

MODULE DESCRIPTION FORM

Module Information				
Module Title	AGRICULTURAL PRODUCTION MECHANIZATION TECHNIQUES		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	APT2130			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGII	Semester of Delivery		3
Administering Department	AGME1986	College	AGFO1964	
Module Leader	Nofal Issa Mohamed		e-mail	nofelemh@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	MSc.	
Module Tutor	N.A.		e-mail	N.A.
Peer Reviewer Name	N.A.		e-mail	N.A.
Scientific Committee Approval Date	01/02/2025	Version Number	1.0	

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1-Teaching students the fundamentals of agricultural machinery and equipment and their applications in the agricultural sector. 2-Practically applying these fundamentals in various agricultural fields. 3-Preparing advanced personnel in this field who can utilize these tools in different agricultural sectors. 4-Understanding the theories behind the design and operation of specialized agricultural equipment, as well as maintenance methods to ensure the sustainability of agricultural operations. 5-Keeping up with the rapid advancements in the agricultural sector to meet local market demands and export surplus production to global markets.
Module Learning Outcomes	LO#1: Clarify the fundamentals and principles of agricultural machinery and equipment and their applications in various agricultural fields. LO#2: Acquire knowledge of the maintenance, repair, and servicing methods of

	<p>agricultural machinery and equipment.</p> <p>LO#3: Develop the ability to keep up with agricultural development and expansion plans, including land cultivation and the adoption of modern agricultural techniques.</p> <p>LO#4: Gain knowledge in optimizing the use of resources, such as water resources, and making the most of available reserves through the implementation of efficient irrigation methods.</p> <p>LO#5: Develop both theoretical and practical expertise in establishing small-scale agricultural production projects in the fields of crop and livestock production.</p> <p>LO#6: Acquire skills in managing agricultural machinery and equipment in the field.</p> <p>LO#7: Develop skills in improving crop harvesting processes to minimize both quantitative and qualitative losses.</p> <p>LO#8: Enhance plant production through the adoption of modern seeding techniques and crop management practices.</p>
<p>Indicative Contents</p>	<p>Introduction to Agricultural Tractors: Definition and Classification Agricultural tractors serve as the primary source of power on farms, used for various agricultural operations such as towing and hauling equipment. They are classified based on their size, horsepower, and the type of tasks they perform, including wheeled and tracked tractors.</p> <p>Tractor Engines and Farm Power Sources Agricultural tractors rely on internal combustion engines powered by diesel or gasoline. Other power sources on farms include electricity, solar energy, and mechanical power derived from animals.</p> <p>Engine Operation: Four-Stroke and Two-Stroke Cycles Engines operate using either a four-stroke cycle (intake, compression, power, exhaust) or a two-stroke cycle, with the choice affecting fuel efficiency and overall engine performance.</p> <p>Power Transmission Systems in Agricultural Tractors Power is transmitted from the engine to the wheels or equipment through components such as the gearbox (manual or automatic), clutch, and hydraulic transmission systems, allowing for precise control of speed and power.</p> <p>Ground Contact Mechanisms, Hydraulic System, and Power Take-Off (PTO) Ground contact mechanisms include wheels or tracks to ensure stability and traction. The hydraulic system is used for raising and lowering implements, while the PTO drives mechanical attachments.</p> <p>Primary Soil Preparation Equipment This category includes various plows such as the moldboard plow, chisel plow, disc plow, vertical disc plow, and rotary plow, all designed to break up and turn the soil, improving aeration and preparing it for planting.</p> <p>Secondary and Specialized Soil Preparation Equipment Equipment such as harrows and leveling tools are used after plowing to refine the soil surface and optimize growing conditions. Other tools include subsoilers, cultivators, furrow openers, and undercut cultivators.</p> <p>Seeding Equipment Seeding machinery includes conventional and precision seeders that ensure uniform seed distribution at the proper depth for optimal germination.</p> <p>Planting and Transplanting Equipment These machines are used for planting seedlings and crops that require systematic placement, such as vegetables and field crops.</p> <p>Fertilization Equipment This includes manure spreaders and chemical fertilizer applicators, which help distribute nutrients efficiently across fields.</p> <p>Sprinkler Irrigation Equipment Sprinkler irrigation systems, either stationary or mobile, deliver water evenly to crops, enhancing water use efficiency.</p>

	<p>Drip Irrigation Systems and Pumps Drip irrigation systems provide a slow and steady water supply directly to plant roots through perforated pipes, while pumps transfer water from various sources to agricultural fields.</p> <p>Pest and Fire Control Equipment This category includes sprayers and dusters used to combat agricultural pests and diseases, along with fire control equipment for fields and forests.</p> <p>Grain Harvesting and Fruit Picking Equipment This includes combine harvesters and their functional units, which are essential for efficient harvesting operations.</p> <p>Post-Harvest Equipment post-harvest operations involve drying, sorting, storage, and packaging systems designed to maintain crop quality and minimize losses before marketing.</p>
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Learning and Teaching Strategies			
Strategies	Quizzes Reports Homework Discussion and solving exercises within the lecture, student interaction.		
Student Workload (SWL)			
Structured SWL (h/sem)	63	Structured SWL (h/w)	4
Unstructured SWL (h/sem)	62	Unstructured SWL (h/w)	4
Total SWL (h/sem)	125		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	Continuous	LO #1, #2 #3
	Assignments-class	2	10% (10)	Continuous	LO #4, #5
	Assignments-homework	2	10% (10)	Continuous	All
	Report	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Agricultural Tractors: Definition, Classification, and Power Sources Used on Farms, Agricultural Tractor Engines and Power Sources.
Week 2	Engine Operation Mechanism: Four-Stroke and Two-Stroke Cycles
Week 3	Power Transmission and Drive Systems in Agricultural Tractors
Week 4	Ground Engagement Systems, Hydraulic System, and Power Take-Off (PTO) Shaft
Week 5	Primary Soil Preparation Equipment
Week 6	Secondary and Specialized Soil Preparation Equipment
Week 7	Seeding Equipment
Week 8	Planting and Transplanting Equipment
Week 9	Fertilization Equipment
Week 10	Sprinkler Irrigation Equipment and Pumps
Week 11	Drip Irrigation Equipment
Week 12	Weed, Pest and Fire Control Equipment
Week 13	Grain Harvesting and Fruit Picking Equipment
Week 14	Mechanization of animal farm
Week 15	Final Examination

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Components and Assembly of Internal Combustion Engines
Week 2	Training on Operating Agricultural Tractors
Week 3	Timing System and Fuel System
Week 4	Cooling System and Lubrication System
Week 5	Field Training on Equipment Usage
Week 6	Field Training on Equipment Usage
Week 7	Field Training on Equipment Usage
Week 8	Field Training on Equipment Usage
Week 9	Field Training on Equipment Usage
Week 10	Field Training on Equipment Usage
Week 11	Field Training on Equipment Usage
Week 12	Field Training on Equipment Usage
Week 13	Field Training on Equipment Usage

Week14	Field Training on Equipment Usage
Week15	Final Examination

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> - Agricultural Machinery and Equipment, authored by Dr. Yassin Hashim Al-Tahan and Dr. Mohammed Jasim Al-Naama. Mechanization of animal farm, authored by Dr. Mohammed Jasim Al-Naama 	Yes
Recommended Texts	<ul style="list-style-type: none"> - CIGR Handbook of Agricultural Engineering. Vol., 1, 2, 3, 4, 5. American Society of Agricultural Engineers. USA 	NO
Websites	https://asabe.org/ , https://www.fao.org/home/ar	

Group	Grade	Marks %	Definition
Success Group (50 - 100)	A - Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example, a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



رئيس اللجنة العلمية
أ.د. محمد احمد مراد