات)</b></p> <ul style="list-style-type: none"> <li>• الأخطاء اللغوية</li> <li>• الأملاء</li> </ul> <p><b>الجزء الخامس: (8 ساعات)</b></p> <ul style="list-style-type: none"> <li>• الادب في العصر العباسي</li> <li>• الشاعر المتنبي</li> <li>• الشاعر أبو تمام</li> <li>• الشاعر أبو فراس الحمداني</li> </ul> |
| Learning and Teaching Strategies                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



| استراتيجيات التعلم والتعليم                                             |                                        |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
|-------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------|---------------------------|
| Strategies<br>الاستراتيجيات                                             |                                        | إنَّ الغاية الأساسية من دروس اللغة العربية هو القضاء على الصعوبة والجمود الذي قد يصاحب مواضيع بعض هذه الدروس، بالإضافة إلى إيصال الأفكار والمعلومات المطلوبة إلى الطلاب بطرق مفهومة وتناسب الفروقات الفردية بينهم، ومن أبرز ما تم التركيز عليه في المحاضرات هو قواعد اللغة العربية والأدب وتتمثل الدراسة بالمحاضرات والامتحانات والواجبات داخل الصف والمناقشة والواجبات المنزلية. |                                                                    |            |                           |
| Student Workload (SWL)<br>الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا       |                                        |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطلاب خلال الفصل       |                                        | 33                                                                                                                                                                                                                                                                                                                                                                                | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطلاب أسبوعيا       |            | 2.2                       |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل |                                        | 17                                                                                                                                                                                                                                                                                                                                                                                | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا |            | 1.1                       |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              |                                        | 50                                                                                                                                                                                                                                                                                                                                                                                |                                                                    |            |                           |
| Module Evaluation<br>تقييم المادة الدراسية                              |                                        |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
|                                                                         |                                        | Time/Number                                                                                                                                                                                                                                                                                                                                                                       | Weight (Marks)                                                     | Week Due   | Relevant Learning Outcome |
| Formative Assessment<br>التقويم التكويني                                | Quizzes<br>الكويز                      | 3                                                                                                                                                                                                                                                                                                                                                                                 | 5% (15)                                                            | 4,8 and 10 | All                       |
|                                                                         | H.W Assignments<br>الواجبات البيتية    | 2                                                                                                                                                                                                                                                                                                                                                                                 | 5% (10)                                                            | 6, 7       | CLO4, CLO5, and CLO6      |
|                                                                         | Seminars<br>السمنار                    | 1                                                                                                                                                                                                                                                                                                                                                                                 | 5% (5)                                                             | 12         | All                       |
|                                                                         | On-site Assignment<br>واجبات داخل الصف | 2                                                                                                                                                                                                                                                                                                                                                                                 | 5% (10)                                                            | 6, 10      | CLO4, CLO5, and CLO6      |
| Summative Assessment<br>التقويم التلخيصي                                | Midterm Exam<br>امتحان نصف الفصل       | 2 hrs                                                                                                                                                                                                                                                                                                                                                                             | 10% (10)                                                           | 7          | All                       |
|                                                                         | Final Exam<br>الامتحان النهائي         | 3 hrs                                                                                                                                                                                                                                                                                                                                                                             | 50% (50)                                                           | 16         | All                       |
| Total Assessment / التقويم النهائي                                      |                                        |                                                                                                                                                                                                                                                                                                                                                                                   | 100% (100 Marks)                                                   |            |                           |
| Delivery Plan (Weekly Syllabus)<br>المناهج الاسبوعي النظري              |                                        |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
|                                                                         | Material Covered / المواضيع المغطاة    |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
| Week 1                                                                  | قواعد اللغة العربية (النحو)            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
| Week 2                                                                  | المبتدأ والخبر                         |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |
| Week 3                                                                  | نواسخ المبتدأ والخبر                   |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    |            |                           |

|         |                          |
|---------|--------------------------|
| Week 4  | كان واخواتها             |
| Week 5  | إن واخواتها              |
| Week 6  | ظن واخواتها              |
| Week 7  | الامتحان الفصلي          |
| Week 8  | الأسماء المنصوبة         |
| Week 9  | المفعول المطلق           |
| Week 10 | الأخطاء اللغوية          |
| Week 11 | الأملاء                  |
| Week 12 | الادب في العصر العباسي   |
| Week 13 | الشاعر المتنبي           |
| Week 14 | الشاعر أبو تمام          |
| Week 15 | الشاعر أبو فراس الحمداني |
| Week 16 | الامتحان النهائي         |

### Delivery Plan (Weekly Lab. Syllabus)

|        | Material Covered / المواضيع المغطاة |
|--------|-------------------------------------|
| Week 1 | لا يوجد                             |
| Week 2 | لا يوجد                             |
| Week 3 | لا يوجد                             |
| Week 4 | لا يوجد                             |
| Week 5 | لا يوجد                             |
| Week 6 | لا يوجد                             |
| Week 7 | لا يوجد                             |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                                              | Text<br>الاسم                                                                                                                                             | Available in the Library?<br>هل متوفر في المكتبة؟ |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Required Texts</b><br>المنهج المطلوب      | النحو الوافي / عباس حسن                                                                                                                                   | نعم                                               |
| <b>Recommended Texts</b><br>المنهج الموصى به | في الأدب العباسي / محمد مهدي البصير                                                                                                                       | نعم                                               |
| <b>Websites</b><br>المواقع الالكترونية       | <a href="https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/">https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</a> |                                                   |

### Grading Scheme

مخطط الدرجات

| Group                               | Grade         | التقدير | Marks %  | Definition                     |
|-------------------------------------|---------------|---------|----------|--------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | A - Excellent | امتياز  | 90 - 100 | Outstanding Performance        |
|                                     | B - Very Good | جيد جدا | 80 - 89  | Above average with some errors |
|                                     | C - Good      | جيد     | 70 - 79  | Sound work with notable errors |

|                                |                  |                     |         |                                       |
|--------------------------------|------------------|---------------------|---------|---------------------------------------|
|                                | D - Satisfactory | متوسط               | 60 - 69 | Fair but with major shortcomings      |
|                                | E - Sufficient   | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b> | <b>FX – Fail</b> | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                | <b>F – Fail</b>  | راسب                | (0-44)  | Considerable amount of work required  |
|                                |                  |                     |         |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                                                |                               |                                                                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                                |                               |                                                                                                                                                                                                                                          |
| Module Title                       | Computer2                                      |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | Basic                                          |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | UOM2032                                        |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 3                                              |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | 75                                             |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 2                                              | Semester of Delivery          | 2                                                                                                                                                                                                                                        |
| Administering Department           | ENV8                                           | College                       | ENG4                                                                                                                                                                                                                                     |
| Module Leader                      | Abeer Khalil Ibraheem<br>Dr. Samir saadi yasso | e-mail                        | <a href="mailto:Abeer.alsaraf@uomosul.edu.iq">Abeer.alsaraf@uomosul.edu.iq</a><br><a href="mailto:syasso@uomosul.edu.iq">syasso@uomosul.edu.iq</a>                                                                                       |
| Module Leader's Acad. Title        | Assist Lecturer                                | Module Leader's Qualification | M.Sc.                                                                                                                                                                                                                                    |
| Module Tutor                       | Abeer Khalil Ibrahim                           | e-mail                        | <a href="mailto:abeer.alsaraf@uomosul.edu.iq">abeer.alsaraf@uomosul.edu.iq</a>                                                                                                                                                           |
| Peer Reviewer Name                 | Abeer Khalil Ibraheem                          | e-mail                        | Abeer.alsaraf@uomosul.edu.iq                                                                                                                                                                                                             |
| Scientific Committee Approval Date | 19/10/2024                                     | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                       |
| Module Aims<br>أهداف المادة الدراسية                     | The Module aim is to utilize the fundamental concepts and applications of Artificial Intelligence, machine learning, and neural networks. The course emphasizes both theoretical foundations and practical implementations using tools such as MATLAB |

|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Learning Outcomes</b><br><br>مخرجات التعلم للمادة الدراسية | 1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.<br>2. An ability to acquire and apply new knowledge and using appropriate learning strategies.<br>3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.<br>4. It is expected from the student who passes this module learn the computer components, security and networking, computer troubleshooting.<br>5. learning the application of AI. |
| <b>Indicative Contents</b><br><br>المحتويات الإرشادية                | Security and netwrking [6 hr]<br>E-commerce [4 hr]<br>computer troubleshooting [6 hr]<br>Memory type [6 hr]<br>Introduction to AI [6 hr]<br>application of AI.[8]<br>learning the basic of MATLAB program.[6 hr]<br>matrices in MATLAB . [6 hr]<br>Monthly LAB Exam [3 hr]<br>Applied examples using MATLAB. [6 hr]                                                                                                                                                                                                                                                   |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً      |    |                                                                            |     |
|--------------------------------------------------------------------------------|----|----------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 50 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 3.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 25 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 1.7 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 75 |                                                                            |     |

| Module Evaluation<br>تقييم المادة الدراسية |              |             |                |          |                           |
|--------------------------------------------|--------------|-------------|----------------|----------|---------------------------|
|                                            |              | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment                       | Quizzes      | 2           | 5% (10)        | 4, 11    | LO #Q1: 1-2, Q2: 7-9      |
|                                            | Assignments  | 2           | 2% (4)         | 3, 10    | LO #A1: 1-2, A2: 7-9      |
|                                            | Lab.         | 3           | 6% (18)        | 5,8,12   | All                       |
|                                            | seminar      | 1           | 8% (8)         | 7,8      | All                       |
| Summative assessment                       | Midterm Exam | 2 hr        | 10% (10)       | 9        | All                       |
|                                            | Final Exam   | 3hr         | 50% (50)       |          |                           |
| Total assessment                           |              |             | (100 Marks)    |          |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                |
|------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                                            | Material Covered                                                               |
| Week 1                                                     | computer hardware and software, Software and Hardware Interaction              |
| Week 2                                                     | Security and networking , what is the network, network types.                  |
| Week 3                                                     | Basic network components                                                       |
| Week 4                                                     | e-commerce, concept of electronic banking services, phone banking, SMS banking |
| Week 5                                                     | Computer troubleshooting                                                       |
| Week 6                                                     | Basic troubleshooting technique and tools                                      |
| Week 7                                                     | Introduction to AI, Define AI                                                  |
| Week 8                                                     | AI technique and approaches                                                    |
| Week 9                                                     | Monthly Exam                                                                   |
| Week 10                                                    | ethical consideration                                                          |
| Week 11                                                    | AI in our daily lifes                                                          |
| Week 12                                                    | Application of AI , education, healthcare, marketing.                          |
| Week 13                                                    | AI and society                                                                 |
| Week 14                                                    | challenges of AI                                                               |
| Week 15                                                    | The future of AI                                                               |
| Week 16                                                    | Preparatory week before the final Exam                                         |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المناهج الاسبوعي للمختبر |                                                                                          |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|                                                                         | Material Covered                                                                         |
| <b>Week 1,2</b>                                                         | Introduction to MATLAB, Understanding the MATLAB interface, Using the Command Window.    |
| <b>Week 3,4</b>                                                         | Programming Basics in MATLAB, Variables and data types, Arithmetic and logical operation |
| <b>Week 5,6,7</b>                                                       | Matrices in MATLAB, Creating 1D and 2D matrices                                          |
| <b>Week 8,9</b>                                                         | Solving Equations Using Matrices                                                         |
| <b>Week 10</b>                                                          | Control Flow – Learning the if Statement                                                 |
| <b>Week 11</b>                                                          | Monthly Exam                                                                             |
| <b>Week 12,13</b>                                                       | Loops Using for                                                                          |
| <b>Week 14,15</b>                                                       | Simple Practical Projects                                                                |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                   |                           |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                 | Text                                                                                                                                              | Available in the Library? |
| <b>Required Texts</b>                                           | 2015 Computer Literacy BASICS: A Comprehensive Guide to IC3<br>Connie Morrison, Dolores Wells, Lisa Ruffolo<br>Cengage Learning. ISBN: 128576658X | Available as PDF          |
| <b>Recommended Texts</b>                                        | Ahmed Banafa { introduction to Artificial Intelligence (AI)} 1'st addition (2024)<br>مدخل الى عالم الذكاء الاصطناعي (2005) الدكتور عادل عبد النور | Available as PDF          |
| <b>Websites</b>                                                 | Google Classroom                                                                                                                                  |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks (%) | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |           |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |           |                                       |