MODULE DESCRIPTION

Module Information

Module Title	**WASTE TREATMENT AGRICULTURAL ENGINEERING**	**Module Delivery**	
Module Type	**Core learning activity**	☒Theory ☐ Lecture ☒T Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**AWE2210**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level	**UGll**	**Semester of Delivery**	2
Administering Department	AGME1986	**College**	**AGFO1964**
Module Leader	Yousif Yakoub Hilal	**e-mail**	Yousif.Yakoub@uomosul.edu.iq
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	Ph.D.
Module Tutor	N.A.	**e-mail**	N.A.
Peer Reviewer Name	N.A.	**e-mail**	N.A.
Scientific Committee Approval Date	2026/2/1	**Version Number**	1.0

Relation with other Modules

Prerequisite module	APT2140	**Semester**	2
Co-requisites module	None	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1-Developing the concept of agricultural waste treatment engineering 2- Capacity development on creating clean, environmentally friendly, recycled projects 3- Promoting the positive attitudes of individuals towards agricultural waste treatment engineering and the use of modern technologies in treatment 4- Encouraging work on recycling and treating agricultural waste and using organic fertilizers
Module Learning Outcomes LOs	The student should be able to: LO#1: Knows the general concepts of agricultural waste treatment engineering LO#2: Determines appropriate means and methods for recycling and treating environmentally harmless agricultural waste LO#3: It proposes modern ideas and capabilities for clean and environmentally friendly projects in reprocessing agricultural waste LO#4: The student has ethical responsibilities in the production of new and recycled resources
Indicative Contents	The guiding content includes the following: Theoretica:l

	Developing agricultural waste treatment engineering skills and identifying appropriate means for treating solid, liquid and gaseous waste, as well as identifying the types of agricultural waste and how to employ them in creating clean, environmentally friendly projects to develop work in the field of agricultural engineering sciences and methods of using them efficiently to develop agricultural production and recycle and treat .environmentally non-harmful waste as an economic opportunity lab The most important modern means of obtaining and benefiting from recycling agricultural waste will be .addressed by conducting reviews and laboratory experiments to recycle some solid, liquid and gaseous waste Total hrs = 63 = SSWL - (Exam hrs) = 63-3= 60 (Time table hrs x 15 weeks)

Learning and Teaching Strategies

Strategies	1. Interactive lecture, Brainstorming 2. Dialogue and discussion 3. Assigning reports 4. Quizzes 5. Show examples for writing scientific reports in the correct formats.

Student Workload (SWL)

Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem)	37	**Unstructured SWL (h/w)**	2
Total SWL (h/sem)	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	15% (10)	4,,10 and 12	LO#1and LO#2
	Assignments	2	10% (10)	2, and 13	LO#1 andLO#3
	Projects/ lab	2	5% (10)	8 and 12	All
	Report	1	10% (10)	14	LO#1, LO#2and LO#4
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO#1, LO#2 and LO#3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered

Week 1	The concept of agricultural waste treatment engineering and its importan
Week 2	Types of solid, liquid and gaseous agricultural waste
Week 3	Agricultural waste treatment objectives as an economic opportunity
Week 4	Classification of agricultural waste according to its components and composition
Week 5	Effects of agricultural waste on the environmental economy
Week 6	Agricultural waste sources .
Week 7	Mid exam
Week 8	gro-environmental management, policy and agro-environmental planning .
Week 9	Ways to benefit from organic agricultural waste
Week 10	Agricultural ecological footprint and its impacts.
Week 11	Waste disposal systems (Waste handling methods)
Week 12	Causes of the spread of hazardous toxic industrial waste, non-toxic waste and radioactive wast
Week 13	Production of organic fertilizer, biogas and biogas fertilizer
Week 14	Reducing greenhouse gas emissions and green nitrogen uses
Week 15	Animal feed production, use of liquid feed, solid molasses blocks and roughage grinding (mechanical processing) .
Week 16	Preparatory week before the final

Delivery Plan (Weekly LAB Syllabus) ing modern technology and discussing the most important means of transferring and adopting it by :farmers, as well as the obstacles and treatments that ensure adoption	
	Material Covered
Week 1	Organic fertilizer (improving the organic fertilizer properties of poultry manure by adding biochar)
Week 2	Biogas potential as a sustainable new energy source for rural livelihoods (green hydrogen and gas uses and greenhouse gas mitigation)
Week 3	Practical experiments to benefit from heat exchangers in drying fish farm waste and treating and recycling chicken litter .
Week 4	Methane production by anaerobic fermentation from cattle manure and poultry droppings under laboratory conditions.
Week 5	Hydroponics: Growing plants in a water solution instead of soil, which reduces water use.
Week 6	Some natural properties of apricot kernels and their recycling.
Week 7	Midterm Exam
Week 8	Agricultural Robots: The use of robots to perform tasks such as planting and harvesting.
Week 9	Utilization of heat exchangers in drying fish farm waste.
Week 10	Design and manufacture of a unit for cooking meals from poultry waste as a non-traditional feed
Week 11	Improving the properties of organic fertilizer of poultry waste by adding biochar
Week 12	Crushing of roughage (mechanical treatment of waste with urea solution, ammonia gas and silage)
Week 13	Organic fertilizer production as a successful, clean and environmentally friendly project
Week 14	Organic Farming: Agricultural techniques that rely on the use of natural materials instead of chemicals.

Week 15	Organic Fertilizer Production Systems Andrew's Method Classification of Organic Fertilizer Production Systems and Production Stages .

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Environmental Economics 2022lMustafa Youssef Kafi Book	YES
Recommended Texts	Agricultural Waste Treatment Engineering 2000, Kingdom of Saudi Arabia, King Saud University, College of Agricultural Engineering.	NO
Websites		

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

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