# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Elementary Statistics I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT101** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 1 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Khairy Badal Rasheed | | **e-mail** | Khairy-stat@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecture | | **Module Leader's Qualification** | Msc. | |
| **Module Tutor** | Shaimaa Waleed Mahmood | | **e-mail** | shaimaa.waleed@uomosul.edu.iq | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- Give the learner the statistical skills that enable him to work in the fields of statistic, calculating measures of statistic.<br>2- The subject of statistics is a digital language and an art to express the variables and numbers accurately, and thus enables the student to benefit from this subject in the statistics and the programs that are important to him in most fields of life.<br>3- Statistics course aims to develop ways and means of thinking and how to deal with various problems.<br>4- Trying to think in sound ways and methods, specifically in solving problems and thus improving and developing society. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Understand the fundamental concepts and principles of statistics, including data types, measurement scales, and sampling methods.<br>2- Interpret and analyze data using descriptive statistical measures, such as measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation).<br>3- Apply probability theory to analyze and make predictions about uncertain events, including calculating probabilities and understanding the laws of probability.<br>4- Utilize basic principles of statistical inference to draw conclusions about a population based on sample data, including hypothesis testing and confidence intervals.<br>5- Apply appropriate statistical techniques for analyzing relationships between variables, including correlation analysis and simple linear regression.<br>6- Understand and interpret the results of statistical software output and graphical representations.<br>7- Communicate statistical findings and interpretations effectively, both orally and in written form.<br>8- Develop critical thinking and problem-solving skills in the context of statistical analysis and interpretation. |
| **Indicative Contents**<br>المحتويات الإرشادية | 1- familiarize students with the basics of statistics, its fields of application.<br>2- the statistical method in scientific research, methods of data collection.<br>3- classification and presentation for the purpose of obtaining the necessary information to make appropriate decisions and the possibility of using this data in prediction, in addition to developing students.<br>4- skills in research design method.<br>5- bringing the student to a level where he has the ability to interpret the results and turn them into a practical reality. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students in the statistical methods. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 93 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 20% (20) | 5 and 10 | LO #1, #2 and #4 |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #6, #7 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Definition and importance of statistics |
| **Week 2** | Statistical method in scientific research<br>Statistical Notation Types of statistics |
| **Week 3** | Data types and methods of collection |
| **Week 4** | Types of Samples |
| **Week 5** | Frequency distributions (importance and types) |
| **Week 6** | Presentation of data Frequency distribution (Tabular presentation) |
| **Week 7** | Cumulative distribution |
| **Week 8** | Graphical presentation |
| **Week 9** | Measures of Central tendency for ungrouped data |
| **Week 10** | Measures of Central tendency for grouped data |
| **Week 11** | Properties of central tendency measures |
| **Week 12** | Measures of dispersion (variation) for ungrouped data<br>Measures of dispersion (variation) grouped data |
| **Week 13** | Properties of dispersion measurements |
| **Week 14** | Pearson and spearman correlation |
| **Week 15** | Preparatory week before the final Exam |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Elementary Statistics (2007), Allan Bluman. | Yes |
| **Recommended Texts** | Basics of Statistics (1995), Jarkko Isolalo. | Yes |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Calculus I** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT102** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 1 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Heyam Abed Al-Majeed Hayawi | | **e-mail** | he.hayawi@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Prof. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Noorsal Ahmed Zeenalabiden | | **e-mail** | zeennorsal@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The goal of this course is to help you understand the subject of calculus and demonstrate its fundamental role in various scientific fields, particularly in Statistics. Throughout the course, you will explore the two major concepts of calculus: the derivative and the integral, both of which have numerous practical applications. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understanding Calculus, sketch a graph of an equation, find the intercepts of a graph, and find the domain and range of a function.<br>2. Understanding the types of functions, such that one-to-one, even and odd, and trigonometric. Able to solve trigonometric equations.<br>3. Able to define limits and continuity of functions and effectively evaluate them, Understand the properties associated with limits.<br>4. Define the derivative as a generalization of the slope of the tangent line to a curve. Gain an understanding of convenient formulas that allow us to calculate the derivative of almost any function we encounter. Acquire knowledge of convenient rules for evaluating derivatives.<br>5. Being able to find the absolute maximum and minimum values of a given function and identify its extrema.<br>6. Learning how the fundamental theorem of calculus and how differentiation and integration are inverse operations of each other. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | **Part A - Preliminaries**<br>Understanding the concept of limits; Evaluating limits algebraically and graphically; One-sided limits and infinite limits; Defining continuity and its properties; Identifying discontinuities and types of discontinuities. [18 hrs.]<br>**Part B - Derivatives**<br>Basic rules and techniques of differentiation; Derivatives of exponential, logarithmic, and trigonometric functions; Derivatives of exponential, logarithmic, and trigonometric functions; Applications of Differentiation (Optimization problems). [36 hrs.]<br>**Part C - Fundamental Theorem of Calculus**<br>Understanding the connection between differentiation and integration and evaluating definite integrals using the Fundamental Theorem of Calculus. [6 hrs.]<br>**Part D - Integration**<br>Antiderivatives and indefinite integrals; Definite integrals and their properties; Techniques of integration, including substitution and integration by parts; Applications of Integration, including Area under a curve and the average value of a function, the average value of a function. [30 hrs.] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Preparing Prerequisite Knowledge, begin each topic with real-world examples and applications to demonstrate the relevance and practicality of calculus to Encourage students to explore how calculus concepts are applied in various fields, such as statistics and computer science. Providing timely feedback on student work to identify, address errors, and reinforce learning through quizzes. Promoting collaborative learning by assigning problem-solving tasks. Encourage students to work together, explain concepts to their peers, and engage in collaborative problem-solving. |

| 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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 15% (15) | 5, 12 | LO #1- #4 |
| | **Assignments** | 4 | 15% (15) | 3,6,10, and 13 | LO #3, #4 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| **Week 1** | A Preview of Calculus - Reviewing Graphs and Types of Functions. |
| **Week 2** | Review-Functions and Trigonometry |
| **Week 3** | Limits and continuity of functions |
| **Week 4** | Concept of Derivatives and the fundamental rules of Differentiation |
| **Week 5** | Product, Quotient, and Chain Rules |
| **Week 6** | Extrema on an Interval, Increasing and Decreasing Functions |
| **Week 7** | Concavity and Points of Inflection |
| **Week 8** | Mid-term Exam + Curve Sketching and Linear Approximations |
| **Week 9** | Applications-Optimization Problems |
| **Week 10** | Antiderivatives and Basic Integration Rules |
| **Week 11** | The Fundamental Theorem of Calculus |
| **Week 12** | Basic Rules and Techniques of Integration |
| **Week 13** | Differentiation and Integration of Exponential and Natural Logarithmic Functions |
| **Week 14** | The area under the region and between two curves. |
| **Week 15** | Volume-The Disk Method |
| **Week 16** | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | NO | No |
| **Recommended Texts** | The Great Courses Study Workbook for Understanding Calculus Problems, Solutions, and Tips by Bruce H. Edwards, PhD Professor of Mathematics, University of Florida, 2010. | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Basics Programming** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT103** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 1 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Husham Y. A. Alameen | | **e-mail** | hisham.alameen@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Lecturer | **Module Leader's Qualification** | | MSc. |
| **Module Tutor** | Dr. Luma Alharbawee | | **e-mail** | Luma.akram@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The objective is to learn the student the fundamental of programming through practical application using the C++ programming language. In this course, students will learn about: The basic programming and OOPs concepts. Creating C++ programs, Tokens, expressions and control structures in C++. Arranging same data systematically with arrays. Classes and objects in C++. Constructors and destructors in C++. Files management and templates in C++. Handling exceptions to control errors. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | After completing this course, the student will have acquired basic information in the science of computer programming through the following outcomes for learning this module, and these outcomes are:<br>1. Understand tokens, expressions, and control structures.<br>2. Explain arrays and strings and create programs using them.<br>3. Describe and use constructors and destructors.<br>4. Understand and employ file management.<br>5. Demonstrate how to control errors with exception handling.<br>6. Use functions and pointers in C++ program.<br>7. Describe OOPs concepts. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A – Introduction C++ and Basic programming</u><br><br>Understanding Language Features, history, covers C++ statements and expressions, constants, variables, operators, and how to control execution flow in applications. Exploring C++ Types, describes C++ built-in types, aggregated types, type aliases, initializer lists, and conversion between types.<br>Rules of C++ programming, structure of C++ program, C++ Tokens (Identifiers, Keywords, Constants, Operators, Special characters), C++ data types (Basic, Derived, User defined). Console I/O statements (cin, cout), programs to perform various calculations, programs to implement various operators. [15 hrs]<br><br>Arrays and Control statements: definition, advantages, array types, single dimension, double dimension, declaration, accessing array data, implementation of array operations. Conditional control statements, if-else, switch-case, loops, while, do while, for. Implementing programs on conditional & loops, break, continue, go to keywords. [15 hrs]<br><br><u>Part B – Functions and Object-oriented programming</u><br>Gives a thorough description of the fundamental characteristics of the object-oriented C++ programming language. In addition, students are introduced to the steps necessary for creating a fully functional C++ program. Many examples are |

| | |
|---|---|
| | provided to help enforce these steps and to demonstrate the basic structure of a C++ program. [15 hrs]<br>Describes how to declare and call standard functions. This will also teach students to use standard classes, including standard header files. In addition, students work with string variables for the first time in this topic. Explains the use of streams for input and output, with a focus on formatting techniques. Formatting flags and manipulators are discussed, as are field width, fill characters, and alignment. [7 hrs]<br><br>Introduces operators needed for calculations and selections. Binary, unary, relational, and logical operators are all examined in detail. Also, describes the statements needed to control the flow of a program. These include loops with while, do-while, and for; selections with if-else, switch, and the conditional operator; and jumps with goto, continue, and break. [15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| **Student Workload (SWL)**<br>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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 87 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<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) | 5 and 10 | LO #1, #2 and #4 |
| | Assignments | 2 | 10% (10) | 2 and 12 | All |
| | Projects / Lab. | 1 | 10% (10) | Continuous | All |
| | Report | 1 | 10% (10) | 13 | All |
| Summative assessment | Midterm Exam | 2hr | 10% (10) | 7 | LO #1 - #6 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Structure of Simple C++ Programs |
| Week 2 | Fundamental Types: characters identifiers, variable declaration, constants. |
| Week 3 | Operators for fundamental types: Binary Arithmetic Operators, Unary Arithmetic Operators, Relational Operators, Logical Operators. |
| Week 4 | Arithmetic operations: converting arithmetic types, implicit type conversions, performing usual arithmetic type conversions, more type conversions. |
| Week 5 | Arrays: defining arrays, initializing arrays, class arrays, multidimensional arrays, member arrays. |
| Week 6 | Library files " header" |
| Week 7 | Assign statements |
| Week 8 | Conditional statements |
| Week 9 | Control Flow: loops, the for statement, the while statement, the do-while statement, selections with if-else. |
| Week 10 | Control Flow to complete: else-if chains, conditional expressions, selecting with switch, jumps with break, continue, and go to. |
| Week 11 | The Standard Class string: defining and assigning strings, concatenating strings, comparing strings, inserting and erasing in strings, searching and replacing in strings, accessing characters in strings. |
| Week 12 | Input and Output with Streams: streams, formatting and manipulators, formatted output of integers, formatted output of floating-point numbers, output in fields, output of characters. |
| Week 13 | Functions: significance of functions in C++, defining functions, return value of functions, passing arguments, inline functions. |

| | |
|---|---|
| **Week 14** | Functions: default arguments, overloading functions, recursive functions. |
| **Week 15** | Strings, and Boolean values, formatted input, formatted input of numbers, unformatted input/output. |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: An introduction to installing programs on a computer, C++ installation with its libraries. |
| **Week 2** | Lab 2: Characters identifiers |
| **Week 3** | Lab 3: Variables declaration |
| **Week 4** | Lab 4: Constants |
| **Week 5** | Lab 5: Arithmetic operations |
| **Week 6** | Lab 6: library files " header" |
| **Week 7** | Lab 7: Assign statement |
| **Week 8** | Lab 8: "if "conditional statements |
| **Week 9** | Lab 9: "if – else "conditional statements |
| **Week 10** | Lab 10: Array |
| **Week 11** | Lab 11:" for loop" |
| **Week 12** | Lab 12:"while loop" |
| **Week 13** | Lab 13: Functions |
| **Week 14** | Lab 14: Functions |
| **Week 15** | Lab 15: String |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | | |
| **Recommended Texts** | Introduction to C++: Part 1<br>Brian Gregor, Research Computing Services. | no |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Linear Algebra** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT104** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 1 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Hyllaa Anas Abdul-Majeed | | **e-mail** | hyllaa.77@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Professor | | **Module Leader's Qualification** | MSc. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- The student discusses vector spaces and related abstract concepts.<br>2- The student is familiar with the algebraic concepts and terminology of matrices and determinants and inverses, and uses creative thinking in the use of elementary transformation methods.<br>3-Learn about systems of linear equations and their applications.<br>4-Recognize the basis and dimension of vector spaces. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Algebraic operations on matrices and calculating determinants.<br>2- Solve linear systems.<br>3 - Learn about vector spaces and algebraic operations on them.<br>4- Self-learning method<br>5- One of the most important outputs is building a base for the student to move to the basic stages of subjects in which matrices and linear equations are the basis.<br>6- Encourage the student to look at books and extract information from them |
| **Indicative Contents**<br>المحتويات الإرشادية | Part (1) - Definition of matrix, its types, algebraic operations on matrices and determinants, methods of finding the determinant and their properties. [13 hours]<br>Part (2) - inverse and methods of finding the inverse of a matrix and its properties. [11 hours]<br>Part (3) - Linear Equations and Methods for Solving Linear Equations. [14 hours]<br>Part (4) - rank of matrix, The canonical form and equivalent matrices, and rank relation with equations. [14 hours]<br>Part (5) - Latent roots, vectors, algebraic operations on vectors, linear composition, distance and Euclidean length. [11 hours] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 87 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<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 | 15% (15) | 3 and 8 | LO #1and #2 |
| | **Assignments** | 2 | 15% (15) | 2 and 12 | LO #1, #2 and#4 |
| | **Report** | 1 | 10% (10) | 13 | LO #4, #5and#6 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #2 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Definition of matrices and types |
| **Week 2** | Algebraic processes on matrices |
| **Week 3** | Determinants, Determinant solution methods |
| **Week 4** | properties of the determinant |
| **Week 5** | Mid-term Exam + Inverse matrix using the matrices method (the adjoint of matrix) |
| **Week 6** | Inverse matrix using Gaussian deletion method |
| **Week 7** | The properties of the inverse matrix |
| **Week 8** | Linear equations, Methods of solving linear equations in the case of m = n |
| **Week 9** | Method of matrices to solve linear equations in the case of m> n |
| **Week 10** | rank of matrix, The canonical form |
| **Week 11** | equivalent matrices, Relationship of ranks and linear equations m>n |
| **Week 12** | Mid-term Exam + Relationship of ranks and linear equations m=n |
| **Week 13** | Latent roots of order (2x2), (3x3) |
| **Week 14** | Vector and Algebraic processes on vector, Euclidean length and Euclidean distance |
| **Week 15** | Linear Composition |
| **Week 16** | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | الجبر الخطي / أ.د عبدالمجيد حمزة – د.لميعة باقر | Yes |
| **Recommended Texts** | Elementary and Intermedicite Algebra(2)—Mark Dugopolski | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Human Rights** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT105** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **30** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 1 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Fidaa Ziyad Hasan | | **e-mail** | Fidaa-law@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Lecturer | **Module Leader's Qualification** | | MSc. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. حث الطلبة على المشاركة الموضوعية في الحوار بأسلوب ينسجم مع أخلاق المجتمع العربي.<br>2. توضيح مفاهيم ومصطلحات حقوق الإنسان للطلبة وتقريبها الى أذهانهم.<br>3. شرح وتبسيط الإعلانات العالمية والمواثيق الدولية التي تتعلق بهذا الموضوع.<br>4. تعويد الطلبة على العمل في محيطهم في مجال حقوق الإنسان وتعريفهم على تجارب العالم فيه.<br>5. تدريب الطلبة على الكشف عن انتهاكات حقوق الإنسان وتوثيقها دون تحيّز ووفق منهج علمي قدر المستطاع.<br>6. تجذير فكرة قبول الآخر واحترام رأيه واستئصال نزعة الإقصاء وتهميش الرأي المخالف. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. تعريف الطالب بحقوق الانسان وحرياته الاساسية.<br>2. تمكين الطالب من ممارسة حقوقه بصورة فعالة من خلال التنمية الشاملة لشخصيته والاحساس بكرامتها واحترام حقوق الاخرين وحرياتهم الاساسية بما يتفق وقيم المجتمع الديمقراطي.<br>3. جعل الطالب قادرا على التأثير بالأخرين تأثيرا ايجابيا بما يتسق ومبادئ حقوق الانسان<br>4. ترسيخ المعلومات النظرية في ذهن الطالب يتم من خلال ربط هذه المعلومات بما يجري من احداث وظواهر اجتماعية وسياسية واقتصادية وصولا الى الغاية المرجوة من تدريس هذه المادة. |
| **Indicative Contents**<br>المحتويات الإرشادية | يتضمن المحتوى الإرشادي ما يلي.<br><br>الجزء أ - المفاهيم الأساسية لحقوق الانسان:<br>ماهية حقوق الانسان، تعريفه، انواعه، مضامين حقوق الانسان، الاهمية، الخصائص، المميزات، الفئات، المعايير. [20 ساعة]<br><br>الجزء ب - الواجبات:<br>الواجبات المفروضة على ممارسة حقوق الانسان والقيود الواردة عليها. [20 ساعة]<br><br>الجزء ج - ضمانات حقوق الانسان:<br>الضمانات الجنائية الدولية لحماية حقوق الانسان (الموضوعية – الاجرائية). انتهاكات حقوق الانسان – المخدرات –الابتزاز الالكتروني – الاحتيال الالكتروني – الإبادة الجماعية. [35 ساعة] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 1. تتمحور الاستراتيجيات الخاصة بحقوق الانسان في ثلاثة امور اساسية:<br>2. الاستراتيجية العامة: تعريف الطالب الجامعي بماهية حقوق الإنسان من وجهات نظر عالمية وإنسانية وعلمية ودينية وبشكل موضوعي بعيداً عن التأثيرات السياسية والفكرية والمذهبية ...الخ<br>3. الاستراتيجية الخاصة هو السعي لإحداث تغيير في سلوك الطالب بما يتوافق مع الهدف العام من خلال توجيه الانتباه إلى المضامين الحقيقية لحقوق الإنسان وأبعادها القانونية ودراسة الإعلانات والمواثيق الدولية، وتأثير الخروقات الفاضحة لتلك القواعد والتي تمس بحياة الناس أو كرامتهم سيما وأنّ حقوق الإنسان هي شمولية ولكافة المجتمعات الإنسانية .. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 20% (20) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **Report** | 1 | 10% (10) | 13 | 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 Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | ماهية حقوق الانسان، تعريفه، انواعه، مضامين حقوق الانسان، الاهمية، الخصائص، المميزات، الفئات، المعايير |
| **Week 2** | مراحل تطور حقوق الانسان التاريخية والحديثة |
| **Week 3** | خصائص حقوق الانسان الاساسية (الحرية والمساواة) |
| **Week 4** | مصادر حقوق الانسان (المصدر الديني، المصدر الوطني، المصدر الدولي) |
| **Week 5** | الواجبات المفروضة على ممارسة حقوق الانسان والقيود الواردة عليها |
| **Week 6** | حقوق الانسان بالإسلام (حق المرأة والطفل) |
| **Week 7** | حقوق بعض الفئات الخاصة في ظل القانون الدولي (الطفل – المرأة- المرضى – السجين – أسري الحرب) |

| | |
|---|---|
| **Week 8** | الشرعة الدولية لحقوق الانسان |
| **Week 9** | ضمانات حقوق الانسان – العامة – في القانون الوطني – على الصعيد الدولي |
| **Week 10** | الضمانات الجنائية الدولية لحماية حقوق الانسان (الموضوعية – الاجرائية) |
| **Week 11** | انتهاكات حقوق الانسان –المخدرات –الابتزاز الالكتروني – الاحتيال الالكتروني – الإبادة الجماعية |
| **Week 12** | النزاع السيبراني والقانون الدولي الانساني |
| **Week 13** | آليات حماية حقوق الانسان الكترونياً- الهيمنة السيبرانية والمزايا الاستراتيجية للأسلحة الالكترونية |
| **Week 14** | الفساد مفهومه ومظاهره واسبابه وانواعه |
| **Week 15** | أثر الفساد على حقوق الانسان، حق الانسان في الغذاء واشكاليه الامن الغذائي الدولية وموقف العراق منها |
| **Week 16** | **Preparatory week before the final Exam** |

## Learning and Teaching Resources
## مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | حقوق الانسان والديمقراطية في القانون الدولي للمؤلف د. محمد يونس الصايغ | Yes |
| **Recommended Texts** | حقوق الانسان والديمقراطية للمؤلف د. حميد حنون خالد<br>حقوق الانسان للمؤلف رياض عزيز هادي<br>حقوق الانسان للمؤلف والديمقراطية د.ماهر صبري كاظم | |
| **Websites** | المصادر الدولية لحقوق الانسان:<br>1. الإعلان العالمي لحقوق الانسان عام 1948.<br>2. العهدان الدوليان الخاصان بحقوق الانسان:<br>أ- العهد الدولي الخاص بالحقوق السياسية والمدنية.<br>ب. العهد الدولي الخاص بالحقوق الخاص بالحقوق الاجتماعية والاقتصادية والثقافية | |

## Grading Scheme
## مخطط الدرجات

| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Arabic Language** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT106** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 1 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | م. د. ثامر عبد الجبار مصطفى | | **e-mail** | Thamer.abdeljabar@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 11/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه.<br>2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية<br>3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية<br>4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال<br>5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي<br>6- معرفة لطالب الفعل العربي من حيث الزمن<br>7- طرق كتابة العدد و تذكرة وتانيثه<br>8- معرفة علامات الترقيم في الكلام<br>9- تعلم قواعد رسم الهمزة<br>10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة<br>11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب<br>12- معرفة ماهو الأسلوب الخبري،<br>13- معرفة ماهو الأسلوب الانشائي،<br>14- تعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- ان يعرف الطالب الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه.<br>2- ان يتعلم الطالب الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية<br>3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية<br>4- ان يعرف الطالب العفل العربي: من حيث الصحة والاعلال<br>5- ان يتعلم الطالب الفعل العربي من حيث اللزوم والتعدي<br>6- معرفة الطالب الفعل العربي من حيث الزمن<br>7- معرف الطالب طرق كتابة العدد و تذكرة وتانيثه<br>8- معرفة الطالب لعلامات الترقيم في الكلام<br>9- ان يتعلم الطالب قواعد رسم الهمزة<br>10- معرف الطالب على طريقة كتابة التاء المربوطة، والمبسوطة<br>11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب<br>12- التعرف على الأسلوب الخبري،<br>13- معرفة ماهو الأسلوب الانشائي،<br>14- التعلم على مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين |
| **Indicative Contents**<br>المحتويات الإرشادية | 1- التعرف على الكلام العربي: من ناحية تعريفة، اقسامة، الى علامات كل قسم منه[ساعه 2]<br>2- معرفة الجملة العربية واقسام الجملة العربية والجمل الاسمية والجمل الفعلية، ساعه 2<br>3- التعرف على حركات الاعراب: سواء كانت اصلية او فرعية، ساعه 2<br>4- معرفة الطالب بالعفل العربي: من حيث الصحة والاعلال، ساعه 2<br>5- معرفة الطالب الفعل العربي من حيث اللزوم والتعدي، ساعه 2<br>6- معرفة لطالب الفعل العربي من حيث الزمن، ساعه 2<br>7- طرق كتابة العدد و تذكرة وتانيثه، ساعه 2<br>8- معرفة علامات الترقيم في الكلام، ساعه 2<br>9- تعلم قواعد رسم الهمزة، ساعه 2<br>10- التعرف على طريقة كتابة التاء المربوطة، والمبسوطة، ساعه 2<br>11- قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب ، ساعه 2<br>12- معرفة ماهو الأسلوب الخبري، ساعه 2<br>13- معرفة ماهو الأسلوب الانشائي، ساعه 2 |

| | |
|---|---|
| 14- التعلم مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين، ساعه 2 | |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة على المشاركه في الكلام الفربي وكتابته بالصورة الصحيحه ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **50** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | الكلام العربي: تعريفة، اقسامة، وعلامات كل قسم. |
| **Week 2** | الجملة العربية: تعريفها ، اقسامها : الاسمية والفعلية |
| **Week 3** | حركات الاعراب: اصلية، فرعية |
| **Week 4** | العفل العربي: من حيث الصحة والاعلال |
| **Week 5** | الفعل العربي من حيث اللزوم والتعدي |
| **Week 6** | الفعل العربي من حيث الزم |
| **Week 7** | امتحان |
| **Week 8** | العدد: تذكرة، وتانيثه |
| **Week 9** | علامات الترقيم في الكلام |
| **Week 10** | قواعد رسم الهمزة |
| **Week 11** | التاء المربوطة، والمبسوطة |
| **Week 12** | قل ولا تقل: الأخطاء الشائعة لدى المتكلمين والكتاب |
| **Week 13** | الأسلوب الخبري، |
| **Week 14** | والأسلوب الإنشائي |
| **Week 15** | مهارات لغوية: تنمية الذوق اللغوي، وتحسين الأسلوب لدى المتعلمين |
| **Week 16** | امتحان نهاية الفصل |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | ين ذريل، عدنان " اللغة والأسلوب دراسة" الطبعة الثانية،2006 | no |
| **Recommended Texts** | بحيري، سعيد حسن، "الاساس في فقه اللغة العربية 2000 | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Elementary Statistics II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT107** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 2 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Khairy Badal Rasheed | | **e-mail** | Khairy-stat@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecture | | **Module Leader's Qualification** | Msc. | |
| **Module Tutor** | Shaimaa Waleed Mahmood | | **e-mail** | shaimaa.waleed@uomosul.edu.iq | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- Give the learner the statistical skills that enable him to work in the fields of engineering, calculating probabilities and linear equations.<br>2- The subject of statistics is a digital language and an art to express the variables and numbers accurately, and thus enables the student to benefit from this subject in the engineering and arithmetic transactions that are important to him in most fields of life.<br>3- Statistics course aims to develop ways and means of thinking and how to deal with various problems.<br>4- Trying to think in sound ways and methods, specifically in solving problems and thus improving and developing society. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Understand the fundamental concepts and principles of statistics, including data types, measurement scales, and sampling methods.<br>2- Interpret and analyze data using descriptive statistical measures, such as measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation).<br>3- Apply probability theory to analyze and make predictions about uncertain events, including calculating probabilities and understanding the laws of probability.<br>4- Utilize basic principles of statistical inference to draw conclusions about a population based on sample data, including hypothesis testing and confidence intervals.<br>5- Apply appropriate statistical techniques for analyzing relationships between variables, including correlation analysis and simple linear regression.<br>6- Understand and interpret the results of statistical software output and graphical representations.<br>7- Communicate statistical findings and interpretations effectively, both orally and in written form.<br>8- Develop critical thinking and problem-solving skills in the context of statistical analysis and interpretation. |
| **Indicative Contents**<br>المحتويات الإرشادية | 1- familiarize students with the basics of statistics, its fields of application.<br>2- the statistical method in scientific research, methods of data collection<br>3- classification and presentation for the purpose of obtaining the necessary information to make appropriate decisions and the possibility of using this data in prediction, in addition to developing students.<br>4- skills in research design method.<br>5- bringing the student to a level where he has the ability to interpret the results and turn them into a practical reality. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students in the statistical methods. |

| 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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 20% (20) | 5 and 10 | LO #1, #2 and #4 |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #6, #7 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Multiple correlation coefficient |
| **Week 2** | Partial correlation coefficient |
| **Week 3** | Simple linear regression |
| **Week 4** | Multiple linear regression |
| **Week 5** | Testing of hypotheses |
| **Week 6** | Type one and two error |
| **Week 7** | Z –test (one sample) |
| **Week 8** | Z –test (two samples) |
| **Week 9** | t –test (one sample) |
| **Week 10** | t –test (two samples) |
| **Week 11** | t –test (paired samples) |
| **Week 12** | Confidence Intervals |
| **Week 13** | ANOVA{Analysis of variance (part 1) } |
| **Week 14** | ANOVA{Analysis of variance (part 1) } |
| **Week 15** | Preparatory week before the final Exam |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Elementary Statistics (2007), Allan Bluman. | Yes |
| **Recommended Texts** | Basics of Statistics (1995), Jarkko Isolalo. | Yes |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Calculus II** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT108** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | | UG1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Heyam Abed Al-Majeed Hayawi | | **e-mail** | he.hayawi@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Prof. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Dr. Noorsal Ahmed Zeenalabiden | | **e-mail** | zeennorsal@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The goal of this course is to the goal of this course is to further your understanding and appreciation of calculus as calculus I. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Being able to use the integration techniques such as integration by parts, trigonometric Substitution, and partial Fractions.<br>2. Gaining the ability to evaluate improper integrals where one of the limits of integration is infinite or not continuous.<br>3. Understanding the moments and centers of mass. Being able to find the balancing point of a planar area, or lamina.<br>4. Understanding the infinite series and their connection to the functions.<br>5. Defining infinite series is perhaps the most important topic in Calculus II. The concept of infinite series is based on sequences.<br>6. Being able to approximate a function with a polynomial to linear form.<br>7. Defining vectors and their properties. |
| **Indicative Contents**<br>المحتويات الإرشادية | **Part A - Techniques of Integration**<br>In this part, students learn various techniques to evaluate integrals more effectively. They explore methods such as integration by substitution, integration by parts, and trigonometric and hyperbolic substitutions. They also delve into partial fraction decomposition, which involves breaking down rational functions into simpler fractions. [42 hrs.]<br><br>**Part B - Infinite Series**<br>Infinite series plays a significant role in Calculus II. Students investigate the convergence and divergence of series and learn about important series, such as geometric series. Additionally, they encounter power series and Taylor series, which expand functions as infinite polynomials. [30 hrs.]<br><br>**Part C - Vectors**<br>Vectors and their properties are examined in this part. Students learn about vector operations, including addition, subtraction, and scalar multiplication. They explore the dot product and cross product, understanding their geometric and algebraic interpretations. [12 hrs.]<br><br>**Part D - Moments, Centers of Mass**<br>The students understand how to calculate moments using the cross-product and explore the concept of moments in different contexts. Students study the definition of the center of mass.[6 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Preparing Prerequisite Knowledge, begin each topic with real-world examples and applications to demonstrate the relevance and practicality of calculus to Encourage students to explore how calculus concepts are applied in various fields, such as statistics and computer science. Providing timely feedback on student work to identify, address errors, and reinforce learning through quizzes. Promoting collaborative learning by assigning problem-solving tasks. Encourage students to work together, explain concepts to their peers, and engage in collaborative problem-solving. |

| 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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 15% (15) | 5, 12 | LO #1- #4 |
| | **Assignments** | 4 | 15% (15) | 3,6,10, and 13 | LO #3, #4 |
| | **Report** | 1 | 10% (10) | 13 | All |
| | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |

| | | | | | |
|---|---|---|---|---|---|
| **Summative assessment** | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| Week | Material Covered |
|---|---|
| **Week 1** | Basic Functions of Calculus and Limits. |
| **Week 2** | Trigonometric Integrals |
| **Week 3** | Integration by Parts, |
| **Week 4** | Integration by Trigonometric Substitution |
| **Week 5** | Integration by Partial Fractions |
| **Week 6** | applications of Integration methods |
| **Week 7** | Mid-term Exam + Improper Integrals |
| **Week 8** | Moments, Centers of Mass, and Centroids |
| **Week 9** | Sequences and Limits |
| **Week 10** | Infinite Series—Geometric Series |
| **Week 11** | Series, Divergence, and |
| **Week 12** | Taylor Polynomials and Approximations |
| **Week 13** | Power Series and Intervals of Convergence |
| **Week 14** | Vectors in the Plane |
| **Week 15** | The Dot Product of Two Vectors |
| **Week 16** | **Preparatory week before the final Exam** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | NO | No |
| **Recommended Texts** | Understanding Calculus II: Problems, Solutions, and Tips, by Professor Bruce H. Edwards, University of Florida, 2013. | No |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Information Technology** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT109** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 2 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Alla Abd AlStaar Hamoodat | | **e-mail** | allahamoodat@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Dr. | |
| **Module Tutor** | Husham Y. A. Alameen | | **e-mail** | hisham.alameen@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures.<br>2. • Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures.<br>3. Work: Streamlined workflow systems, shared storage, and collaborative workspaces can increase business efficiency and allow employees to process a greater level of work in a shorter period of time. Information technology systems can be used to automate routine tasks, to facilitate data analysis and to store data in a way that can be easily retrieved for future use. Technology can also be used to answer customer questions through email, in a real-time chat session, or through a phone routing system that connects the customer to an available customer service agent.<br>4. Cost Reduction and Economic Efficiency: Communication technology and social technology have made business promotion and product launch affordable. Many small businesses have found ways to use social technology to increase their brand awareness and get more customers for less. In business, factors such as operating cost play an important role in business development and growth. So when companies use information technology to reduce operating costs, the return on investment will increase, which will lead to business growth. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Enhancing the ability of information technology to adapt and respond to the multiple, renewable and constantly changing needs of all parties benefiting from the outputs of the information system, especially the university leaders in the researched university, and thus enables information technology to carry out its work efficiently and effectively. Predicting the studied phenomenon in the future by means of Box-Jenkins model·<br>2. Employing information technologies in the axes of the educational process worked to build a bridge of vital communication between faculty members and all sources of the educational process, and this necessarily means facilitating the teacher's task in delivering information to the student within an interactive technical environment, and information technologies provide multiple sources in order to |

| | |
|---|---|
| | obtain information Whether it is from sources within the university or from the Internet and the educational technologies it contains. |
| **Indicative Contents**<br>المحتويات الإرشادية | Although the information technology specialization is one of the most demanded fields currently in all global markets, some specializations range from stagnant to saturated and required, so you should study the market well before choosing a specialization. But if you are looking for the best majors that have a future in the field of information technology, then they are as follows:<br>Network security major in programming - software engineering - 3D printing - data science major - Artificial Intelligence - Computer Science - Aerospace Engineering |

## Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | 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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills. |

## 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 | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 87 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<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) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | 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 Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Getting to know the computer and the history of its stages of development - indicating the types of computers - installing the computer - defining the physical parts |
| **Week 2** | Data entry units and data output units to the computer - The central processing unit and its tasks |
| **Week 3** | Primary and secondary memories - Types of displays |
| **Week 4** | Software |
| **Week 5** | Computer operating systems |
| **Week 6** | Low-level languages and high-level languages |
| **Week 7** | Service application software |
| **Week 8** | Getting to know the Word program - How to open or run the program - Transforming the Word program interface - Word program menus. |
| **Week 9** | Home Toolbar - Home Page Insert Menu - Toolbar - Insert Menu - Page Layout |
| **Week 10** | Microsoft Excel - the most common uses of the Excel program - opening the Excel program - closing the Excel program - an explanation of the main toolbar of the Excel program |
| **Week 11** | Entering data in Excel program - how to navigate in a worksheet - inserting a function from the ready-made functions into a cell - examples - shading cells - clearing cells |
| **Week 12** | The basics of building a POWER POINT presentation - entering the program and the program interface - creating a new presentation |
| **Week 13** | Open a presentation file - save a presentation - insert a new slide - add shapes to the slide - slide margins - slide design - add animations to the slide |
| **Week 14** | Internet - services provided by the Internet - keywords, comprehensive search engines |
| **Week 15** | Create an E-mail |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Lab 1** | Word applications |
| **Lab 2** | Applications on Excel |
| **Lab 3** | Power Point applications |
| **Lab 4** | E-mail applications |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Fundamentals of Information Technology | Yes |
| **Recommended Texts** | Glend Gay and Ronald B., "Information Technology", 3 rd Ed, CSEC,OUP Oxford ,2019. | Yes |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **MATLAB programming** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Stat110** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 2 |
| **Administering Department** | | STAT | **College** | | CSM |
| **Module Leader** | Hyllaa Anas Abdul-Majeed | | **e-mail** | | hyllaa.77@uomosul.edu.iq |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | MSc. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. 1- Perform complex calculations very quickly<br>2. 2- Derivation of logarithms<br>3. 3- Simulation and design of various systems in all branches of science and industry<br>4. 4- Data analysis and exploration<br>5. 5- Drawing in two and three dimensions (2D-3D)<br>6. 6-solve problems that are difficult for the researcher to do in the usual ways |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Know the basic axioms of the MATLAB language.<br>2. The ability to operate the system and identify its windows.<br>3. The ability to write and implement simple programs.<br>4. The ability of the MATLAB program to perform mathematical operations in vectors or matrices.<br>5. Identify ready-made instructions for solving problems or programming them.<br>6. The possibility of writing programs in the MATLAB language when the classical methods fail to solve them.<br>7.<br>8. The possibility of solving problems in MATLAB language, including numerical solutions<br>9. Develop skill in dealing with programs similar to MATLAB.<br>10. Encourage the student to look at books and extract information from them<br>11. One of the most important outputs is building a basic base for the student to move to future stages of subjects in which probability theory is a basis. |
| **Indicative Contents**<br>المحتويات الإرشادية | Part - Introduction to the MATLAB<br>Introduction to the MATLAB program and the Windows program, clarifying some important instructions and commands, writing data in the program, matrices in the matlab program, and creating matrices based on the instructions. [12 hrs]<br>Part - Create matrices in MATLAB<br>Writing the matrix in the program, some instructions used in the matrix, creating a row, column, or vector matrix with consecutive elements, some other instructions for creating matrices finding the inverse, determinant, and rank of the matrix in matlab, and reshaping matrices. [12 hrs]<br>Part – Algebraic operations in matlab<br>Algebraic operations on matrices in matlab, matrix elevation, finding the square root of a matrix and also boolean signs in matlab. [12 hrs]<br>Part - Boolean directives in MATLAB<br>Using (and), (or) between arrays whose elements are (1,0), and how to write input and output statements. [12 hrs]<br>Part - Writing programs in MATLAB language<br>And how to write a simple program based on writing the program using (for -end), drawing in MATLAB, conditional cases (if-end), using dashes (for the end) and (if the end) together. [15 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in providing solutions to some of the problems that the student faces in solving them when they cannot be solved by classical methods, by programming these solutions to reach the best solution depending on the programming language, including the MATLAB language that is commonly used in scientific departments, including statistics, and in the applied fields of the market Work as well as gain skills in developing solutions by encouraging students to participate in exercises, while improving and expanding critical thinking skills at the same time. This will be achieved through classes and interactive educational programs by identifying the directives of the MATLAB language program and getting to know the system of the system so that the student acquires the skill in programming to benefit from in the field of his studies, primary and higher |

| Student Workload (SWL)<br>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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 87 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **150** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 15% (15) | 3 and 9 | LO #1, #2 AND #4, #5, #6 |
| | **Assignments** | 2 | 15% (15) | 4 and 12 | LO #3, #4 and #7 |
| | **Report** | 1 | 10% (10) | 13 | LO #9 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #10 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to the MATLAB program and the Windows program, clarification of some important instructions and commands, and writing data in the program |
| **Week 2** | Matrices in the MATLAB program, and methods of writing the matrix in the program |
| **Week 3** | Some instructions used in the matrix |
| **Week 4** | Creates a row, column, or matrix vector with consecutive elements, and Create matrices based on instructions |
| **Week 5** | Mid-term Exam + Some other instructions for creating matrices |
| **Week 6** | Finding the inverse, determinant, and rank of a matrix in MATLAB , and reshaping matrices |
| **Week 7** | Adding new elements to the matrix, deleting some elements of the matrix, and changing the values of some elements of the matrix and submatrix |
| **Week 8** | Algebraic operations on matrices in the MATLAB program, raising the matrix, finding the square root of the matrix and also logical signs in the MATLAB program |
| **Week 9** | Using (and), (or) between matrices whose elements are (1,0), and how to write input and output sentences |
| **Week 10** | loops, and how to write a simple program |
| **Week 11** | Writing the program using (for -end) |
| **Week 12** | Mid-term Exam +Drawing in MATLAB |
| **Week 13** | Conditional (if-end) cases |
| **Week 14** | Using the (for-end) and (if-end) conditionals together |
| **Week 15** | use loop(while-end) |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction to MATLAB and its main windows and writing data in the program |
| **Week 2** | Lab 2: Application examples for Matrices in the MATLAB program, and methods of writing the matrix in the program |
| **Week 3** | Lab 3: Application examples for Some instructions used in the matrix |
| **Week 4** | Lab 4: Application examples for Creates a row, column, or matrix vector with consecutive elements, and Create matrices based on instructions |
| **Week 5** | Lab 5: Application examples for Some other instructions for creating matrices |
| **Week 6** | Lab 6: Application examples for Finding the inverse, determinant, and rank of a matrix in MATLAB, and reshaping matrices |
| **Week 7** | Lab 7: Application examples for Adding new elements to the matrix, deleting some elements of the matrix, and changing the values of some elements of the matrix and submatrix |
| **Week** 8 | Lab 8: Application examples for Algebraic operations on matrices in the MATLAB program, raising |

| | |
|---|---|
| | the matrix, finding the square root of the matrix and also logical signs in the MATLAB program |
| **Week** 9 | Lab 9: Application examples for Using (and), (or) between matrices whose elements are (1,0), and how to write input and output sentences |
| **Week** 10 | Lab 10: Application examples for loops, and how to write a simple program |
| **Week** 11 | Lab 11: Application examples for Writing the program using (for -end) |
| **Week** 12 | Lab 12: Application examples for Drawing in MATLAB |
| **Week** 13 | Lab 13: Application examples for Conditional (if-end) cases |
| **Week** 14 | Lab 14: Application examples for Using the (for-end) and (if-end) conditionals together |
| **Week** 15 | Lab 15: Application examples for use loop(while-end) |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | | |
| **Recommended Texts** | "تطبيقات MATLAB الحلول العددية" ، ياسين احمد الشبول، 2004 | |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **English Language** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT111** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 2 |
| **Administering Department** | | STAT | **College** | | CSM |
| **Module Leader** | Zainab Qusay Ahmed Taqi | | **e-mail** | | Zainab.q@uomosul.edu.iq |
| **Module Leader's Acad. Title** | | Asst. lecturer | **Module Leader's Qualification** | | MSc. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 11/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To be able to speak English fluently and accurately.<br>2. To think in English and then speak.<br>3. To be able to talk in English.<br>4. To be able to compose freely and independently in speech and writing.<br>5. To be able to read books with understanding. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. To address grammar issues that students encounter in their daily speech, writing, reading and listening<br>2. To address the issue of grammatical errors that affect effective communication<br>3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections<br>4. Recognize the structure and organization of paragraphs,<br>5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, reading speed, and vocabulary development<br>6. Develop the writing skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Introduction: about new headway pre-intermediate plus [1 hrs]<br>Tenses: past-present-future, wh- questions. Vocabulary- using a bilingual dictionary, reading (communication). Everyday English (social expressions) [9 hrs]<br><br>Grammar: Review about tenses, Present tenses, have and have got. Vocabulary: about (daily life), listening and match between verb and nouns. Practices about simple present and present continuous, Reading: about living in the USA. Social expressions about every day English. [8 hrs]<br><br>Past tenses, simple past and past continuous, practice, Reading and listening, regular and irregular verbs. Vocabulary: about N.- V.- Adj. endings. Everyday English (time expressions). [6hrs]<br><br>Grammar: the quantities, also about Something/someone/somewhere, practices. Reading: about markets, practices. [6 hrs] |
| | |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | - The main strategy that will be adopted in developing the four skills:<br>The skill of speaking,<br>The skill of reading,<br>The skill of writing,<br>The skill of listening,<br>Also, enable the students for the use of grammar correctly, |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **50** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 15% (15) | 4,9 and 11 | LO #1, #2 and #5 |
| | **Assignments** | 3 | 15% (15) | 2,10 and 13 | LO #3, #4 and #6 |
| | **Report** | 1 | 10% (10) | 13 | LO #1, #4 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #5 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction: new headway pre-intermediate plus |
| **Week 2** | Grammar: Tenses, wh- questions, practices. |
| **Week 3** | Vocabulary- how to use a bilingual dictionary, reading about (communication) |
| **Week 4** | Everyday English (social expressions), listening, practices. |
| **Week 5** | Grammar: Present tenses, have and have got, practices. |
| **Week 6** | Vocabulary about (daily life), listening and match between vocabularies, practices. |
| **Week 7** | Mid-term Exam. |
| **Week 8** | simple present and present continuous, practices, reading about living in the USA. |
| **Week 9** | Social expressions about every day English, practices. |
| **Week 10** | Grammar: simple past and past continuous tenses, practices. |
| **Week 11** | Reading and listening, regular and irregular verbs, practices. |
| **Week 12** | Vocabulary: about N.- V.- Adj. endings, practices, Everyday English (time expressions), practices. |
| **Week 13** | Grammar: quantity (some, many, any, much, few,…. ), practice. |
| **Week 14** | Grammar: about Something/someone/somewhere, practices. |
| **Week 15** | Reading: about markets, practices. |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | None |
| **Week 2** | None |
| **Week 3** | None |
| **Week 4** | None |
| **Week 5** | None |
| **Week 6** | None |
| **Week 7** | None |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Headway pre-intermediate plus student's book. (John and Liz Soars) | Yes |
| **Recommended Texts** | Headway pre-intermediate plus work's book | Yes |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Democracy** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT112** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **30** | | | | |
| **Module Level** | UGI | | **Semester of Delivery** | 2 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Fidaa Ziyad Hasan | | **e-mail** | Fidaa-law@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Lecturer | | **Module Leader's Qualification** | MSc. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | ان الهدف الاساسي هو معرفة نظام بلده السياسي عبر التعرف على النظام الديمقراطي الذي تمارسه اغلب الدول العلم ويعد كضمان للحقوق والحريات .وحقوق الانسان الحديثة. فضلا عن التعرف على الاسس القانونية لتحقيق الديمقراطية ومعرفة شروطها وشروط انجاحها وانتهاكاتها وكيفية ان التعدد السياسي هو واحد شروط تحقق الديمقراطية وتقبل الاطراف الاخرى وتقبل الانتقادات الموجه للطرفين ومحاكاة ذلك بانتقائية ومعالجة الانتهاكات بصورة سلمية وبالحوار البناء وان اساس تحقق الديمقراطية يكون من خلال احترام حقوق الانسان التي تكون هي نتيجة تلك تحقق تلك الاهداف والحقوق. |
| **Module Learning** | عندما يتم طرح مفهوم الديمقراطية للطالب سيتبادر إلى الذهن فورا مفاهيم الحرية والعدل في الحقوق |

| | |
|---|---|
| **Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | والواجبات والحياة الاجتماعية المسالمة حيث سيادة القانون وتساوي المواطنين وغير ذلك من مفاهيم وممارسات تعبر عن احترام حقوق الإنسان والمواطن بغض النظر عن فكرة ولونه وانتمائه فضلا عن تطوير مفهومه للحق السياسي وممارسته له وانعكاس ذلك في حياته الاجتماعية والسياسية على حد سواء والتطوير الفكري السياسي له في تمييز الانظمة السياسية واساليب ادارة الحكم السياسي |
| **Indicative Contents**<br>المحتويات الإرشادية | يتضمن المحتوى الإرشادي ما يلي.<br><br>الجزء أ - المفاهيم الأساسية للديمقراطية:<br>المكونات الرئيسية لإقامة النظام الديمقراطي السليم، مبادئ وانواع المفهوم الديمقراطي، الاركان والخصائص . [20 ساعة]<br><br>الجزء ب - ضمانات النظام الديمقراطي:<br>صور الحكم الديمقراطي – الديمقراطية المباشرة - صورها القديمة والحديثة –ايجابيات وسلبيتها. [20 ساعة]<br><br>الجزء ج - المرتكزات السياسية والفكرية لإقامة النظام الديمقراطي:<br>اشكال النظام التمثيلي – النظام البرلماني –النظام الرأسي – النظام المختلط – النظام المجلسي (الجمعية التشريعية). [35 ساعة] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | تتمحور الاستراتيجيات الخاصة في الديمقراطية في امريين:<br>1. الاستراتيجية العامة: تعريف الطالب الجامعي بماهية النظام الديمقراطي من وجهات نظر عالمية وإنسانية وعلمية ودينية وبشكل موضوعي بعيداً واهمية التأثيرات السياسية والفكرية على آلية وعمل النظام السياسي واستقلاليه الحكم السياسي<br>2. الاستراتيجية الخاصة هو السعي لإحداث تغيير في طريقة تفكير الطالب بما يتوافق مع الهدف العام من خلال توجيه الانتباه إلى المضامين الحقيقية للنظام الديمقراطي وفوائده التي سوف تنعكس على المجالات الاقتصادية والاجتماعية فضلا عن اهمية دور الارادة العامة في توجيه دفه الحكم من خلال ممارسة الحقوق السياسية. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 20% (20) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **Report** | 1 | 10% (10) | 13 | 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 Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | ماهية الحكم الديمقراطي، نشأة الديمقراطية |
| **Week 2** | مبادئ وانواع المفهوم الديمقراطي، الاركان والخصائص |
| **Week 3** | المكونات الرئيسية لإقامة النظام الديمقراطي السليم |
| **Week 4** | العناصر الاساسية لنظام الديمقراطي وفوائده |
| **Week 5** | وسائل النظام الديمقراطي وشروط نجاحه |
| **Week 6** | ضمانات النظام الديمقراطي |
| **Week 7** | صور الحكم الديمقراطي – الديمقراطية المباشرة – صورها القديمة والحديثة –ايجابيات وسلبيتها |
| **Week 8** | الديمقراطية شبة المباشرة وصورها–مشاركة الشعب في العمل التشريعي –رقابة الشعب على البرلمانيين–سلبيات وايجابيات |
| **Week 9** | الديمقراطية غير مباشرة –مفهومها ونشأتها– ايجابيات وسلبيات |
| **Week 10** | موقف الاسلام من الديمقراطية |

| | |
|---|---|
| **Week 11** | الديمقراطية وحقوق الانسان –الديمقراطية والدستور –الديمقراطية والراس مالية |
| **Week 12** | المرتكزات السياسية والفكرية لإقامة النظام الديمقراطي |
| **Week 13** | اشكال النظام التمثيلي – النظام البرلماني –النظام الرأسي – النظام المختلط – النظام المجلسي (الجمعية التشريعية) |
| **Week 14** | الحقوق السياسية للفرد في اطار النظام الديمقراطي، ماهية الحقوق السياسية ومميزاتها |
| **Week 15** | انواع الحقوق السياسية (حق تقرير المصير، حق اكتساب الجنسية، حق الحياة الخاصة، الحق في الانتخابات الحرة النزيهة، حق المساواة وعدم التميز)، نشأت الحقوق السياسية وشروط تحققها |
| **Week 16** | **Preparatory week before the final Exam** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | حقوق الانسان والديمقراطية في القانون الدولي للمؤلف د. محمد يونس الصايغ | Yes |
| **Recommended Texts** | الديمقراطية وحقوق الانسان للمؤلف د. كمال محمد الاسطل<br>الديمقراطية (التاريخ والمفهوم) للمؤلف د. وجيه قانصو<br>الديمقراطية للمؤلف أ. م. مجد زين العابيدين طعمه | |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Probability I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Stat201** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Safwan Nathem Rashed | | **e-mail** | safwan75nathem@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To develop the student's problem-solving skills by getting acquainted with sets theory and some of its basic theories and understanding its laws<br>2. Developing the student's abilities on counting methods to reach sets theory as well as the binomial expansion law<br>3. Developing skills in applying probability theory and understanding its axioms, its laws and application<br>4. Identify the random experiment and the accidents that will appear in the experiment in order to obtain a sample space<br>5. Learn about independent events and how to identify them, in addition to conditional probability and its connection to Bayes' theory<br>6. Provide a solid foundation for advanced work on probability and its applications, and is essential to understanding many applied fields |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Identify the axioms of probability theory and its basic theories<br>2. The possibility of proving the basic axioms of probability theory<br>3. Familiarize yourself with the statistical terminology in the probabilities view<br>4. Knowing the theory of sets and the sample space that arises from any experiment and its laws<br>5. Identifying the counting methods in determining the sample space of the sets theory as well as the expansion theory<br>6. The possibility of obtaining a sample space through any random experiment and the accidents that appear in the experiment<br>7. Knowing the axioms of probability theory and how to obtain the probability value according to the probability law<br>8. Applying probabilistic laws according to the axioms of sets theory and how to prove them<br>9. The possibility of distinguishing between independent and non-independent events<br>10. Identify conditional probability and build models and laws for any experiment<br>11. The possibility of using Bayes' theory and its application in fields with multiple accidents<br>12. The most important of the outputs is building a basic base for the student to move to the future stages of subjects in which the probabilistic theory is mainly dependent. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part - Set Theory</u><br>Introduction to probability theory, element, set operations, finite and countable sets, product sets, separation of sets. [23 hrs]<br><br><u>Part - Counting methods</u><br>Introduction to counting methods, basic counting principle, factorial symbol, tree drawing, permutations, combinations, ordered samples, binomial theorem. [18 hrs]<br><br><u>Part - Introduction to probability theory</u><br>An introduction to probabilities, types of probability, case and accident spaces, |

| | |
|---|---|
| | random empiricism, probability finding laws, finite sample space, equal probabilities space, probabilistic theories according to a priori sets. [23 hrs]<br><br><u>Part - Conditional and independent probability</u><br>Axioms of probability, independent and dependent probabilities, random processes, conditional probability, Bayes' theorem. [18 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in introducing this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time by getting acquainted with the theory of probability and random variables, in the first part and expanding the student's mind. This will be achieved through classes and interactive educational programs to learn about sets theory and counting methods for it, and through learning about random experiment and sample space in forming sets, as well as using basic probabilistic laws in application in its various forms, which will be the basis for the student for his future stages. |

| **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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| **Module Evaluation**<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 20% (20) | 5 and 14 | LO #1-#4, #5-#8 and #9- #11 |
| | **Assignments** | 5 | 10% (10) | 1 and 14 | LO #1- #11 |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of the Probability and Basic set theory. |
| **Week 2** | Basic Set theory, definitions of set theory. |
| **Week 3** | Some Fundamental Theorems, Fundamental laws of set theory with theorems. |
| **Week 4** | Sequence and limits, with theorems. |
| **Week 5** | Mid-term Exam + Field and σ-Field and Power of the set. |
| **Week 6** | Techniques of Counting, Tree Diagrams and Arrangement |
| **Week 7** | Techniques of Counting, Permutations. |
| **Week 8** | Techniques of Counting, Combinations with theorems. |
| **Week 9** | Combinations and Binomial theorem and Multinomial Expansion. |
| **Week 10** | Mid-term Exam + Probability Introduction, Random Experiment, Events Kinds, Sample Space and Probability a law. |
| **Week 11** | Axiomatic Approach of Probability. |
| **Week 12** | Probabilistic models according to the basic laws of set theory with theorems. |
| **Week 13** | Independent events, Conditional Probability. |
| **Week 14** | Conditional Probability and Bayes law |
| **Week 15** | Mid-term Exam + Bayes' theorem. |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week** | There are no laboratories |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1-Introduction to probability theory ,Dr.dhafir H. Rasheed,1999,2-nd edition ,Baghdad university<br>2-probability , Dr.kubais S. A Fahady Dr. Pirlanty J. shamoon, Ministry of Higher Education and Scientific Research University of Mosul | Yes |

| | | |
|---|---|---|
| **Recommended Texts** | 1- A first course in probability, Sheldon Ross, 2010, Eighth edition.<br>2- Probability, schume series | No |
| **Websites** | https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library<br>https://www.khanacademy.org/math/statistics-probability<br>https://www.coursearena.io/topic/free-probability-theory-courses | |

**Grading Scheme**
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Sampling Theory I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT202** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Rikan Abdulazeez Ahmed | | **e-mail** | rikan.ahmed@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | | **Version Number** | | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- To deepen understanding of sampling process and create students' awareness of the sampling methodology in mathematical researches.<br>2- cover sampling design and analysis methods that would be useful for research and survey<br>3- A well-designed sampling procedure ensures that we can summarize and analyze data with a minimum of assumptions and complications<br>4- Introducing students to the principles and methods of designing inference-based samples and clarifying the mathematical approach to them |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- define principal concepts about sampling<br>2- Explains the advantages of sampling<br>3- Lists the stages of sampling process<br>4- Categorizes and defines the sampling methods.<br>5- Apply the Simple Random Sampling (SRS) method.<br>6- Expresses sample select process on SRS.<br>7- Formulates and calculates the estimators of population mean, population total, population ratio of two variables, the percentage and the total number of units in the population that possess some characteristic.<br>8- Identifies and interprets confidence intervals via variance estimates of the estimators.<br>9- Estimates the convenient sample size for SRS method. |
| **Indicative Contents**<br>المحتويات الإرشادية | • Basic concepts and definitions about sampling - Sampling methods- The sample selection process in simple random sampling- Simple estimation in simple random sampling [12 hrs]<br>• Simple Random Sampling With Replacement or simply SRSWR sampling - Simple Random Sampling and Without Replacement or simply SRSWOR sampling - Pseudo Random Numbers (PRN)- Probability sampling -Qualitative random variable-Quantitative random variable [12 hrs]<br>• experiments and surveys, steps in planning a survey; randomization approach to sampling and estimation, sampling distribution of estimator, expected values, variances, generalization of probability sampling; prediction approach, inadequacies of approach, decomposition of population total [12 hrs]<br>• Under SRSWR sampling, while estimating population mean (or total) - The covariance between two sample means - The probability for any population unit to get selected in the sample at any particular draw is equivalent to inverse of the population size [12 hrs]<br>• Simple random sampling with associated estimation and confidence interval methods- Estimating proportions - Ratio estimation [12 hrs]<br>• Selecting sample sizes -Estimation of the sample size [12 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<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) | 4 and 12 | LO #3, #4 and #6, #8 |
| | **Assignments** | 5 | 10% (10) | 1 to 14 | LO #2 - #7 |
| | **Discussions** | 5 | 10% (10) | 5-10 | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #9 |
| Summative assessment | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction-Elementary Definitions-Advantages of the Sampling Method- The Principal Steps in a Sample Survey |
| **Week 2** | Population and Unit-Finite and Infinite Populations-Probability Sampling-Alternatives to Probability Sampling |
| **Week 3** | Simple Random Sampling-Selection of a SRS-Definitions and Notation-Estimation of Population Mean and Variance |
| **Week 4** | Estimation of Population Covariance-Estimation of the Standard Error from a Sample-Confidence Limits |
| **Week 5** | Ratio Estimator for Population Ratio- Exact & Approximate Expression of Bias and Mean-Square Error |
| **Week 6** | Ratio Estimator for Population Mean & Total- Confidence Limits |
| **Week 7** | Mid-term Exam + Efficiency of the Ratio Estimator- Optimality of the Ratio Estimator |
| **Week 8** | Estimation of Population Proportion-Variances of the Sample Estimates-Confidence Limits |
| **Week 9** | Population Proportion Estimator for Population Mean & Total- Confidence Limits |
| **Week 10** | Classification into More than Two Classes |
| **Week 11** | Estimation of Sample Size to estimate the Population Mean-Population Total-Population Proportion |
| **Week 12** | Sample Size in Decision Problems |
| **Week 13** | Simple Random Sampling With Replacement- Estimation of the Population Mean and Variance |
| **Week 14** | Estimation of Population Proportion With Replacement sampling |
| **Week 15** | Comparison of the Designs with and Without Replacement |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Tillé, Yves. Sampling and estimation from finite populations. John Wiley & Sons, 2020. | Yes |
| **Recommended Texts** | Cochran, William G. *Sampling techniques*. John Wiley & Sons, 1977. | Yes |
| **Websites** | https://www.tandfonline.com/doi/abs/10.1198/tas.2007.s89?journalCode=utas20 Sampling Methods: Exercises and Solutions | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Numerical Analysis I** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT203** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Zaid T. Al-Khaledi | | **e-mail** | zaid.alkhaledi@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Nada Nazar Mohammed | | **e-mail** | nada-nazar1984@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | Calculus I | **Semester** | 1 |
| **Co-requisites module** | Calculus II | **Semester** | 2 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | This course provides an introduction to numerical methods used in statistics for solving mathematical problems that arise in various fields. The course covers fundamental numerical techniques, algorithms, and their applications in solving linear and nonlinear equations, and interpolation. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understand the basic concepts and principles of numerical methods.<br>2. Recognizing sources of errors in numerical computations.<br>3. Learning how to extract function roots from graph.<br>4. Apply numerical methods to solve nonlinear equations and systems.<br>5. Learning how to solve linear systems numerically.<br>6. Implement interpolation techniques to approximate functions.<br>7. Utilize computational software and programming languages to solve numerical problems |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A – Basic concepts of numerical analysis:</u><br>Reasons of using numerical analysis, problem that we typically face in numerical analysis, problem identification before utilizing numerical methods. [12 hrs.]<br><br><u>Part B – Linear and non-linear equations:</u><br>Implementation of numerical algorithms to solve linear and non-linear equations/systems. [28 hrs.]<br><br><u>Part C – Interpolation:</u><br>Building interpolants using different interpolation approaches. [20 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, computer labs, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>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 |
| **Unstructured SWL (h/sem)** | 62 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |

| | | | |
|---|---|---|---|
| الحمل الدراسي غير المنتظم للطالب خلال الفصل | | | |
| **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** | 3 | 10% (10) | 4, 7, and 10 | All |
| | **Assignments** | 4 | 20% (20) | 4, 8, 11, and 15 | All |
| | **Projects / Lab.** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #4 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Sources of errors in numerical computations |
| **Week 2** | Roots of nonlinear equations – Root locating using graphs |
| **Week 3** | Roots of nonlinear equations – Root locating using the intermediate value theorem |
| **Week 4** | Solving nonlinear equations – Bisection Algorithm |
| **Week 5** | Solving nonlinear equations – Secant Algorithm |
| **Week 6** | Solving nonlinear equations – Newton-Raphson's Algorithm |
| **Week 7** | Solving a system of nonlinear equations – Multidimensional Newton-Raphson's Algorithm |
| **Week 8** | Solving a system of linear equations – Review of direct methods (Gaussian elimination, Gauss-Jordan Elimination, Triangular factorization) |
| **Week 9** | Solving a system of linear equations – Jacobi iterative method |
| **Week 10** | Solving a system of linear equations – Gauss-Seidel iterative method |
| **Week 11** | Interpolation – The direct approach |
| **Week 12** | Interpolation – Newton's divided differences approach |

| | |
|---|---|
| **Week 13** | Interpolation using LaGrange polynomial |
| **Week 14** | Spline Interpolation – Linear spline Interpolation |
| **Week 15** | Spline Interpolation – High-order spline Interpolation |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Lab 1** | Programing in MATLAB: Review |
| **Lab 2** | Functions declaration and evaluation in MATLAB |
| **Lab 3** | Functions plotting in MATLAB |
| **Lab 4** | Bisection algorithm |
| **Lab 5** | Secant algorithm |
| **Lab 6** | Newton-Raphson's algorithm |
| **Lab 7** | Multidimensional Newton-Raphson's algorithm |
| **Lab 8** | Interpolation: Direct approach |
| **Lab 9** | Interpolation: Newton's approach |
| **Lab 10** | Interpolation: LaGrange polynomial |
| **Lab 11** | Interpolation: Spline interpolation |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Non | --- |
| **Recommended Texts** | • Conte, Samuel Daniel, and Carl De Boor. Elementary numerical analysis: an algorithmic approach. Society for Industrial and Applied Mathematics, 2017.<br>• Stoyan, Gisbert, and Agnes Baran. Elementary numerical mathematics for programmers and engineers. Basel, Switzerland: Springer International Publishing, 2016. | No |
| **Websites** | TBD | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Calculus III** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT204** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Khalida Ahmed Mohammed | | **e-mail** | khalida@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Noorsal Ahmed Zeenalabiden | | **e-mail** | zeennorsal@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The aim of the Calculus III course is to provide students with an advanced understanding of multivariable calculus and its applications. Building upon the knowledge gained in previous calculus courses, this course aims to develop students' ability to analyze and solve problems involving functions of several variables, multiple integrals, vector calculus, and applications in various fields. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Provide students with advanced concepts in calculus and their applications.<br>2. Develop students' ability to solve problems using multivariable calculus techniques.<br>3. Demonstrate a solid understanding of multivariable functions, including limits, continuity, and partial derivatives<br>4. Understand the geometric interpretation of vectors in three-dimensional space.<br>5. Apply vector operations such as dot product, cross product, and vector projections.<br>6. Identify critical points, local extrema, and saddle points of multivariable functions. |
| **Indicative Contents**<br>المحتويات الإرشادية | **Part A - Linear Differential Equations**<br>The part on Linear Differential Equations covers fundamental concepts and techniques related to linear differential equations. Students will study first-order differential equations, including separable equations, exact equations, and linear equations. The course explores second-order linear differential equations, focusing on homogeneous and non-homogeneous equations with constant coefficients. [20 hrs.]<br><br>**Part B - Partial derivatives, and differentiability.**<br>The course focuses on understanding the gradient vector and directional derivatives, enabling students to analyze the behavior of multivariable functions. [20 hrs.]<br><br>**Part C - Directional Derivatives and Gradients**<br>The part focuses on understanding the gradient vector and directional derivatives, enabling students to analyze the behavior of multivariable functions. It further extends to multiple integrals, encompassing double and triple integrals, and their applications in computing areas, volumes, center of mass, and moments of inertia. [20 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Preparing Prerequisite Knowledge, begin each topic with real-world examples and applications to demonstrate the relevance and practicality of calculus to Encourage students to explore how calculus concepts are applied in various fields, such as statistics and computer science. Providing timely feedback on student work to identify, address errors, and reinforce learning through quizzes. Promoting collaborative learning by assigning problem-solving tasks. Encourage students to work together, explain concepts to their peers, and engage in collaborative problem-solving. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| | **Quizzes** | 2 | 15% (15) | 5, 12 | LO #1- #4 |

| | | | | | |
|---|---|---|---|---|---|
| **Formative assessment** | **Assignments** | 4 | 15% (15) | 3,6,10, and 13 | LO #3, #4 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| Week | Material Covered |
|---|---|
| **Week 1** | Differential Equations—Growth and Decay |
| **Week 2** | Extracting the Differential Equations |
| **Week 3** | Linear Differential Equations: Properties and Operations |
| **Week 4** | Applications of Differential Equations |
| **Week 5** | A Visual Introduction to 3-D Calculus, and Functions of Several Variables |
| **Week 6** | Limits, Continuity, and Partial Derivatives |
| **Week 7** | Partial Derivatives—One Variable at a Time, Total Differentials and Chain Rules |
| **Week 8** | Mid-term Exam + Extrema of Functions of Two Variables |
| **Week 9** | Applications to Optimization Problems |
| **Week 10** | Vectors and the Dot Product in Space |
| **Week 11** | Directional Derivatives and Gradients |
| **Week 12** | Lagrange Multipliers—Constrained Optimization |
| **Week 13** | Applications of Lagrange Multipliers |

| | |
|---|---|
| **Week 14** | Iterated Integrals and Area in the Plane |
| **Week 15** | Double Integrals and Volume |
| **Week 16** | **Preparatory week before the final Exam** |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | NO | No |
| **Recommended Texts** | Understanding Multivariable Calculus: Problems, Solutions, and Tips, by Professor Bruce H. Edwards, University of Florida, 2013. | No |
| **Websites** | | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Demography** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT205** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Zinah Mudhar Albazzaz | | **e-mail** | Zeenamudhar@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Farah Abd AlGany | | **e-mail** | farah.younus2244@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | تهيئة الطالب للعمل بدوائر الاحصاء المختلفة بحيث يتمكن من جمع ونشر المعلومات الديمغرافية والاجتماعية والاقتصادية والطبية بالأسلوب العلمي |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. ان يتعلم الطالب دراسة البيانات الاجتماعية والطبية ذات العلاقة بالسكان لكونهم مصدر كل النشاطات الاقتصادية وغير والاقتصادية من ثقافية واجتماعية وصحية وغيرها وان هذه النشاطات مرتبطة ويؤثر بعضها على بعض<br>2. ان يتعلم الطالب كيفية الحصول على البيانات الديمغرافية وطرق الكشف وتنقيح الاخطاء التي تتعرض لها البيانات السكانية<br>3. ان يتعلم الطالب كيفية اجراء التعداد والمسح السكاني وكذلك يتمكن من التنبؤ السكاني<br>4. ان يتقن الطالب تكوين وتحليل جداول الحياة الاعتيادية والجداول السريرية وحساب المعدلات الحياتية<br>5. حساب مقاييس الخطورة وتحليل بيانات البقاء على قيد الحياة |
| **Indicative Contents**<br>المحتويات الإرشادية | 1. عريف الاحصاء السكاني ومصادر البيانات السكانية وانواع المجتمعات السكانية وحساب المؤشرات الديمغرافية ومعايرة المعدلات (13hr)<br>2. طرق الكشف عن الاخطاء التي تعترض البيانات السكانية وطرق تنقيح البيانات السكانية (12hr)<br>3. التنبؤ السكاني (12hr)<br>4. بناء وتحليل جداول الحياة الاعتيادية والسريرية (12hr)<br>5. حساب المعدلات الحياتية ومقاييس العلاقة بين العوامل الحياتية, الخطورة النسبية وانواعها ومعدلاتها وتحليل بيانات البقاء على قيد الحياة و نمط البقاء. (14hr) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | الاستراتيجية الرئيسية التي سيتم تبنيها هي تشجيع الطلاب على تعلم كيفية الحصول على البيانات الديمغرافية وتحليلها وتوسيع وصقل مهارات التفكير النقدي لديهم من خلال المحاضرات ومن خلال التقارير التي سيعدها الطلاب |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #4 |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #5 |
| | **H.W.** | 2 | 10% (10) | 4 and 12 | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, and #4 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | All |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | تعريف الاحصاء السكاني وبيان اهميته والتغيرات التي تطرأ على المجتمع والعوامل التي تنشأ منها |
| **Week 2** | مصادر البيانات السكانية |
| **Week 3** | انواع نماذج الهرم السكاني |
| **Week 4** | المؤشرات الديمغرافية والمعدلات التي يعتمد عليها بالدراسات |
| **Week 5** | طرق تقييس المعدلات |
| **Week 6** | دراسة تقييم بيانات التركيب العمري والنوعي وكشف الاخطاء التي تعترض البيانات السكانية |
| **Week 7** | طرائق تنقيح البيانات السكانية |

| | |
|---|---|
| **Week 8** | توفيق الدوال الرياضية للتنبؤ السكاني |
| **Week 9** | بناء جداول الحياة الاعتيادية |
| **Week 10** | بناء جداول الحياة السريرية |
| **Week 11** | تحليل جداول الحياة |
| **Week 12** | المعدلات الحياتية |
| **Week 13** | مقاييس العلاقة بين العوامل الحياتية |
| **Week 14** | الخطورة النسبية وانواعها ومعدلاتها |
| **Week 15** | تحليل بيانات البقاء على قيد الحياة ونمط البقاء |
| **Week 16** | **Preparatory week before the final Exam** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | الاحصاء الديموغرافي/عبد الحسين الزيني | Yes |
| **Recommended Texts** | التحليل السكاني الرياضي /عز الدين بن عامر | No |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **English Language** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT206** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 3 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Zainab Qusay Ahmed Taqi | | **e-mail** | Zainab.q@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Asst. lecturer | | **Module Leader's Qualification** | MSc. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 11/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To be able to speak English fluently and accurately.<br>2. To think in English and then speak.<br>3. To be able to talk in English.<br>4. To be able to compose freely and independently in speech and writing.<br>5. To be able to read books with understanding. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. To address grammar issues that students encounter in their daily speech, writing, reading and listening<br>2. To address the issue of grammatical errors that affect effective communication<br>3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, written responses, discussions, and reflections<br>4. Recognize the structure and organization of paragraphs,<br>5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, and vocabulary development.<br>6. Develop the writing skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Introduction, Study materials. [1 hrs]<br><br>Grammar (quantity)(much/many, a few, a little, little, a lot of, lots), questions and answers. Articles, reeding (about shopping). Vocabulary: Shopping, prices, listening and reading. Verb patterns (want/hope to do), making questions. Future intentions: going to/will, practices, reading about Hollywood kids., Vocabulary: hot verbs: have, go, come, listening, everyday English: how do you feel?. [12 hrs]<br><br>Grammar: What….. like?, Comparative and superlative adjectives big, bigger, biggest good, better, best, practices. Vocabulary: Synonyms and antonyms. Everyday English about directions, listening and reading. [7 hrs]<br><br>Grammar: present tense, practices. for/ since, practices, questions. Adverbs, word pairs, practices. Everyday English about short answers (Question tags). [8 hrs]<br><br>Review about Study materials. [2 hrs] |

## Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | - The main strategy that will be adopted in developing the four skills:<br>The skill of speaking,<br>The skill of reading,<br>The skill of writing,<br>The skill of listening,<br>Also, enable the students for the use of grammar correctly, |

| **Student Workload (SWL)**<br>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 |
| **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 |
| **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** | **Quizzes** | 2 | 15% (15) | 3,5 and 10 | LO #1, #2 |
| | **Assignments** | 2 | 15% (15) | 4, 6 and 12 | LO #3, #4 and #6 |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #2 and #3 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #5 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction: Review about Study materials. [2 hrs] |
| **Week 2** | Quantities, wh- questions and answers. |
| **Week 3** | Articles, reeding (about shopping). |
| **Week 4** | Vocabulary: Shopping, prices. |
| **Week 5** | Grammar: Verb patterns, making questions. |
| **Week 6** | Mid-term Exam |
| **Week 7** | Future: Going to/will, practices, reading (Hollywood kids). |
| **Week 8** | Grammar: hot verbs, listening, everyday English: how do you feel?. |
| **Week 9** | Grammar: What ….. like? , Comparative and superlative adjectives big, bigger, practices. |
| **Week 10** | Vocabulary: Synonyms and antonyms. |
| **Week 11** | everyday English about directions, listening and reading, practices. |
| **Week 12** | Present tense, simple present, present continuous, practices. |
| **Week 13** | Grammar: for/ since, practices, questions. |
| **Week 14** | Adverbs, word pairs, practices. |
| **Week 15** | Everyday English about short answers (Question tags). |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | None |
| **Week 2** | None |
| **Week 3** | None |
| **Week 4** | None |
| **Week 5** | None |
| **Week 6** | None |
| **Week 7** | None |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Headway pre-intermediate plus student's book (john and Lize Soars) | Yes |
| **Recommended Texts** | Headway pre-intermediate plus work's book | Yes |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Probability II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **Stat207** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | | UGII | **Semester of Delivery** | | 4 |
| **Administering Department** | | **STAT** | **College** | **CSM** | |
| **Module Leader** | Dr. Safwan Nathem Rashed | | **e-mail** | safwan75nathem@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Developing the student's problem-solving skills by identifying random, intermittent and continuous variables based on group theory.<br>2. Developing the student's abilities on counting methods to reach the probability mass function and study its properties, as well as the probability density function and study its properties.<br>3. Developing skills in finding the distribution function for each of the probability mass function and the probability density function based on random variables and distinguishing between functions.<br>4. Developing the student's role in benefiting from the generated functions and developing problem-solving skills through these functions.<br>5. Identify some of the distributions commonly used in various fields of operation, including intermittent and continuous ones.<br>6. To provide a solid foundation for advanced work on probabilities and their applications, essential to an understanding of many applied fields |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Recognize the axioms of obtaining discrete and continuous random variables and their basic theories related to group theory.<br>2. The possibility of obtaining the probability mass function as well as the probability density function.<br>3. The possibility of obtaining the distribution function for each of the probability mass function as well as the probability density function.<br>4. The possibility of obtaining functions generated from the mathematical expectation, variance, and moments, in addition to the function that generates moments, as well as the characteristic function.<br>5. Identifying some commonly used probability distributions in the fields of discrete and continuous applications.<br>6. The possibility of obtaining the functions that generate the discrete and continuous distributions.<br>7. One of the most important outputs is to build a basic base for the student to move to future stages of subjects in which probability theory is a basis. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part -</u> the Probabilities and The concept random variables.<br>A simple review of group theory and probability finding, how to obtain random variables depending on the state space of the random experiment, discrete and continuous random variables. [23 hrs]<br><u>Part - Probability functions and the distribution function</u><br>Introduction to the probability function, how to obtain the probability mass function from discrete random variables, how to obtain the probability mass function from discrete random variables, studying the properties of the probability mass function as well as the probability density function, finding the distribution function for the probability mass function and the probability density function, studying the properties of the probability function distribution. [23 hrs]<br><u>Part – Generating function</u><br>Finding the mathematical expectation, variance, moments, and the moment-generating function as well as the characteristic function when the random variables are discrete and continuous. [18 hrs]<br><u>Part - Some Probability Distributions</u> |

| | |
|---|---|
| | Some discrete probability distributions, the uniform distribution, the Bernoulli distribution, the binomial distribution, the Poisson distribution, the geometric distribution, the hypergeometric distribution, and the negative binomial distribution. Some continuous probability distributions, the uniform distribution, the exponential distribution, the normal distribution, the gamma distribution, and the beta distribution. Finding the generating functions for each of the discrete and continuous probability distributions. [18 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in the introduction of this unit is to encourage students to participate in the exercises, while improving and at the same time expanding their critical thinking skills through the theory of probability and discrete and continuous random variables obtained drawing on the theory of groups from the first part Expanding the mental and mental mind for students. This will be achieved through classes and interactive educational programs to identify the quality of random variables and their intermittent and continuous probabilistic functions as well as the distribution function and study the characteristics of cases, with identification of finding functions generated from mathematical expectation, variance and moments with the moment-generating function, with identification of some common probability distributions discontinuous and continuous, as well as the use of basic probability laws in application in their various forms, which will be the basis for the student for his future stages. |

| 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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 3 | 10% (10) | 5 and 14 | LO #1-#2, #3-#4 and #5- #6 |
| | Assignments | 5 | 10% (10) | 1 and 14 | LO #1, #6 |
| | Discussion | 5 | 10% (10) | 2, 4, 6, 12 | All |
| | Report | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| Summative assessment | Midterm Exam | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Introduction in the Probabilities and The concept random variables. |
| Week 2 | Probability mass function, Discrete random variable. |
| Week 3 | Probability density function, Continuous random variable. |
| Week 4 | Distribution function, discrete and continuous variables. |
| Week 5 | Properties of mass and density functions for discrete and continuous variables. |
| Week 6 | Properties of distribution functions for discrete and continuous variables. |
| Week 7 | Mid-term Exam + Laws and notes on finding the probability value of functions of discrete and continuous random variables. |
| Week 8 | Generating function, Mathematical Expectation and Variance with Properties. |
| Week 9 | Mathematical Expectation and Variance of (p.m.f and p.d.f) for discrete and continuous variables. |
| Week 10 | Generating function, Moment, Central Moment and Non-Central Moment. |
| Week 11 | Moment Generating function and Characteristic function, discrete and continuous variables. |
| Week 12 | Mid-term Exam + Some discrete probability distributions. |
| Week 13 | Finding the generating functions for the discrete distributions |
| Week 14 | Some continuous probability distributions. |
| Week 15 | Mid-term Exam + Finding the generating functions for the continuous distributions |
| Week 16 | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week** | There are no laboratories |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1-Introduction to probability theory ,Dr.dhafir H. Rasheed,1999,2-nd edition ,Baghdad university<br>2-probability , Dr.kubais S. A Fahady Dr. Pirlanty J. shamoon, Ministry of Higher Education and Scientific Research University of Mosul | Yes |
| **Recommended Texts** | 1- A first course in probability, Sheldon Ross, 2010, Eighth edition.<br>2- Probability, schume series | No |
| **Websites** | https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library<br>https://www.khanacademy.org/math/statistics-probability<br>https://www.coursearena.io/topic/free-probability-theory-courses | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Sampling Theory II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT208** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 4 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Rikan Abdulazeez Ahmed | | **e-mail** | rikan.ahmed@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | | **Version Number** | | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- To deepen understanding of sampling process and create students' awareness of the sampling methodology in mathematical researches.<br>2- cover sampling design and analysis methods that would be useful for research and survey<br>3- A well designed sampling procedure ensures that we can summarize and analyze data with a minimum of assumptions and complications<br>4- Introducing students to the principles and methods of designing inference-based samples and clarifying the mathematical approach to them |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Apply the Stratified Sampling method<br>2- Applies the simple estimation method in Stratified Sampling<br>3- Composes the optimum allocation of the sample size to stratum<br>4- Compares SRS and Stratified Random Sampling methods<br>5- Calculates required sample size for the estimators in Stratified Random Sampling<br>6- Applies the Ratio & Linear Regression Estimation method for Stratified Random Sampling<br>7- Apply the Systematic Sampling (SS) methods<br>8- Expresses sample select process on SS<br>9- Applies SS method to strata<br>10- Apply the Two Phase Sampling methods |
| **Indicative Contents**<br>المحتويات الإرشادية | • Stratification and Stratified Random Sampling - What Is a Stratified Random Sample - How to Take a Stratified Random Sample - Why Stratified Sampling [12 hrs]<br>• Population Parameters for Strata-Sample Statistics for Strata-Estimation of Population Parameters from Stratified Random Sampling [12 hrs]<br>• Estimation of Population Parameters- Allocation of Sample to Strata-Proportional Allocation- Optimal Allocation-Construction of Stratum Boundaries and Desired Number of Strata [12 hrs]<br>• Ratio & Regression Estimation in Stratified Random Sampling- Estimation with Mean & Totals Probabilities- Determination of Sample Size [12 hrs]<br>• How To Take a Systematic Sample-Estimation of Population Characteristics-Variance of Estimates-Efficiency of Systematic Sampling [12 hrs]<br>• Two-Phase Sampling for Estimation-Difference Method of Estimation-Procedure for construction of estimators of the total[12 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

## Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

| | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<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) | 4 and 12 | LO #3, #4 and #9, #10 |
| | **Assignments** | 5 | 10% (10) | 1 to 14 | LO #2 - #10 |
| | **Discussions** | 5 | 10% (10) | 5-10 | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| Summative assessment | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Stratified Sampling- Introduction-Definition of Stratified Sampling-Advantages of Stratified Sampling-Notation- Estimation Procedure |
| **Week 2** | Estimation of Population Mean- The Estimated Variance and Confidence Limits |
| **Week 3** | Optimum Allocation- Optimum Allocation for Fixed Cost- Optimum Allocation for Fixed Variance |
| **Week 4** | Neyman Optimum Allocation- Proportional Allocation- Relative Precision of Stratified Random and Simple Random Sampling |
| **Week 5** | Sampling for Stratified Proportions- Sampling for Stratified Proportions |
| **Week 6** | Estimation of Sample Size with Continuous Data- Estimation of Sample Size with Proportions |
| **Week 7** | Mid-term Exam + Ratio Estimates in Stratified Random Sampling- Separate Ratio Estimator |
| **Week 8** | Combined Ratio Estimator- Comparison Between the Separate and Combined Ratio Estimators- Optimum Allocation with a Ratio Estimate |
| **Week 9** | The Linear Regression Estimate- Regression Estimates with Preassigned *b*- Regression Estimates when *b* Is Computed from the Sample |
| **Week 10** | Large Sample Comparison with the Ratio Estimate and the Mean per Unit- Regression Estimates in Stratified Sampling |
| **Week 11** | Sampling- Introduction- Linear Systematic Sampling- Estimation of the Population Mean Systematic and Its Variance |
| **Week 12** | Comparison of Systematic with Stratified Random Sampling- Circular Systematic Sampling |
| **Week 13** | Two Phase Sampling - Introduction - Two Phase Sampling for Estimation |
| **Week 14** | Ratio Method of Estimation - Regression Method of Estimation |
| **Week 15** | Two-Phase Sampling for Stratification |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Tillé, Yves. Sampling and estimation from finite populations. John Wiley & Sons, 2020. | Yes |
| **Recommended Texts** | Cochran, William G. *Sampling techniques*. John Wiley & Sons, 1977. | Yes |
| **Websites** | https://www.tandfonline.com/doi/abs/10.1198/tas.2007.s89?journalCode=utas20 Sampling Methods: Exercises and Solutions | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Numerical Analysis II** | | | **Module Delivery** | |
| **Module Type** | **Elective** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT209** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 4 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Zaid T. Al-Khaledi | | **e-mail** | zaid.alkhaledi@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Nada Nazar Mohammed | | **e-mail** | nada-nazar1984@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | This course provides an introduction to numerical methods used in statistics for solving mathematical problems that arise in various fields. It's a continuation of Numerical Analysis I. The course covers numerical differentiation, numerical integration, initial value problems for ordinary differential equations, and a quick glimpse on numerical solution of partial differential equations. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Perform numerical differentiation of functions.<br>2. Perform numerical differentiation of interpolants<br>3. Perform numerical integration of functions.<br>4. Perform numerical integration of interpolants.<br>5. Solve ordinary differential equations using appropriate numerical methods.<br>6. Solve partial differential equations using appropriate numerical methods. |
| **Indicative Contents**<br>المحتويات الإرشادية | <u>Part A – Numerical differentiation:</u><br>Learning about backward, forward, and central approaches of finding derivative of functions. Additionally, finding the numerical derivatives of numerical interpolants [16 hrs.]<br><br><u>Part B – Numerical integration:</u><br>Approximating finite integrals of functions using trapezoidal rule, Simpson's rule, Romberg integration, and Gaussian integration. Double integrals and integration of interpolants are briefly interduce as well. [24 hrs.]<br><br><u>Part C – Numerical solutions of ordinary differential equations:</u><br>Euler's method, Runge-Kutta methods, second order ordinary differential equations. [12 hrs.]<br><br><u>Part D – Numerical solutions of partial differential equations:</u><br>Finite difference methods for elliptic, parabolic, and hyperbolic equations. Finite element methods for solving partial differential equations. [8 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, computer labs, weekly assignments, quizzes, and projects. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 10% (10) | 5, 11, and 13 | All |
| | **Assignments** | 4 | 20% (20) | 5, 11, 13, and 15 | All |
| | **Projects / Lab.** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 10 | LO #1 - #4 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Numerical differentiation of functions using Forward, Backward, and Central divided differences approaches. |
| **Week 2** | Tylor's Expansion, Comparing accuracy of numerical differentiation approaches. |
| **Week 3** | High-order numerical differentiation |
| **Week 4** | Numerical differentiation of interpolants – Application on LaGrange interpolants |
| **Week 5** | Numerical integration - Trapezoidal rule. |
| **Week 6** | Numerical integration - Simpson's rule. |

| | |
|---|---|
| **Week 7** | Numerical integration - Romberg integration. |
| **Week 8** | Numerical integration – Gaussian integration. |
| **Week 9** | Numerical double integral. |
| **Week 10** | Numerical integration of interpolants - Newton-Cotes Quadrature Formula |
| **Week 11** | Numerical solutions of ordinary differential equations - Euler's method |
| **Week 12** | Numerical solutions of ordinary differential equations - Runge-Kutta methods |
| **Week 13** | Numerical solutions of second order ordinary differential equations |
| **Week 14** | Numerical methods for partial differential equations - Finite difference methods for elliptic, parabolic, and hyperbolic equations. |
| **Week 15** | Finite element methods for solving partial differential equations. |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Lab 1** | Implementation of numerical differentiation in MATLAB. |
| **Lab 2** | Numerical differentiation of interpolants. |
| **Lab 3** | Implementation of numerical integration in MATLAB. |
| **Lab 4** | Numerical double integral. |
| **Lab 5** | Newton-Cotes Quadrature |
| **Lab 6** | Runge-Kutta method |
| **Lab 7** | Second order ordinary differential equations |
| **Lab 8** | Numerical methods for partial differential equations |
| **Lab 9** | Finite element methods for solving partial differential equations |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Non | --- |
| **Recommended Texts** | • Stoyan, Gisbert, and Agnes Baran. Elementary numerical mathematics for programmers and engineers. Basel, Switzerland: Springer International Publishing, 2016. | No |

| | | |
|---|---|---|
| | • Conte, Samuel Daniel, and Carl De Boor. Elementary numerical analysis: an algorithmic approach. Society for Industrial and Applied Mathematics, 2017. | |
| **Websites** | TBD | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Data Base** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT210** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 4 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Najlaa Saad Ibrahim | | **e-mail** | najlaa.s.a@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Luma Akram Abdullah Ali | | **e-mail** | luma.akram@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. The ability to interact with future systems. One of the most important goals of database design is to plan the database to allow modifications and improvements to it without the need to modify application programs or reorganize files.<br>2. Designing the data so that it is free of repetition and can be retrieved, modified and added to without the problems that can occur with the presence of repetition in it.<br>3. Reducing the total cost of storage requirements.<br>4. The physical and logical organization of data so that it can meet expected inquiries at the appropriate speed, as well as unplanned inquiries or to produce non-routine reports. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Focus on the way data is organized and not on special applications.<br>2. The ability to represent the natural structure of the data so that it reflects the logical relationships between the data.<br>3. Ensure that data can be shared among users for a variety of products.<br>4. Harmonization and compatibility with the current systems, so that the database system adopted by the facility must be consistent with the programs, data and procedures available at the facility.<br>5. Achieving interaction between multiple users and the database.<br>6. Achieving the logical coherence between the data distributed within the sub-files of the database.<br>7. Allowing users to build their personal opinion about the data without caring about the way the data is physically stored.<br>8. Allowing the database to evolve according to the needs of users. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following:<br><br>Part A - Basic Concepts of Database Management System:<br>Definition of databases, Purpose of database systems, Types of databases, Properties of databases, Database system applications, View of data and database languages. [10 hrs]<br><br>Part B – The Relational Algebra and Relational Database Model:<br>Definition of relationships and their importance and Types them. Definition of Algebraic Operators(Projection Operation, Selection Operation, Cartesian Multiplication and Join Operation).Definition of Set Operations( Union, Intersection, difference and Division Operation).[24 hrs]<br><br>Part C - Create an integrated database in Access:<br>Create a database, configure tables, learn about the types and properties of fields, Identify the operations that can be performed on fields and records , specify a primary key for the table and work on relationships between tables (linking tables) and understanding referential integrity. Creating queries using the Query Wizard and designing queries. Creating forms through the use of several types of forms (form tool, blank form, multiple elements, form wizard, split form, datasheet) and using form design. Creating reports through reports using several types of reports (report tool, blank report, report wizard) and using report design, previewing reports through the use of several methods and printing reports.[26 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, computer labs, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to databases and characteristics them. |
| **Week 2** | History and applications of database System. |
| **Week 3** | Database users and administrators. |
| **Week 4** | Stages of developing databases. |
| **Week 5** | The concept of tables and data types and query them. |
| **Week 6** | Definition of relationships and their importance. |
| **Week 7** | Types of relationships between tables. |
| **Week 8** | Introduction to relational Algebra and Relational Database Model: Projection Operation |
| **Week 9** | Algebraic Operators: Selection Operation and the combination of the Selection Operation and Projection Operation. |
| **Week 10** | Algebraic Operators: Cartesian Multiplication. |
| **Week 11** | Algebraic Operators: Join Operation. |
| **Week 12** | Set Operations: Union. |
| **Week 13** | Set Operations: Intersection. |
| **Week 14** | Set Operations: difference. |
| **Week 15** | Set Operations: Division Operation. |
| **Week 16** | Preparatory week before the final Exam. |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Create a database and create tables with different types of fields, in addition to controlling field properties. |
| **Week 2** | Apply operations taken theoretically to fields and records. |
| **Week 3** | Determine a primary key for the tables and create relationships between the two tables or more, such as a one-to-one relationship, a one-to-many relationship, and a many-to-many relationship, in addition to imposing referential integrity. |
| **Week 4** | Creating simple queries, a search query for duplicates, crosstab queries, and non-identical queries through one of the previously created tables. |
| **Week 5** | Creating queries using query design for linked tables and using the tab group for query design. |

| | |
|---|---|
| **Week 6** | Create forms using form tool, blank form, multiple elements, form wizard, split form and datasheet for each table to facilitate data entry. |
| **Week 7** | Creating forms using form design and using a group of tabs for designing forms by adding logos, backgrounds and other operations to the form. |
| **Week** 8 | Generate reports using report tool, blank report and report wizard. |
| **Week** 9 | Create reports using the report design, use the report design tab group, and report printing. |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | | |
| **Recommended Texts** | Adrien W. and Nelson E. "Database Design" by Hsoub Academy, v1.0, first edition.<br>Aswad, Firas Muhammad and Lazim, Ali al-Hur "Databases"<br>Abou Elela ,M. 'Microsoft Office 2010 Professional" , | No |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Time Series Analysis** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT211** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGII | | **Semester of Delivery** | 4 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Najlaa Saad Ibrahim | | **e-mail** | najlaa.s.a@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Rehad Emad Slewa | | **e-mail** | alshamany@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Visualize the examples above the different behaviors of time associated with the random variable. Understanding these different temporal characteristics in any application is the goal of time series analysis.<br>2. Among the most important time series are those related to economic indicators and annual sales of companies in all aspects of their activities, education, population size, and the like. The change that occurs in the values of the time series variable or the values of its variables is a function of time that can be represented graphically<br>3. Using time series data to look ahead and predict future change through the facts of yesterday and today.<br>4. The use of time series in control systems, through which the production process is controlled and knowledge of whether the product conforms to the required specifications or not. Then the right decision can be taken and errors in the production process can be corrected.<br>5. Building software systems for electronic control of production processes and specifications. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Separating the components of the time series and knowing their interaction, impact and contribution to describing the phenomenon of the time series<br>2. Estimating the component of the linear and non-linear general trend in two ways, and how to remove the effect of the trend from the studied phenomenon.<br>3. Estimating seasonal, cyclical and random compounds and removing them from the studied phenomenon.<br>4. Addressing the non- stationary of the series and preparing it to build the model.<br>5. Building a statistical model, a time series model with one variable or multivariate, and interpreting its features through its relationship to the studied phenomenon, and extracting facts about the behavior of the data.<br>6. Predicting the studied phenomenon in the future by means of Box-Jenkins models |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A - Basic Concepts of Time Series:</u><br>Definition of time series, the purpose of using series, types of series, mathematical models of time series, and analysis of regular and irregular main components. [10 hrs]<br><br><u>Part B - Estimating of Regular and Irregular Main Compounds:</u><br>Methods for measuring the linear and non-linear general trend and removing its effect from the studied phenomenon, measuring the seasonal, cyclical and random compounds and removing their effect, as well as using the Minitab program to implement the methods for estimating the four compounds presented [30 hrs]. |

| | |
|---|---|
| | Part C - Box Jenkins models:<br>Studying the stationary of time series, non-stationary processing, and identifying correlation functions represented by autocorrelation and partial autocorrelation functions to determine model ranks and model building stages with application. [20 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 by taking time series of a specific phenomenon and analyzing it using the Minitab program and predicting its future values.. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | All |
| | **Assignments** | 4 | 20% (20) | 4, 8, 11, and 15 | All |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to time series, its applications, purpose and how to draw it |
| **Week 2** | Analysis of the main components of the time series |
| **Week 3** | Measuring the general linear trend by means of the Half Middle-Series Method |
| **Week 4** | Measurement of the general linear trend by least squares method |
| **Week 5** | Measurement of the general non-linear trend by the method of curves of the second and third order |
| **Week 6** | Measurement of the general non-linear trend by semi-logarithmic equation method |
| **Week 7** | Removing the effect of the general linear and non-linear trend |
| **Week 8** | Measuring seasonal changes in the ratio method to the general average |
| **Week 9** | Measuring seasonal changes in a way relative to the general trend and removing its effect |
| **Week 10** | Measuring cyclical changes in a way relative to the general trend and removing its effect |
| **Week 11** | Measuring random changes and excluding removing its effect |
| **Week 12** | Time series stationary and non- stationary treatment |
| **Week 13** | Stages of building Box-Jenkins models |
| **Week 14** | The first-order and p-order autoregressive model |
| **Week 15** | First-order and q-order moving averages model |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | al-Mashhadani, M. H. & Eifan M.M.” From the methods of statistics (indices and time series)” | Yes |
| **Recommended Texts** | Box, G., Jenkins, G., Reinsel ,G. and Ljung G.," Time Series Analysis Forecasting and control", Copyright Year: 2016.<br>Liu, L.,"Time Series Analysis and Forecasting ", Copyright Year: 2006.<br>Wei , W.S. " Time Series Analysis : Univariate and Multivariate Methods ", Copyright Year: 1990 | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Research Methodology** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT212** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | UGII | **Semester of Delivery** | | 4 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Wisam Wadullah Saleem | | **e-mail** | wisam-stat@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Israa abduljawaad saleh | | **e-mail** | Israa.alameen81@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. تعريف الطلبة بالمنهج العلمي الحديث وبداية النظرية العلمية.<br>2. التعرف على المفاهيم العامة للمنهج العلمي وافتراضات المنهج العلمي.<br>3. بيان مفهوم البحث العلمي وأنواعه وأهدافه وخصائصه<br>4. الاطلاع على منهاج البحث العلمي<br>5. معرفة صفات الباحث الناجح وأدوات جمع البيانات وطرق اختيار عينة الدراسة.<br>6. معرفة خطوات اجراء البحث العلمي وطريقة كتابته.<br>7. التعرف على طرق توثيق المصادر والمراجع المختلفة.<br>8. تعريف الطالب بأساليب البحث العلمي وعناصر خطة البحث وخصائص التفكير العلمي وتمكينه من كتابة بحث علمي يتفق مع المنهج الصحيح للبحث العلمي |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. ان يكون الطالب قادراً على ان يوضح خصائص البحث العلمي واهميته.<br>2. ان يكون الطالب قادراً على ان يصف اساليب البحث العلمي واساسياته<br>3. ان يربط الطالب بين مناهج البحث والأدوات المناسبة لها.<br>4. ان يلتزم الطالب بآداب واخلاقيات البحث العلمي.<br>5. اكتساب المهارات للطلبة في بناء بحث علمي باستخدام أدوات البحث العلمي.<br>6. تمكين الطالب من تشخيص المشاكل والتوصل الى حلها وفق الأسلوب العلمي.<br>7. تمكين الطالب من القراءة الصحيحة الواعية واختيار المعلومات المناسبة لحل المشكلات.<br>8. التمكن من اعداد خطة بحث علمي وفق الأسس العلمية الصحيحة.<br>9. تمكين الطالب من كتابة البحث العلمي وفق الأسس العلمية الصحيحة. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>الجزء A</u><br>دراسة المنهج العلمي الحديث وطريقة بناء النظرية العلمية باستخدام القوانين العلمية، وبيان مفهوم البحث العلمي وأنواع البحث العلمي وأهدافه وخصائصه وخطوات اعداد البحث العلمي [10 hrs]<br><br><u>الجزء B</u><br>بيان مناهج البحث العلمي وصفات الباحث الناجح وادوات جمع البيانات في البحث العلمي وطرق اختيار العينات في البحث العلمي، مع بيان أنواع العينات. [10 hrs]<br><br><u>الجزء C</u><br>. [10 hrs]<br>معرفة اهم المعايير والاسس في اختيار عينة الدراسة، اهم أسباب اختيار عينة الدراسة، طرق اختيار موضوع البحث، القراءات الاستطلاعية مع جمع المعلومات وتحليلها، ودراسة طرق توثيق مصادر ومراجع البحث العلمي وأنواع التوثيق، واهم طرق توثيق المصادر والمراجع، ضوابط أخرى لكتابة قائمة مصادر ومراجع البحث العلمي، واستخدام طرق التوثيق التي يمكن الاعتماد عليها من قبل الباحث العلمي، طريقة هارفارد، طريقة MAL ، طريقة PAP. [10 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | تشجيع الطلبة على بناء البحث العلمي باستخدام أساليب وأدوات البحث العلمي وإيجاد الحلول لمشاكل البحث العلمي مع تحسين مهارات التفكير العلمي وتوسيعها، من خلال المشاركة في التمارين وسيتم تحقيق ذلك من خلال الفصول التعليمية والمهام والاختبارات والمشاريع. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **50** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 15% (15) | 5 and 10 | LO #1,#2,#3,#4,#5,#6,#7and #8 |
| | **Assignments** | 3 | 15% (15) | 2 and 12 | LO #1,#2,#3,#4,#5,#6,#7,#8 and #9 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 9 | All |
| | **Final Exam** | 3hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | المنهج العلمي الحديث، العلم والمعرفة، بداية النظرية العلمية، بناء النظرية العلمية، وظائف النظرية العلمية وخطواتها |
| **Week 2** | القوانين العلمية ، شروط القوانين العلمية ، خطوات المنهج العلمي ، المخاطر التي تواجه البحث العلمي |
| **Week 3** | المفاهيم العامة للمنهج العلمي، افتراضات المنهج العلمي للظواهر الطبيعية، اهداف العلم ، الفكر والتفكير أساليب التفكير |
| **Week 4** | مقدمة ، مفهوم البحث العلمي ، أنواع البحث العلمي |
| **Week 5** | أهداف البحث العلمي ، خصائص البحث العلمي، خطوات إعداد البحث العلمي |
| **Week 6** | مناهج البحث العلمي, المنهج التاريخي, المنهج المسحي، منهج دراسة الحالة، المنهج التجريبي، المنهج الاحصائي، منهج تحليل المحتوى |
| **Week 7** | صفات الباحث الناجح ، أنواع البحوث ، أدوات جمع البيانات في البحث العلمي ، الاستبيان |
| **Week 8** | أنواع الاستبيان في البحث العلمي ، طريقة الملاحظة ، طريقة المقابلة ، الاختبار |
| **Week 9** | طرق اختيار العينة في البحث العلمي، خطوات اختيار عينة البحث |
| **Week 10** | أنواع العينات، العينة الاحتمالية ، اللا احتمالية |
| **Week 11** | اهم المعايير والاسس في اختيار عينة الدراسة، اهم أسباب اختيار عينة الدراسة، طرق اختيار موضوع البحث، القراءات الاستطلاعية |
| **Week 12** | جمع المعلومات وتحليلها، القراءة، شروط القراءة في البحث |
| **Week 13** | طرق توثيق مصادر ومراجع البحث العلمي، أهمية التوثيق، أنواع التوثيق، اهم طرق توثيق المصادر والمراجع |
| **Week 14** | الفرق بين المصادر والمراجع، أنواع المراجع، أهمية المصادر والمراجع في البحث العلمي، قائمة المصادر والمراجع الخاصة بالبحث العلمي، ضوابط أخرى لكتابة قائمة مصادر ومراجع البحث العلمي |
| **Week 15** | طرق التوثيق التي يمكن الاعتماد عليها من قبل الباحث العلمي، طريقة هارفارد، طريقة MAL ، طريقة PAP |
| **Week 16** | الامتحان النهائي |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Non | - |
| **Recommended Texts** | إبراهيم، مروان عبد المجيد. (2000). أسس البحث العلمي لإعداد الرسائل الجامعية. مؤسسة الوراق. | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Mathematical Statistics I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT301** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | | UGIII | **Semester of Delivery** | | 5 |
| **Administering Department** | | STAT | **College** | CMS | |
| **Module Leader** | Dr. Hayfa Abdul Jawad Saieed | | **e-mail** | haeifa965@gmail.com | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Explain probability mass, density , cumulative distribution functions ,joint density , mass, cumulative functions with theur properties<br>2. Identify different moments of single variable and their properties and relations between moments<br>3. Identifying generating functions and cumulants with their uses and properties<br>4. Learn about important measures such as median , modes, harmonic mean variance mean deviation, coefficient of variation. These measures are very important in studying statistical properties of discrete and continuous distributions Which the student will study in Mathematical Statistics 2 in the second course.<br>5. Learning joint probability functions, marginal and conditional probability functions, joint, marginal, conditional moments, joint generating functions and cumulants.<br>6. Defining theoretical joint measures such as covariance, simple correlation , and partial correlation coefficients . |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understanding the process of calculating cdf for discrete and continuous variables and how to find the pdf or pdf from cdf.<br>2. Recognize the different types of moments and their relationship between them<br>3. Recognize the relationship between generarating functions and their uses.<br>4. Understanding theoretical definitions for some measures of tendency for example median , modes ,and harmonic mean with their properties<br>5. Understanding definitions of some throretical dispersion measures for example variance and mean deviation of a random variables with properties.<br>6. Identifying joint random variables and joint pmf , pdf ,cdf and marginal functions .<br>7. Learn the difference between joint ,marginal conditional functions.<br>8. Recognize another type of mathematical expectation, which is the joint mathematical expectation and conditional expectations with their properties<br>9. Distinguish between independent and correlated random variables<br>10. Learn general definitions of joint generating functions and cumulants with their properties and uses . |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>1. Probability mass, density functions with theorems and proofs, some examples and discussions (3 weals) -<br>2. Expectations different kinds of moments, generating functions properties and theorems with proofs exercises and homework's. (3 weals).<br>3. Theoretical definitions of mode, median, harmonic mean, geometric mean, variance mean deviation, measures of skewness and kurtosis with properties and examples (3 weaks).<br>4. Definition of joint probability mass, density, cumulative and marginal functions , stochastic independence with different theorems and examples (2 weals).<br>5. Joint moments, marginal moments, moments of functions of random variables, properties with examples. ( 1 weak). |

| | |
|---|---|
| | 6. Conditional distributions and conditional moments with theorems and examples 2 weaks ).<br>7. Joint generating fans cumulant functions, marginal generating and cumulants ( 1 weak).<br>8. Definition of covariance, simple and partial correlation coefficients with properties, theorems with proofs and examples. (1 weak ). |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities , moments or drawing probability functions. Also linking the knowledge they receive with the subjects that he studied in previous levels and the levels that he will turn to later. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Probability mass and density functions, Cumulative distribution function with properties |
| **Week 2** | Mathematical expectation with properties, Moments around zero , central and non-central moments . factorial moments |
| **Week 3** | Moment generating function, characteristic function with properties |
| **Week 4** | Probability generating function, cumulant generating function |
| **Week 5** | Median, Modes, Harmonic mean, geometric mean |
| **Week 6** | Mean deviation, variance with properties |
| **Week 7** | coefficient of variation, skeenes kurtosis mid-year exam |
| **Week 8** | Joint probability mass and density functions, joint cumulative distribution functions |
| **Week 9** | Marginal density, mass, cumulative functions |
| **Week 10** | Joint moments,marginal moments, independence |
| **Week 11** | Joint moment generating, characteristic function, joint cumulant generating functions and marginals |
| **Week 12** | Conditional distributions, conditional cumulative distribution function with properties |
| **Week 13** | Conditional moments |
| **Week 14** | Covariance and simple correlation coefficients |
| **Week 15** | Partial correlation with examples |
| **Week 16** | **Final exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>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** | 1. Hermiz,A.H.(1989),"Mathrmatical Statistics ", Directorate of Dar Al-Kutub for Printing and Publishing, University of Mosul, Iraq<br>2. School,P., Louisville, KY ,(2013) ,"Probability and mathrmatical statiztics ", https://www.researchgate.net/publication/272237355 | Yes |
| **Recommended Texts** | Hog,R.V. and Craig, A.T. (1978) ," Inttofuction to mathrmatical statiztics ",fourth edition, Macmillan Publishing Co., Inc. NEW YORK | |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Regression Analysis I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT302** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 5 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Bashar A. Al-Talib | | **e-mail** | bashar.altalib@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Prof. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Nada N. Al-Obaidi | | **e-mail** | nazar1984@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 13/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | Linear Algebra, Probability I, Probability II | **Semester** | 1,3,4 |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | **After completing this course, the students have ability to:**<br>1. organize and analyze data using regression analysis.<br>2. operate open-source software in order to solve problems related to regression analysis.<br>3. building a greater understanding, theoretical underpinning, and tools for applying linear regression model and its generalizations.<br>4. explores the workings of multiple regression and problems that arise in applying it.<br>5. going deeper into the theory of inference underlying regression and most other statistical methods.<br>6. covers new classes of models for binary and count data. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | **The learning outcomes associated with this course are aimed at students being able to:**<br>1. Define regression analysis.<br>2. Develop a deeper understanding of the linear and non-linear regression models and its limitations;<br>3. Develop a greater familiarity with a range of techniques and methods through a diverse set of theoretical and applied readings;<br>4. Produces simple linear regression equation.<br>5. Estimates the model using LSE.<br>6. evaluate the regression model.<br>7. Determines standard error, variance, correlation coeficient of the estimate and interprets them.<br>8. Lists the LSE assumptions.<br>9. Estimates the confidence intervals of the parameters and interprets them.<br>10. Analyzes the regression model by hypothesis tests and interprets the results.<br>11. Obtains the model using the matrices. |
| **Indicative Contents**<br>المحتويات الإرشادية | **Indicative content includes the following.**<br>1. An introduction to simple linear regression analysis<br>2. Regression assumptions<br>3. Estimation of regression parameters using the least squares method<br>4. Some properties of the regression line equation<br>5. Estimate the variance of model parameters and the average response<br>6. Hypothesis testing and confidence limits in regression models<br>7. Equivalence between the F test and the t test,<br>8. Determination coefficient R2, its maximum value, correlation coefficient and its relationship to the regression coefficient<br>9. Non-conformity test<br>10. Regression through the origin<br>11. Test hypotheses related to the correlation coefficient<br>12. Appreciation in the manner of the greatest possibility<br>13. Matrix method in simple linear regression<br>14. Irregularities or defects in the assumptions of analysis<br>15. The difference between correlation and regression |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Upon successful completion of this course, the learner will be able to:<br>1. Understand the concept of simple linear regression model and properties of model parameters;<br>2. Understand the development of modern statistical models and relationships of these models;<br>3. Apply various linear models to address research questions and fit into different data structure;<br>4. Utilize statistical software such as SPSS and R procedures in computation and analysis;<br>5. Interpret results from specific statistical model;<br>6. Integrate analytical skills and knowledges from research questions and statistical hypotheses,<br>7. to study design, variable definition and data collection, statistical analysis and computation,<br>8. interpretation of results through a team project;<br>9. Develop collaboration and interprofessional skills through team work |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **150** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction |
| **Week 2** | Parameter Estimation using OLS -1- |
| **Week 3** | Parameter Estimation using OLS -2- |
| **Week 4** | properties of regression equation |
| **Week 5** | Estimation of parameter variance |
| **Week 6** | Hypothesis testing |
| **Week 7** | confidence limits |
| **Week 8** | Tests Equivalent and correlation coefficient |
| **Week 9** | The relationship of the correlation coefficient with the regression coefficient |
| **Week 10** | Regression through the origin -1- |
| **Week 11** | Regression through the origin -2- |
| **Week 12** | Hypotheses testing of correlation coefficient |
| **Week 13** | Regression Analysis using Matrix Approach |
| **Week 14** | Elementary Regression Diagnostics |
| **Week 15** | Simple Regression Analysis using SPSS |
| **Week 16** | **Preparatory week before the final Exam** |

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

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Jeremy Arkes - Regression Analysis_ A Practical Introduction-Routledge (2023) | Yes |
| **Recommended Texts** | 1. (Chapman & Hall_CRC Statistics In The Social And Behavioral Sciences) Jocelyn E. Bolin - Regression Analysis in R_ A Comprehensive View For The Social Sciences-CRC Press _ Taylor & Francis Group (2023)<br>2. (International Series in Operations Research & Management Science, 337) Daniel P. McGibney - Applied Linear Regression for Business Analytics with R_ A Practical Guide to Data Science with Case Studie 2023<br>3. Michael Mitchell - Interpreting and Visualizing Regression Models Using Stata-StataCorp (2021)<br>4. William Mendenhall, Terry Sincich - A Second Course in Statistics_ Regression Analysis 8th Edition-Pearson (2020)<br>5. Montgomery , Ping and Vining, Introduction to Linear Regression Analysis (2012)<br>6. (Wiley series in probability and statistics) R. Dennis Cook, Sanford Weisberg - Applied Regression Including Computing and Graphics (Wiley Series in Probability and Statistics)-Wiley-Interscience (1999) | Yes |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Operation research** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT303** | | | | |
| **ECTS Credits** | 5 | | | | |
| **SWL (hr/sem)** | 125 | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 5 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Zinah Mudher ALbazzaza | | **e-mail** | Zeenamudhar@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Talal AbdAlrazaq Saeed | | **e-mail** | talal744740@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The purpose of this teaching this object to enable students to understand the principles and the basics of operation research and quantities methods, making them able to engage in the business market in the future and be able to make the right decision with regard to the field of business.<br>1-The main objective of Operation Research is Optimization, i.e.," to do thinks best under the given circumstances. "<br>2- The student is familiar with the operation research concepts and building model for practical problem, and solve it<br>3-Learn about Sensitivity Analysis to identify how much variations in the input values for a given variable impact the results for a mathematical model<br>4 Learn about Network Analysis to minimize total project cost and minimize total project duration<br>5 -Recognize the intention of Game theory to produce optimal decision -making of independent and competing actors in a strategic setting |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Giving lectures and using textbooks<br>2- Solving issues related to scientific material<br>3- The use of e-learning in teaching according to the available capabilities<br>4- Self-learning method<br>5- One of the most important outputs is building a base for the student to move to the basic stages of subjects in which Operations research has an important role in various fields of theoretical and practical life, and the entry of this important subject into various fields of life, and since it has entered many fields, it had to be studied from all aspects because of its impact on production processes in terms of achieving the highest possible profit in productive projects and lowering costs. To the least possible in production and service projects are the basis. |
| **Indicative Contents**<br>المحتويات الإرشادية | Part (1) - Definition of operation research, Build &solve the model of linear programming, methods of finding the optimal solution using graph, simplex M- Technique and dual simplex. [16 hours]<br>Part (2) Sensitivity Analysis . [9 hours]<br>Part (3) - balance and solve Transportation problem and test of initial solution . [14 hours]<br>Part (4) - Network Analysis to minimize total project cost and minimize total project duration . [11 hours]<br>Part (5) - Game theory, optimal solution of Two-persons zero- sum Games &Solution of mixed strategy Games . [13 hours] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **H. W** | 3 | 10% (10) | 2, 5, and 8 | All |
| | **Report** | 1 | 10% (10) | 13 | 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 Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction, Definition, Discussion, Linear programming model , Min & Max model, Model Building |
| **Week 2** | Solve the L.P. model, Graphical method |
| **Week 3** | Simplex method, Standard form , Solve the L.P by using simplex method |
| **Week 4** | Special case in graphical method and simplex method, No feasible solution, Multi – optimal solution, Unbounded solution, Degeneracy |
| **Week 5** | M- Technique |
| **Week 6** | Dual model |
| **Week 7** | Sensitivity Analysis or post optimality analysis |
| **Week 8** | Transportation problem, Transportation model, Balanced Transportation problem |
| **Week 9** | North-west corner method, least cost method, Vogel's approximation method |
| **Week 10** | Test ideal first solution in transportation problem, the stepping stone method |
| **Week 11** | Network Analysis |
| **Week 12** | Critical path method (CPM) computation |
| **Week 13** | PERT network |
| **Week 14** | Game theory, optimal solution of Two-persons zero- sum Games |
| **Week 15** | Solution of mixed strategy Games |
| **Week 16** | **Preparatory week before the final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | بحوث العمليات /حامد الشمرتي | Yes |
| **Recommended Texts** | **Operation research /Hamdy Taha** | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Data Mining** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT304** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UGIII | **Semester of Delivery** | | 5 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Osamah Basheer Shukur | | **e-mail** | drosamahannon@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To learn how to mine datasets through understanding the theoretical basis concepts for statistical data mining with practical applications.<br>2. To learn the techniques of displaying and arranging the datasets statistically.<br>3. To solve the different problems of datasets by using the suitable statistical and modern approaches or improving these approaches to be more appropriate to perform an accurate analysis of datasets. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Recognize types of data and samples statistically.<br>2. Learning how to display the data statistically.<br>3. Understanding time series data mining.<br>4. Modelling time series data.<br>5. Learning how to use clustering.<br>6. Learning how to use Goodness of fits and error measurements. |
| **Indicative Contents**<br>المحتويات الإرشادية | 1. Data Mining, definition, and introduction.<br>2. Basics of Types of Data.<br>3. Histogram, Scatter plot, and Box-plot., Quantiles and Probability Plot.<br>4. Time series data mining.<br>5. Data Transformations, Box-Cox Transformation.<br>6. Time series models, definition and introduction.<br>7. Measures of distance, Measures of Similarity.<br>8. Clustering, definition and introduction.<br>9. Hierarchical methods for clustering.<br>10. Non- Hierarchical methods for clustering.<br>11. Multiple linear regression, definition and introduction.<br>12. Goodness of fits and error measurements. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 10% (10) | 5 and 10 | LO #2 and #3 |
| | **Assignments** | 2 | 5% (5) | 2 and 12 | LO #1, #2 and #3 |
| | **Projects / Lab.** | 9 | 20% (20) | Continuous | LO #1, #2 and #3 |
| | **Report** | 1 | 5% (5) | 13 | LO #1, #2 and #3 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #2 and #3 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Data Mining, definition, and introduction. |
| **Week 2** | Basics of Types of Data. |
| **Week 3** | Histogram, Scatter plot, and Box-plot., Quantiles and Probability Plot. |
| **Week 4** | Time series data mining. |
| **Week 5** | Data Transformations, Box-Cox Transformation. |
| **Week 6** | Time series models, definition and introduction. |
| **Week 7** | Case study. |
| **Week 8** | Mid-term Exam. |
| **Week 9** | Measures of distance, Measures of Similarity. |

| | |
|---|---|
| **Week 10** | Clustering, definition and introduction. |
| **Week 11** | Hierarchical methods for clustering. |
| **Week 12** | Non- Hierarchical methods for clustering. |
| **Week 13** | Case study. |
| **Week 14** | Multiple linear regression, definition and introduction. |
| **Week 15** | Goodness of fits and error measurements. |
| **Week 16** | **Preparatory week before the final Exam.** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Histogram, Scatter plot, and Box-plot., Quantiles and Probability Plot (Minitab and Excel). |
| **Week 2** | Lab 2: Time series data mining, Plotting, ACF, PACF (Minitab). |
| **Week 3** | Lab 3: Time series modelling (Minitab). |
| **Week 4** | Lab 4: Practical Mid-term Exam. |
| **Week 5** | Lab 5: Hierarchical methods for clustering. |
| **Week 6** | Lab 6: Non- Hierarchical methods for clustering. |
| **Week 7** | Lab 7: Multiple linear regression, Goodness of fits and error measurements. |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Tufféry, S. (2011). *Data mining and statistics for decision making*. John Wiley & Sons. | Yes |
| **Recommended Texts** | Olson, D. L., Lauhoff, G., Olson, D. L., & Lauhoff, G. (2019). *Descriptive data mining* (pp. 129-130). Springer Singapore. | No |
| **Websites** | http://www.cs.cmu.edu/~./awm/tutorials/index.html | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Hypothesis testing** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT305** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | | UGIII | **Semester of Delivery** | | 5 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Mhasen Saleh Abdullah | | **e-mail** | mhasenaltalib@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. statistical hypothesis test is a method of making decisions using data, either from a controlled experiment or from an observational (uncontrolled) study. In statistics, a result that is statistically significant if it is not expected to have occurred by chance alone, according to a predetermined probability threshold, is called the degree of significance.<br>2. Familiarize yourself with the subject of statistical hypothesis testing, when it is applied, the extent to which its results are benefited, and what are the statistical terms that must be recognized (such as the level of significance, error of the first and second kind, types of hypotheses .....) in order to define the hypothesis and apply it correctly, which leads to a decision Correct decision.<br>3. The purpose of testing a particular hypothesis.<br>4. What is the statistical hypothesis, what does it consist of, and what is its statistical formula.<br>5. Identifying the types of tests: for one community, two communities, or more, and what are the statistical characteristics of this community.<br>6. What are the parameters being tested, mean, ratio or variance...<br>7. Knowing the quality of the data and the distribution of the community from which the sample that will be tested is taken until the correct hypothesis is developed. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 8. There are two possible outcomes to a hypothesis test: Reject the null hypothesis, $H_0$, in which case we have evidence in support of the alternative hypothesis. Not reject the null hypothesis, $H_0$, in which case we do not have enough evidence to support the alternative hypothesis.<br>9. Learn about the statistical hypothesis and how to formulate it.<br>10. Errors of the first and second kind<br>11. Significant level<br>12. The areas of rejection and acceptance of the null hypothesis<br>13. The statistical laboratory, its types and its uses<br>14. Collect data from the sample and calculate the value of the statistical laboratory<br>15. How to make a decision.<br>16. Types of tests (parametric and non-parametric)<br>* For small and large samples.<br>A) Means test (one mean, two averages, more than two means (one-way and two-way analysis of variance))<br>b) Contrast test (one contrast, two contrasts and multiple contrasts)<br>c) Proportions test (one ratio, two ratios).<br>10. non-parametric tests: a general introduction to these tests, when to use them, and what data are subject to these tests, in addition to some commonly used tests.<br>11. Mann-Whitney test, Kruskal test and Wilcoxon test. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Identify the types of hypothesis testing (parametric and non-parametric)<br>2. How to determine the appropriate hypothesis for the available data.<br>3. Formulate the hypothesis.<br>4. Types of hypotheses.<br>5. How is the decision to accept or reject the hypothesis taken?<br>6. Knowing the quality of the data and the distribution of the community from which the sample that will be tested is taken until the correct hypothesis is developed. |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding critical thinking skills through reports and using programs to calculate the statistical laboratory, as well as linking the knowledge they receive with the materials they studied in previous levels and the levels they will turn to later. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 52 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **100** | | |

| **Module Evaluation**<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | 1 - 5, 8-10 |
| | **Assignments** | 2 | 10% (10) | 2 and 10 | 1-4, 7-9 |
| | **Open book exam** | 4 | 10% (10) | 4,6,7,10 | 4,6,7,11 |

| | | | | | |
|---|---|---|---|---|---|
| | **Report** | 1 | 10% (10) | 13 | |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Hypothesis testing: definitions with general concepts |
| **Week 2** | Building hypotheses: the null hypothesis and the alternative hypothesis with testing from one side and from two sides, error of the first and second kind, and the power of the statistical test. |
| **Week 3** | Test criterion: The steps involved in testing a hypothesis. |
| **Week 4** | Tests related to averages: A test related to one average in the case of large samples. |
| **Week 5** | Tests related to averages: a test related to one average, analysis hypotheses and applied examples related to one average test in the case of small samples. |
| **Week 6** | Difference of two means tests: The difference between two means using large samples.<br>Z-test |
| **Week 7** | Difference of two means tests: The difference between two means using small samples<br>t-test and test the difference between two related means. t-tailed. |
| **Week 8** | Testing the difference between more than two means: Introduction- analysis of variance - one-way and two-way. |
| **Week 9** | One-way analysis of variance model parameters estimation. two -way analysis of variance and Practical examples. |
| **Week 10** | A test related to proportions for a population with a binomial distribution - for one sample + applied examples |
| **Week 11** | Test the difference between two proportions / applied examples |
| **Week 12** | Tests for standard deviation and variance: A normal population test of variance, A test for the homogeneity of two variances between two independent estimates. |
| **Week 13** | Tests for standard deviation and variance: A test for the equality of several variances |
| **Week 14** | Common nonparametric tests: Introduction, 1. The Mann-Whitney U test |
| **Week 15** | 2. The Wilcoxon Site Rank Test.<br>3. The Kruskal-Wallis test |
| **Week 16** | **Final exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. Al-Rawi, Khasha'a Mahmoud (1998) "Introduction to the Principles of Statistics", first edition, Ibn Al-Atheer Press, University of Mosul-Iraq.<br>2. Prof. Kamal Alwan Khalaf and Prof. Dr. Emad Hazim (2009) "Testing Statistical Hypotheses", Al Jazeera Printing and Publishing Office - Baghdad. | Yes |
| **Recommended Texts** | 3e- Daryl S. Paulson, (2008); "Biostatistics and Microbiology" Bioscience Labortoies Bozeman, MT, USA. | Electronic |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computer Applications** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT306** | | | | |
| **ECTS Credits** | **3** | | | | |
| **SWL (hr/sem)** | **75** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 5 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Mahmood M Taher | | **e-mail** | mahmoo81_tahr@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Shaimaa Waleed Mahmood | | **e-mail** | shaimaa.waleed@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To develop statistical analysis skills using direct and indirect methods.<br>2. To understand the generation of data from different distributions with the calculation of descriptive statistics.<br>3. This course deals with the basic concept of the Minitab program and spss.<br>4. The main topic for understanding and the application of most statistical measures.<br>5. To apply time series analysis and simple linear regression analysis.<br>6. To perform statistical tests. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Learn how the Minitab program works and the types of program interfaces.<br>2. Gain skills in data entry by direct and indirect methods.<br>3. Able to deal with data by calculating descriptive statistics and dealing with matrices.<br>4. Applying statistical tests by direct and indirect methods.<br>5. Acquiring skills in coding data.<br>6. The ability to analyze variance using direct and indirect methods.<br>7. Learn about data generation and calculating probability and density functions.<br>8. Ability to analyze time series and interpret results.<br>9. Learn how the SPSS program works and the types of program interfaces.<br>10. The ability to handle data and calculate most descriptive statistics.<br>11. Ability to simple linear regression analysis and interpret results. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A - basic concepts of statistical analysis<br>dealing with program destinations, data entry methods, definition of variables and their types. [24 hours]<br><br>Part B - Statistical Tests<br>Application of Statistical Tests, graphics, Generate data for statistical distributions, Time Series Analysis. [20 hours.]<br><br>Part C – Distributions<br>Introduction to spss program ,Compare means, Linear Regression Model Analysis. [16 hours] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encourage students' participation in the exercises, while at the same time refining and expanding their Practical thinking skills. This will be achieved through classes, computer labs, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 12 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **Total SWL (h/sem)**<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 | 10% (10) | 5and 9 | LO #1,#2,#3,#4and #6 |
| | **Homework** | 2 | 10% (10) | 6 and 11 | LO #1-#8and#9 |
| | **Lab** | 4 | 20% (20) | Continuous | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 12 | LO #1-#8and#9 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to the Minitab program- Types of interfaces, types of variables |
| **Week 2** | Data Entry, indirect method, direct method |
| **Week 3** | Simple statistics using the command |
| **Week 4** | Mathematical operations, rows (states), columns (variables), constants |
| **Week 5** | Matrices, mathematical operations, addition, subtraction, division, multiplication |
| **Week 6** | Descriptive Statistics, graphics |
| **Week 7** | Statistical tests, normality test |
| **Week 8** | Encoding variables, standardizing, sampling |
| **Week 9** | Analysis of Variance Table ANOVA |
| **Week 10** | Generate distributions, probability density function, cumulative density function |
| **Week 11** | Time series analysis |
| **Week 12** | Introduction to spss program, types of interfaces, the definition of variables, Enter data, describe the variables |
| **Week 13** | Calculating statistical measures using the program's menus, Statistical tests |
| **Week 14** | compare means, graphics |
| **Week 15** | Regression analysis |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Application on program interfaces and to implement of simple commands |
| **Week 2** | Lab 2: Application arithmetic operations on matrices |
| **Week 3** | Lab 3: Application: Descriptive Statistics, graphics |
| **Week 4** | Lab 4: Apply Statistical tests and normality test, Analysis of Variance Table ANOVA |
| **Week 5** | Lab 5: Application: Generate distributions, probability density function, cumulative density function |
| **Week 6** | Lab 6: Application of Time series analysis |
| **Week 7** | Lab 7: Application on program interfaces spss and implement of commands |
| **Week 8** | Lab 8: Application on compare means, graphics |
| **Week 9** | Lab 9: Application of Regression analysis |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Non | --- |
| **Recommended Texts** | 1- Minitab, L. L. C. (2020). Getting started with Minitab statistical software. *Software manual, Minitab*.<br>2-Arkkelin, D. (2014). Using SPSS to understand research and data analysis.<br>2-طارق شريف يونس ورائد عبدالقادر"التحليل الاصائي مفاهيم-منهجية تطبيقات استخدام البرمجية Minitab، مملكة البحرين.2011 " ،جامعة العلوم التطبيقية | No |
| **Websites** | https://www.minitab.com/en-us/ | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Mathematical Statistics II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT307** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 6 | |
| **Administering Department** | STAT | | **College** | CMS | |
| **Module Leader** | Dr. Hayfa Abdul Jawad Saieed | | **e-mail** | haeifa965@gmail.com | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>**أهداف المادة الدراسية** | 1. Applying all the vocabulary of mathematical statistics 1 to discrete and continuous distributions.<br>2. Recognizing the applications of each distribution.<br>3. Studying the distributions of linear combinations of single and more than one independent variables by using mgf, cdf, and transformation techniques.<br>4. Studying the importance of sampling distributions in different fields of statistics especially confidence intervals and hypothesis testing.<br>5. Studying the importance of order statistics and their distributions and properties.<br>6. Studying the importance of central limit theorem which is important in studying distributions of estimators, tests and other properties in large samples. |
| **Module Learning Outcomes**<br>**مخرجات التعلم للمادة الدراسية** | 1. He can discriminate between continuous and discrete distributions through the mathematical forms of off, cdf, mgf, off functions.<br>2. A discrimination between symmetric, skewed distributions through measures of skewness and kurtosis.<br>3. He can differentiate between location, shape, and scale parameters.<br>4. He can know the distributions of different test statistics.<br>5. It enables the student to understand the vocabulary of statistical inference. |
| **Indicative Contents**<br>**المحتويات الإرشادية** | Indicative content includes the following<br>1. Discrete probability distributions with their properties and applications, discussions, open book exams, HomeWorks, and, quizzes (3.25 WEALS).<br>2. Important continuous probability distributions: statistical properties, relations between distributions, their applications, distributions of linear and nonlinear functions of random variables (mgf, cdf, transformation technique). There are many discussions, quizzes, open book exams). ( 4.75 weak).<br>3. Distributions of nonlinear independent Randi variables (1 weak).<br>4. Transformation technique in discrete random variables ( 1 weak)<br>6. Sampling distributions: chi square, t, and, F distributions properties relations between them, applications. ( 3 weals).<br>7. Order statistics with different distributions, properties and applications ( 2 weals).<br>8. Central limit theorem, the importance, and it's application ( 1 weak). |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities, moments or drawing probability functions. Also linking the knowledge, they receive with the subjects that he studied in previous levels and the levels that he will turn to later. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 6 and 13 | 1 ,5 |
| | **Assignments** | 2 | 10% (10) | 3 and 12 | 1-3, 4 |
| | **Open book exam** | 5 | 10% (10) | 2,5,8,11, 14 | 1- 5 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | 1-3 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Discrete distributions: Uniform and Bernoulli distribution. |
| **Week 2** | Binomial distribution. |
| **Week 3** | Poisson distribution |
| **Week 4** | Geometric distribution.<br>Continuous distributions: uniform Distribution. Methods of finding distribution of functions of random variables. |
| **Week 5** | Normal distribution. |
| **Week 6** | Exponential and Beta distribution. |
| **Week 7** | Gamma distribution |
| **Week 8** | Distributions of nonlinear functions of independent continuous random variables. |
| **Week 9** | Transformation technique in discrete distributions |
| **Week 10** | Chi square distribution |
| **Week 11** | Student t distribution |
| **Week 12** | F distribution |
| **Week 13** | Order statistics, distribution of single order statistics. |
| **Week 14** | Distribution of functions of order statistics. |
| **Week 15** | Central limit theorem, limiting distributions |
| **Week 16** | Final exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |

| | |
|---|---|
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

| **Learning and Teaching Resources**<br>**مصادر التعلم والتدريس** | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Hermiz,A.H.(1989),"Mathrmatical Statistics ", Directorate of Dar Al-Kutub for Printing and Publishing, University of Mosul, Iraq<br>School,P., Louisville, KY ,(2013) ,"Probability and mathrmatical statiztics ", | Yes |
| **Recommended Texts** | Hog,R.V. and Craig, A.T. (1978) ," Inttofuction to mathrmatical statiztics ",fourth edition, Macmillan Publishing Co., Inc. NEW York.<br>Hogg, RV, McKean, JW, Craig, At, (2019), Introduction to mathematical statistics, 8th edition, Pearsoc education Inc, USA. | electronic<br>electronic |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Regression Analysis II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT308** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 6 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Bashar A. Al-Talib | | **e-mail** | bashar.altalib@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Prof. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Nada N. Al-Obaidi | | **e-mail** | nazar1984@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 2.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | Linear Algebra, Probability I, Probability II | **Semester** | 1,3,4 |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | **After completing this course, the students have ability to:**<br>1. explores the workings of multiple regression and problems that arise in applying it.<br>2. going deeper into the theory of inference underlying regression and most other statistical methods.<br>3. covers new classes of models for categorical data using dummy variables.<br>4. Understanding how to choose best regression model<br>5. Giving an introduction to simple and Multiple Non-Linear Regression |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | **The learning outcomes associated with this course are aimed at students being able to:**<br>1. Define Multiple Regression Analysis.<br>2. Develop a deeper understanding of the linear and non-linear multiple regression models and its limitations;<br>3. The students will have the ability to deal with categorical data using dummy variables<br>4. The students will be able to select the best regression equation in Linear and Non-Linear regression models<br>5. The students will be familiar with real data analysis using SPSS package |
| **Indicative Contents**<br>المحتويات الإرشادية | **Indicative content includes the following:**<br>1. Multiple linear regression<br>2. properties of estimators<br>3. Analysis of Variance<br>4. Additional sum of squares<br>5. Sequential sources of variation<br>6. the use of the Doolittle method<br>7. choosing the best linear regression equation (1)<br>8. choosing the best linear regression equation (2)<br>9. dummy variables (1)<br>10. dummy variables (2)<br>11. Simple nonlinear regression<br>12. Determine the degree of regression equation<br>13. Multiple nonlinear regression<br>14. choosing the best Non-linear regression equation<br>15. Regression Analysis using SPSS |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Upon successful completion of this course, the learner will be able to:<br>1. Understand the concept of simple linear regression model and properties of model parameters;<br>2. Understand the development of modern statistical models and relationships of |

| | |
|---|---|
| | these models;<br>3. Apply various linear models to address research questions and fit into different data structure;<br>4. Utilize statistical software such as SPSS and R procedures in computation and analysis;<br>5. Interpret results from specific statistical model;<br>6. Integrate analytical skills and knowledges from research questions and statistical hypotheses,<br>7. to study design, variable definition and data collection, statistical analysis and computation,<br>8. interpretation of results through a team project;<br>9. Develop collaboration and interprofessional skills through team work |

## Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

| | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<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 | 20% (20) | 4 and 10 | LO #1, #2 and #4 |
| | **Assignments** | 2 | 10% (10) | 4 and 12 | LO #1- #5 |
| | **Report** | 1 | 10% (10) | 13 | LO #3-#5 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #3 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Least Squares Parameter Estimation |
| **Week 2** | population variance estimation or $S^2$ or Mse |

| | |
|---|---|
| **Week 3** | Properties of Least Squares Estimators, Mean Response Variance |
| **Week 4** | Standard Partial Regression Coefficient |
| **Week 5** | Analysis of Variance ANOVA table, Corrected Sum of Squares |
| **Week 6** | Additive sum of Squares, Hypothesis Testing and Analysis of Variance Table for Corrected and Additive Sum of Squares |
| **Week 7** | Sequential Sources of Variation |
| **Week 8** | Doolittle Method to find the Vector of the Estimated Parameters |
| **Week 9** | Relationship Between Confidence Limits and Hypothesis Testing |
| **Week 10** | Criteria for Selecting the Best Regression Equation |
| **Week 11** | Partial Correlation Coefficient, Corrected Coefficient of Determination |
| **Week 12** | Simple Non-Linear Regression Equation |
| **Week 13** | Determine the Degree of Equation in Simple Non-linear Regression |
| **Week 14** | Multiple Non-Linear regression, Determining the Degree of Equation in Multiple Non-linear Regression |
| **Week 15** | Real data analysis using SPSS |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Jeremy Arkes - Regression Analysis_ A Practical Introduction-Routledge (2023) | Yes |
| **Recommended Texts** | 1. (Chapman & Hall_CRC Statistics In The Social And Behavioral Sciences) Jocelyn E. Bolin - Regression Analysis in R_ A Comprehensive View For The Social Sciences-CRC Press _ Taylor & Francis Group (2023)<br>2. (International Series in Operations Research & Management Science, 337) Daniel P. McGibney - Applied Linear Regression | Yes |

| | | |
|---|---|---|
| | for Business Analytics with R_ A Practical Guide to Data Science with Case Studie 2023<br>3. Michael Mitchell - Interpreting and Visualizing Regression Models Using Stata-StataCorp (2021)<br>4. William Mendenhall, Terry Sincich - A Second Course in Statistics_ Regression Analysis 8th Edition-Pearson (2020)<br>5. Montgomery , Ping and Vining, Introduction to Linear Regression Analysis (2012)<br>6. (Wiley series in probability and statistics) R. Dennis Cook, Sanford Weisberg - Applied Regression Including Computing and Graphics (Wiley Series in Probability and Statistics)-Wiley-Interscience (1999) | |
| **Websites** | | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Biostatistics** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT309** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | | UGIII | **Semester of Delivery** | | 6 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Mhasen Saleh Abdullah | | **e-mail** | mhasenaltalib@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. This course aims to provide the student with basic information and scientific training in the field of biostatistics through the application of many types of important statistical methods in data analysis, especially in the field of science and statistical applications in the field of clinical medicine, as well as benefiting from it in other fields.<br>2. Distinguish between vital statistics and vital statistics.<br>3. Studying population data through both standard and clinical life tables.<br>4. Study the survival data and their statistical distributions and analyze them.<br>5. Knowing how to verify the results of laboratory analyzes, the accuracy of these analyzes, and the consistency of results between health units such as hospitals and analysis laboratories.<br>6. How to calculate and use the appropriate dose for any vaccine, treatment, or insecticide, i.e. in general, any medical drug. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Biostatistics is the application of statistics to a wide range of topics in biology. Biostatistics includes designing biological tests, especially in medicine and agriculture, collecting, summarizing and analyzing information from these experiments, interpreting results and drawing conclusions from them. The terms "biometric" or "biometric" can also be used as synonyms for vital statistics.<br>2. Identify the areas of application of biostatistics, including: Public health - including epidemiology research, health services research, nutrition, and environmental health. Medicine - clinical test design and analysis. Genetics, genetics, and genetic statistics that attempt to relate abnormalities in genotype with phenotype. The results of these researches were applied in the fields of agriculture to improve the quality and quantity of crops and the breeding of farm animals. It is applied in biomedical research to find alleles of a gene responsible for genetic diseases.<br>3. Learn about laboratory analyzes and how to verify the validity of their results through some statistical tests.<br>4. How to conduct vital tests, the effectiveness of medical drugs such as a vaccine, treatment or pesticide...<br>5. Comparison of death rates for a particular cause.<br>6. Confirming the seriousness of diseases and indicating which of them is more risk, in addition to studying another reason for increasing this risk.<br>7. Determine the confidence limits for relative severityز<br>8. Learn how to calculate and use the appropriate dose for any vaccine, treatment, or insecticide, i.e. in general, any medical drug.<br>9. How to determine vital tests- Estimate the median dose.<br>10. Analyze survival data - life function, death function and hazard function, and the relationship between these functions. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Determine the types of life tables and how to analyze their data.<br>2. Studying life rates of all kinds.<br>3. The possibility of monitoring and determining the accuracy of laboratory analyzes. |

| | |
|---|---|
| | 4. The possibility of determining the extent of correspondence between the results of two health units through the results of pathological analyzes.<br>5. How is the risk function determined for data tracking one of the life distributions? |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding critical thinking skills through reports and using programs to calculate the statistical laboratory, as well as linking the knowledge they receive with the materials they studied in previous levels and the levels they will turn to later. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **150** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 10% (10) | 5,7 and 10 | 1 - 4,6, 8-10 |
| | **Assignments** | 2 | 10% (10) | 2 and 10 | 1-4, 7-10 |
| | **Open book exam** | 4 | 10% (10) | 4,6,7,10 | 3,4,7,8-10 |
| | **Report** | 1 | 10% (10) | 13 | |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #10 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | biostatistics: definitions with general concepts. |
| **Week 2** | Birth and death rates. |
| **Week 3** | disease rates and Practical examples. |
| **Week 4** | Measure of the relationship between life factors - Practical examples. |
| **Week 5** | Comparing two rates of death from a particular cause. |
| **Week 6** | Fisher's exact test for comparison of two rates- Practical examples. |
| **Week 7** | Usual and clinical life schedule. |
| **Week 8** | Comparison of two sets of survival data. |
| **Week 9** | Comparison of two sets of survival data- Relative Risk estimation for a single study with confidence limits. |
| **Week 10** | General relative risk estimation with confidence limits- Practical examples |
| **Week 11** | Laboratory analyzes - concordance between the results of two laboratories. |
| **Week 12** | Matching in terms of effectiveness, sensitivity and accuracy. |
| **Week 13** | Matching in terms of sensitivity and accuracy -double test |
| **Week 14** | vital tests- Estimate the median dose- Practical examples |
| **Week 15** | Analyze survival data - life function, death function and hazard function, and the relationship between these functions. |
| **Week 16** | Final exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>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** | 1. 1- Al-Rawi, Khasha'a Mahmoud (1998) "Introduction to the Principles of Statistics", first edition, Ibn Al-Atheer Press, University of Mosul-Iraq.<br>2. 1- Prof. Kamal Alwan Khalaf and Prof. Dr. Emad Hazim (2009) "Testing Statistical Hypotheses", Al Jazeera Printing and Publishing Office - Baghdad. | Yes |
| **Recommended Texts** | 3e- Daryl S. Paulson, (2008); "Biostatistics and Microbiology" Bioscience Labortoies Bozeman, MT, USA. | Electronic |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Quality and Reliability** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT310** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UGIII | **Semester of Delivery** | | 6 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Khalida Ahmed Mohammed | | **e-mail** | khalida@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Dr. Ban Ghanim Al-ani | | **e-mail** | drbanalani@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/6/2023 | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Teaching students\the means and methods of quality control from the statistical side, according to several methods.<br>2. Teaching students to formulate and transform the reality of the problem into mathematical and statistical method by studying the most important control charts for variable and attributes.<br>3. Reliability aims to first identify the most survival functions associated with most important survival distribution: the mean lifetime to failure, reliability function, distribution function, hazard fn. and design time to failure.<br>4. Teaching the exponential distribution is one of the most important survival distributions and the derivation of the function associated with it in addition to the memory less property<br>5. Another survival distribution is Weibull: identify the associated functions of it their curves.<br>6. How to derive the reliability system that follows an exponential distribution or Weibull when components are independent or independent and identical.<br>7. Learning how to calculate reliability systems: series systems, parallel system, mixed system |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Learning quality concepts and application of quality control charts on real issues and on computers.<br>2. Understand the major concepts of reliability prediction.<br>3. Identify reliability testing components.<br>4. Apply reliability theory to assessment of reliability engineering.<br>5. Identify several distributions of survival times and the role in calculating reliability systems.<br>6. Analyze statistical experiments to reliability modeling. |
| **Indicative Contents**<br>المحتويات الإرشادية | Quality concept, basic statistics and quality terms and specification six sigma limits. Statistical control of operation, control charts for variables, Control charts for attributes[12 hr].<br>The reliability function, mean time to failure ,hazard function bathtub function, The conditional reliability-design life and failure mode, their relationship of all these function.[8 hr].<br>Constant failure function-The exponential reliability function –Failure with CFR-Memory lessness-Failure modes-Failure modes with CFR, Failure on demand-redundancy and CFR model –applications [12 hr].<br>Time dependent failure models-The Weibull distribution- Design median and mode-Burn-in screeding , Failure modes-Identical Weibull process. [10 hr].<br>Derive all the characteristic functions related to the reliability of time dependent models, Derive reliability system for CFR and Weibull if components are independent or independent and identical [10 hr].<br>System structurfunction, minimal cut and minimal paths(optimal), System structurfunction, minimal cut and minimal paths(optimal) [10 hr] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, and ask them to make reports on the study material that help them expand their horizons and use som statistical software in making control charts. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | All |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | All |
| | **Open book** | 1 | 10%(10) | 7 | LO#4 |
| | **Report** | 1 | 10% (10) | 10 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 9 | LO #1 - #6 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction Quality concept, basic statistics and quality terms and specification six sigma limits. |
| **Week 2** | Statistical control of operation, control charts for variables |
| **Week 3** | Control charts for attributes. |
| **Week 4** | The reliability function, mean time to failure, hazard function bathtub function |
| **Week 5** | The conditional reliability-design life and failure mode, their relationship of all these function and examples |
| **Week 6** | Constant failure function-The exponential reliability function –Failure with CFR-Memory lessness-Failure Modes-Failure modes with CFR |
| **Week 7** | Failure on demand-redundancy and CFR model -applications |
| **Week 8** | Time dependent failure models-The Weibull distribution- Design median and mode-Burn-in screeding |
| **Week 9** | Failure modes-Identical Weibull process |
| **Week 10** | Derive all the characteristic functions related to the reliability of time dependent models |
| **Week 11** | Redundancy with failure- Application |
| **Week 12** | Derive reliability system for CFR and Weibull if components are independent or independent and identical |
| **Week 13** | Reliability system. Introduction, Serial configuration, parallel configuration ,examples |
| **Week 14** | Combined series-parallel systems High levels verses low-level redundancy, examples |
| **Week 15** | System structurfunction, minimal cut and minimal paths(optimal) |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **V.N.A.Naikan ,Reliability engineering and life testing,2009** | Yes |
| **Recommended Texts** | Charles,E.E(1997),An introduction to reliability inginnering | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Statistical Learning** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT311** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 6 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Osamah Basheer Shukur | | **e-mail** | drosamahannon@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To learn how to predict and classify for the future through understanding the theoretical basis concepts for statistical prediction and classification with practical applications.<br>2. To learn the techniques of statistical learning for prediction and classification.<br>3. To solve the different problems of datasets by using the suitable statistical and modern approaches or improving these approaches to be more appropriate to perform an accurate analysis of datasets. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Recognize prediction and classification statistically.<br>2. Learning how to predict the data of in time series and linear regression.<br>3. Understanding how to classify by using Logistic Regression.<br>4. Learning how to use CART and random forest.<br>5. Learning how to use SVM and SVR in classification and prediction.<br>6. Learning how to use KNN and Kernel in Classification.<br>7. Learning how to use different Artificial Neural Networks types in classification and prediction. |
| **Indicative Contents**<br>المحتويات الإرشادية | Statistical Prediction, definition, and introduction.<br>Statistical forecasting in time series.<br>Statistical forecasting in linear regression.<br>Statistical Classification, definition, and introduction.<br>Logistic Regression, definition, and introduction.<br>Prediction and classification in Classification and regression trees.<br>Prediction and classification in Random Forest.<br>Prediction and classification in SVM and SVR.<br>K-Nearest neighbor.<br>Gaussian Kernel.<br>Artificial Neural Networks. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>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 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 37 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **100** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 10% (10) | 5 and 10 | LO #2 and #3 |
| | **Assignments** | 2 | 5% (5) | 2 and 12 | LO #1, #2 and #3 |
| | **Projects / Lab.** | 11 | 20% (20) | Continuous | LO #1, #2 and #3 |
| | **Report** | 1 | 5% (5) | 13 | LO #1, #2 and #3 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #2 and #3 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Statistical Prediction, definition, and introduction. |
| **Week 2** | Statistical forecasting in time series. |
| **Week 3** | Statistical forecasting in linear regression. |
| **Week 4** | Statistical Classification, definition, and introduction. |
| **Week 5** | Logistic Regression, definition, and introduction. |
| **Week 6** | Case study. |
| **Week 7** | Mid-term Exam. |
| **Week 8** | Prediction and classification in Classification and regression trees. |
| **Week 9** | Case study. |

| | |
|---|---|
| **Week 10** | Prediction and classification in Random Forest. |
| **Week 11** | Prediction and classification in SVM and SVR. |
| **Week 12** | K-Nearest neighbor |
| **Week 13** | Gaussian Kernel. |
| **Week 14** | Prediction in Artificial Neural Networks. |
| **Week 15** | Classification in Artificial Neural Networks. |
| **Week 16** | **Preparatory week before the final Exam.** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Statistical forecasting in time series (Minitab). |
| **Week 2** | Lab 2: Statistical forecasting in linear regression (Minitab). |
| **Week 3** | Lab 3: Statistical classifying by Logistic Regression (Minitab and Excel). |
| **Week 4** | Lab 4: Statistical classifying by CART and Random Forest (MATLAB). |
| **Week 5** | Lab 5: Statistical classifying by KNN and Kernel (MATLAB). |
| **Week 6** | Lab 6: Statistical Prediction by ANN (MATLAB). |
| **Week 7** | Lab 7: Statistical classifying by ANN (MATLAB). |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Ciaburro, G. (2017). *MATLAB for machine learning*. Packt Publishing Ltd. | Yes |
| **Recommended Texts** | Soman, K. P., Loganathan, R., & Ajay, V. (2009). *Machine learning with SVM and other kernel methods*. PHI Learning Pvt. Ltd.. | No |
| **Websites** | http://www.cs.cmu.edu/~./awm/tutorials/index.html | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **English Language** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT312** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | UGIII | | **Semester of Delivery** | 6 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Zainab Qusay Ahmed Taqi | | **e-mail** | Zainab.q@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Asst. lecturer | | **Module Leader's Qualification** | MSc. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 11/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To be able to speak English fluently and accurately.<br>2. To think in English and then speak.<br>3. To be able to talk in English.<br>4. To be able to compose freely and independently in speech and writing.<br>5. To be able to read books with understanding. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.<br>1. To address grammar issues that students encounter in their daily speech, writing, reading and listening<br>2. To address the issue of grammatical errors that affect effective communication<br>3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections<br>4. Recognize the structure and organization of paragraphs,<br>5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, reading speed, and vocabulary development<br>6. Develop the writing skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Introduction, Study material review [1 hr]<br><br>Grammar: Have (got) to, practices. Should/must, questions and answers. Reading. Vocabulary: words that go together, everyday English at the doctors. [6hrs]<br><br>Time and conditional clauses, practices (when, as soon as). listening and speaking/ life in 2050, Reading and speaking/ the world's first megalopolis. Vocabulary: Hot verbs/ take- get- do and make. [7 hrs]<br><br>Grammar: verb patterns and infinitives, practices. Vocabulary: -ed/ -ing adjective, reading about (Into the wild). Expressions about exclamations with so and such. [8 hrs]<br><br>Grammar: actives and passives voice, practices. Verbs and nouns that go together, practices. Reading: about the discovery of DNA., expressions about(notices). [6 hrs]<br><br>Review the study units. [2 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | - The main strategy that will be adopted in developing the four skills:<br>The skill of speaking,<br>The skill of reading,<br>The skill of writing,<br>The skill of listening,<br>Also, enable the students for the use of grammar correctly, |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **50** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 15% (15) | 3,6 and 10 | LO #1, #2 and #4 |
| | **Assignments** | 3 | 15% (15) | 2,8 and 12 | LO #3, #5 and #6 |
| | **Report** | 1 | 10% (10) | 13 | LO #2, #4 and #6 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #5 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction: about study materials of Headway Pre-intermediate Plus. |
| **Week 2** | Grammar: Have (got) to, practices. |
| **Week 3** | Should/must, questions and answers. Reading. |
| **Week 4** | Vocabulary: words that go together, everyday English at the doctors. |
| **Week 5** | Grammar: verb patterns and infinitives, practices. |
| **Week 6** | Time and conditional clauses, practices (when, as soon as). listening and speaking/ life in 2050. |
| **Week 7** | Mid-term Exam |
| **Week 8** | Reading and speaking/ the world's first megalopolis. |
| **Week 9** | Vocabulary: Hot verbs/ take- get- do and make. |
| **Week 10** | Vocabulary: -ed/ -ing adjective, reading about (Into the wild). |
| **Week 11** | Expressions about exclamations with so and such. |
| **Week 12** | Grammar: actives and passives voice, practices. |
| **Week 13** | Verbs and nouns that go together, practices. |
| **Week 14** | Reading: about the discovery of DNA., expressions about(notices). |
| **Week 15** | Study material review |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | None |
| **Week 2** | None |
| **Week 3** | None |
| **Week 4** | None |
| **Week 5** | None |
| **Week 6** | None |
| **Week 7** | None |

| Learning and Teaching Resources |
|---|

| مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Headway pre-intermediate plus student's book(john and Lize Soars) | Yes |
| **Recommended Texts** | Headway pre-intermediate plus work's book | Yes |
| **Websites** | | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Stochastic Processes I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT401** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 7 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Muthanna Subhi Sulaiman | | **e-mail** | muthanna.sulaiman@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. This course provides a comprehensive introduction to stochastic processes.<br>2. Focusing on their fundamental concepts, principles, and applications.<br>3. It covers topics ranging from basic probability theory to advanced stochastic models.<br>4. Equipping students with the necessary knowledge and skills to analyze and model various phenomena involving randomness and uncertainty.<br>5. Modeling and analyzing systems with the Markov property.<br>6. Understanding the behavior of Markov chains.<br>7. Examining transition probabilities and constructing transition matrices.<br>8. Studying special types of Markov chains, such as absorbing and ergodic chains.<br>9. Determining and analyzing the stationary distribution. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understanding of generating function and probability generating.<br>2. Gain a solid understanding of the fundamental concepts and principles of stochastic processes.<br>3. Identify and analyze sources of uncertainty and randomness in various systems.<br>4. Develop skills in predicting and forecasting future outcomes using stochastic models.<br>5. Apply stochastic processes to model and solve problems.<br>6. Gain proficiency in using computational tools and programming languages to simulate and analyze stochastic processes. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A – Basic concepts of probability generating function:</u><br>Generating functions and probability generating functions are mathematical tools used in probability theory and combinatorics to study the distribution of random variables and sequences. [20 hrs.]<br><br><u>Part B – Introduction to Stochastic processes:</u><br>The Stochastic Processes course is designed to provide students with a comprehensive understanding of stochastic modeling and analysis. [20 hrs.]<br><br><u>Part C – Markov Chain and transition probability matrix:</u><br>Markov chains are widely used to model systems that exhibit a specific probabilistic property known as the Markov property. The objective is to accurately capture the dynamics of a system where the future state depends only on the current state and is independent of the past states, given the current state. By studying Markov chains, we aim to understand and analyze the behavior and evolution of such systems over time. [35 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, computer labs, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 4, 12 | LO #1, #5 |
| | **Assignments** | 4 | 20% (10) | 4, 9, 12, and 13 | All |
| | **Report** | 1 | 10% (10) | 12 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Definition of generating function and probability generating function. |
| **Week 2** | Probability generating function of sum discrete random variables. |
| **Week 3** | Probability generating function of sum of random number of discrete random variables. |
| **Week 4** | Generating function of bivariate distribution. |
| **Week 5** | Introduction to Stochastic processes. |
| **Week 6** | Definitions and examples of stochastic processes. |
| **Week 7** | Specification of stochastic processes with independent increments. |
| **Week 8** | Mid-term Exam + Stationary processes, Covariance stationary, Gaussian process. |
| **Week 9** | Definition of Markov Chain and transition probability matrix. |
| **Week 10** | Random walk and Absorbing barriers. |
| **Week 11** | Higher transition probabilities (derivation of Chapman-Kolmogorov equation). |
| **Week 12** | Initial distribution and Probability Distribution. |
| **Week 13** | Transition Diagram and Transition tree with application and examples of M.C. |
| **Week 14** | Two-state Markov chain. |
| **Week 15** | Classification of Markov chain. |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. الربيعي، فاضل محسن وعبد، صلاح حمزة، (2000)، " مقدمة في العمليات التصادفية ". دار الكتب والوثائق، بغداد. | Yes |
| **Recommended Texts** | 1. Cox D.R &H.D. Miller, “The theory of stochastic process”, 1985.<br>2. Parzen,” Stochastic Process”, 1962.<br>3. Ross, S. M. (1983), ‘‘Stochastic Processes'' Wiley, New York.<br>4. ذنون، باسل يونس، (2011)، " النمذجة الماركوفية مع تطبيقات عملية ". دار ابن الأثير للطباعة والنشر جامعة الموصل، العراق. الجزء الاول والثاني. | Yes |
| **Websites** | TBD | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Statistical Inference I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT402** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | | UGIV | **Semester of Delivery** | | 7 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Raya Salim Al-Rassam | | **e-mail** | rayasalim73@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Explain the concept of the parameters and estimate this parameter with some methods of point estimation.<br>2. Studying the properties of good estimators such as the unbiasedness, consistency, sufficiency, efficiency and completeness.<br>3. Explain the Rao-Blackwell Theorem and use it in relative efficiency of estimators and in minimum variance unbiased estimate.<br>4. Identify some of the point estimate methods such as the maximum likelihood method and moments method. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understanding the basic concepts of statistical inference such that the parameter,estimator,estimation,…etc<br>2. Understanding the unbiased property of estimators and calculate it using different distributions.<br>3. Identifying the consistency property of estimators which is need to review about some properties of limits.<br>4. Understanding the sufficiency property with three methods ,the first depends on conditional probability ,the second using the factorization criterion and the third using the exponential family.<br>5. Learn how to prove that the distributions are belong to the exponential family and how to find the sufficient statistic from it.<br>6. Learn how to find the Fisher information and use it in the efficiency and minimum variance unbiased estimate property<br>7. Understanding the completeness property of estimators<br>8. Understanding Grammar-Rao Inequality and use it in the minimum variance unbiased estimate property.<br>9. Learn how to calculate the mean square error and it uses in the comparison between estimators.<br>10. Understanding the point estimation which is the first part of estimation theory.<br>11. Understanding how to find the maximum likelihood estimators and some properties of it.<br>12. Understanding how to find the estimators using the moments method. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Basic concepts of statistical inference. (1 week)<br>2. Unbiasedness property of estimators. (1 week)<br>3. Consistency property. (1 week)<br>4. Sufficiency property (4 weeks)<br>5. Efficiency property. (2 weeks)<br>6. Minimum Variance Unbiased Estimate. (2 weeks)<br>7. Estimation theory (point estimation methods), maximum likelihood method, moments method. (4 weeks). |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities , moments or drawing probability functions. Also linking the knowledge they receive with the subjects that he studied in previous levels and the levels that he will turn to later. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Basic concepts of statistical inference. |
| **Week 2** | Unbiasedness property of estimators. |
| **Week 3** | Consistency property. |
| **Week 4** | Sufficiency property using the conditional probability. |
| **Week 5** | Sufficiency property using the Factorization criterion. |
| **Week 6** | Exponential family |
| **Week 7** | Sufficiency property using exponential family. |
| **Week 8** | Fisher Information. |
| **Week 9** | Efficiency property. |
| **Week 10** | Completeness property. |
| **Week 11** | Rao-Blackwell theorem. |
| **Week 12** | Minimum Variance Unbiased Estimate. |
| **Week 13** | Estimation theory (Point Estimation). |
| **Week 14** | Maximum Likelihood Estimator. |
| **Week 15** | Moments Method. |
| **Week 16** | **Final exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. Al-Nasir,A. and Rashid,D.,(1988),"Statistical Inference ", Directorate of Dar Al-Kutub for Printing and Publishing, Baghdad, Iraq<br>2. George Casella and Roger L. Berger ,(2001) ,"Statistical Inference ",Second Edition, https://www.r-project.org/. | Yes |
| **Recommended Texts** | Anthony Almudevar, (2022) ," Theory of Statistical Inference ",Chapman and Hall. | Electronic |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Multivariate Analysis** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT403** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UGIV | **Semester of Delivery** | | 7 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Ban Ghanim Alani | | **e-mail** | drbanalani@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1- Multivariate Analysis is concerned with methods of analysing data that consist of observations on two or more variables for each individual or unit<br>2- To introduce the main ideas of multivariate statistical analysis; that is, the analysis of sets of data where there are several measurements on each of a number of individuals.<br>3- Identifying generating functions and cumulates with their uses and properties<br>4- Learning joint probability functions, marginal and conditional probability functions, joint ,marginal, conditional moments, joint generating functions<br>5- Defining theoretical joint measures such as var-covariance , correlation , and partial correlation coefficients |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- On a general level the students should be able to understand the concept of analysing multivariate data. They should be familiar with a basic minimum level of matrix competency and with general aspects of handling multivariate data.<br>2- will appreciate the range of multivariate techniques available<br>3- will be able to summarize and interpret multivariate data<br>4- will have an understanding of the link between multivariate techniques and corresponding univariate techniques<br>5- will be able to use multivariate techniques appropriately, undertake multivariate hypothesis tests, and draw appropriate conclusions.<br>6- A knowledge and understanding of models and methods for multivariate data.<br>7- A reasonable degree of familiarity with some of the main techniques of multivariate analysis.<br>8- Apply appropriate techniques to different sets of data. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following:<br>1- Basic concepts and Characteristic root and vectors and their properties and Quadratic forms and The Multivariate normal distribution, Bivariate normal distribution (11hr)<br>2- linearity property in multivariate and Marginal distributions, Distribution of linear combination of normal variates (11h )<br>3- The conditional distribution and Moment generating function (10hr)<br>4- Parameter estimation by Maximum Likelihood Method and Sufficient statistic (11hr)<br>5- Multivariate regression( 8hr)<br>6- Parameter estimation of multivariate linear regression by L.S.M and Parameter estimation of multivariate linear regression by m.l.e (11hr) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class by solving the exercises and discussing them, and improving thinking skills by relating each topic to real-world examples, Students' participation with the professor to give the material a kind of interaction |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 14 | LO #1, #2 and #7, #8 |
| | **Assignments** | 2 | 10% (10) | 4 and 12 | LO #3, #4 and #6 |
| | **Open book exam** | 5 | 10% (10) | 3, 6, 8, 11, 15 | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #5 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Basic concepts<br>1- properties of matrices<br>2- Characteristic root and vectors and their properties and Quadratic forms |
| **Week 2** | The Multivariate normal distribution |
| **Week 3** | Bivariate normal distribution |
| **Week 4** | Distribution of Quadratic forms |
| **Week 5** | linearity property in multivariate |
| **Week 6** | Marginal distributions |
| **Week 7** | Distribution of linear combination of normal variates |
| **Week 8** | The conditional distribution |
| **Week 9** | Mid-term Exam |
| **Week 10** | Moment generating function |
| **Week 11** | Parameter estimation by Maximum Likelihood Method |
| **Week 12** | Sufficient statistic |
| **Week 13** | Multivariate regression |
| **Week 14** | Parameter estimation of multivariate linear regression by OLS |
| **Week 15** | Parameter estimation of multivariate linear regression by MLE |
| **Week 16** | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>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** | Multivariate regression analysis. Dr. Shalal Habib Al-Jubouri | Yes |
| **Recommended Texts** | An Introduction to Multivariate Statistical Analysis / T. W. ANDERSON | Yes |
| **Websites** | | |

## Grading Scheme
مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computational Statistics** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT404** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 7 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Omar Salim Ibrahim | | **e-mail** | omarsalim85@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The learning objective of the course is that the student demonstrates the ability to:<br>1- Perform programming relevant to the content of the course in the statistical package used in the r.<br>2. Reproduce key theoretical results concerning elementary operations on random variables and vectors, and to apply R<br>3. Reproduce and apply the fundamental theorems of random variate generation.<br>4. Evaluate the quality of a random number generator.<br>5. Use simulation to Random Variable Generation for Continuous Distributions<br>6. Use simulation to Random Variable Generation for Continuous Distributions<br>7. Investigate properties of statistical procedures and estimators using simulation.<br>8. use methods Monte Carlo Integration and The Bootstrap<br>9. Perform programming relevant to the content of the course in the statistical package used in the course.<br>10. Identify and interpret relevant information in the output of the statistical package used in the course. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | After this course, the student should be able to...<br><br>1- use R and other statistical software to perform statistical analysis;<br>2-use different methods to solve an random number generator problem;<br>3- use Linear congruential and mid-square methods for uniform generator,<br>4- use Inverse transform method for simulating various probability distributions and stochastic models,<br>5- apply some efficient computer algorithms in simulation by bootstrap;<br>6- use Monte Carlo methods to solve statistical problems;<br>7-plan and implement a statistical simulation study in an efficient way;<br>interpret the results from a simulation study;<br>8- find appropriate information from the library, Internet, or other sources using computer software. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A –<br><br>Computational Statistics to R , Basic Syntax R , Formula Specification in RGraphics in R and Using Packages[ 15 hrs]<br>Part B –<br><br>Probability and Statistics, Probability Density Function, Cumulative Distribution Function, *Introduction to Simulation*, Discrete-Event System Simulation, Generating Random Numbers, Testing Randomness ,Testing Uniformity ,Testing Independence [ 15 hrs] |

| | |
|---|---|
| | Part C –<br>Generating Random Variables, Random *Variable Generation for Continuous Distributions, Random Variable Generation for Discrete Distributions* [ 15 hrs]<br><br>Part D –<br>Monte Carlo Integration, Monte Carlo Methods in Inference<br>The Bootstrap, Bootstrap Estimation of Standard Error, Bootstrap Estimation of Bias ,The Standard Normal Bootstrap Confidence Interval [ 15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| **Student Workload (SWL)**<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 8% (8) | 4 and 7 | LO #1, #2 and #5, #7 |
| | **Assignments** | 3 | 12 % (12) | 3, 6 and 12 | LO #3, #4 and #6, #7 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10 % (10) | 13 | LO #5, #6 and #7, #8 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 10 | LO #1 - #8 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | Material Covered |
| **Week 1** | Introduction<br>Computational Statistics<br>Getting Started with R and R studio |
| **Week 2** | Basic Syntax R<br>Distributions and Statistical Tests in R |
| **Week 3** | Arrays, Data Frames, and Lists in R |
| **Week 4** | Formula Specification in R<br>Graphics in R and Using Packages |
| **Week 5** | Probability and Statistics Review<br>Continuous Random Variables<br>Discrete Random Variables |
| **Week 6** | Introduction to Simulation, Advantages and Disadvantages of Simulation, Areas of Application,<br>Model of a System ,Types of Models, Discrete-Event System Simulation, Types of simulations |
| **Week 7** | Generating Random Numbers<br>Pseudorandom Number Generators in R,<br>Linear congruential generator<br>Lagged Fibonacci generator |
| **Week 8** | Testing Randomness Generating Random Numbers<br>Testing Uniformity Generating Random Numbers<br>Testing Independence Generating Random Numbers |
| **Week 9** | Generating Random Variables<br>Methods for Generating Random Variables in R |
| **Week 10** | Midterm Exam ;Distributions and Simulation<br>Random Variable Generation for Continuous Distributions ,Uniform Distribution and<br>The normal distribution |

| | |
|---|---|
| **Week 11** | Random Variable Generation for Continuous Distributions ,The exponential distribution<br>The gamma distribution ,The beta distribution |
| **Week 12** | Random Variable Generation for Discrete Distributions ,The Bernoulli distribution<br>,The binomial distribution |
| **Week 13** | Random Variable Generation for Discrete Distributions, The poisson distribution<br>Geometric distribution |
| **Week 14** | Monte Carlo Simulation Monte Carlo Integration |
| **Week 15** | The Bootstrap Techniques |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction to R |
| **Week 2** | Lab 2: Getting Started with R and Rstudio |
| **Week 3** | Lab 3: application Basic Syntax R<br>Distributions and Statistical Tests in R |
| **Week 4** | Lab 4: Arrays, Data Frames, and Lists, Matrix Algebra in R |
| **Week 5** | Lab 5: Example Probability and Statistics inR |
| **Week 6** | Lab 5: R code computes the variance of the random variable<br>Example Descriptive Statistics in R |
| **Week 7** | Lab 7: Pseudorandom Number Generators in R,<br>Example Linear congruential generator application with R<br>Example Lagged fibonacci generator application with R |
| **Week 8** | Lab 8: Testing Randomness application withR<br>Example Testing Uniformity application with R<br>Example Testing Independence application withR |
| **Week 9** | Lab 9: Generating Random Variables in R<br>Examples Methods for Generating Random Variables in R |
| **Week 10** | Lab 10: Example The normal distribution application with R |
| **Week 11** | Lab 11: Example The exponential distribution application with R<br>Example The gamma distribution application with R<br>Example The beta distribution application with R |
| **Week 12** | Lab 12: Example The Bernoulli distribution application with R<br>Example The binomial distribution application with R |
| **Week 13** | Lab 13: Example The poisson distribution application with R<br>Geometric distribution application with R |
| **Week 14** | Lab 14: Example Monte Carlo Simulation Monte Carlo Integration with R |
| **Week 15** | Lab 15: Example The Bootstrap Techniques with R |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | -Basic Elements of Computational Statistics, Wolfgang Karl Härdle • Ostap Okhrin Yarema Okhrin, 2017 | Yes |
| **Recommended Texts** | -Discrete-Event System Simulation Banks Carson II Nelson Nicol Fifth Edition,2014<br>-Simulation and Modelling to Understand Change Manuele Leonelli<br>-Statistics and Computing *Series Editors:*J. ChambersD. HandW. Härdle ,2009 | NO |
| **Websites** | https://en.wikipedia.org/wiki/Simulation_modeling | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Design and Analysis of Experiments I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT405** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 7 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Muzahem Mohammed Yahya | | **e-mail** | muzahim_alhashime@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Wisam Wadullah Saleem | | **e-mail** | wisam-stat@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Introduce the student to how to design the experiment according to sound scientific foundations.<br>2. Enable the student to deal with problems related to data and conduct appropriate statistical analysis according to the design and nature of the data.<br>3. Enable the student to conduct statistical analysis, create variance analysis tables, and make comparisons.<br>4. Introducing the different designs, the method of implementing them, and analyzing their data in order to obtain scientific decisions with a sufficient degree of accuracy and at the lowest possible cost.<br>5. Enabling the student to choose the appropriate design for the experiment according to scientific bases.<br>6. Enable the student to evaluate and interpret the results. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Introducing the basic terms of experiment design, the basics of experiment design.<br>2. Interpret the results and give the appropriate decision for a completely randomized design in the case of equal and nonequal.<br>3. The ability to deal with the nature of experimental units in terms of homogeneity and heterogeneity and choose the appropriate design for analysis.<br>4. The ability to apply the appropriate design and choose the mathematical model according to the experimental conditions.<br>5. The ability to identify important factor and interpret the results based on the analysis of variance.<br>6. The ability to deal with different design schemes according to the appropriate experimental units.<br>7. The ability to analyze randomized complete block design and Latin square design in case of missing experimental units.<br>8. The ability to choose the important factor that has a significant impact through the use of multiple tests (LSD, Duncan and Dunnett) |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Part A - Basic concepts in designing experiments and handling simple one-factor experiments Dealing with a completely randomized design and identifying the mathematical model and the analysis of variance table for the design in the case of equal and unequal frequencies and in the case of recording one observation and more than one observation of the experimental unit. [16 hours]<br>Part B - Dealing with experimental units in the event of heterogeneity and in one direction using the complete random design and identifying the mathematical model and the analysis of variance table for the designs and studying the relative efficiency and showing the effect of losing observations on the analysis in the case of recording one observation and more than one observation of the experimental unit. [16 hours.]<br>Part C - Dealing with the experimental units in the case of inconsistency and in two directions using the Latin square design and the Greek Latin square design, identifying the mathematical model and the analysis of variance table for the designs, studying the |

| | |
|---|---|
| | relative efficiency of the Latin square design, and showing the effect of losing observations on the analysis. [12 hours.]<br>Part D - The use of multiple comparisons through the application of tests (LSD, Duncan and Dunnett) to indicate the most important (significant) factor. [16 hours.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encourage students' participation in the exercises, while at the same time refining and expanding their Practical thinking skills. This will be achieved through classes, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 52 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **100** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Definition of basic terminology for designing experiments, processing, experimental unit, sampling unit, experimental error. |
| **Week 2** | The design is completely random, Introduction, design advantages and disadvantages, linear randomization model, analysis of variance. |
| **Week 3** | Completely randomized design with equal frequencies, Completely randomized design with equal frequencies. |
| **Week 4** | Completely randomized design in the case of nonequal and in the case of recording more than one observation, Completely randomized design with unequal frequencies. |
| **Week 5** | Complete random block design, Introduction, grouping of experimental units into sectors, design advantages and disadvantages, randomization, linear model, analysis of variance. |
| **Week 6** | Complete random block design, Relative efficiency of design, estimation of missing data |
| **Week 7** | Randomized complete block design with one view per experimental unit, Randomized complete block design with one view per experimental unit. |
| **Week 8** | Randomized complete block design with sample experimental units, Randomized complete block design with sample experimental units. |
| **Week 9** | Latin square design, Introduction, design advantages and disadvantages, randomization, linear model, analysis of variance. |
| **Week 10** | Latin square design, Relative efficiency, estimate of missing data. |
| **Week 11** | Greco-Latin square design, Introduction, linear model, analysis of variance table. |
| **Week 12** | Multiple comparisons Least significant difference test (LSD), Introduction, the concept of multiple comparisons Least significant difference (LSD) test of a completely randomized design |
| **Week 13** | Multiple comparisons Least significant difference test (LSD), Introduction, the concept of multiple comparisons Least significant difference (LSD) test for block design |
| **Week 14** | Duncan's polynomial test Dunnett test, Introduction, Duncan's polynomial test Dunnett's test for a completely randomized design |
| **Week 15** | Duncan's polynomial test Dunnett test, Introduction, Duncan's polynomial test Dunnett test for sectoral design |
| **Week 16** | **Preparatory week before the Final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **الراوي، خاشع محمود (1980)" تصميم وتحليل التجارب الزراعية " الطبعة الاولى، مديرية دار الكتب للطباعة والنشر - العراق.** | Yas |
| **Recommended Texts** | 1- Montgomery, D.C. (2017), Design and Analysis of Experiments. 9th Edition. John Wily & Sons. Inc New York.<br><br>**2-الامام، محمد محمد طاهر(1994)" صميم وتحليل التجارب " دار المريخ للنشر -الرياض.** | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | **التقدير** | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **English Language** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT406** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 7 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Zainab Qusay Ahmed Taqi | | **e-mail** | Zainab.q@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Asst. lecturer | | **Module Leader's Qualification** | MSc. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 11/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To be able to speak English fluently and accurately.<br>2. To think in English and then speak.<br>3. To be able to talk in English.<br>4. To be able to compose freely and independently in speech and writing.<br>5. To be able to read books with understanding. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. To address grammar issues that students encounter in their daily speech, writing, reading and listening<br>2. To address the issue of grammatical errors that affect effective communication<br>3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections<br>4. Recognize the structure and organization of paragraphs,<br>5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, reading speed, and vocabulary development<br>6. Develop the listening skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Introduction: about the study materials. [1 hr]<br><br>Passive and active voices, practices. Grammar: Verbs and nouns. [5 hrs]<br><br>Second conditional, practices, questions and short answers. Grammar: might, If I were you. Vocabulary: phrasal verbs. social expressions, practices. [8 hrs]<br><br>Present perfect continuous, practices. Words formation, adverbs, reading. Everyday English (telephoning), practices. [6 hrs]<br><br>Past perfect practices, grammar and pronunciation. Report statement, practices. Vocabulary: hot verbs (bring, take, come, go). Social expressions (saying goodbye). [8 hrs]<br><br>Review the study units. [2 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | - The main strategy that will be adopted in developing the four skills:<br>The skill of speaking,<br>The skill of reading,<br>The skill of writing,<br>The skill of listening,<br>Also, enable the students for the use of grammar correctly, |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **50** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 15% (15) | 3,6 and 10 | LO #1, #2 and #3 |
| | **Assignments** | 3 | 15% (15) | 4,7 and 12 | LO #3, #4 and #6 |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #3 and #6 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction: about the study materials. |
| **Week 2** | Grammar: Verbs and nouns. Passive and active voices, practices. |
| **Week 3** | Second conditional, practices, questions and short answers. |
| **Week 4** | Grammar: might, If I were you. |
| **Week 5** | Vocabulary: phrasal verbs. |
| **Week 6** | social expressions, practices. |
| **Week 7** | Mid-term Exam |
| **Week 8** | Grammar: Present perfect continuous, practices. |
| **Week 9** | Grammar: Words formation, adverbs, reading. |
| **Week 10** | Social expressions: Everyday English (telephoning), practices. |
| **Week 11** | Tenses: Past perfect practices, grammar and pronunciation. |
| **Week 12** | Report statement, practices. |
| **Week 13** | Hot verbs (bring, take, come, go). |
| **Week 14** | Social expressions about (saying goodbye), practices. |
| **Week 15** | Study the material review |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | None |
| **Week 2** | None |
| **Week 3** | None |
| **Week 4** | None |
| **Week 5** | None |
| **Week 6** | None |
| **Week 7** | None |

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

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Headway pre-intermediate plus student's book (john and Lize Soars) | Yes |
| **Recommended Texts** | Headway pre-intermediate plus work's book | Yes |
| **Websites** | | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Stochastic Processes II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT407** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 8 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Muthanna Subhi Sulaiman | | **e-mail** | muthanna.sulaiman@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Understand the concept of a Markov chain and its classifications.<br>2. Recognize the different types of states in a Markov chain, such as absorbing, transient, and recurrent states.<br>3. Learn to classify Markov chains based on their behavior, including irreducible, reducible, and periodic chains.<br>4. Identify and analyze the stationary distribution of a Markov chain.<br>5. Understand the basic properties and characteristics of a Poisson process.<br>6. Derive and interpret the probability density function and cumulative distribution function of the Poisson process.<br>7. Understand the concept and assumptions of a branching process.<br>8. Calculate the mean and variance of a branching process.<br>9. Understand the characteristics and assumptions of a birth and death process.<br>10. Calculate the mean and variance of a birth and death process.<br>11. Understand the basic concepts and components of queuing models.<br>12. Identify and apply different queuing models, such as M/M/1. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Demonstrate a solid understanding of the fundamental concepts and principles of each stochastic process.<br>2. Classify and analyze different types of states or behaviors within each process, such as absorbing, transient, recurrent, and periodic states.<br>3. Evaluate and interpret the stationary distribution, steady-state behavior, and equilibrium properties of the processes.<br>4. Calculate and interpret relevant performance measures, such as mean, variance, extinction probabilities, and waiting times.<br>5. Communicate effectively, both orally and in writing, about the concepts, analysis, and results related to the classification of these stochastic processes.<br>6. By achieving these learning outcomes, students will have a strong foundation in the classification and analysis of stochastic processes, enabling them to apply these concepts and techniques in a wide range of fields such as probability theory, statistics, operations research, and various branches of engineering and applied sciences. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A – Classification of state of a Markov chain:</u><br>Reasons of using numerical analysis, problem that we typically face in numerical analysis, problem identification before utilizing numerical methods. [25 hrs.]<br><br><u>Part B Poisson process and its properties:</u><br>Learn how to model events that occur randomly over time using the Poisson process. [30 hrs.]<br><br><u>Part C – Application of stochastic processes:</u> |

| | |
|---|---|
| | Understand the fundamental concepts and principles of each stochastic process. And identify and classify the different types of states or behaviors within each process. [20 hrs.] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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, computer labs, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 4, 11 | LO #1, #5 |
| | **Assignments** | 4 | 20% (10) | 4, 11, 14, and 15 | All |
| | **Report** | 1 | 10% (10) | 12 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 9 | LO #1 - #4 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Classification of Markov Chain. Classification of state of a Markov chain. |
| **Week 2** | Recurrent and transient states. |
| **Week 3** | Computation of first passage and mean recurrence time. |
| **Week 4** | Stationary distribution of a Markov chain (steady states dist.). |
| **Week 5** | Markov Process with discrete state space, introduction to counting process. |
| **Week 6** | The Poisson process, and assumptions Poisson process. |
| **Week 7** | Derivation the p.d.f. of a Poisson process. |
| **Week 8** | Properties of Poisson process, additive and difference property. |
| **Week 9** | Mid-term Exam + Decomposition of a Poisson process. |
| **Week 10** | Poisson process and related distribution- Inter arrival time and waiting time. |
| **Week 11** | Introduction to Branching Process. Generating function and probability of extinction. |
| **Week 12** | Calculate the mean and variance of a branching process. |
| **Week 13** | Birth and Death process. Pure Birth process and Yule – Furry process. |
| **Week 14** | Pure death process and pure Birth – Death process. |
| **Week 15** | Stochastic Process in Queuing model, General concepts, m/m/1 steady state behavior. |
| **Week 16** | **Preparatory week before the final Exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. الربيعي، فاضل محسن وعبد، صلاح حمزة، (2000)، " مقدمة في العمليات التصادفية ". دار الكتب والوثائق، بغداد. | Yes |

| | | |
|---|---|---|
| | 2. ذنون، باسل يونس، (2011)، " النمذجة الماركوفية مع تطبيقات عملية ". دار ابن الأثير للطباعة والنشر جامعة الموصل، العراق. الجزء الاول والثاني. | |
| **Recommended Texts** | 1. Cox D.R &H.D. Miller, “The theory of stochastic process”, 1985.<br>2. Parzen,” Stochastic Process”, 1962.<br>3. Ross, S. M. (1983), ‘‘Stochastic Processes'' Wiley, New York. | Yes |
| **Websites** | TBD | |

| **Grading Scheme**<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Statistical Inference II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT408** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | | UGIV | **Semester of Delivery** | | 8 |
| **Administering Department** | | STAT | **College** | CSM | |
| **Module Leader** | Dr. Raya Salim Al-Rassam | | **e-mail** | rayasalim73@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. Explain the second part of estimation theory which is the interval estimation for the parameters ,<br>2. Construction the confidence intervals about the mean ,the difference between two means, the variance , the ratio between two variances,and the proportions.<br>3. Studying the second part of statistical inference which is the testing of hypothesis about the mean,the difference between two means ,the variance ,the ratio between two variances, and the proportions<br>4. Learn the types of errors,type one error and type two error and how to calculate them.<br>5. Learn how to create a critical region.<br>6. Learn how to calculate the power function for the statistical test and determine the best critical region.<br>7. Learn how to perform the sequential test for the statistical hypothesis to reduce from the sample size. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Recognize the difference between the parameters and the random variables.<br>2. Understanding how to construct the confidence intervals about the mean,the difference between two means ,the variance , the ratio between two variances ,and the proportions.<br>3. Understanding how to test the hypothesis about the mean, the difference between two means ,the variance , the ratio between two variances ,and the proportions.<br>4. Understanding the two types of errors and the critical region.<br>5. Understanding how to calculate the power function for the statistical hypothesis and determine the most powerful critical region.<br>6. Understanding the sequential test which is used to reduce the sample size. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Construction the confidence intervals about the mean ,the difference between two means, the variance , the ratio between two variances, and the proportions and applications,discusions,open book exam,homeworks,and quizzes(4 weeks)<br>2. The testing of hypothesis about the mean,the difference between two means ,the variance ,the ratio between two variances, and the proportions applications,discusions,open book exam,homeworks,and quizzes(3 weeks)<br>3. The types of errors,type one error and type two error and how to calculate them.Applications(2 weeks)<br>4. Create a critical region.Application(1 week)<br>5. Calculate the power function for the statistical test and determine the best critical region. applications,discusions,open book exam,homeworks,and quizzes(4 weeks)<br>6. The sequential test for the statistical hypothesis.Application(1 week) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encouraging students to participate in the class through discussion and solving exercises, while improving and expanding their critical thinking skills through reports and using software to calculate cumulative probabilities, moments or drawing probability functions. Also linking the knowledge, they receive with the subjects that he studied in previous levels and the levels that he will turn to later. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 97 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 20% (20) | 5 and 10 | LO #1, #2 and #6 |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #6 |
| | **Report** | 1 | 10% (10) | 13 | 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 Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Estimation Theory (Interval Estimation). |
| **Week 2** | Confidence Intervals about Mean. |
| **Week 3** | Confidence Intervals about difference between two means(when variances of two populations are known). |
| **Week 4** | Confidence Intervals about difference between two means(when variances of two populations are unknown). |
| **Week 5** | Confidence Intervals about Variance. |
| **Week 6** | Confidence Intervals about the ratio between two variances. |
| **Week 7** | Confidence Intervals about proportions. |
| **Week 8** | Hypothesis Testing (Basic concepts). |
| **Week 9** | Tests concerning the mean and the difference between two means. |
| **Week 10** | Tests concerning the variance and the ratio between two variances. |
| **Week 11** | Tests concerning the proportions. |
| **Week 12** | The likelihood ratio test. |
| **Week 13** | Construction of the most powerful critical region. |
| **Week 14** | The best critical region |
| **Week 15** | Sequential test |
| **Week 16** | **Final exam** |

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

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. Al-Nasir,A. and Rashid,D.,(1988),"Statistical Inference ", Directorate of Dar Al-Kutub for Printing and Publishing, Baghdad, Iraq<br>2. George Casella and Roger L. Berger ,(2001) ,"Statistical Inference ",Second Edition, https://www.r-project.org/. | Yes |
| **Recommended Texts** | Anthony Almudevar, (2022) ," Theory of Statistical Inference ",Chapman and Hall. | Electronic |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Statistical Modeling** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT409** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 8 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Bashar A. Al-Talib | | **e-mail** | bashar.altalib@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Prof. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | Regression Analysis I and Regression Analysis II | **Semester** | 5,6 |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | **After completing this course, the students have ability to:**<br>1. detect Assumptions Violations in Simple and multiple Linear Regression Models<br>2. detect and deal with Heteroscedasticity, Multi-Collinearity, and Autocorrelation.<br>3. Analyzing regression model Residual and Detect Un-usual Observations (extreme values, outliers, leverage point, influential observations<br>4. Running biased regression methods such as Ridge Regression, Principal Component Regression<br>5. Deal with outlying regression data using Robust Regression<br>6. Use Statistical Packages such as SPSS and R to deal with regression violations |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | **The learning outcomes associated with this course are aimed at students being able to:**<br>1. deal with regression data for which analysis assumptions are not satisfied<br>2. learn how to detect violations in simple and multiple regression using graphs and statistical tests<br>3. detect and deal with the problems of regression models such as Non-linearity, Non-normal distribution, Multi-Collinearity, heteroscedasticity, and autocorrelation problem.<br>4. differentiate between the types of un-usual observations, extreme values, influential and outlying observations, and how to detect their existence and how to deal with them.<br>5. apply regression techniques that deal with violations in analysis assumptions, such as: Ridge Regression, Principal Component Regression, and Robust Regression.<br>6. analyze regression data with violations, by using SPSS package, R program and other software |
| **Indicative Contents**<br>المحتويات الإرشادية | **Indicative content includes the following.**<br>1. Introduction to Assumptions Violations in Regression Models<br>2. Assumptions Violations in Simple Linear Regression Models<br>3. Assumptions Violations in Multiple Linear Regression Models<br>4. Heteroscedasticity Problem<br>5. Multi-Collinearity Problem<br>6. Autocorrelation Problem<br>7. Residual Analysis and Detecting Un-usual Observations<br>8. Ridge Regression<br>9. Principal Component Regression<br>10. Robust Regression<br>11. Applications Using Statistical Packages |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | 1. Using Visualization for data analysis<br>2. concentrate with Cooperative Learning between students<br>3. Differentiated Instruction<br>4. Using internet and Technology<br>5. Effective Class Discussions<br>6. Professional Development of learning process<br>7. Team-Based Learning |

| Student Workload (SWL)<br>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 |
| **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 |
| **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 | 2 | 10% (10) | 4 and 10 | LO #1, #2 and #4 |
| | Assignments | 2 | 10% (10) | 4 and 12 | LO #3, #5 |
| | Projects / Lab. | 1 | 10% (10) | Continuous | All |
| | Report | 1 | 10% (10) | 13 | LO #4, #5 |
| Summative assessment | Midterm Exam | 2hr | 10% (10) | 8 | LO #2 - #5 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | **Introduction**: Assumptions Violations in Regression Models |
| Week 2 | **The nature of regression models:** Reasons for adding the random variable when estimating the relationships between variables, Hypotheses of analysis of the random variable and the linear model, Kauss Markov Theorem for Least Squares (BLUE), The importance of the BLUE feature. |
| Week 3 | **Simple Linear regression model problems -1-:** Simple linear regression model problems, assumptions violations in general, autocorrelation testing. |
| Week 4 | **Simple Linear regression model problems -2-:** detection and adjustment, Residuals normality test. |
| Week 5 | **Problems of multiple linear regression models -1-:** nature and sources of problems, multi-collinearity oblem, nature, implications, reasons for its existence, means of treatment. |

| | |
|---|---|
| **Week 6** | **Problems of multiple linear regression models -2-:** methods of detection, estimation by Ridge regression (RR), estimation by the method of Principal components (PCA regression). |
| **Week 7** | **Autocorrelation Problem -1-:** its concept, detecting it graphically, the reasons for its appearance, its implications, detection by the statistical test. |
| **Week 8** | **Autocorrelation Problem -2-:** treatment methods, the generalized least squares method (GLS). |
| **Week 9** | **Heteroscedasticity Problem -1-:** its concept, reasons for its existence, implications, testing for its existence. |
| **Week 10** | **Heteroscedasticity Problem -2-:** treatment by GLS method and using transformations |
| **Week 11** | **Residual Analysis**: Detecting Un-usual Observations, extreme values, influential observations |
| **Week 12** | **Residual Analysis**: outliers, leverage points (good and bad leverage) |
| **Week 13** | **Ridge Regression, Principal Component Regression** |
| **Week 14** | **Robust Regression** |
| **Week 15** | **Applications Using Statistical Packages** |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 7** | Tutorial: Introduction to data analysis using R and SPSS |
| **Week 15** | Tutorial: Real data analysis using R and SPSS |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | John Fox - Regression Diagnostics_ An Introduction-SAGE Publications (2020), (Quantitative Applications in the Social Sciences) | Yes |
| **Recommended Texts** | 1. David A. Belsley, Edwin Kuh, Roy E. Welsch - Regression Diagnostics - Identifying Influential Data and Sources of Collinearity-Wiley-Interscience (2004), (Wiley Series in Probability and Statistics).<br>2. Anthony Atkinson, Marco Riani (auth.) - Robust Diagnostic Regression Analysis-Springer-Verlag New York (2000), (Springer Series in Statistics). | Yes |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Non-parametric Statistics** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT410** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 8 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Omar Salim Ibrahim | | **e-mail** | omarsalim85@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Rikan abdulazeez ahmed | | **e-mail** | rikan.ahmed@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The learning objective of the course is that the student demonstrates the ability to:<br>1- The difference between parametric and nonparametric statistics and How to rank data.<br>2- How to determine counts of observations and How to ind a data sample's kurtosis and skewness and determine if the sample meets acceptable levels of normality.<br>3- How to perform a Kolmogorov–Smirnov one-sample test to determine if a data sample meets acceptable levels of normality and How to compute the Wilcoxon signed rank test. And How to construct a median conidence interval based on the Wilcoxon signed rank test for matched pairs.<br>4- How to perform the Mann−Whitney U-test and How to construct a median conidence interval based on the difference between two independent samples.<br>5- How to perform the Kolmogorov−Smirnov two-sample test., How to perform the Mann−Whitney U-test and the Kolmogorov−Smirnov and How to compute the Friedman test. , How to perform contrasts to compare samples<br>6- How to compute the Kruskal–Wallis H-test. • How to perform contrasts to compare samples and How to compute the Spearman rank-order correlation coeficient.<br>7- How to compute the point-biserial correlation coeficient. And How to compute the biserial correlation coeficient. And How to perform a chi-square goodness-of-it test.and How to perform a chi-square test for independence. And How to use a runs test using SPSS |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | After this course, the student should be able to...<br>1. Compare and contrast parametric and nonparametric tests<br>2. Identify multiple applications where nonparametric approaches are appropriate<br>3. Perform and interpret the Mann Whitney U Test<br>4. Perform and interpret the Sign test and Wilcoxon Signed Rank Test<br>5. Compare and contrast the Sign test and Wilcoxon Signed Rank Test<br>6. Perform and interpret the Kruskal Wallis test<br>7. Identify the appropriate nonparametric hypothesis testing procedure based on type of outcome variable and number of samples |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Part A –<br>Introduction, The Nonparametric Statistical , State the Null and Research Hypotheses ,Compute the Test Statistic ,Ranking Data ,testing data for normality, Computing the Kolmogorov–Smirnov One-Sample Test , Computing the Wilcoxon Signed Rank Test Statistic , Computing the Sign Test [20 hrs]<br>Part B –<br>Computing the Mann-Whitney U-Test Statistic, Computing the Kolmogorov–Smirnov Two-Sample Test Statistic, Computing the Kolmogorov–Smirnov Two-Sample Test Statistic, Computing the Friedman Test Statistic, Computing the Friedman Test Statistic, RANK-ORDER, POINT-BISERIAL, AND BISERIAL CORRELATIONS[20 hrs] |

| | |
|---|---|
| | Part C –<br>The χ2 Goodness-of-Fit Test ,Computing the χ2 Goodness-of-Fit Test Statistic , The χ2 Test for Independence ,Computing the χ2 Test for Independence, The Fisher Exact Test , Computing the Fisher Exact Test for 2 × 2 Tables , The Runs Test for Randomness ,Sample Runs Test[20 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>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 |
| **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 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | Material Covered |
| **Week 1** | Introduction, The Nonparametric Statistical Procedures Presented in This cors<br>State the Null and Research Hypotheses<br>Set the Level of Risk (or the Level of Signiicance) Associated with the Null Hypothesis<br>Choose the Appropriate Test Statistic ,Compute the Test Statistic<br>Ranking Data , Ranking Data with Tied Values |
| **Week 2** | *TESTING DATA FOR NORMALITY*<br>Describing Data and the Normal Distribution<br>Computing and Testing Kurtosis and Skewness for Sample Normality<br>Examining Skewness and Kurtosis for Normality Using SPSS<br>Computing the Kolmogorov–Smirnov One-Sample Test |
| **Week 3** | COMPARING TWO RELATED SAMPLES: THE WILCOXON SIGNED RANK AND THE SIGN TEST<br>Computing the Wilcoxon Signed Rank Test Statistic<br>Sample Wilcoxon Signed Rank Test (Small Data Samples) and (Large Data Samples)<br>Conidence Interval for the Wilcoxon Signed Rank Test |
| **Week 4** | Computing the Sign Test<br>Sample Sign Test (Small Data Samples) and (Large Data Samples)<br>Performing the Wilcoxon Signed Rank Test and the Sign Test Using SPSS |
| **Week 5** | *COMPARING TWO UNRELATED SAMPLES: THE MANN-WHITNEY* U-*TEST AND THE KOLMOGOROV-SMIRNOV TWO-SAMPLE TEST*<br>Computing the Mann-Whitney *U*-Test Statistic<br>Sample Mann-Whitney *U*-Test (Small Data Samples) and (Large Data Samples)<br>Conidence Interval for the Difference between Two Location Parameters |
| **Week 6** | Computing the Kolmogorov–Smirnov Two-Sample Test Statistic<br>Sample Kolmogorov–Smirnov Two-Sample Test<br>Performing the Mann–Whitney *U*-Test and the Kolmogorov–Smirnov Two-Sample Test Using SPSS |
| **Week 7** | *COMPARING MORE THAN TWO RELATED SAMPLES: THE FRIEDMAN TEST*<br>Computing the Friedman Test Statistic<br>Sample Friedman's Test (Small Data Samples without Ties) and(Large Data Samples without Ties)<br>Sample Friedman's Test (Small Data Samples with Ties)<br>Performing the Friedman Test Using SPSS |
| **Week 8** | Midterm Exam ,*COMPARING MORE THAN TWO UNRELATED SAMPLES: THE KRUSKAL–WALLIS* H-*TEST*<br>Computing the Kruskal–Wallis *H*-Test Statistic<br>Sample Kruskal–Wallis *H*-Test (Small Data Samples) and (Large Data Samples)<br>Performing the Kruskal–Wallis *H*-Test Using SPSS |
| **Week 9** | *COMPARING VARIABLES OF ORDINAL OR DICHOTOMOUS SCALES: SPEARMAN RANK-ORDER, POINT-BISERIAL, AND BISERIAL CORRELATIONS*<br>The Correlation Coeficient<br>Computing the Spearman Rank-Order Correlation Coeficient<br>Sample Spearman Rank-Order Correlation (Small Data Samples without Ties) and (Small Data Samples with Ties)<br>Performing the Spearman Rank-Order Correlation Using SPSS |

| | |
|---|---|
| **Week 10** | Computing the Point-Biserial and Biserial Correlation Coeficients<br>Correlation of a Dichotomous Variable and an Interval Scale Variable<br>Correlation of a Dichotomous Variable and a Rank-Order Variable<br>Sample Point-Biserial Correlation (Small Data Samples)<br>Performing the Point-Biserial Correlation Using SPSS |
| **Week 11** | Sample Point-Biserial Correlation (Large Data Samples)<br>Sample Biserial Correlation (Small Data Samples)<br>Performing the Biserial Correlation Using SPSS<br>The Kendall Rank Correlation CoefBcient: r<br>The Kendall Partial Rank Correlation Coeffecient: r,-,<br>The Kendall Coeffecientt of Concordance: W |
| **Week 12** | *ESTS FOR NOMINAL SCALE DATA: CHI-SQUARE AND FISHER EXACT TESTS*<br>The χ2 Goodness-of-Fit Test<br>Computing the χ2 Goodness-of-Fit Test Statistic<br>Sample χ2 Goodness-of-Fit Test (Category Frequencies Equal)<br>Sample χ2 Goodness-of-Fit Test (Category Frequencies Not Equal) |
| **Week 13** | The χ2 Test for Independence<br>Computing the χ2 Test for Independence<br>Sample χ2 Test for Independence |
| **Week 14** | The Fisher Exact Test<br>Computing the Fisher Exact Test for 2 × 2 Tables<br>Sample Fisher Exact Test |
| **Week 15** | *TEST FOR RANDOMNESS: THE RUNS TEST*<br>The Runs Test for Randomness<br>Sample Runs Test (Small Data Samples) and (Large Data Samples)<br>Sample Runs Test Referencing a Custom Value<br>Performing the Runs Test for a Custom Value Using SPSS |
| **Week 16** | Final Exam |

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

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Siegel, Nonparametric Statistics for the Behavioral Sciences | Yes |
| **Recommended Texts** | Higgins, Introduction to Modern Nonparametric Statistics<br>Higgins, Introduction to Modern Nonparametric Statistics | NO |

| Websites | |
|---|---|

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Design and Analysis of Experiments II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **STAT411** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | UGIV | | **Semester of Delivery** | 8 | |
| **Administering Department** | STAT | | **College** | CSM | |
| **Module Leader** | Dr. Muzahem Mohammed Yahya | | **e-mail** | muzahim_alhashime@uomosul.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Dr. Wisam Wadullah Saleem | | **e-mail** | wisam-stat@uomosul.edu.iq | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 10/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | 1. To develop statistical analysis skills using unbalanced designs.<br>2. To understand multiple treatments analysis and interpret its results.<br>3. Acquisition of skill in the analysis of nested coefficients of different experiments.<br>4. The ability to choose the appropriate design according to the conditions of the experiment.<br>5. Gain skills in planning different experiments.<br>6. The ability to analyze various Factorial experiments according to the requirements of the experiment.<br>7. Gain the ability to analyze various Split-plot designs and interpret the results |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Analyze the various Incomplete designs and determine the appropriate mathematical model for the experiment.<br>2. Interpret the results and give the appropriate decision for the various Cross-over design and all possible cases<br>3. Able to deal with Factorial experiments for different designs.<br>4. The ability to analyze Factorial experiments containing three factors<br>5. The ability to apply the appropriate design and choose the mathematical model according to the experimental conditions.<br>6. The ability to identify important factorial coefficients and interpret the results based on the analysis of variance.<br>7. The ability to deal with different design schemes according to the appropriate experimental units.<br>8. The ability to analyze Nested experiments and interpret results.<br>9. Gain skill in identifying the type of Confounding experiment. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A - Basic concepts of some one-factor designs<br>Dealing with Cross-over designs and Youden Square and getting acquainted with the mathematical model of the designs. [20 hours]<br><br>Part B - Factorial experiments<br>Analyzing experiments that contain more than one factor and identifying the appropriate mathematical model. [20 hours.]<br><br>Part C – Confounding experiment<br>Identify Split-plot designs and Nested experiments and the types of Confounding experiments. [20 hours] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Encourage students' participation in the exercises, while at the same time refining and expanding their Practical thinking skills. This will be achieved through classes, assignments, quizzes, and projects. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 52 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **100** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 15 % (15) | 5,9 and 13 | LO #1-#6and #7 |
| | **Homework** | 5 | 15% (15) | 6,8,9,12and 13 | LO #1-#6and #7 |
| | **Report** | 1 | 10% (10) | 13 | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 11 | LO #1-#5and #6 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Cross-over design, Introduction, conditions for Cross-over design, two treatments in Cross-over design |
| **Week 2** | Cross-over design, Three treatments in Cross-over design, linear model, table analysis of variance |
| **Week 3** | Youden Square design, Introduction, linear model, table analysis of variance |
| **Week 4** | Randomized Incomplete block design, Introduction, linear model, table analysis of variance |
| **Week 5** | List of balanced randomized Incomplete block designs, ways to create balanced designs |
| **Week 6** | Factorial experiments, introduction, use, advantages, and disadvantages |
| **Week 7** | Factorial experiment two-factor, completely randomized design (CRD) |
| **Week 8** | Factorial experiment two-factor, Randomized complete block design |
| **Week 9** | Factorial experiment two-factor, Latin square design |
| **Week 10** | Factorial experiment three-factor |
| **Week 11** | Split-plot designs, Introduction, and whole plots in a completely randomized design |
| **Week 12** | Split-plot designs, whole plots in Randomized complete block design |
| **Week 13** | Split-plot designs, whole plots in Latin square design |
| **Week 14** | Nested experiment, Introduction, linear model, table analysis of variance |
| **Week 15** | Confounding, Introduction, type Confounding |
| **Week 16** | **Preparatory week before the Final Exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **الراوي، خاشع محمود (1980)" تصميم وتحليل التجارب الزراعية " الطبعة الاولى، مديرية دار الكتب للطباعة والنشر - العراق.** | Yas |
| **Recommended Texts** | 1-Montgomery, D. C. (2017). *Design and analysis of experiments*. John wiley & sons.<br>**2-الامام، محمد محمد طاهر(1994)" صميم وتحليل التجارب " دار المريخ للنشر -الرياض.** | No |
| **Websites** | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks %** | **Definition** |
| **Success Group (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 (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.