# Course Description Form

1. Course Name:

Agricultural machines and equipment

2. Course Code:

AGME207

3. Semester / Year:

The second spring semester/first stage/2024-2025

4. Description Preparation Date:

1/2/2025

5. Available Attendance Forms:

in-person and online

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

75 hours (2 theoretical + 3 practical / 3.5 units

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

Name of Lecturer for Theory part: Mr. Layth Mahmood Yahya
Email: laithmy@uomosul.edu.iq
Name of Lecturer for practical part: Mr. Othman muayad mohammed tofeq

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

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- 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 |
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| 1 | 2 Theoretical | a2: Introducing the student to the methods of transmitting motion in agricultural machines and machinery and the means used to transmit motion<br>The student acquires knowledge and concepts related to the methods and means used in transporting and transforming movement in agricultural tractors | Methods and means used in transporting and shifting the movement of agricultural pullers | Interactive lecture, brainstorming , dialogue and discussion, self-learning | Semester exam 1, final exam |
| | 3 Practical | b1: Calculating the movement transfer rate in and the methods used in transferring and converting movement in agricultural pullers<br>The student should be able to identify the methods used in transporting and shifting the movement of agricultural tractors | Mathematical relations for calculating the movement transfer ratio in and the methods used in transferring and converting movement in agricultural tractors | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short practical test1 |
| 2 | 2 Theoretical | a2: Introducing the student to the agricultural tractor, its types | Agricultural tractor types and specifications and field traffic | Interactive lecture, brainstormi ng, dialogue | Semester exam 1, final exam |

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| | | and specifications The student acquires knowledge and concepts related to the agricultural tractor, its types and specifications | system using GPS system in precision agriculture | and discussion, self-learning | |
| | 3 Practical | b2: Training the student to drive an agricultural tractor The student must be able to operate and drive the agricultural tug in a scientific and correct manner | Driving an agricultural trac<br><br>And display automatic driving system | Interactive lecture, brainstormi ng, dialogue and discussion, self-learning | Short practical test1 |
| 3 | 2 Theoretical | a2: The student explains the foundations of design and operation of compression and spark engines, the foundations of design and operation of four- and two-stroke engines. The student acquires knowledge and concepts related to internal combustion engines | Internal combustion engines | Interactive lecture, brainstormi ng, dialogue and discussion, self-learning | Semester exam 1, final exam |
| | 3 Practical | b4: The student shows the component parts of the engine The student should be able to disassemble and install engine parts | The main and auxiliary parts of the engine | Interactive lecture, brainstormi ng, dialogue and discussion, self-learning | Short practical test1 |
| 4 | 2 Theoretical | a2: The student shows the timing device, the pilot wheel, the crankshaft, and the power stages in different | Timing device, pilot wheel, crankshaft and power stages in different sequences | Interactive lecture, brainstormi ng, dialogue and discussion, self-learning | Semester exam 1, final exam |

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| | | sequences<br><br>The student acquires knowledge and concepts related to the timing device, pilot wheel, crankshaft, and power stages in different sequences | | | |
| | 3 Practical | b1: Calculates the working cylinder volume of the engine<br>The student should be able to evaluate the functions of working parts in agricultural equipment and machinery | Technical terminology of the engine and the mathematical relationship of the engine | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short practical test1 |
| 5 | 2 Theoretical | a2: The student shows the fuel injection device for compression engines<br>The student acquires knowledge and concepts related to the fuel injection device for compression engines | Fuel injection device for compression engines | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Semester exam 1, final exam |
| | 3 Practical | b3: Repair and maintenance of the fuel injection system in agricultural tractors<br>The student should be able to identify faults in the agricultural tractor engine | Fuel injection system in agricultural tractors and its maintenance | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short practical test1 |
| 6 | 2 Theoretical | a2: The student learns about the lubrication device and the cooling device | Lubrication device and cooling device in agricultural pullers | Interactive lecture, brainstorming, dialogue and discussion, | Semester exam, final exam |

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| | | in agricultural tractors<br><br>The student acquires knowledge and concepts related to the lubrication device and the cooling device | | self-learning | |
| | 3 Practical | b3: Repair and maintenance of the water-cooling system and the lubrication system in agricultural pullers<br>The student should be able to identify faults in the agricultural tractor engine | The cooling and lubrication system in the agricultural tug and its maintenance | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short practical test1 |
| 7 | 2 Theoretical | a2: The student shows the transmission devices in the agricultural tug (clutch and gearbox).<br>The student acquires knowledge and concepts related to the transmission devices in the agricultural tug (clutch and gearbox) | Transmission devices in the agricultural tug (clutch and gearbox). | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Semester exam 1, final exam |
| | 3 Practical | b3: Repair and maintenance of transmission devices in agricultural pullers (clutch and gear box in agricultural pullers)<br>The student should be able to monitor safety conditions when | Maintenance and repair of transmission devices (clutch - gearbox) | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Short practical test1 |

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| | | working on agricultural equipment and machinery | | | |
| 8 | 2 Theoretical | a2: The student shows the transmission devices in the agricultural tractor (the differential device and the vertical device)<br>The student acquires knowledge and concepts related to the transmission devices in the agricultural tractor (the differential device and the vertical device) | Transmission devices in the agricultural tug (differential device and vertical device) | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | b3: Repair and maintenance of transmission devices in agricultural pullers (differential device and vertical device) in agricultural pullers<br>The student should be able to choose the appropriate plowing method according to the conditions and nature of the field to be plowed | Maintenance and repair of transmission devices (differential and vertical devices) | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 9 | 2 Theoretical | c3: The student shows the power transmission devices in the agricultural tractor<br>The student acquires knowledge and concepts related to power transmission devices in agricultural tractors | Power transmission devices in agricultural pullers | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |

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| | 3 Practical | b3: Operating and maintaining power transmission devices in agricultural tugs The student should be able to choose the appropriate plowing method according to the conditions and nature of the field to be plowed | Power transmission parts (operation and maintenance) | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 10 | 2 Theoretical | c3: The student shows the primary and secondary soil preparation and preparation equipment The student acquires knowledge and concepts related to primary soil preparation and preparation equipment | Primary and secondary soil preparation and preparation equipment | Interactive lecture, brainstormin g, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | b1: Identifying plowing methods and types, applying mathematical relationships to calculate theoretical productivity, actual productivity, and field efficiency of plows. The student should be able to calculate the theoretical and actual productivity and field efficiency of tillage equipment | Methods of plowing with plows, their types, and mathematical and computational applications for plowing equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |

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| 11 | 2 Theoretical | c3: Scientific visit<br>The student acquires knowledge and concepts related to secondary and special soil preparation and preparation equipment<br>The student should be able to monitor safety conditions when working on agricultural equipment and machinery | Scientific visit | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | a2: Identifying the methods of netting and connecting agricultural machinery to the agricultural puller<br>The student should be able to organize and connect agricultural machinery to the agricultural puller | Methods of netting and connecting agricultural machinery to the agricultural puller | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 12 | 2 Theoretical | a2: The student shows the seeding and agricultural equipment<br>The student should be able to know seed and agricultural equipment | Seeding and farming equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | b2: Laboratory and field organization of grain seeds<br>The student should be able to organize grain seeds | Calibrating and maintaining seed and agricultural equipment | Interactive lecture, brainstorming , dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 13 | 2 Theoretical | a1: The student is introduced to fertilization equipment<br>The student should be able to | Fertilization equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, | short exams, assignment of duty, discussions |

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| | | know fertilization equipment | | practical exercises, and self-learning | |
| | 3 Practical | b1: Calculates and organizes the amount of fertilizer needed per unit area<br>The student must be able to operate and organize fertilization equipment | Calibration and maintenance of fertilization equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 14 | 2 Theoretical | a1: The student is introduced to the hydraulic sprinkler Pneumatic, disinfectants and mechanical control<br>The student acquires knowledge and concepts related to pest control equipment | Control equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | b1: Calculates and regulates the amount of pesticide needed per unit area<br>The student should be able to organize chemical control sprays | Calibrating and maintaining control equipment | Interactive lecture, brainstormin g, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| 15 | 2 Theoretical | a2: The student learns about the combined grain harvester.<br>The student should be able to know about harvesting equipment | Harvesting equipment | Interactive lecture, brainstormin g, dialogue and discussion, field training, practical exercises, and self-learning | short exams, assignment of duty, discussions |
| | 3 Practical | b3: Sustaining and maintaining harvesting equipment<br>The student must be able to operate harvesting equipment | Sustaining and maintaining harvesting equipment | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, and | short exams, assignment of duty, discussions |

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| | | | | self-learning | |

## 11. Course Evaluation

| | Evaluation methods | Evaluation date (week) | Grade | Relative weight % |
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| 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

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| Required textbooks (curricular books, if any) | 1- Agricultural tugs. Written by Dr. Abdel Salam Muhammad Ezzat and Lotfi Hussein Muhammad Ali.<br>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 | |

Teacher of Theoretical part
Mr. Layth Mahmood Yahya

Teacher of practical part
Mr. Othman muayad mohammed tofeq

Chairman of the Scientific Committee
Professor Dr. Kais Nazem Ghazal

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