

## Course Description Form

1. Course Name:
Forest Machinery
2. Course Code:
FOMA253
3. Semester / Year:
First semester Autumn 2023–2024
4. Description Preparation Date:
1/4/2024
5. Available Attendance Forms:
Physical
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours of theory and 3 hours of practical, for 15 weeks, making a total of 75 hours / 3.5 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: Layth Mahmood Yahya
8. Course Objectives
<b>Course Objectives for theory part</b>
<b>Theoretical:</b> <ul style="list-style-type: none"><li>– Enabling the student to understand the importance of vegetation, especially forests</li><li>– Enabling the student to understand the importance of the tractor as a power source in the field and to understand the thermal cycle in internal combustion engines</li><li>– Enable the student to know how tractor systems operate and maintain them</li><li>– Enabling the student to know how machines for preparing and reclaiming forest land work</li><li>– Enable the student to understand how forest tree planting machines work</li><li>– Enable the student to understand how Forest Service machines work (fertilization, irrigation, control)</li><li>– Enabling the student to understand how to harvest and process tree trunks on the forest floor and transport them to the factory</li><li>– Enabling the student to know the appropriate methods, methods and equipment in preventing and extinguishing fires</li></ul>
<b>Course Objectives for practical part</b>
<b>Practical:</b> <ul style="list-style-type: none"><li>– The student should be familiar with the methods of operating and maintaining the tractor, which is the source of energy in the forest.</li><li>– The student should be aware of the risks he is exposed to when using machinery in the forest.</li></ul>

- The student must be able to carry out all experiments and work related to agriculture and forest service.
- The student must be fully aware of the responsibility of preserving forests from pests and fires and apply the necessary processes for this.
- The student must have practical experience in forest management and investment of their products.

## 9. Teaching and Learning Strategies

<b>Strategy of theory part</b>	<ul style="list-style-type: none"> <li>- Effective lectures</li> <li>- Brainstorming</li> <li>- Dialogue and discussion</li> <li>- Assigning tasks and reporting</li> <li>- Displaying real models of orchard mechanization equipment and machines</li> </ul>
<b>Strategy of practical part</b>	<ul style="list-style-type: none"> <li>- Assigning group work to reveal leadership skills</li> <li>- Assigning individual tasks to reveal personal skills</li> <li>- Assigning reports on practical experiments and field tasks</li> </ul>

## 10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	a1: Gets acquainted with the concept of the work means of transmission a3: Solve special calculations of transportation ratios	Instrumentation of transportation and their calculations	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Assigned a task
	3 practical	b3: Try disassembling and installing transmission devices c3: Performs calculations for the transmission ratios	Instrumentation of transportation and their calculations	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
2	2 Theoretical	a1: Learn about the principle of operation of the internal combustion engine in tractors, the types of agricultural tractors, their classification and specifications. c3: Applies the calculations of power and compression ratio	Power source on the farm and calculations of engine size, compression ratio capacity	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Experience tractor driving and tractor maintenance c3: Performs calculations for the liter volume and compression ratio in the engine	Power source on the farm and calculations of engine size, compression ratio capacity	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
3	2 Theoretical	a2: Recognizes the condition of the crankshaft and timing device c3: Shows what the device is made of	Crankshaft and timing device in the engine	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz

	3 practical	b3: Try disassembling and installing the crankshaft	Problems with the crankshaft and timing device in the engine and their maintenance	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
4	2 Theoretical	a1: Learn about the components of the work of the ignition device and the fuel feeding device c3: Explain what devices and systems are composed of	Ignition and fuel feeding devices into the engine	Interactive lecture brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Try disassembling and installing the ignition and fuel feeding device	Problems with the ignition and fuel supply devices in the engine and their maintenance	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
5	2 Theoretical	a2: Learn about the working principle of the cooling device and the lubrication device c3: Shows what the device is made of	Engine cooling and lubrication devices	Interactive lecture brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Measures the changes when maintaining and programming the ignition and fuel feeding device	Problems with cooling and lubrication devices in the engine and their maintenance	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
6	2 Theoretical	a4: Explains the working principle of the gearbox separator device c3: shows what is composed of it	Clutch device and gearbox	Interactive lecture brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Tests the changes caused by maintaining the cooling and lubrication system	Problems with the clutch and gearbox and its maintenance	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
7	2 Theoretical	a2: Learn about the working principle of the final transmission device and the contact and stopping devices c3: Shows what devices installed	Final transmission gear, ground contact and stopping devices in tractors	Interactive lecture brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Measures the changes during calibration and maintenance of the separator and gearbox	problems of Final transmission gear, ground contact and stopping devices in tractors	Interactive lecture brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
8	2 Theoretical	a2: Learn about the principle of operation of power transmission devices in the tractor c3: Shows what devices installed	Power devices in tractors	Interactive lecture brainstorming, dialogue and discussion, self-learning	quiz

	3 practical	b3: Measures the change in calibration and maintenance of the final transmission device and contact devices	Problems with power transmission devices in tractor	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
9	2 Theoretical	a2: Understands the concept of work and types of land reclamation equipment, plows and their parts c3: Explain what its parts are composed of	Equipment for reclaiming forest land and preparing the soil for agriculture	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester test And a short test
	3 practical	b3: Tests the changes you made to the machine and performs maintenance on it	Problems with equipment for reclaiming forest land and preparing and maintaining the soil for agriculture	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Semester test And a short test
10	2 Theoretical	a2: Gets acquainted with the principles of the work of seeders, planters, and drill diggers for planting seedlings c3: Explain what its parts are composed of	Seedlings and planters of cuttings and shrubs	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Tests the change you made to the machine and c3: Performs seed rate and seed productivity calculations	Organizing and maintaining seedlings and plantings of cuttings and shrubs	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
11	2 Theoretical	a2: Learn about the components of automatic fertilization, sprinkler and drip irrigation, and the components of each system. c3: Apply water requirement calculations	Fertilization and tree irrigation equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Tests the change you made to the machine and c3: It is being maintained	Organizing and maintaining fertilization and irrigation	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
12	2 Theoretical	a2: Learn about the components of control and how pesticides are spread using equipment operating on ground or flying in the air c3: Explain what its parts are composed of	Forest pest control equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Test the change you made to the machine c2: It is being maintained	Organizing the work of pest control equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test

13	2 Theoretical	a2: Learn about the components of fighting fires and how to prevent them c3: Shows what the equipment is made of	Firefighting equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Assignment of a report, discussions, assignment and a short test
	3 practical	b3: Tests the changes you made to the equipment c3: It is being maintained	Operating and maintaining firefighting equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assignment of a report, discussions, assignment and a short test
14	2 Theoretical	a2: Learn about the ideas of cutting tree trunks and branches using hand tools and mechanical mechanisms c3: Explain what its parts are composed of	Log harvesting equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	b3: Tests the area where trees are dropped and c3: Tests the changes you have made and perform maintenance on the machines	Operating and maintaining log harvesting equipment	Interactive lecture, brainstorming, dialogue and discussion, field training, and self-learning	Assign an assignment and a short test
15	2 Theoretical	a2: Learn about the components of processing and transporting tree trunks from the forest to the factory c3: Explain what its parts are composed of	Log processing and transportation equipment	Interactive lecture, brainstorming, dialogue and discussion, self-learning	quiz
	3 practical	c2: Trying to operate on the machines in the Mosul forest nursery	A visit to the stores of the Directorate of Agriculture and Forests of Mosul in the governorate	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 and Yassin Al-Talib (1988) Agricultural machines and equipment Mosul University Press, Iraq.
Main references (sources)	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

Dr. Rafea Abdulsattar Mohammed

Mr. Layth Mahmood Yahya

Chairman of the Scientific Committee

Head of Forestry sciences