



Course Specification

(Bachelor)

Course Title: Modern Agricultural Technologies

Course Code: APSA1603

Program: Sustainable Agriculture Techniques

Department: Enter Department Name .

College: Applied College

Institution: : Umm Al-Qura University

Version: Version 1

Last Revision Date: 16 June 2025



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A. General information about the course:

1. Course Identification

1. Credit hours: (2 hours)

2 credit hours

2. Course type

- A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
- B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: 1st Semester

4. Course General Description:

This course introduces students to the latest smart and sustainable technologies in agriculture. It emphasizes precision agriculture, smart irrigation systems, greenhouse management, hydroponics, aeroponics, and vertical farming. Students will gain theoretical knowledge and practical insights into how these innovations enhance productivity, resource efficiency, and environmental sustainability.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

- Understand the principles of modern agricultural technologies and their role in sustainable food production.
- Explore applications of smart agriculture tools such as sensors, drones, and automation.
- Analyze management strategies for protected agriculture and soilless farming systems.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		



3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe the principles of hydroponic and aeroponic systems.	K3	Group Discussions	-Reports -Oral presentations
1.2	Explain the concepts and environmental, economic, and social objectives of sustainable agriculture.	K2	Lectures	-Quizzes -Assignments -Final exam
1.3	Recognize key smart agricultural technologies and their functions.	K4	Lectures, Case Studies	Quizzes Final exam
2.0				
2.1	Analyze and compare various protected agriculture systems.	S1	Lectures -Discussions -Presentations	Oral presentations -Quizzes -Assignments -Final exam
2.2	Demonstrate responsibility in applying sustainable farming	S1	-Lectures -Discussions -Presentations	-Oral presentations -Quizzes -Assignments
2.3	Evaluate the effectiveness of	S4	Lectures	-Final exam





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	renewable energy use in agricultural operations.			
	Apply soil-less farming systems (hydroponics and aeroponics) in a simulated environment.	S1	-Lectures -Discussions -Presentations	-Oral presentations -Quizzes -Assignments
	Design a sustainable farming plan incorporating water and soil conservation techniques.	S2	Presentations	Oral presentations -Assignments
3.0				
3.1	Collaborate in a multidisciplinary team to solve an agricultural problem related to sustainability.	V2	-Discussions -Presentations	-Oral presentations Assignments
3.2	Demonstrate ethical and environmentally responsible practices in agricultural activities.	V3	-Discussions -Presentations	-Oral presentations Assignments

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to smart agriculture and sustainability	2
2.	Precision agriculture: sensors, drones, and data analysis	2
3.	Smart irrigation and water-saving technologies	2
4.	Climate-smart farming techniques	2
5.	Protected agriculture and greenhouse management	4
6.	Hydroponic systems: types and operation	4
7.	Aeroponics: principles and applications	2
8.	Vertical farming and urban agriculture	2
9.	Renewable energy in agriculture (solar, wind)	4
10.	Internet of Things (IoT) in agriculture	2
11.	Agricultural robotics and automation	2
12.	Review and Case Studies -	2





Total

30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid Term Exam	6	20%
2.	Applied case studies	10	20%
3.	Reports and essay	12	10%
4.	Final Exam	16	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<p>Jones, H.G. (2014). Plants and Microclimate. Cambridge University Press.</p> <p>- Resh, H.M. (2022). Hydroponic Food Production. CRC Press.</p> <p>- Shamshiri, R.R. et al. (2021). Intelligent Agriculture. Springer.</p>
Supportive References	<p>- Kozai, T. et al. (2019). Plant Factory. Academic Press.</p> <p>- Gebbers, R. & Adamchuk, V.I. (2010). Precision Agriculture and Food Security. Science.</p>
Electronic Materials	<p>Articles from Agricultural Systems, Computers and Electronics in Agriculture</p> <p>- Online hydroponic/aeroponic design simulations</p>
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
<p>facilities</p> <p>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)</p>	Classrooms
<p>Technology equipment</p> <p>(projector, smart board, software)</p>	Projector and Smart board
<p>Other equipment</p> <p>(depending on the nature of the specialty)</p>	





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct: CLO's assessment Indirect: regular surveys to evaluate teaching effectiveness and course relevance
Effectiveness of Students assessment	Peer review	Direct: Annual review of course content by faculty members and external experts
Quality of learning resources	Students	Indirect: regular surveys to evaluate quality of learning resources
The extent to which CLOs have been achieved	Peer review	Direct: Annual review of course content by faculty members and external experts
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Umm Al-Qura University Council
REFERENCE NO.	851110214476/195626
DATE	18/2/1447

