Course Description – Thermodynamics

1. Course Name:
Thermodynamics
2. Course Code:
THER376
3. Semester / Year:
First semester/ Third Class / 2025-2026
4. Description Preparation Date:
1 / 9 / 2025
5. Available Attendance Forms:
Presence + online
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory (2 hours)- practice (4 hours) (90 hours)/ 4 units
7. Course administrator's name (mention all, if more than one name)
Name: Firas Salah Yahya Email: firas.alkhayatt@uomosul.edu.iq Shamil Mohammed Saleh eng.sh.hassn@uomosul.edu.iq
8. Course Objectives
To study the relationship between heat, work, and the properties of materials, such as gases and vapors, within the boundaries of the thermal system, so that the student will later have a broad understanding of the work of thermal systems, whether thermal systems that produce or consume energy.
9. Teaching and Learning Strategies
- Interactive lecture - Brainstorming - Dialogue and discussion - Practical exercises - Self-education
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theory	a1,a2: Remembers and understands the basics of thermodynamics	Basic concepts of thermodynamics	Interactive lecture, brainstorming, dialogue and discussion	Exams,
	4 practice	a1,a2: Remembers and understands the basics of thermodynamics	Learn about some thermal systems by watching videos	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams,
2	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Pressure and its types	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
3	2 Theory	a1,a2,a3: Remembers, understands and solves	Density, specific weight, and	Interactive lecture, brainstorming, dialogue and	Exams, homework

		examples related to the topic	temperature and its types	discussion	
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
4	2 Theory	a1,a2: Remembers, understands the topic	Zeroth law of thermodynamics, reversibility and pure substance	Interactive lecture, brainstorming, dialogue and discussion	Exams,
	4 Practice	a2,a3: Understands and solves problems related to the previous topic	Solve problems related to the previous topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
5	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Energy and its types	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
6	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Perfect gas laws	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
7	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Perfect gas laws	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
8	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	First law of thermodynamics and it application on closed and open systems	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
9	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	First law of thermodynamics and it application on closed and open systems	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
10	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Reversible processes of thermodynamics for closed systems	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
11	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Reversible processes of thermodynamics for closed systems	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
12	2 Theory	a1,a2,a3: Remembers,	Second law of	Interactive lecture,	Exams,

		understands and solves examples related to the topic	thermodynamics, entropy and thermal processes	brainstorming, dialogue and discussion	homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
13	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Second law of thermodynamics, entropy and thermal processes	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
14	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Gas mixtures	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework
15	2 Theory	a1,a2,a3: Remembers, understands and solves examples related to the topic	Gas mixtures	Interactive lecture, brainstorming, dialogue and discussion	Exams, homework
	4 Practice	a2,a3: Understands and solves problems related to the topic	Solve problems related to the topic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Exams, homework

11. Course Evaluation

Theory	practice	Final Exam	Total
25% -Exams -Presence	15% - Exams - Homework	60%	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Fundamentals of engineering thermodynamics, John R. Howell & Richard O. Buckius, 1st ed. , McGraw-Hill, 1987.
Main references (sources)	- Thermodynamics: engineering approach, Yunus A. Cengle & Michael A. Boles, 5th ed., McGraw-Hill, 2005. - Thermodynamics for engineers, Schaum's outlines, MERLE C. POTTER, Ph,D., 1993.
Recommended books and references (scientific journals, reports...)	------
Electronic References, Websites	------

مدرس المادة النظري: م. فراس صلاح يحيى

مدرس المادة العملي: م. شامل محمد صالح حسن

رئيس اللجنة العلمية: أ. د. عادل احمد عبد الله

رئيس القسم: أ. م. د. يوسف يعقوب هلال

Course Description Form

1. Course Name:

Irrigation and drainage

2. Course Code:

IRDR 308

3. Semester / Year:

First semester 2025-2026

4. Description Preparation Date:

1 \ 9 \ 2025

5. Available Attendance Forms:

Combined (Attendance + distance education)

6. Number of Credit Hours (Total) / Number of Units (Total)

2 theoretical + 2 practical/ 60/ 3 units/

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Ahmed Khair El-Din Abdel Salam Email: ahmed.khairuldeen@uomosul.edu.iq
M.M. Alia Abdel Latif Jassim Email: alyaaaltaee2@uomosul.edu.iq

8. Course Objectives

- Enable the student to understand what is the science irrigation and what is the irrigation process - Enabling the student to become familiar with classification of irrigation water - Enabling students to appreciate irrigation competenc - Enable the student to schedule irrigation and know water needs of the crop - Enabling the student to know the different irrigat methods - Enable the student to learn about the characteristics sprinkler and drip irrigation	**practical:** **- Enable the student to recognize the mathematical relationships between soil parameters and knowledge of the depth of water in the soil** **- The student will be able to estimate the moisture content of the soil - work on the pressure device and estimate the ready wa** **- He can estimate the tip** **- The student is able to estimate and calculate water consumption.** **- The student estimates the volume of wate and drainage in the canals**

9. Teaching and Learning Strategies

theoretical: - Interactive lectures - Brainstorming - Dialogue and discussion - Assigning tasks and reporting	practical: - Assigning group work to reveal leadership skills - Assigning tasks and reporting for each experiment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2 Theoreti 2 practical	Theoretical:a1 What is the science of irrigatio the irrigation process, and what are the sourc of water Practical:a8What are soil components properties that matter irrigation and drainage	theory: Irrigation science Practical: Mathematical relationships of soil components	theory: Audio methods, blackboard practical : Laboratory worl to estimate some properties	Short exams, assignments, discussions
2	2 Theoreti 2 practical	Theoretical: a2The student learns about rain-fed regions and what purposes irrigation achieves Practical: a9examples and applications of equivalent depth	Theoretical: Classification of rai fed regions practical : Estimating the equivalent depth of soil water	Theoretical: The blackboar a style of dialog practical : Laboratory application reporting	Short exams, assignments, discussions
3	2 Theoreti 2 practical	Theoretical: a3The student is famil with the standards adopted in evaluating quality of irrigation water in terms of salinity, sodicity, and toxicity Practical b9Laboratory work estimate soil moist content	Theoretical: Standards adopted i evaluating t quality of irrigation wa practical : Estimating soil moisture conservation	Theoretical: Audio methods: writing on the blackboard practical : Assigning tasks and reporting	Short exams, assignments, discussions
4	2 Theoreti 2 practical	Theoretical: a4The student will b able to estimate irrigation efficiencie (efficiency of transportation, irrigation, storage, a homogeneity) Practical:b10 The student can work on t pressure device	Theoretical Irrigation efficiencie Practical: press device	Theoretical: The solution method is on th board Practical Laboratory w and writ reports	Short exams, assignments, discussions
5	2 Theoreti 2 practical	Theoretical: b1Applications and solutions of examples irrigation efficiencies a uniformity coefficient Practical: b11The stud is able to estimate	Applications and examples of irrigatio efficiencies Practical: Estimatin field capacity and permanent wilting	Theoretical: Examples on th board practical : Make reports	Short exams, assignments, discussions

		calculate ready-m water	point		
6	2 Theoreti 2 practical	Theoretical:a5 The student is able to learn about irrigation scheduling and what water needs are Practical: a10The student can estimate water consumption	Theoretical: Scheduling irrigatio and water needs Practical: water consumption	Theoretical: The blackboard a direct dialogu style practical : Assigning ta and reports	exams,
7	2 Theoreti 2 practical	Theoretical:b2 The student learns the stages of plant growth and the related curve, well as calculating the number of days betwe one irrigation and another Practical: b12The stude can estimate evaporat using an evaporation basin	Theoretical: Plant growth stages irrigation frequency Practical: evaporat pan	Theoretical: Audio methods, writing style on blackboard practical : Assigning ta and reporting	Short exams, assignments, discussions
8	2 Theoreti 2 practical	Theoretical:a6 The student is able to learn about the differe methods of irrigation and the ability to understand the advantages of surface irrigation Practical: b13 student is able estimate water draina	Theoretical: Different ways to a water Practical: Meth of wa measurements	Theoretical: Auditory metho 'whiteboard method Practical: field observations	Short exams, assignments, discussions
9	2 Theoretical:b3 2 practicaldent is familiar with the irrigation method wit irrigation, its characteristics, and estimating the depth o irrigation using the irrigation method Practical: a11 student is able estimate water draina	Theoretical: e irrigation method Practical: Methods of measuring water - measuring facilities	Theoretical: Writing on the blackboard is a practical direct dialogue metho Assigning ta and reporting	Short exams, assignments, discussions
10	2 Theoreti 2 practical	Theoretical:b4 The student is able to learn about the advantages of sprinkle irrigation as well as	Theoretical: Sprinkler irrigatio	Theoretical: Audio methods, blackboard work: field	Short exams, assignments, discussions

		devices Practical: a12The student will be able to estimate rain in the fie or laboratory	Partical : the tip	laboratory wor	
11	2 Theoreti 2 practical	Theoretical:b5 The student is able to estimate the capacity the sprinkler irrigation system, the capacity o one sprinkler Practical: b14Applyin the infiltration basin	Theoretical: Sprinkler irrigation system capaci Practical: infiltration in the basin method	Theoretical: Writing on the blackboard is a practical direct dialogue metho Assigning ta and reporting	Short exams, assignments, discussions
12	2 Theoreti 2 practical	Theoretical:b6 The student is able to identify the characteristics and determinants of drip irrigation, and estima the coefficient of consistency Practical: a13The student is able to appl water consumption equations	Theoretical: Drip irrigation Practical: Water consumption experimental metho	Theoretical: Chalkboard sty practical : Applications ir water consump n	Short exams, assignments, discussions
13	2 Theoreti 2 practical	Theoretical:a7 The student is able to know the types of trocars, vertical trocars, and the characteristics of op trocars Practical: a14Mathematical applications about t infiltration	Theoretical: Types of drain Practical: Estimat the Infiltration rate	Theoretical: Audio methods, blackboard Practical: Problems about calculating infiltration	Short exams, assignments, discussions
14	2 Theoreti 2 practical	Theoretical:b7 The student learns abo covered drain and what is the classification of dra according to the natu of their work Practical:a15 The student is able to iden what drainage	Theoretical: Covered drain Practical: drainage	Theoretical: The blackboard a direct dialogu style ical : gning tasks reporting	exams
15	2 Theoreti 2 practical	Theoreticalb8 By knowing the dista	Theoretical: Calculate the distan	Theoretical: Audio methods	Short exams, assignments,

		between the drain, the student will be able to know the depth of the drainage layer. Practical:a16 T student will be able understand open covered drain system	between the drain Practical: dr systems	style, blackboard practical : Display post for assignme and reports	discussions

11. Course Evaluation

	Evaluation	Time of evalution	Degree	Relative weight
1	Theoretical final report + practical experience reports	Theoretical week 15. Practical week 1-15	7Theoretical + 6Practical	13%
2	Quiz -1-	Week 3	4 Theoretical + 2 practical	6%
3 4	Midterm Exam	Week 9	10 theoretical + 5 practical	15%
5	Final practical test	Practical exams week	20%	20%
6	Final theoretical test	The week of theoretical exams	40%	40%
sum			100%	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Book on irrigation and drainage (Prof. Dr. La Khalil Ismail)
Main references (sources)	Irrigation, its basics and applications (Prof. Nabil Ibrahim and Prof. Dr. Issam Khader Hadithi)
Recommended books and references (scientific journals, reports...)	Mesopotamia Journal of Agriculture and Al-Anbar Journal of Agricultural Sciences
Electronic References, Websites	The World Health Organization, and the US Fo and Drug Administration.

م.د. احمد خير الدين عبد السلام

أ.م. د. يوسف يعقوب هلال
رئيس قسم المكائن والالات الزراعية

رئيس اللجنة العلمية
أ.د. عادل امر حيزران

Course Description Form

1. Course Name:
Sowing and fertilizing equipment
2. Course Code:
SOFE378
3. Semester / Year:
First semester (autumn)/2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Combined (Attendance + distance education)
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours (30 theoretical hours + 30practical hours) / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Yousif Yakoub Hilal Email: yousif. yakoub @uomosul.edu.iq Mahmood natiq Email: manatiq9 @uomosul.edu.iq
8. Course Objectives

Course Objectives	− Graduating agricultural engineers and researchers to serve the agricultural sector. - Scientific cooperation with agricultural directorates and other parties with the aim of improving agricultural production in quantity and quality. - Investing in modern technology in the field of sowing and fertilizing equipment in order to develop education, training and research programmed. - Qualifying students to work according to the modern production system that relies on computers and information technology to operate. - Preparing an advanced technical staff in the field of sowing and fertilizing equipment design to meet the needs of society.

9. Teaching and Learning Strategies	
theoretical: -Interactive lecture. -Brainstorming. -Dialogue and discussion. -Assigning tasks and reports	practical: Assigning the student to inspect the symptoms in sowing and fertilization equipment and the possibility of treating them within a specific period to reveal the student's skill ability. Assigning the student to calibrate and adjust sowing and fertilization equipment and ensure that its field performance requirements are met.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	a1: Explain the basics and principles of seed characteristics and seed technology	Physical and technical characteristics of seeds	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b1: Acquires the ability to explain the basics and principles of seed characteristics and seed technology	Basics and principles of seed traits and seed technology	Attendance, distance education, or video lectures	Discussions, quizzes and reports

2	2 Theoretical	a2: Understands new sowing methods	New sowing methods	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b2: Acquire skill in using new sowing methods	sowing methods	Attendance, distance education, or video lectures	Discussions, quizzes and reports
3	2 Theoretical	a3: Learn about the classification of new sowing equipment and methods	Principles adopted in classifying sowing equipment	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b3: Acquires skill in classifying new sowing equipment and methods.	Classification of new sowing equipment and methods	Attendance, distance education, or video lectures	Discussions, quizzes and reports
4	2 Theoretical	a4: understands the techniques of seed feeding mechanisms.	Seed feeding techniques	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b4: Acquires the skill in classifying seed feeding mechanisms	Classification of seed feeding mechanisms	Attendance, distance education, or video lectures	Discussions, quizzes and reports
5	2 Theoretical	a5: understands the use of sowing and planting equipment and methods	Techniques of feeding mechanisms for cultivation and sorting –farrows and tubes transporting seeds	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b5: Acquires skill in using feeding mechanisms for cultivation and sorting - farrows and tubes transporting seeds	Feeding mechanisms for cultivation and sorting – farrows and tubes transporting seeds	Attendance, distance education, or video lectures	Discussions, quizzes and reports
6	2 Theoretical	a6: understands sowing classification and modern methods of agriculture	Types of seedlings based on prose and underlining – Types of plantings on lines	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b6: Acquires skill in sowing classification and modern methods of agriculture	sowing classification and modern methods of agriculture	Attendance, distance education, or video lectures	Discussions, quizzes and reports
7	2 Theoretical	a7: understands the parts and components of Sowing equipment	Sowing equipment	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b7: Acquires the skill to describe the parts and components of Sowing equipment	Parts and components of Sowing equipment	Attendance, distance education, or video lectures	Discussions, quizzes and reports
8	2 Theoretical	a8: understands designing, manufacturing and managing seedlings in a way that develops the agricultural sector	Seedling techniques + Monthly exam 1	Questions that include leading topics	Class test
	2 Practical	b8: Acquires the skill in classifying, manufacturing and managing seedling equipment	Classification, manufacturing and management of seedling equipment + a monthly practical exam	Questions that include leading topics	practical test
9	2 Theoretical	a9: Identify the contents of sowing and fertilization	A field visit to sowing and fertilization equipment	A lecture by technicians in	Questions and reports

		equipment manufacturing workshops and specialized exhibitions	manufacturing workshops and specialized exhibitions	the repair shop	about the visit
	2 Practical	b9: The student is shown the contents of sowing and fertilization equipment manufacturing workshops and specialized exhibitions	Safety requirements in the circulation of contents of sowing and fertilization equipment manufacturing workshops and specialized exhibitions	A lecture by technicians in the repair shop	Questions and reports about the visit
10	2 Theoretical	a10: understands the parts and components of potato planters and rice seedlings	Parts and components of potato planters and rice seedling techniques	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b10: Acquires the skill in describing the parts and components of potato planters and rice seedlings	Parts and components of potato planters and rice seedlings	Attendance, distance education, or video lectures	Discussions, quizzes and reports
11	2 Theoretical	a11: Explains the basics and principles of the characteristics of organic fertilizer	Physical, chemical and technical characteristics of organic fertilizer	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b11: Acquires the ability to explain the characteristics of organic fertilizer	Organic fertilizer	Attendance, distance education, or video lectures	Discussions, quizzes and reports
12	2 Theoretical	a12: understands the types of fertilization equipment for organic fertilizer	Types of fertilization equipment for organic fertilizer	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b12: Acquires the skill in classifying new organic fertilization equipment and methods	Organic fertilization equipment and methods	Attendance, distance education, or video lectures	Discussions, quizzes and reports
13	2 Theoretical	a13: Clarifies the basics and principles of chemical fertilizer characteristics	Physical and technical characteristics of chemical fertilizer	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b13: Acquires the ability to explain the characteristics of chemical fertilizer	Chemical fertilizer	Attendance, distance education, or video lectures	Discussions, quizzes and reports
14	2 Theoretical	a14: understands the design and classification of new chemical fertilization equipment and methods	The engineering principles adopted in classifying fertilization equipment for chemical fertilizers	Attendance, distance education, or video lectures	Discussions, quizzes and reports
	2 Practical	b14: Acquires the skill in classifying new chemical fertilization equipment and methods	Organic fertilization equipment and methods	Attendance, distance education, or video lectures	Discussions, quizzes and reports
15	2 Theoretical	a15: understands the design of chemical fertilizer spreaders and soil application equipment	The technological process in spreading chemical fertilizers and equipment for applying fertilizer into the soil + monthly exam 2	Questions that include leading topics	Class test
	2 Practical	b15: Acquire skill in designing chemical fertilizer spreaders and equipment for applying fertilizer to the soil	Chemical fertilizer spreaders	Questions that include leading topics	practical test

11. Course Evaluation

Seq.	Evaluating style	date	marks	Relative weight
1	Final report: theoretical + practical	Theoretical: Week 13 Practical: week 13	7 theoretical + 6 practical	%13
2	Monthly test 1	Week:8	4 theoretical + 2 practical	%6
3	Monthly test 2	Week:15	10 theoretical + 5 practical	%15
4	Quizzes	Week:12	4 theoretical + 2 practical	%6
5	Final practical test	The week of the theoretical exam	20	%20
6	Final theoretical test	The week of the Practical exam	40	%40
	the total		100	%100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Seeding and planting equipment. Dr. Nateq Sabri.
Main references (sources)	Seeding and planting equipment. Dr. Nateq Sabri.
Recommended books and references (scientific journals, reports...)	Agricultural Engineering Manual. Dr. Abdul Muti Al-Khafaf
Electronic References, Websites	https://www.youtube.com + Agricultural Engineering website

Lecturer:

Asst.Prof. Yousif Yakoub Hilal

Lecturer :Mahmoud Natiq

Head of the Scientific Committee:
Professor Dr. Adil Ahmed Abdullah

Head of the Agricultural Machines and Equipment Department:

Asst.Prof. Yousif Yakoub Hilal

Course Description Form-Soil Preparation Equipment

1. Course Name:
Soil Preparation Equipment
2. Course Code:
SOPE377
3. Semester / Year:
first semester 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Combined (Attendance + distance education)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours +30 practical hours =60 hours \ 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: prof. dr. Adel Ahmed Abdullah Email: dr.adil.aa@uomosul.edu.iq **Ahmed Mohammad Ameen Saeed Email: ahmed_ameem@uomosul.edu.iq**
8. Course Objectives
1- Explaining the basics and principles of engineering sciences and their applications in the field of soil preparation equipment **2- Gaining knowledge in improving soil treatments and preparing it with machines in a way that suits agricultural reality and development** **3- The ability to develop modern soil preparation systems in line with the general trend in production and the requirements of human resources capable of dealing with those systems**
9. Teaching and Learning Strategies
1-Interactive lecture **2-Brainstorming** **3-Dialogue and discussion** **4-Field Training** **5-Practical exercises** **6-Field project** **7-Self-education**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	a1 knows the importance of soil and its types and knows the types of tillage	Importance, types of soils, and types of tillage	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2Practical	c3 tests the technological properties of the soil a2 classifies types of soil preparation equipment	Technological characteristics of the soil and their impact on tillage operations and types of tillage Classification of tillage equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
2	2 theoretical	a1 knows what the mold board plow is and its parts, and remembers its features a5 distinguishes its types	Mold board plow Types features_ parts	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	c3 tries and tests the mold board plow in the field c2write a report on the mold board plow	Applications, regulations, and field experiments on the mold board plow	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
3	2 theoretical	a1 knows what a disc plow is and its parts, and remembers its features a5 distinguishes its types	disc plow Types - features - parts	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	c3 trials and tests a disc	Applications,	Interactive lecture,	Short daily test1

		plow in the field c2write a report on the disc plow	**regulations, and field experiments on the disc plow**	**brainstorming, dialogue and discussion, field training, and self-learning**	**Semester test1 Final test**
4	**2 theoretical**	**a1 knows what a vertical disc plow is and its parts, and remembers its features a5 distinguishes its types**	**Vertical disc plow - types - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests a vertical disc plow in the field c2write a report on the vertical disc plow**	**Applications, regulations,and field experiments on the Vertical disc plow**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
5	**2 theoretical**	**a1 knows what a chisel plow is and its parts, and remembers its features a5 distinguishes its types**	**Chisel plow - types - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests the chisel plow in the field c2writes a report on the chisel plow**	**Applications, regulations,and field experiments on the The chisel plow**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
6	**2 theoretical**	**a1 knows what a rotary plow is and its parts, and remembers its features a5 distinguishes its types**	**Rotary plow - types - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests the rotary plow in the field c2write a report on the rotary plow**	**Applications, regulations,and field experiments on the Rotational plow**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
7	**2 theoretical**	**a1 knows what subsoil plow is and its parts, and remembers its features a5 distinguishes its types**	**Subsoil plow (mulching and maintenance plow) - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests the subsoil plow in the field c2write a report on the subsoil plow**	**Applications, regulations,and field experiments on the subsoil plow**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
8	**2 theoretical**	**a1 knows what a plow or undercutting hoe is and its parts, and remembers its features a5 distinguishes its types**	**Undercut plow or hoe - types - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests the plow or the sub-cutting hoe in the field c2 writes a report on the plow or the undercut hoe**	**Applications, regulations,and field experiments on subsoiler shear joints**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
9	**2 theoretical**	**a1 knows the types of combs and their parts and remembers their features harrows a5 distinguishes its types**	**Disc, crawler, and toothed combs - types - features - parts**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	2 Practical	**c3 tries and tests types of harrows in the field c2write a report on the types of combs**	**Applications, regulations, and field experiments on combs of all kinds**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
10	**2 theoretical**	**a1: Identifying the operation Rollers and graders and Land and land-leveling machines using laser technology**	**Rollers and graders and Land-Leveling Machines – Application of Operational Mechanisms Using**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**

		based on artificial intelligence and GPS for agricultural fields. a5: Distinguishes their type a5 distinguishes its types	Artificial Intelligence		
	2 Practical	c3 tries and tests graders and graders in the field c2 writes a report on rollers and graders	Applications, regulations, and field experiments on rollers and graders	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
11	2 theoretical	a1 knows what planning machines and their parts are and remembers their features a5 distinguishes its types	Planning machines and compound machines - types - features - parts	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	c3 tries and tests plotting machines in the field c2writes a report on plotting machines	Applications and organization of field experiments on planning machines	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
12	2 theoretical	a1 knows what the mechanical assembly of soil preparation machines and its parts is and remembers its advantages a5 distinguishes its types	Mechanical assembly of preparation machines Soil and its systems	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	c3 experiments and tests the mechanical assembly of soil preparation machines in the field c2 write a report on the mechanical assembly of soil preparation machines	Applications, regulations, and field experiments on mechanical assembly machines	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
13	2 theoretical	c1 calculates field productivity and field efficiency of soil preparation equipment	Calculating the process productivity and field efficiency of initializing machines the soil	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	a3 solves mathematical problems about field productivity and field efficiency	Solve mathematical problems on how to calculate field productivity and field efficiency	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
14	2 theoretical	c1 calculates the capacity and sliding requirements of soil preparation equipment	Calculating the power, sliding, and (floating and soil compaction) requirements for soil preparation machines	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	2 Practical	a 3 solves calculation problems about capacity requirements and sliding of soil preparation equipment	Solve mathematical problems on how to calculate power and slip requirements with field experiments	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
15	2 theoretical	a1 knows the importance	The importance of	Interactive lecture,	Short daily test1

		of maintaining and maintaining soil preparation equipment	maintenance and maintenance - storing soil preparation machines	brainstorming, dialogue and discussion, self-learning	Semester test1 Final test
	2 Practical	c4 inspects machinery in the field c3 is trying to perform maintenance operations and perpetuate	Educational field applications for how to maintain, sustain, and store soil preparation machines	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test

10. Course Evaluation				
Seq.	Evaluating style	date	marks	Relative weight
1	Home reports	every week	10	10%
2	Short tests	every week	10	10%
3	Semester test 1	The seventh week	10	10%
4	Semester test 2	The final week	10	10%
5	Final practical test	End of the course	20	20%
6	Final theoretical test	End of the course	40	40%
	the total		100	100%

11. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Tillage equipment
Main references (sources)	FARM MACHINERY AND EQUIPMENT
Recommended books and references (scientific journals, reports...)	ELEMENTS of Agricultural Machinery
Electronic References, Websites	https://www.youtube.com

مدرس المادة العملي
م. احمد محمد امين

مدرس المادة النظري
أ.د. عادل أحمد عبدالله

رئيس قسم المكائن والآلات الزراعية
أ.م.د. يوسف يعقوب هلال

رئيس اللجنة العلمية
أ.د. عادل أحمد عبدالله

Course Description Form

1. Course Name:
Animal Production Mechanization
2. Course Code:
ANPM224
3. Semester / Year:
First Semester Autumn 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Physical & Electronic
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theory and 4 hours of practical, for 15 weeks, making a total of 90 hours / 4 units
7. Course administrator's name (mention all, if more than one name)
Name of Lecturer for Theory part: Dr. Rafea Abdulsattar Mohammed Email: rafea-machine@uomosul.edu.iq Name of Lecturer for practical part: Mr. Othman Muayyad Muhammad Tawfiq Email: Othman.mmt@uomosul.edu.iq
8. Course Objectives
Course Objectives
Theoretical - The student understands the importance of livestock and their mechanization. - The student must be familiar with the concept of the operation of all equipment and machines used in animal shelters. - The student should be able to invest agricultural machinery and equipment in promoting animal products - The student must be able to manage and supervise the farm.
Practical - The student should be familiar with the methods of operating and maintaining equipment and machinery in animal pens. - The student should be aware of the risks to which he is exposed when using machines in barns. - The student must be able to carry out all experiments and special work on equipment and machines in animal pens. - The student must be fully aware of the responsibility of maintaining the farm and the processes necessary for that. - The student must have practical experience in managing animal pens and investing in the farm in the best possible way.
9. Teaching and Learning Strategies
Strategy

Strategy theory part	- Effective lectures - Brainstorming - Dialogue and discussion

	- Assigning tasks and reporting - Displaying real models of orchard mechanization equipment and machines
Strategy practical part	- Assigning group work to reveal leadership skills - Assigning individual tasks to reveal personal skills - Assigning reports on practical experiments and field tasks

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	a1: Identify the types of animal pens according to the type of animal or type of breeding	Animal barns and breeding systems	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Assigned a task
	4 practic	b1: Examination of the soil in which the farm or animal pens will be constructed b3: Check the water available on site	Site selection requirements	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
2	2 Theoretical	a1: Identify harmful gases in the barn a1: Identify the mechanisms of expelling gases and humidity and ventilating the barn	Controlling environmental conditions in barns (ventilation)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining the ventilation fan c1: Fan discharge calculation	Determine and calculate ventilation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
3	2 Theoretical	a1: Identify the idea of the cooling system a1: Identify the mechanisms for cooling the barn atmosphere	Controlling environmental conditions in barns (cooling)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining cooling systems c1: Discover the cooling efficiency of cooling systems	Operating and maintaining cooling systems	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
4	2 Theoretical	a1: Identify the concept of heating a1: Identifying the mechanisms for heating the atmosphere or floor of the barn	Controlling environmental conditions in barns (heating)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining heating systems	Operating and maintaining heating systems	Interactive lecture, brainstorming, dialogue and	Assign an assignment and a short test

		b1: Examination temperatures in the barn		discussion, field training, and self-learning	
5	2 Theoretical	a1: Identify water sources and pumps and Identify tanks, transportation pipes, drinking water nozzles, and drippers	Mechanization of water supply	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Practice operating the water pumping station on the farm b1: Maintenance of the water pumping station	Problems and maintenance of the water pumping station to the farm	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
6	2 Theoretical	a1: Calculate the amount of water needed for the farm	Calculating the water need on the farm	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	c1: Discover the calculation of water needs on the farm	Calculating the water need on the farm	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
7	2 Theoretical	a1: Identifying the types of feeders according to the types of breeding systems or animal pens, and understanding the working principle of dry feed and silage feeding mechanisms.	Feeders and feed presenting equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Training to operate feed presenting equipment b1: Discover the feed serving equipment	Operating and maintaining feed serving equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
8	2 Theoretical	a1: Identify the idea of working waste disposal mechanisms inside barns and Identify means and mechanisms for storing and treating waste and deploying them in the field	Removal equipment of Animal manure	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Practice operating waste disposal equipment c4: Apply waste abatement calculations and practice equipment maintenance	Operating and maintaining manure disposal equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
9	2 Theoretical	a1: Identify the concept of shearing wool and	Mechanization of wool shearing	Interactive lecture,	Semester test And a short test

		Identify the types of wool shearing machines		brainstorming, dialogue and discussion, self-learning	
	4 practical	b1: Examination the operating and maintaining wool shearing equipment	Operating and maintaining wool shearing equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Semester test And a short test
10	2 Theoretical	a1: Identify the concept of extracting milk from the udder and Identify the stages of milking a cow	Automated milking and cow milking	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Practice operating and maintaining the milking machine	Operating and maintaining the milking machine	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
11	2 Theoretical	a1: Identify the types of milking systems and milking halls	Milking systems and milking halls	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining milking halls	Operation and maintenance of milking halls	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
12	2 Theoretical	a1: Identifying the conditions for preparing eggs for hatching and the types of hatcheries and incubators	Egg hatchery equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining hatcheries and chick incubators	Operating and maintaining hatcheries	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
13	2 Theoretical	a1: Identify the mechanisms of collecting and detecting table eggs and packaging equipment	Egg handling and transportation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Assignment of a report discussions assignment and a short test
	4 practical	b1: Examination the operating and maintaining egg transport and handling equipment	Operating and maintaining table egg transport and handling equipment	Interactive lecture, brainstorming, dialogue and discussion, field	Assignment of a report discussions assignment and a short test

				training, and self-learning	
14	2 Theoretical	a1: Identifying the mechanisms and stages of poultry reflux and Identifying the mechanisms and stages of livestock slaughter	Slaughtering and handling of meat	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Practice operating animal island equipment b1: Examination the operating meat handling and processing equipment	A visit to the typical Mosul massacre	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
15	2 Theoretical	a2: Acquaint about equipment for cooling and preserving animal products	Cooling and preserving animal products	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	4 practical	b1: Examination the operating and maintaining equipment for cooling and preserving animal products	Operating and maintaining equipment for cooling and preserving animal products	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Discussions and a short test

11. Course Evaluation

Theoretical evaluation method	evaluation date	evaluation degree
Monthly test	Week 9	10 %
Quiz	Weeks 1-15	10 %
Report	Week 13	5 %
total	25 %	
Practical evaluation method	evaluation date	evaluation degree
Monthly test	Week 9	5 %
Quiz and assignment	Weeks 1-15	2 + 3 = 5 %
Report	Week 13	5 %
total	15 %	
Theoretical + practical semester endeavor (25+15)	After 15 week	40 %
Final practical exam	20 %	20%
Final Theoretical exam	40 %	40%
Final degree	100 %	100 %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Al-Naama, Muhammad Jassim (1990) Mechanization of Animal Production, Mosul University Press. Iraq
Main references (sources)	Azza, Abdul Salam and Tawfiq Fahmi (1900)

	Animal production mechanization equipment, Baghdad University Press. Iraq Stout, Bill A. (1990) CIGR Handbook of Agricultural Engineering, Volume III, *ASAE*, USA.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Food and Agriculture Organization FAO

Teacher of Theoretical part
Dr. Rafea Abdulsattar Mohammed-nori

Chairman of the Scientific Committee
prof. Dr. Adel
7/12/2025

Teacher of Practical part
Mr. Othman Muayyad Muhammad Tawfiq

Head of agricultural machines and Equipment
Dr. Yousif Yakoub Khalil

Course Description Form

1. Course Name:
Fluid Mechanics
2. Course Code:
FLME79
3. Semester / Year:
first semester 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Combined (Attendance + distance education)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours +60 practical hours =90 hours / 4 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Mohammad Ameen Saeed Email:ahmed_ameem@uomosul.edu.iq **Gazwan Ahmed Dahham Email: ghazwanagr@uomosul.edu.iq**
8. Course Objectives
1- Introducing the student to how to use conversion tables (energy, pressure, mass, momentum...) And use it in designs, analyses, and flow sciences **2- Increasing the student's knowledge of how pressure occurs and knowing the types and measuring devices** **3- Study losses in pipes and curves and develop correct designs for drainage in pipes** **4- The student's understanding, complete knowledge, and familiarity with the subject of pumps, their types and parts, how they work and operate, finding their costs and pressures, and the ability necessary for that.**
9. Teaching and Learning Strategies
1-Interactive lecture **2-Brainstorming** **3-Dialogue and discussion** **4-Field Training** **5-Practical exercises** **6-Field project** **7-Self-education**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	a1 knows the meaning of fluid, fluid properties, fluid mechanics, and standard units used to study fluids	Definition of fluid and its relationship to fluid mechanics and fluid properties	Interactive lecture, brainstorming, dialogue and discussion, self-learning	test1 Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about the properties of fluids	Definition of fluid and its relationship to fluid mechanics and fluid properties	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
2	2 theoretical	a2 learns about the meaning of pressure, pressure units, and atmospheric pressure, as well as the basic equations of fluid balance	Hydrostatics (the science of fluid balance)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	test1 Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about hydrostatics (the science of fluid balance)	Hydrostatics (the science of fluid balance)	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
3	2 theoretical	c1 enumerates the types of pressure gauges and knows how each type works	Pressure measuring devices	Interactive lecture, brainstorming, dialogue and discussion, self-learning	test1 Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about pressure measuring devices	Pressure measuring devices	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-	test1 Final test

				learning	
4	**2 theoretical**	**a5 the student distinguishes the laws and equations related to the forces acting on flat and inclined curved surfaces of liquids**	**Forces acting on surfaces due to static fluid pressure**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**test1 Final test**
	4 Practical	**c4the student conducts experiments a3 it solves mathematical problems about the forces acting on surfaces in the case of a static fluid**	**Forces acting on surfaces due to static fluid pressure**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**test1 Final test**
5	**2 theoretical**	**a2 the student learns about the equilibrium conditions for a body completely or partially immersed in a liquid**	**Equilibrium of submerged and floating bodies in a liquid (conditions of equilibrium)**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 test1 Final test**
	4 Practical	**c4the student conducts experiments a3 and solves mathematical problems about the balance of submerged bodies**	**Equilibrium of submerged and floating bodies in a liquid (conditions of equilibrium)**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Semester test1 Final test**
6	**2 theoretical**	**a2the student understands the classifications of flow types for fluids and how to derive the continuity equation for fluid flow**	**Fluid flow, flow classification, and continuity equation**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**test1 Final test**
	4 Practical	**c4the student conducts experiments a3 and solves mathematical problems about types of flow and the continuity equation for flow**	**Fluid flow, flow classification, and continuity equation**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**test1 Final test**
7	**2 theoretical**	**a1 the student knows the derivation of bernoulli's equation and its practical applications**	**Fluid flow and Bernoulli's equation**	**Interactive lecture, brainstorming, dialogue and**	**test1 Final test**

				discussion, self-learning	
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about the bernoulli equation and its applications	Fluid flow and Bernoulli's equation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
8	2 theoretical	c2 the student benefits from machines and devices that work on applications of the momentum equation	Principles of momentum	Interactive lecture, brainstorming, dialogue and discussion, self-learning	test1 Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about the momentum equation for steady flow and its applications	Principles of momentum	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
9	2 theoretical	a2 the student learns how to find the reynolds number and how to use the darcy equation	The flow of liquid in pipes, Reynolds' experiment, and Darcy's equation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	test1 Final test
	3 Practical	c4the student conducts experiments a3 solves mathematical problems about the reynolds number and the darcy equation	The flow of liquid in pipes, Reynolds' experiment, and Darcy's equation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
10	2 theoretical	a4the student explains how to find the marginal roughness coefficient for pipes and the coefficient of friction for types of flow	Fluid flow and study of losses through pipes due to friction	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test2 test1 Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about the coefficient	Fluid flow and study of losses through pipes due to friction	Interactive lecture, brainstorming, dialogue	Semester test1 Final test

		of friction and marginal roughness		**and discussion, field training, and self-learning**	
11	**2 theoretical**	**c1 the student enumerates the laws and equations related to the various losses resulting from flow in pipes**	**Fluid flow and study of losses through pipes**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**test1 Final test**
	4 Practical	**c4the student conducts experiments a3 and solves mathematical problems about charge loss as a result of flow in its various states**	**Fluid flow and study of losses through pipes**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**test1 Final test**
12	**2 theoretical**	**a1 the student knows the laws for equivalent pipe and tank emptying**	**Flow in a pipeline**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**test1 Final test**
	4 Practical	**c4the student conducts experiments a3 solves mathematical problems about flow in a pipeline**	**Flow in a pipeline**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**test1 Final test**
13	**2 theoretical**	**a2the student understands and knows the principles used in classifying pumps in general and centrifugal pumps in particular**	**Types of pumps and centrifugal pumps**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**test1 Final test**
	4 Practical	**c4the student conducts experiments a3 and solves mathematical problems about the velocity trigonometry diagram of a centrifugal pump**	**Types of pumps and centrifugal pumps**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**test1 Final test**
14	**2 theoretical**	**a2 the student understands**	**Performance of centrifugal**	**Interactive**	**test1**

		everything related to the performance and operation of centrifugal pumps	pumps	lecture, brainstorming, dialogue and discussion, self-learning	Final test
	4 Practical	c4the student conducts experiments a3 and solves mathematical problems about the performance of centrifugal pumps	Performance of centrifugal pumps	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	test1 Final test
15	2 theoretical	a2 the student understands and knows the types of positive displacement pumps, their operation and performance	Positive displacement pumps (reciprocating and rotary)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test3 test1 Final test
	4 Practical	c4 the student conducts experiments and solves mathematical problems a3 about positive displacement pumps	Positive displacement pumps (reciprocating and rotary)	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Semester test1 Final test

11.Course Evaluation

Seq.	Evaluating style	date	marks	Relative weight
1	Home reports	Every5 weeks	10	10%
2	Short tests	every 5weeks	10	10%
3	Semester test 1	The seventh week	10	10%
4	Semester test 2	The final week	10	10%
5	Final practical test	End of the course	20	20%
6	Final theoretical test	End of the course	40	40%
	the total		100	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**1- ميكانيك الموائع الدكتور ياسين هاشم الطحان و المهندس عبد الصابر ابراهيم بكر/جامعة الموصل 1990**
Main references (sources)	**ميكانيك الموائع وتطبيقاتها الهندسية , روبرت ل.دوجرتي وجوزيف ب.فرانزيني . دار ماكروهيل للنشر1977**
Recommended books and references (scientific journals, reports...)	**1- ميكانيكا الموائع والهيدروليكا , رينالد ف.جايلز . دار ماكروهيل للنشر 1977** **2-ميكانيك الموائع ترجمة الدكتور نبيل زكي مرقص و الدكتور فوزي HFVHIDL صادق/ 1984** **3-Hydraulics and fluid Mechanics .Dr.P.N.Mody ,M.SETH,17th edition .2009**
Electronic References, Websites	**https://www.youtube.com**

مدرس المادة العملي

م.غزوان أحمد دحام

رئيس قسم المكائن والآلات الزراعية

أ.م.د.يوسف يعقوب هلال

مدرس المادة النظري

م.أحمد محمدأمين سعيد

رئيس اللجنة العلمية

أ.د. عادل أحمد عبدالله

Course Description Form

1. Course Name:
Agricultural Buildings
2. Course Code:
AGBU480
3. Semester / Year:
Autum/2025-2026
4. Description Preparation Date:
1st Sep. 2025
5. Available Attendance Forms:
Attendance + electronic
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours (2hours theoretical +2 hours practical) / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Khalid E. Ahmed Email: khalid.allaf@uomosul.edu.iq Ammar Wael Saleh Email: ammarwael1800@uomosul.edu.iq
8. Course Objectives
The learner should be able to define the concept of buildings and the information that must be available for their optimal design **• Choosing the appropriateness of the factors affecting the planning and coordination of agricultural buildings** **• Differentiate between different planning systems and the appropriate ones** **• Distinguishing between types of buildings and their sections according to the purpose for which those buildings were built** **• Familiarity with the information the designer needs and what is available to him to construct buildings** **• The designer's awareness of the factors affecting agricultural buildings**
9. Teaching and Learning Strategies

Strategy	-Interactive lecture -Brainstorming - Dialogue and discussion -Field Training - Practical exercises - Field project

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2 theoretical	A6,B1 the student learns about agricultural buildings	introduction to agricultural buildings	the audio-visual method uses the date show	quiz and midterm exam
	2practical	A9 the student uses building distributio n methods	distribution of buildings according to the united circles method	the audio-visual method uses the date show	quiz and midterm exam
2	2 theoretical	A6,C1 the student learns the basics of constructin g agricultural buildings	basics of building construction	the audio-visual method uses the date show	quiz and midterm exam
	2practical	A32 the student uses building distributio n methods	distribution of buildings according to wind direction	the audio-visual method uses the date show	quiz and midterm exam
3	2 theoretical	B32 the student learns about the types of thermal insulation	thermal insulation	the audio-visual method uses the date sho	quiz and midterm exam
	2practical	B1 the student learns to use	thermal insulation	the audio-visual method uses the date show	quiz and midterm exam

		isolation			
4	2 theoretical	A13,B32 the student proposes a building plan	construction plan	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B39, the student learns about the building plan	construction plan	the audio-visual method uses the date show	quiz and midterm exam
5	2 theoretical	A32, the student enumerates the types of barns	types of barns		quiz and midterm exam
	2practical	B32, the student sees the types of barns	types of barns	the audio-visual method uses the date show	quiz and midterm exam
6	2 theoretical	B32,C23, the student recognizes the type of barn	barns with cubic	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B32 the student controls the dimensions of the bed according to the type	barns with cubic	the audio-visual method uses the date show	quiz and midterm exam
7	2 theoretical	A35,B39 the student calculates the dimensions of the barn	dimensions of barns with cubic	the audio-visual method uses the date show	quiz and midterm exam
	2practical	C24, the student	dimensions of barns with	the audio-visual method	quiz and midterm

		controls the dimensions of the bed according to the type	cubic	uses the date show	exam
8	2 theoretical	B32, the student calculates the dimensions of the cubic	calculating the dimensions of the shrine	the audio-visual method uses the date show	quiz and midterm exam
	2practical	C24, the student controls the dimensions of the bed according to the type	calculating the dimensions of the shrine	the audio-visual method uses the date show	quiz and midterm exam
9	2 theoretical	A35, the student identifies the type of barn	multi-section barns	the audio-visual method uses the date show	quiz and midterm exam
	2practical	C24, the student controls the dimensions of the bed according to the type	multi-section barns	the audio-visual method uses the date show	quiz and midterm exam
10	2 theoretical	A35, the student identifies the components of the barn	cow barns with stalls	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B32 the student mentions	cow barns with stalls	the audio-visual method uses the	quiz and midterm exam

		the components of the barn		date show	
11	2 theoretical	A35, the student knows the components of a barn	sheep pens	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B32, the student plans the barn	sheep pens	the audio-visual method uses the date show	quiz and midterm exam
12	2 theoretical	B32 the student is familiar with the methods of constructing protected buildings	Smart green house	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B32 the student chooses the layout of the greenhouse	Using Arduion in green house	the audio-visual method uses the date show	quiz and midterm exam
13	2 theoretical	B32, the student understands treatment methods	waste management in farm	the audio-visual method uses the date show	quiz and midterm exam
	2practical	B32, the student plans treatment methods	waste management in farm	the audio-visual method uses the date show	quiz and midterm exam
14	2 theoretical	B32 the student masters waste disposal methods	waste management in farm	the audio-visual method uses the date show	quiz and midterm exam

	2practical	B32 the student distinguishes the types of tanks and treatment methods	waste management in farm	the audio-visual method uses the date show	quiz and midterm exam
15	2 theoretical	B32, the student prepares a report	a field visit	the audio-visual method	seminar
	2practical	B32, the student prepares a repor	A field visit	The audio-visual method	Seminar

1. Course Evaluation				
No.	Test type	date	grade	Rate
1	Theoretical + practical report	Week 15	5 theoretical +5 practical	10%
2	Theoretical quiz + practical quiz	Week 1- 14	Theoretical 2.5 +2.5 practical	5%
3	Midterm Exam (Theoretical+Practical)	Week 8	17.5 theoretical +7.5practical	25%
4	Final Theoretical Examination	Final term examination	40	40%
5	Final Practical Examination	Final term examination	20	20%
	Summation		100	100%

2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Diary freestall housing and equipment housing design for cattle Farm Builbing Design House Agricultural Waste Managemen Systems Free Stall Design Housing Design For Cattle

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

مدرس المادة العملي

م.م. عمار وائل صالح

رئيس القسم

أ.م.د. يوسف يعقوب هلال

مدرس المادة

م.خالد عصام احمد

رئيس اللجنة العلمية

أ.د. عادل احمد عبد الله

Course Description Form

1. Course Name:
Computer applications4
2. Course Code:
COMA403
3. Semester / Year:
Autumn semester / 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Blended learning (Attendance + Electronic)
6. Number of Credit Hours (Total) / Number of Units (Total):
2 hours/2 units
7. Course administrator's name (mention all, if more than one name)
Name: Najla Matti Isaac Email: najla.matti@uomosul.edu.iq
8. Course Objectives

Course Objectives	• **Enable the student to become familiar with the SAS statistical program and its applications in agricultural experiments.** • **Enable the student to know and understand programs in the SAS language and apply the steps and procedures followed to use the SAS statistical program in analyzes of agricultural experiments.** • **Enabling the student to write programs in the SAS language for various agricultural and scientific experiments.** • **Providing the student with the skills of dealing with data types when writing programs in the SAS language.** • **Enabling the student to correct grammatical and linguistic errors that appear when implementing programs written in the SAS language** • **Enable the student to read, understand and interpret the results and outputs of implementing programs written in SAS.**

9. Teaching and Learning Strategies	
Strategy	1. Applying modern strategies for education. 2. Providing learners with many different skills and knowledge. 3. Increase students' ability to learn. 4. Diversity in methods and implementation of the curriculum in the teaching process, taking into account individual circumstances, abilities and potentials of learners. 5. Learning and teaching are carried out according to the latest self-education tools using computers and through modern programs in the fields of education. 6. Use effective modern teaching strategies that help all types of students participate in educational materials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 practical	The student should be able to know and understand the nature and objectives of the SAS program and the tools necessary to analyze the data available in the program.	What is the SAS program - storing and retrieving information - modifying and programming data - writing reports - statistical analysis - processing records	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
2	2 practical	The student should be able to know and understand SAS windows and practical application therein	SAS windows - writing and loading the program window - program execution steps window - results window. Who uses SAS software? Why SAS	Lectures, audio materials, reports, and images with practical application of exercises and experiments	Exams, reports, discussions, quizzes

				using the SAS program	
3	2 practical	The student should be able to know, understand and practically apply the general steps for writing a SAS program.	General steps for writing a SAS program.	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
4	2 practical	The student should be able to know, understand, and practically apply the use of functions, their importance, and formulas for using them in writing a program in the SAS language.	Functions	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes Exams, reports, discussions, quizzes
5	2 practical	The student should be able to know, understand and practically apply to create new data from the input data set using mathematical operations or functions and the formulas for using them in writing a program in the	Create new data from an input data set using mathematical operations or functions.	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes

		SAS language.			
6	2 practical	The student should be able to know, understand and practically apply to generate statements using IF conditionals. The use of conditional statements to delete data from the data set and the formulas for using them in writing a program in the SAS language	- Generate data using IF conditional statements. - Using conditional statements to delete data from the data set in the program + scientific visit.	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
7	2 practical		Semester exam 1	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
8	2 practical	The student should be able to know, understand, and practically apply sorting and arranging data and the formulas used in writing a program in the SAS language.	- Sorting and arranging data Use the PROC SORT statement	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
9	2	The student	- Applications in	Lectures,	Exams,

	practical	should be able to know, understand and practically apply to find one-way and two-way frequency distribution tables and the formulas for using them in writing a program in the SAS language.	descriptive statistics - One-way frequency distribution table - Two-way frequency distribution table PROC FREQ	audio materials, reports, and images with practical application of exercises and experiments using the SAS program	reports, discussions, quizzes
10	2 practical	The student should be able to know, understand, and practically apply measures of averageness and dispersion and formulas for using them in writing a program in the SAS language.	-Measures of mediation and measures of dispersion. PROC MEANS	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
11	2 practical	The student should be able to know, understand and practically apply T-test formulas to use in writing a program in the SAS language	- Test of means and analysis of variance - t-test	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	
12	2 practical	The student should be able to know,	- Analysis of variance formula PROC ANOVA-	Lectures, audio materials,	Exams, reports, discussions,

		understand and practically apply the analysis of variance table and formulas to use in writing a program in the SAS language	- PROC GLM	reports, and images with practical application of exercises and experiments using the SAS program	quizzes
13	2 practical		Semester exam 2	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
14	2 practical	The student should be able to know, understand and practically apply to find the correlation coefficient and the formulas used in writing a program in the SAS language	PROC CORR correlation coefficient formula	Lectures, audio materials, reports, and images with practical application of exercises and experiments using the SAS program	Exams, reports, discussions, quizzes
15	2 practical	The student should be able to know, understand and practically apply to find the regression equation and the formulas for	PROC REG REGRESSION FORMULA	Lectures, audio materials, reports, and images with practical application of exercises and experiments	Exams, reports, discussions, quizzes

		using it in writing a program in the SAS language		using the SAS program	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	A curriculum was prepared by computer professors at the college based on the SAS software guide.
Main references (sources)	- SAS software guide - A Handbook of Statistical Analyses using SAS. (authors: Geoff Der and Brian S. Everitt) Data analysis using the SAS statistical program, written by Dr. Firas Rashad Al-Samarrai
Recommended books and references (scientific journals, reports…)	Statistical analysis using the SAS package, prepared by: Abdullah Al-Shahrani
Electronic References, Websites	https://www.sas.com/en_sg/training/offers/free-training.html https://video.sas.com/detail/videos/how-to-tutorials https://www.udemy.com/course/sas-programming-for-beginners https://sascrunch.com/courses/sas-base-programming-for-absolute-beginners-free-version/

مدرس المادة: نجلاء متي اسحق

رئيس القسم: أ.م.د. يوسف يعقوب هلال

/ ١٢

رئيس اللجنة العلمية:

أ.د. عادل [illegible]

Course Description Form For Maintenance and Repair of Tractors

1. Course Name:
Maintenance and Repair of Tractors
2. Course Code:
MART475
3. Semester / Year:
1st semester (4th class) 2025-2026
4. Description Preparation Date:
1 – 9 – 2025
5. Available Attendance Forms:
Physical & Electronic
6. Number of Credit Hours (Total) / Number of Units (Total)
90 hr (2-4 hours) / 15 weeks (4) units
7. Course administrator's name (mention all, if more than one name)
Assistant Prof. Dr. Montaser Khairie Hussain Assistant Lecturer. Ammar Wael Saleh Email: montaser.hussain@uomosul.edu.iq ammarwael1800@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Focus on safety standards during work to avoid accidents and ensure a safe working environment. • Teach students how to assess and understand the reasons for engine consumption and the wear of other components, and how this affects the efficiency of agricultural machinery. • Provide students with the necessary knowledge for performing effective routine maintenance to prolong the lifespan of agricultural tractors and associated equipment. • Learn detailed inspection and fault detection methods, including using appropriate techniques and tools to identify problems in different tractor parts. • Equip students with the skills to repair and maintain complex components such as the crankshaft, engine head, pistons, cylinders, and fuel system. • Learn how to inspect and maintain cooling and lubrication systems to avoid malfunctions that can lead to significant engine damage. • Develop the knowledge and skills needed to identify and repair problems in the transmission system and power transfer units, which are essential to the operational efficiency of agricultural tractors. • Provide opportunities for students to apply their knowledge in practical workshop environments to enhance their practical skills and readiness for industry participation after graduation.
9. Teaching and Learning Strategies	
Strategy	• Project-Based Learning (PBL): Assign students practical projects that simulate real problems in tractors and agricultural equipment, enabling them to apply theoretical knowledge in practical scenarios. • Collaborative Learning: Encourage students to work in groups to solve problems and complete projects. • Use of Technology: Employ technological tools such as virtual reality to visualize malfunctions and repairs or internet videos to design and modify spare parts. • Simulation and Experiments: Use simulation tools to train students on educational models before transitioning to actual equipment. • Hands-on Training On-Site: Provide opportunities for students to work in workshops or receive field training to face and handle challenges. • Continuous Formative Assessment: Regularly assess students through practical exams, quizzes, and term evaluations to monitor progress and provide immediate feedback. • Self-Learning and Research: Encourage students to research and read independently about the latest technologies and practices in maintenance and repair.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Students will be able to apply appropriate safety standards in the workplace, recognize potential hazards, and avoid injuries during repair operations.	**Safety During Repair**	Interactive lecture, discussion	Knowledge testing
	4	Conduct a workshop training session on using personal protective equipment and safety procedures.			

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	2	Students will understand the reasons for engine wear and learn how to implement routine maintenance programs to extend engine life.	**Engine Wear and Routine Maintenance**	Interactive lecture, dialogue, discussion, observation	True/False Test
	4	Train students to conduct routine engine inspections and assess its condition to identify early signs of wear.			
3	2	Students will learn to use various inspection and diagnostic methods to identify machines and agricultural equipment faults.	**Inspection and Fault Detection Methods**	Interactive lecture, discussion	True/False Test
	4	Practice using modern diagnostic tools to identify faults in engines and mechanical systems.			
4	2	Students will develop an understanding of how to design, organize, and manage repair workshops for tractors and agricultural equipment.	**Tractor Repair Workshops**	Interactive lecture, discussion	Report writing
	4	Organize a visit to a repair workshop to observe work organization and the techniques used.			
5	2	Students will learn to identify factors that reduce engine efficiency and how to address them.	**Causes of Reduced Engine Efficiency**	Interactive lecture, discussion	Report discussion
	4	Observe experiments on engines operating at different efficiencies to examine and analyze the possible causes of reduced efficiency.			
6	2	Students will learn to inspect and repair the crankshaft and engine block head.	**Crankshaft Inspection and Repair, Engine Block Head Inspection and Repair**	Interactive lecture, discussion	True/False Test
	4	Dismantle and reassemble the crankshaft and engine block head in the lab, focusing on inspecting the parts and how to repair them.			
7	2	Midterm Exam (Theoretical + Practical)			
	4				
8	2	Learn how to open, inspect, and repair engine pistons and cylinders.	**Piston and Cylinder Opening, Inspection, and Repair**	Interactive lecture, discussion	True/False Test
	4	Conduct dismantling of the piston and cylinders to inspect them for damage and discuss repair methods.			
9	2	Students can inspect piston rings, repair them, and install them correctly.	**Piston Rings, Inspection, Repair, and Installation**	Interactive lecture, discussion	True/False Test
	4	Practically inspect piston rings and learn how to replace and adjust them correctly.			
10	2	Students will learn how to inspect and maintain the fuel system in diesel engines.	**Fuel System in Diesel Engines**	Interactive lecture, discussion	True/False Test
	4	Inspect and repair fuel system parts for a diesel engine in the lab, including fuel pumps and injectors.			
11	2	Students will acquire the necessary skills to inspect and repair fuel pumps and injectors.	**Fuel Pumps and Injectors Inspection and Repair**	Interactive lecture, discussion	True/False Test
	4	Observe how to perform diagnostic tests and repairs on fuel pumps and injectors.			
12	2	Students will learn how to inspect and maintain cooling and lubrication systems.	**Cooling and Lubrication Systems, Inspection and Repair**	Interactive lecture, discussion	True/False Test
	4	Inspection and maintenance procedures for cooling and lubrication systems must be applied, including changing oil and filters.			
13	2	Develop skills in diagnosing and repairing transmission system problems.	**Transmission System, Problems, and Repair**	Interactive lecture, discussion	Report writing
	4	Train on identifying faults in the transmission system and repairing them.			

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
14	2	Students will be able to identify problems in power transmission units and how to repair them.	**Power Transmission Units, Problems and Repair**	Interactive lecture, discussion, practical application	Report discussion
	4	Practice diagnostic and repair techniques for power transmission units, focusing on the more complex parts, such as the hydraulic system.			
15	2	Midterm Exam (Theoretical+ Practical)			
	4				

11. Course Evaluation

	Assessment Methods	Evaluation Dates (Week)	Score	Relative Weight %
1	Quiz	Weeks 2, 6, 9, 11	5	5
2	Midterm Exam (theoretical)	Weeks 7, 15	20	20
3	Report Writing + Report Discussion + Short Quiz	Weeks 3, 5, 8, 10, 12, 13, 14	5	5
4	Midterm Exam (Practical)	Weeks 7, 14	10	10
5	Final Practical Exam	End-of-Term Exam	20	20
6	Final Theoretical Exam	End-of-Term Exam	40	40
	Total		100	100%

Learning and Teaching Resources

Required textbooks (curricular books, if any)	Repairing agricultural tractors, Dr. Yassin Hashem Al-Tahan and Dr. Muhammad Jassim Al-Naama, 1992
Main references (sources)	Diesel Engines, Mahmoud Rabie Al-Malat, second edition, 1999
Recommended books and references (scientific journals, reports...)	A Textbook of Farm Machinery & Power Engineering-NIPA, Basavaraj, D Srigiri & Jayan P R, (2019)
Electronic References, Websites	YouTube

مدرس المادة العملي
م.م. عمار وائل صالح

مدرس المادة النظري
أ.م.د. منتصر خيري حسين

رئيس قسم المكائن والآلات الزراعية
أ.م.د. يوسف يعقوب هلال

رئيس اللجنة العلمية
أ.د. عادل احمد عبد الله

Course Description Form

1. Course Name:

Electrical systems of tractors

2. Course Code:

ELST479

3. Semester / Year:

First semester (autumn)/2025−2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Combined (Attendance + distance education)

6. Number of Credit Hours (Total) / Number of Units (Total)

60 hours (30 theoretical hours + 30 practical hours) / 3 units

7. Course administrator's name (mention all, if more than one name)

Name: Hussain Abed Hammood Email: hu_hamood@uomosul.edu.iq
Ammar Wael Saleh Email: ammarwael1800@uomosul.edu.iq

8. Course Objectives

Course Objectives	− Graduating agricultural engineers and researchers to serve the agricultural sector. - Scientific cooperation with agricultural directorates and other parties with the aim of improving agricultural production in quantity and quality. - Investing in modern technology in the field of Electrical systems of tractors in order to develop education, training and research programmed. - Qualifying students to work according to the modern production system that relies on computers a information technology to operate. - Preparing an advanced technical staff in the field of agricultural tractor electrical maintenance to meet the needs of society.

9. Teaching and Learning Strategies

theoretical: -Interactive lecture. -Brainstorming. -Dialogue and discussion. -Assigning tasks and reports	practical: Assigning the student to inspect the components of electrical circuits within a specific period to reveal the student's skill ability. - Assigning the student to identify faults in electrical circuits and the possibility of repairing them to detect the change in the student's skill ability.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	a1: The student Identifies to the basic principles of agricultural tractor electricals	General electrical principles	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b1: The student experiences the practical principles of agricultural tractor electricals	Identify the student to the practical principles of agricultural tractor electricals	interactive lecture , and training	Discussion
2	2	a2: The student Identifies to	Lead acid battery	interactive lecture	Discussion

	Theoretical	the lead-acid battery, the theory of its operation, and maintain it		, Brainstorming, Dialogue and discussion	
	2 Practical	b2: The student examines the lead-acid battery and methods of maintaining it	Identify the student to the practical principles of battery inspection and maintenance	interactive lecture , and training	Discussion
3	2 Theoretical	a3: The student Identifies to the alkaline, lithium ion battery, the theory of operation, and maintain	alkaline, lithium ion battery	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b3: The student examines the alkaline, lithium ion battery and methods of maintaining.	Identify the student to the practical principles of battery inspection and maintenance	interactive lecture , and training	Discussion
4	2 Theoretical	a4: The student Identifies to the types of wires used in the electrical circuits of tractors, their specifications, and how to maintain them.	Electrical wires	interactive lecture , Brainstorming, Dialogue and discussion	quizzes
	2 Practical	b4: The student tests the electrical connections of wires terms of symbols and colors	Identify the student to the practical principles of inspecting and maintaining electrical circuits	interactive lecture , and training	A short practical test
5	2 Theoretical	a5: The student Identifies to the theory of direct current, generator components, and their maintenance	DC generator	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b5: The student will have practical experience examining and maintaining a direct current generator	Identify the student to the practical principles of inspecting and maintaining a D. C. generator	interactive lecture , and training	Discussion
6	2 Theoretical	a6: The student Identifies to the theory of alternating current, generator components, and their maintenance	A. C. generator	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b6: The student has practical experience examining and maintaining an alternating current generator	Identify the student to the practical principles of inspecting and maintaining an A.C. generator	interactive lecture , and training	Discussion
7	2 Theoretical	a7: It identifies the starter motor, its faults and maintenance, and the electric motor for agricultural tractors.	Starter and electric motor for agricultural tractors	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b7: The student tests the connection and maintenance of the starter motor and electric motor parts in the tractor.	Practical principles for testing the starter motor and electric motor.	interactive lecture , and training	Discussion
8	2 Theoretical	a8: The student learns about the theory of relay operation. c1: determine the skill levels acquired by each student	relay + First monthly exam	Interactive lecture + test	Class test
	2 Practical	b8: The student uses a relay in different electrical circuits. c2: determine the skill levels acquired by each student	relay + First monthly exam	Interactive lecture + test	practical test
9	2 Theoretical	a9: The student Identifies to the types of lamps used in agricultural tractors, their installation, and how they	Light bulbs	interactive lecture , Brainstorming, Dialogue and discussion	quizzes

		work			
	2 Practical	b9: The student uses appropriate equipment to inspect and maintain lamps	Identify the student to the practical principles of inspecting and maintaining lamps	interactive lecture , and training	A short practical test
10	2 Theoretical	a10: The student Identifies to the devices and equipment used in repairing tractor malfunctions	A field visit to specialized repair workshops	A lecture by technicians in the repair shop	Discussion
	2 Practical	b10: The student applies safety and security principles in the repair shop	Identify the student to the practical principles of safety security while working in workshops	interactive lecture , and training	reports about the visit
11	2 Theoretical	a11: The student Identifies to theory of operation of the electric ignition system, its malfunctions, and maintenance	Electric ignition system	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b11: The student uses appropriate equipment to inspect and maintain the electrical ignition system	Identify the student to the practical principles of inspecting and maintaining the electrical ignition system	interactive lecture , and training	Discussion
12	2 Theoretical	a12: The student Identifies to the side signal electrical circuit	Side signals	interactive lecture , Brainstorming, Dialogue and discussion	report
	2 Practical	b12: The student will have practical experience examining and maintaining the side signal circuit	Identify the student to the practical principles of inspecting and maintaining electrical circuits for side signals	interactive lecture , and training	report
13	2 Theoretical	a13: The student Identifies to the types of indicators on the tractor's dashboard and the theory of its operation and maintenance	Electrical indicators	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b13: The student explains the types of indicators and methods of inspecting and maintaining them	Identify the student to the practical principles of inspecting and maintaining the dashboard of tractor	interactive lecture , and training	Discussion
14	2 Theoretical	a14: The student Identifies to the theory of sound generation horn, its installation, and its malfunctions	The horn	interactive lecture , Brainstorming, Dialogue and discussion	Discussion
	2 Practical	b14: The student tests the horn methods of checking and maintaining it	Identify the student to the practical principles of checking and maintaining a horn	interactive lecture , and training	Discussion
15	2 Theoretical	a15: The student learns about the types of fuses. c3: determining the skill levels acquired by each student	The fuses + The second monthly exam	Interactive lecture + test	Class test
	2 Practical	b15: The student explains the types of fuses, their inspection maintenance. c4: determining the skill levels acquired by each student	The fuses + The second monthly exam	Interactive lecture + test	practical test

11.Course Evaluation

Seq.	Evaluating style	date	marks	Relative weight
1	Final report: theoretical + practical	Theoretical: Week 12 Practical: week 12	7 theoretical + 6 practical	%13

2	Monthly test 1	Week:8	4 theoretical + 2 practical	%6
3	Monthly test 2	Week:15	10 theoretical + 5 practical	%15
4	Quizzes	Continuous	4 theoretical + 2 practical	%6
5	Final practical test	The week of the theoretical exam	20	%20
6	Final theoretical test	The week of the Practical exam	40	%40
	the total		100	%100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Agricultural tractor repair, Dr. Muhammad Jassim Al-Naama, 1992
Main references (sources)	Maintenance and Repair, Ali Saleh Al-Najjar, 1981
Recommended books and references (scientific journals, reports...)	- The battery as you never knew it before, Ahmed Mohieddin Attia 2013 -Automotive Electricity, Ministry of Education, Syrian Arab Republic, 2018
Electronic References, Websites	https://www.youtube.com

مدرس المادة العملي
م. م. عمار وائل صالح

مدرس المادة النظري
م. حسين عبد حمود

رئيس قسم المكائن والآلات الزراعية
أ.م. د. يوسف يعقوب هلال

رئيس اللجنة العلمية
أ.د. عادل احمد عبدالله

Course Description Form

1. Course Name:
Research Project 1
2. Course Code:
REPR402
3. Semester / Year:
First semester (fall)/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
45 practical hours / 1.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Ghazwan Ahmed Dahham Email: ghazwanagr@uomosul.edu.iq Name: Ammar Wael Saleh Email: ammarwael1800@uomosul.edu.iq
8. Course Objectives

Course Objectives	
9. Teaching and Learning Strategies	
Strategy	• Brainstorming • Dialogue and discussion • Assignment of tasks for data collection and review of previous studies • Students are assigned to prepare periodic reports according the stages of project completion

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3 Practical	c1: The student chooses a subject for his research	Choose the research subject	Interactive lecture, brainstorming, dialogue and discussion	Reports
2	3 Practical	c4: The student proposes a plan for his research	Scientific research plan (research proposal)	Interactive lecture, dialogue and discussion	Reports
3	3 Practical	b1: The student documents the data and information collecte	Collect data and informations	Interactive lecture, dialogue and discussion	Reports
4	3 Practical	b2: The student chooses the samples and research tools requi	choose Samples and research tools	Interactive lecture, dialogue and discussion	Reports
5	3 Practical	c2: The student writes his graduation research in his own style	Procedures for writing research project	Interactive lecture, dialogue and discussion	Reports
6	3 Practical	a2: The student learns about the formal controls for his graduation research project	Formal controls in the research project	Interactive lecture, dialogue and discussion	Reports
7	3 Practical	a4: The student discusses with his supervisor the requirements for the theoretical part of the research	The theoretical part	Interactive lecture, dialogue and discussion	Reports
8	3 Practical	c2: The student gives examples of previous studies for his research	Presenting previous studies	Interactive lecture, presentation of previous studies	Reports
9	3 Practical	a3: The student presents to his supervisor the theories and scientific analysis of his subject	Theories and scientific analysis of the subject research	Interactive lecture, presentation of previous studies	Reports
10	3 Practical	a4: The student discusses with the supervisor the requirements of the practical part of the research	the practical part	Interactive lecture, dialogue and discussion	Reports
11	3 Practical	b3: The student tests the research data statistically	Analyze data statistically	Interactive lecture, reports and discussion	Reports
12	3 Practical	b3: The student tabulates statistical data for research	Writing tables	Interactive lecture, reports and discussion	Reports
13	3 Practical	a4: The student discusses his research data to derive useful tabular values	Results and conclusions	Interactive lecture, reports and discussion	Reports
14	3 Practical	b3: The student adopts the results of his research	Recommendations	Interactive lecture, reports and discussion	Reports
15	3 Practical	b1: The student presents the sources used in the research	Writing sources	Interactive lecture, reports and discussion	Reports

1. Course Evaluation

Seq.	Evaluating style	date	marks	Relative weight

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Methodical books
Main references (sources)	The central library at the university, the college library
Recommended books and references (scientific journals, reports...)	Research from specialized scientific journals
Electronic References, Websites	Research, letters and dissertations from the Internet.

مدرس المادة

أ.م. غزوان احمد دحام

مدرس المادة

م.م. عمار وائل صالح

رئيس القسم

أ.م.د. يوسف يعقوب هلال

رئيس اللجنة العلمية

أ.د. عادل احمد عبد الله

Course Description Form

1. Course Name:
Food Technology Equipment
2. Course Code:
FOTE478
3. Semester / Year:
First semester / 2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
On campus
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours (30 theoretical hours + 30 practical hours) / 3 units
7. Course administrator's name (mention all, if more than one name)
Name: Assis. Professor Mothana Abedalmalik Noori Email: moth1973@uomosul.edu.iq Name: Asst. Lecturer. Ammar Wael Saleh Email: ammarwael1800@uomosul.edu.iq
8. Course Objectives
• Understanding the most important units and technical aspects in food processing facilities and teaching them how to distinguish between them. **• Acquiring comprehensive knowledge of all the manufacturing processes that take place in food processing facilities.** **• Enhancing students' knowledge of all the physical changes that occur in food processing facilitie and how to measure them.** **• Achieving a comprehensive understanding among students of all the thermal processes that occ in food processing facilities, methods of measurement, and how to operate their devices.** **• Identifying steam boilers and how to maintain and preserve them as heating units.** **• Understanding all thermal processes such as pasteurization and sterilization, how to operate different devices, and how to deal with occurring variables.** **• Knowing the most important components of refrigeration and freezing units used in food processing facilities, including their types.** **• Having the ability to choose the appropriate environment for establishing a food processing plan**

• Identifying the most important transportation units in food processing facilities, including pumps their types, and how they work.

• Achieving the ability to work on all devices within a food processing plant.

• Achieving the ability to design a suitable layout for a food processing plant, including planni execution, and monitoring by the end of the academic program.

9. Teaching and Learning Strategies

- Interactive Lecture
- Brainstorming
- Dialogue and Discussion
- Hands-on Training
- Field project

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 (Theoretica approach)	a1 The student should be familiar with the most important manufacturing equipment used in food production lines.	Introduction of food processing equipment	Auditory methods Writing style Direct dialogue style	Midterm exam 1 Final exam
	2 (Practical approach)	a8 Understanding the dimensions and units of measurement used in in food processing industry.	Units and Dimensions	Auditory methods Writing style Assignments	Quiz 1
2	2 (Theoretical approach)	a2 The student should understand the mechanics of material and energy balance.	Material and Energy Balance	Auditory methods Writing style Direct dialogue style	Midterm exam 1 Final exam
	2 (Practical approach)	a9 The student should be able to perform calculations related to material and energy balance.		Auditory methods Writing style Assignments	Quiz 2
3	2 (Theoretical approach)	a3 The student will be familiar with the operating mechanism of measuring devices	Measuring devices	Auditory methods Writing style Direct	Midterm exam 1 Final exam

		used in food processing industry.		dialogue style	
	2 (Practical approach)	b9 The student should be able to calibrate measurement devices.		Assignments, Reports	Report 1
4	2 (Theoretical approach)	a4 The student should be able to recognize heat, its transfer methods, and methods of controlling it.	Heat and its transfer methods	Auditory methods Writing style Direct dialogue style	Midterm exam 1 Final exam
	2 (Practical approach)	b10 The student learns about heating systems in food processing industry.	Heating systems	Auditory methods Writing style Assignments	Report 2
5	2 (Theoretical approach)	b1 The student should be able to estimate the mathematical operations related to heat measurement methods and control.	Heat, its measurement methods, and control	Auditory methods Writing style Direct dialogue style	Midterm exam 1 Final exam
	2 (Practical approach)	b11 The student will be familiar with the operating mechanism of steam boilers and its types.	Steam boilers	Auditory methods Writing style Direct dialogue style	Quiz 3
6	2 (Theoretical approach)	a5 The student learns about the principle of operation of heat exchangers and the calculation methods associated with it.	Heat exchangers	Auditory methods Writing style Direct dialogue style	Midterm exam 1 Final exam
	2 (Practical approach)	a10 The student becomes familiar with the types of pasteurization and sterilization equipment.	Pasteurization and sterilization equipment	Assignments, Reports	Quiz 1
7	2 (Theoretical approach)	b2 The student becomes acquainted with the operation mechanism of refrigeration and freezing equipment.	Refrigeration and freezing	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam
	2 (Practical approach)	b12 The student learns about the types	Refrigeration and freezing equipment	Assignments, Reports	Homework

		of refrigeration and freezing equipment in food processing industry, as well as the associated calculations.			
8	2 (Theoretical approach)	a6 The student is able to understand the mechanism of evaporators in food processing industry, as well as the associated calculations.	Evaporation	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam Report 1
	2 (Practical approach)	b13 The student becomes familiar with the types of evaporators used in food processing industry.	Evaporators	Assignments, Reports	Homework
9	2 (Theoretical approach)	b3 The student is able to understand the mechanism and methods of food dehydration, as well as associated calculations in food processing industry.	Food dehydration	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam Report 2
	2 (Practical approach)	a11 The student learns about the types of food dryers.	Dryers in the food processing industry	Assignments, Reports	Homework
10	2 (Theoretical approach)	b4 The student is able to understand the mechanism of size reduction and sieving the solid materials	Size reduction and sieving the solid materials	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam Report 3
	2 (Practical approach)	a12 The student learns about the types of food size reduction and sieving the solid materials equipment.	size reduction and sieving the solid materials equipment	Assignments, Reports	Homework
11	2 (Theoretical approach)	b5 The student is able to understand the mechanism of materials handling.	Materials handling	Auditory methods Writing style Direct dialogue	Midterm exam 2 Final exam

				style	
	2 (Practical approach)	b14 The student learns about the types of material handling equipment.	Material handling equipment	Assignments, Reports	Homework
12	2 (Theoretical approach)	b6 The student is able to understand the mechanism of grains cleaning and grading	Grains cleaning and grading	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam
	2 (Practical approach)	a13 The student learns about the types of grains cleaning and grading equipment.	Grains cleaning and grading equipment	Assignments, Reports	Homework
13	2 (Theoretical approach)	a7 The student is able to understand the mechanism of food separation processes.	Food separation	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam
	2 (Practical approach)	a14 Instructional trip	Instructional trip	Assignments, Reports	Quiz 1
14	2 (Theoretical approach)	b7 The student becomes acquainted with the pumping process and the types of pumps which are used in food processing industry.	Pumping and its use in food processing industry	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam Quiz 2
	2 (Practical approach)	a15 The student is capable of estimating the efficiency of the pumping process, pump efficiency, and maintenance methods of it.		Assignments, Reports	Homework
15	2 (Theoretical approach)	b8 The student is able to understand the mechanism of food packaging in a food processing industry.	Food packaging	Auditory methods Writing style Direct dialogue style	Midterm exam 2 Final exam Quiz 3
	2 (Practical approach)	a16 The student becomes familiar with the packaging devices used in a food		Assignments, Reports	Industrial report

		processing industry.			

11. Course Evaluation

Seq.	Evaluating style	Date	marks	Relative weight
1	Final report: theoretical + practical	Theoretical: Week 13 Practical: week 13	7 theoretical + 6 practical	%13
2	Monthly test 1	Week:4	4 theoretical + 2 practical	%6
3	Monthly test 2	Week:14	10 theoretical + 5 practical	%15
4	Quizzes	Week:12	4 theoretical + 2 practical	%6
5	Final practical test	The week of the theoretical exam	20	%20
6	Final theoretical test	The week of the Practical exam	40	%40
	the total		100	%100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Food Processing Engineering / Dr. Amer Hameed Al-Dahan
Recommended books and references (scientific journals, reports…)	Food Process Engineering and Technology Second Edition
Electronic References, Websites	

مدرس المادة العملي

م.م. عمار وائل صالح

مدرس المادة النظري

أ.م. مثنى عبدالمالك نوري

رئيس قسم المكائن والآلات الزراعية

أ.م.د. يوسف يعقوب هلال

رئيس اللجنة العلمية

أ.د. عادل احمد عبدالله

Course Description Form

1. Course Name:
Hydraulic System and Equipments
2. Course Code:
HYSE477
3. Semester / Year:
first semester 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Combined (Attendance + distance education)
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours +60 practical hours =90 hours / 4 Units
7. Course administrator's name (mention all, if more than one name)
Name: Arkan Mohammad Amin Sedeeq Email: arkanma.agri.col@uomosul.edu.iq Nam Mahmood natiq Email: manatiq9@uomosul.edu.iq
8. Course Objectives
1- Identify hydraulic systems, their types, and their uses in the field of agricultural machinery **2- Identify the basic hydraulic systems and their main functions, identify their malfunctions, and how to calibrate them.** **3- Identify the advantages and disadvantages of hydraulic systems of various types** **4- Identify the correct operational methods for each type of hydraulic system** **5- Acquiring knowledge in methods of sustaining, maintaining and repairing parts of basic hydraulic systems.** **6- Gaining the ability to keep pace with developments in hydraulic systems represented by adopting modern methods.** **7- Acquire knowledge and ability in how to develop the hydraulic systems used and prove their efficiency when applied.** **8- Acquiring knowledge in the applications of types of hydraulic systems in various agricultural and heavy machinery.** **9- The ability to diagnose hydraulic system malfunctions** **10 - Possibility of calibrating parts of the hydraulic system** **11- How to choose the appropriate systems according to the variables in the crisis** **12- Gaining skill in using modern hydraulic systems.** **13- The ability to design and manufacture hydraulic systems to serve and develop the mechanized sector**
9. Teaching and Learning Strategies
1-Interactive lecture **2-Brainstorming** **3-Dialogue and discussion** **4-Field Training** **5-Practical exercises** **6-Field project**

7-Self-education

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	a2 understands pascal's rule law a1 knows hydraulic basics	Introduction to hydraulic fundamentals and derivation of Pascal's rule law	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you hav learned about pascal's rule	Practical applications and experiments on Pascal's rule	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
2	2 theoretical	a2 understands the components of the hydraulic system a2 knows what distributors and command and control systems are	Hydraulic system components, distributors, command and control systems	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 applies and experiments what he has learned about hydraulic distributors and control systems	Practical applications and experiment Distributors and hydraulic control systems	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
3	2 theoretical	a2 understands the types of hydraulic fluids a2 and knows its specifications and uses	Types of hydraulic fluids, their specifications and uses	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you have learned about hydraulic fluids	Practical applications and experiments on Hydraulic fluids	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
4	2 theoretical	a2 understands what hydraulic motors are and their uses a2 defines and classifies its types	Definition and classification of types Hydraulic motors and their uses	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you have learned about hydraulic motors	Practical applications and experiments on Hydraulic motors	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test

5	**2 theoretical**	**a2 understands what hydraulic pumps are a2 defines the types, parts, and mechanism of action**	**Definition and classification of hydraulic pumps and the use of modern mechanical technologies (Types_parts_mechanism of action)**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	4Practical	**c3 apply and experiment with what you have learned about hydraulic pumps**	**Practical applications and experiments on Hydraulic pumps and the use of modern mechanical technologies**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
6	**2 theoretical**	**a2 understands what hydraulic valves are a2 defines the types, parts, and mechanism of action**	**Definition and classification of types Hydraulic valves (Types_parts_mechanism of action)**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	4 Practical	**c3 apply and experiment with what you have learned about hydraulic valves**	**Practical applications and experiments on Hydraulic valves**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
7	**2 theoretical**	**a2 understands what hydraulic cylinders are a2 defines the types used in agricultural machinery**	**Definition and classification of hydraulic cylinders and examples in Cylinders used in agricultural machinery**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	4 Practical	**c3 apply and experiment with what you have learned about hydraulic cylinders**	**Practical applications and experiments on hydraulic cylinders**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
8	**2 theoretical**	**a2 understands what hydraulic torque converters are c1 and calculate the moments transferred through it**	**Hydraulic moment converters and mathematical questions about them**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	4 Practical	**c3 applies and experiments what he has learned about hydraulic torque converters**	**Practical applications and experiments on hydraulic torque converters**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
9	**2 theoretical**	**a2 understands what oil tanks, oil coolers and hydraulic isolators are**	**Oil tank, oil coolers and hydraulic isolators**	**Interactive lecture, brainstorming, dialogue and discussion, self-learning**	**Short daily test1 Semester test1 Final test**
	4 Practical	**c3 apply and experiment with what you have learned about the oil tank, oil coolers and hydraulic isolators**	**Practical applications and experiments on oil tanks, oil coolers and hydraulic insulators**	**Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning**	**Short daily test1 Semester test1 Final test**
10	**2 theoretical**	**a2 understands the meaning of open hydraulic system**	**Hydraulic systems (open system, types and features)**	**Interactive lecture, brainstorming, dialogue and**	**Short daily test1 Semester test1 Final test**

		a1 and knows its types and features		discussion, self-learning	
	4 Practical	c3 apply and experiment with what you have learned about the open hydraulic system	Practical applications and experiments on Open hydraulic system	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
11	2 theoretical	a2 understands the meaning of a closed hydraulic system a1 and knows its types and features	Types of hydraulic systems (Closed system, its types and advantages)	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you have learned about the closed hydraulic system	Practical applications and experiments on Closed hydraulic system	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
12	2 theoretical	a2 understands hydraulic systems in agricultural machinery a1 knows how to use it	Use of hydraulic systems in agricultural machinery	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you have learned about hydraulic systems in agricultural machinery	Practical applications and experiments on hydraulic systems in agricultural machinery	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
13	2 theoretical	a2 understands hydraulic systems in heavy equipment a1 knows how to use it	Use of hydraulic systems in heavy equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	c3 apply and experiment with what you have learned about hydraulic systems in heavy equipment	Practical applications and experiments on Hydraulic systems in heavy equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
14	2 theoretical	a2 understands the laws and mathematical calculations of hydraulic systems	Mathematical basics about Hydraulic systems	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	a3 calculates and c1 solves various mathematical exercises and problems about hydraulic systems	Exercises for Hydraulic systems	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Short daily test1 Semester test1 Final test
15	2 theoretical	a2 understands the meaning and how to maintain and maintain equipment hydraulic a2 knows how to maintain and maintain	Maintenance and maintenance of equipment Hydraulic	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short daily test1 Semester test1 Final test
	4 Practical	C3 Applies and experiments with what he has learned	Practical applications and experiments on maintaining an	Interactive lecture, brainstorming,	Short daily test1 Semester test1

		about maintaining and maintaining hydraulic equipment	sustaining hydraulic equipment	dialogue and discussion, field training, and self-learning	Final test

10. Course Evaluation

Seq.	Evaluating style	date	marks	Relative weight
1	Home reports	every week	10	10%
2	Short tests	every week	10	10%
3	Semester test 1	The seventh week	10	10%
4	Semester test 2	The final week	10	10%
5	Final practical test	End of the course	20	20%
6	Final theoretical test	End of the course	40	40%
	the total		100	100%

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1- أسس تصميم وصيانة النظم الهيدروليكية . محمد شيخو معمو.شعاع للنشر والعلوم 2009 2- أسس الآلات الهيدروليكية (تقنية آلات زراعية) . المؤسسة العامة للتعليم الفني والتدريب المهني 3- هيدروليكية المكائن الزراعية. عبدالجبارخلف الجميلي وعبدالعزيز عباس عزيز1992 4- التحكم الهيدروليكي وتطبيقاته . أحمد عبدالمتعال .دار النشر للجامعات 1997
Recommended books and references (scientific journals, reports...)	1- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007, 2st Addition, SAK Publisher , Press in 2007 2- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007,1 st Addition, SAK Publisher , Press in 2007 3- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007, 2st Addition, SAK Publisher , Press in 2007 4- Hydraulic Basics - technique of Agricultural Equipments, General Institution for technical training, 2007,1 st Addition, SAK Publisher , Press in 2007
Electronic References, Websites	https://www.youtube.com

مدرس المادة العملي
م.محمود ناطق

مدرس المادة النظري
أ.د. اركان محمد امين صديق

رئيس قسم المكائن والآلات الزراعية
أ.م.د. يوسف يعقوب هلال

رئيس اللجنة العلمية
أ.د. عادل أحمد عبدالله

Course Description Form

1. Course Name:
Heavy Equipment
2. Course Code:
HEME476
3. Semester / Year:
The first semester/4 stage/2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
in−person+ online
6. Number of Credit Hours (Total) / Number of Units (Total)
90 hours (2 theoretical + 4 practical / 4 units
7. Course administrator's name (mention all, if more than one name)
Name: Muosab abd alwihid mohammed Email: goldenagr@uomosul.edu.iq Name: Mahmood natiq Email: manatiq9@uomosul.edu.iq
8. Course Objectives
• Identify the components and parts of agricultural tractors, starting with the engine and the main and auxiliary devices it contains. • Clarifying the basics and principles of engineering sciences and their applications in various agricultural fields. • Discussing every type of agricultural equipment and machinery for the production of agricultural crops (in terms of structure and function), starting from plowing the soil and preparing the seedbed, passing through the stages of serving the growing crop, ending with harvesting operations and the subsequent processes through which these agricultural products are prepared, whether for consumption or Storage. • Making the necessary adjustments to agricultural machines in order to obtain the optimal use of those machines in order to reach the intended use of those machines. • The ability to maintain, maintain and repair agricultural equipment. • The ability to disassemble and install these machines. • The ability to manage agricultural equipment in the field. • The ability to connect machines to the agricultural puller and carry out organizing and calibrating operations for them in a way that suits the agricultural process required to be performed with the agricultural machine.
9. Teaching and Learning Strategies
- Interactive lecture - Brainstorming - Dialogue and discussion

- Field Training
- Practical exercises
- Field project
- Self-education

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	a1/Identifying the types of soils with their different textures and their suitability in determining the type of machine required	Soil physical and mechanical characteristics	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Applications Mathematical About the physical and mechanical properties of soil	Reports	quiz homework discussions
2	2 Theoretical	b2/Identifying machines for dismantling soil and making trenches for different types of soil	Machines for loosening soil and making trenches	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applicati about soil dismantling trenching machines	Reports	quiz homework discussions
3	2 Theoretical	C3, b2/Choose a reclamation project	Identify the conditions that must be met in the soil to be reclaimed	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications for reclamation project selection	Reports	quiz homework discussions

4	2 Theoretical	c3,a1 /Bulldozer	Knowing the types of bulldozers and methods of cutting soil	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications about bulldozer	Reports	quiz homework discussions
5	2 Theoretical	c3,a1 /Using the weapon at different angles to cut the soil, depending on the type of work	Methods of cutting soil using a bulldozer	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications on methods of cutting soil using a bulldozer	Reports	quiz homework discussions
6	2 Theoretical	b2/ Calculating the maximum and normal productivity of the bulldozer	Methods for calculating bulldozer productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications on methods of calculating bulldozer productivity	Reports	quiz homework discussions
7	2 Theoretical	Shovel	Identify the types of Shovels and calculate their balance and the forces affecting them	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications about shovels	Reports	quiz homework discussions
8	2 Theoretical	c3,b2/ Practical methods for using the loader and calculating the optimal number of trucks and loaders	Applications on practical methods for using shovel and calculating the optimal number of trucks and shovels	Auditory methods Writing style Direct dialogue style	final semester exams
	4 Practical	e3/Applications Mathematical	Mathematical applications on practical methods for using a truck and calculating the optimal number of trucks and shovels	Reports	final semester exams

9	2 Theoretical	C3/ Leveling mechanism (grader)	Identify the leveling mechanism (grader), the forces affecting it, and calculate its productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications about the settlement mechanism (grader)	Reports	quiz homework discussions
10	2 Theoretical	b2/Scriber	Identify the scriptor mechanism, the forces affecting it, and calculate its productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussion
	4 Practical	e3/Applications Mathematical	Mathematical applications about the script	Reports	quiz homework discussi
11	2 Theoretical	b2/Machines for digging irrigation and digging channels	Identifying machi for digging irrigat and drain channels, the for affecting them, a calculating th productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussio
	4 Practical	e3/Applications Mathematical	Mathematical applications about machines for digging irrigation canals and punctures	Reports	quiz homework discussion
12	2 Theoretical	power excavators	Identify of power excavators, the forces affecting, and calculate roductivity	Auditory methods Writing style Direct dialogue style	quiz homework discussio
	4 Practical	e3/Applications Mathematical	Mathematical applications about power excavators	Reports	quiz homework discussion
13	2 Theoretical	c3/Hydraulic digging machines	Identify hydraulic digging machines, the forces affecting them, and calculate their productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussion
	4 Practical	e3/Applications Mathematical	Mathematical applications about hydraulic digging	Reports	quiz homework discussion

			machines		
14	2 Theoretical	c3/Identify of clam shell	Identify of clam shells, the forces affecting them, and calculate their productivity	Auditory methods Writing style Direct dialogue style	quiz homework discussions
	4 Practical	e3/Applications Mathematical	Mathematical applications about clam shell	Reports	quiz homework discussion
15	2 Theoretical	b2/Influencing force of clam shell	b2/Analysis of the forces affecting the bucket and different inclination angles	Auditory methods Writing style Direct dialogue style	final semester exams
	4 Practical	e3/Applications Mathematical	Mathematical applications on the force affecting the bucket clam shell	Reports	final semester exams

11. Course Evaluation

	Evaluation methods	Evaluation date (week)	Grade	Relative weight %
1	Report 1	Week Four	2.5	2.5
2	Report 2	Week Five 2.5	2.5	2.5
3	Short test (1) Quiz	Week Six	2	2
4	Short Test (2) Quiz	Week Fourteen	2	2
5	Short Test (3) Quiz	Week Fifteen	1	1
6	Semester test (1)	sixth week	7.5	7.5
7	Semester test (2	the eleventh week	7.5	7.5
8	final theoretical exam final semester exams 40 40	final semester exams	40	40
9	Practical field project	week fifteen	5	5
10	Field evaluation	weeks three and five	2	2
11	short practical tests (1) Quiz	the first week	1	1
12	short practical tests (2) Quiz	Week Four	0.5	0.5
13	Short practical test (3) Quiz	Week Fourteen	1	1
14	Direct drawings and homework	weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final practical exams	Final semester exams	20	20
Total	100		100%	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Agricultural tugs. Written by Dr. Abdel Salam Muhammad Ezzat and Lotfi Hussein Muhammad Ali. 2- Agricultural machines and machinery,

	written by Dr. Yassin Hashem Al-Tahan and Dr. Muhammad Jassim Al-Naama.
Main references (sources)	Agricultural mechanization (pullers and agricultural machines), written by Ahmed Al-Rai Imam Suleiman and Sami Muhammad Younis.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites