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) 2024-2025	
4. Description Preparation Date:	
1 – 2 – 2025	
5. Available Attendance Forms:	
Attendance + online	
6. Number of Credit Hours (Total) / Number of Units (Total)	
75 hr (2-3 hours) / 15 weeks (3.5) units	
7. Course administrator's name (mention all, if more than one name)	
Assistant Prof. Dr. Montaser Khairie Hussain ---------- Assistant Lecturer Mohamed Nathem Email: montaser.hussain@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	a2 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
	3	b3 Conduct a workshop training session on using personal protective equipment and safety procedures.			

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Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	2	a2 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
	3	b5 Train students to conduct routine engine inspections and assess its condition to identify early signs of wear.			
3	2	c4 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
	3	b4 Practice using modern diagnostic tools to identify faults in engines and mechanical systems.			
4	2	a2 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
	3	b2 Organize a visit to a repair workshop to observe work organization and the techniques used.			
5	2	c4 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
	3	c4 Observe experiments on engines operating at different efficiencies to examine and analyze the possible causes of reduced efficiency.			
6	2	b4 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
	3	b1 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)			
	3				
8	2	a2 Learn how to open, inspect, and repair engine pistons and cylinders.	**Piston and Cylinder Opening, Inspection, and Repair**	Interactive lecture, discussion	True/False Test
	3	b4 Conduct dismantling of the piston and cylinders to inspect them for damage and discuss repair methods.			
9	2	c4 Students can inspect piston rings, repair them, and install them correctly.	**Piston Rings, Inspection, Repair, and Installation**	Interactive lecture, discussion	True/False Test
	3	b4 Practically inspect piston rings and learn how to replace and adjust them correctly.			
10	2	c4 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
	3	b4 Inspect and repair fuel system parts for a diesel engine in the lab, including fuel pumps and injectors.			
11	2	c4 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
	3	b4 Observe how to perform diagnostic tests and repairs on fuel pumps and injectors.			
12	2	a2 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
	3	b3 Inspection and maintenance procedures for cooling and lubrication systems must be applied, including changing oil and filters.			
13	2	c6 Develop skills in diagnosing and repairing transmission system problems.	**Transmission System, Problems, and Repair**	Interactive lecture, discussion	Report writing
	3	b4 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	c4 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
	3	a2 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)			
	3				

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 النظري

أ.د. منتصر خيري حسين

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رئيس قسم المكائن والالات الزراعية

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