Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2025

Academic Program Description Form

University name: Northern Technology University
College/Institute:Agricultural Technical College
Scientific Department:Medicinal plant technologies and natural products
Name of academic or professional program:Bachelor'sIn Medicinal plant technologies and natural products
Final certificate name:Bachelor'sIn the Department Medicinal plant technologies and natural products
Academic system:curriculum system
Description preparation date:1/7/2025
Date of filling out the file: 1/7/2025

the signature :
nameScientific Assistant:Dr. Hesham Hashem Mohammed
the date : 1/7/2025

the signature :
nameHead of Department:Dr. Janan kassim al-tarjuman
the date : 1/7/2025

Check the file before
Quality Assurance and University Performance Division
Name of the Director of the Quality Assurance and University Performance Division: Haneen mowfak ahmed
the date : 1/7/2025
the signature

Dean's approval
Prof.Dr.shihab ahmed yousif

Approval of the Dean

1. Program Vision

The Department of Medicinal Plant Technologies and Natural Products is an influential scientific, cultural, and intellectual center that provides the Iraqi and Arab communities with technical and agricultural engineering expertise that meets their needs in terms of both quantity and quality. This is achieved through the department's technical staff, who hold advanced degrees in various fields of specialization, in addition to the department's model laboratories that work to raise scientific efficiency and skills. In order to keep pace with developments in agricultural technical education in accordance with scientific standards that meet the requirements of the labor market and achieve sustainable development on academic and scientific bases capable of satisfying the desires of society in the field of herbal and medicinal plant technologies and natural products, and expanding scientific and technical programs.

2. Program Mission

The Department of Medicinal Plants and Natural Products is committed to preparing qualified agricultural engineering staff specializing in medicinal plants and natural products who are capable of implementing agricultural plans and programs and have the ability to develop, innovate, and keep pace with developments in the field of medicinal plants and their natural products used in various fields.

3. Program Objectives

The department aims to graduate technical staff specialized in herbal and medicinal plant techniques and natural products through:

1. Classifying plants according to their medicinal benefits and degree of toxicity.

2. Cultivating and propagating medicinal plants.

3. The ability to extract natural medicinal drugs.

4. Using separation and purification techniques for active compounds in herbal and medicinal plant extracts.

5. Determining therapeutic doses for diseases using herbal and medicinal plant extracts.

6. The ability to treat diseases with medicinal plants.

7. Ability to cultivate and propagate medicinal plants.

8. Classification of medicinal herbs and plants and determination of their therapeutic efficacy and degree of toxicity.

9. Work in factories producing preparations from medicinal herbs and plants.

4. Program Accreditation

NO

5. Other external influences

The presence of a sponsor that contributes to:

1- Linking the program to the job market or society

2- Supporting student training

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	12	22	14.3	Core and non-core courses
College Requirements	14	28	18.2	Core and non-core courses
Department Requirements	43	104	67.5	Core and non-core courses
Summer Training	2	Decision made	Decision made	core courses
Other	None	None	None	None

* This can include notes whether the course is basic or optional.

7. Program Description

Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First	NTU 100	Democracy and Human Rights	2	0
	NTU 101	English Language (1)	2	0
	NTU 102	Computer principles(1)	1	1
	NTU 103	Arabic Language(1)	2	0
	NTU	Elective	2	0
	TAMO 101	Mathematics	1	0
	TAMO 102	Engineering Drawing	0	3
	TAMO 103	Plane surveying	1	3
	TAMO 104	General Chemistry	1	3
	TAMO	Elective	2	0
	PMNP 101	General Botany	2	3
	PMNP 102	Principles of Soil Sciences	2	3
	PMNP 103	Medicinal plants	2	3
	PMNP 104	Plant anatomy	1	3
	PMNP 105	Biotechnology	1	2
	PMNP	Elective	1	3
	PMNP	Elective	1	3
	PMNP	Elective	1	3
	NTU 104	Sport	1	1
	NTU 105	French Language	2	0
	TAMO 151	Economics of Natural Resources	2	0
	TAMO 152	Agricultural Extension	2	0
	PMNP 151	Laboratory Techniques	0	3
	PMNP 152	Cytology	1	3
	PMNP 153	Plants Protection	1	3
	PMNP 154	General Insects	1	3
	PMNP 155	Molecular biology	1	2
	PMNP 156	Sustainable Agriculture	1	0
	PMNP 157	Desert Plants	1	2
Second	NTU 200	English language (2)	2	0
	NTU 201	Computer principles(2)	1	1
	NTU 202	Arabic Language(2)	2	0
	NTU 203	Crimes of the Baath regime in Iraq	2	0
	NTU 204	Professional ethics	2	0
	TAMO 201	Organic Chemistry	2	3
	TAMO 202	Agriculture Statistics	1	2
	TAMO	Elective	1	3
	PMNP 201	Natural products	2	3
	PMNP 202	Plant environment	2	3
	PMNP 203	Classification ofmeddicinal plants	2	3
	PMNP 204	Plant Physiology	1	3
	PMNP 205	Microbiology	2	3
	PMNP 206	Plant extracts	1	3
	PMNP 207	Decoration Plant	2	3
	PMNP 208	Biological applications of volatile oils	1	3
	PMNP 209	Summer Training (1)	–	–
	PMNP	Elective	1	3
	PMNP	Elective	1	3
	PMNP	Elective	1	3

	TAMO 251	Agro nanotechnology	1	2
	TAMO 252	Food Industry	1	3
	PMNP 251	Production of medicinal plants	1	2
	PMNP 252	Weeds	1	3
	PMNP 253	Oil and Aromatic crops	1	3
	PMNP 254	Soil and Plant Analysis	1	3
	PMNP 255	Plant tissue and cell culture	1	3
	PMNP 256	Genetics	1	2
Third	TAMO 301	Computer Applications (3)	1	2
	TAMO 302	Biochemistry	2	3
	TAMO	Elective	1	2
	PMNP 301	Effective compounds	2	3
	PMNP 302	Protected Decoration Plants	1	3
	PMNP 303	Protected Agriculture Techniques	2	3
	PMNP 304	Production of medicinal plant seeds	2	3
	PMNP 305	Plant Growth Regulators	1	3
	PMNP 306	Molecular Genetics	2	3
	PMNP 307	Plant Pathology	1	3
	PMNP 308	Care &Storage of medicinal plants	1	3
	PMNP 309	Useful Insects	2	3
	PMNP 310	Summer Training (2)	–	–
	PMNP	Elective	1	2
	PMNP	Elective	1	2
	PMNP	Elective	1	2
	TAMO 351	Recycling of Agricultural Wastes	1	2
	TAMO 352	Organic Agriculture	1	2
	PMNP 351	Forage Crops	1	2
	PMNP 352	Fertility and fertilization	1	3
	PMNP 353	Seed technology	1	2
	PMNP 354	Harvesting Equipments	1	2
	PMNP 355	Economical Entomology	1	2
	PMNP 356	Modern planting techniques	1	2
Fourth	NTU 400	Scientific research methodology	2	0
	TAMO 401	Design and Analysis of Experiments	1	3
	TAMO 402	Computer Applications (4)	1	3
	TAMO	Elective	2	0
	PMNP 401	Plant Breeding(1)	2	2
	PMNP 402	Metabolism	1	2
	PMNP 403	Crop Quality	2	2
	PMNP 404	Auto analysis	1	2
	PMNP 405	Plant Breeding(2)	2	2
	PMNP 406	Medicinal plant pests	2	2
	PMNP 407	Biomass chemistry	2	3
	PMNP 408	Seminar and Project (1)	1	3
	PMNP 409	Seminar and Project (2)	1	3
	PMNP	Elective	1	3
	PMNP	Elective	1	3
	PMNP	Elective	1	3
	TAMO 451	Safety	2	0
	TAMO 452	Agricultural marketing	2	0
	PMNP 451	Bio Fertilizers	1	2
	PMNP 452	Tobacoo Technology	1	2
	PMNP 453	Biological Control	1	2
	PMNP 454	Farm Management	1	2
	PMNP 455	Conservation Agriculture	1	2
	PMNP 456	Post-Harvest Techniques	1	2
	PMNP 457	Pesticides	1	2

8. Expected learning outcomes of the program

Knowledge

A1- Students will learn about and understand human rights and democracy.
A2- Students will learn about supporting sciences such as mathematics, geometry, engineering drawing, chemistry, statistics, and other sciences and their applications in the field of medicinal plant technologies and natural products.
A3- Students should be able to identify plant species in general and medicinal plants and their seeds in particular.
A4- Students should learn about types of plant extracts and their applications.

Skills

B 1 – Ability to speak and write in Arabic and English, prepare reports, write graduation projects, and use computers.
B2 – Ability to cultivate and care for plants, medicinal plants, and aromatic plants, including selecting suitable varieties, preparing soil, irrigation, fertilization, pest and disease control, and modern agricultural techniques.
B3 – Ability to extract natural products from plants.
B4 – Ability to use medicinal plants and their products in various fields, such as the manufacture of medicines, cosmetics, health foods, and natural remedies.

Ethics

C1- Learners should be able to understand the meaning of democracy and human rights.
C2- Learners should be able to communicate and write reports and graduation projects in Arabic and English.
C3- Learners should be able to appreciate the importance of plants and medicinal plants in maintaining public health.
C4- Learners will be able to identify medicinal plants and methods of extracting active compounds from them.

9. Teaching and Learning Strategies

Theoretical lectures, practical lectures, educational videos, presentations, field trips, scientific visits, discussions, seminars, and e-lectures.

10. Evaluation methods

Daily tests, quarterly exams, final exams, oral questions, practical and applied exams, extracurricular activities.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Food Science and Biotechnology	Dairy Science		Scientific research and computer skills	1	
Assistant Professor	Field Crops	Weed Control		Scientific research and computer skills	1	
Assistant Lecturer	Plant Production	Plant Production		Scientific research and computer skills	2	
Assistant Lecturer	Food Science and Biotechnology	Food Science		Scientific research and computer skills	1	
Assistant Lecturer	Agricultural Economics	Agricultural Economics		Scientific research and computer skills	1	
Assistant Lecturer	Agricultural machinery and tools	Agricultural machinery and tools			1	
Assistant Lecturer	Horticulture and Landscape Architecture	Horticulture and Landscape Architecture		Scientific research and computer skills	1	
Assistant Lecturer	Soil Science	Soil Science			1	
Assistant Lecturer	Arabic Language	Arabic Language		Computer skills		1
Assistant Professor	Veterinary Medicine	Microbiology		Scientific research and language skills		1
Assistant Lecturer	Computer Science	Computer Science		Computer skills		1
Assistant Lecturer	Economics	Economics		Computer and math skills		1

Professional Development
Mentoring new faculty members
Training courses in the field of specialization. **Courses on teaching and learning.** **Courses on how to publish scientific research.**
Professional development of faculty members
Training courses in the field of specialization. **Developing scientific publishing skills.**

12. **Acceptance Criterion**
Criteria adopted in the central admission process of the Ministry of Higher Education and Scientific Research.

13. **The most important sources of information about the program**
Northern Technical University website. **Agricultural Technical College website.** **Department of Medicinal Plant Technologies and Natural Products website.** **Scientific research published by department members.** **Books on medicinal plants.**

14. Program Development Plan
Work on updating curricula to keep pace with the job market. **Work on developing educational laboratories in the department.** **Work on developing educational fields in the department.**

Program Skills Outline															
				Required program Learning outcomes											
Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First level	NTU 100	Democracy and Human Rights	Basic	✔								✔			
	NTU 101	English Language (1)	Basic					✔					✔		
	NTU 102	Computer principles(1)	Basic					✔					✔		
	NTU 103	Arabic Language(1)	Basic					✔					✔		
	TAMO 101	Mathematics	Basic		✔										
	TAMO 102	Engineering Drawing	Basic		✔										
	TAMO 103	Plane surveying	Basic		✔										
	TAMO 104	General Chemistry	Basic		✔										
	PMNP 101	General Botany	Basic			✔			✔					✔	
	PMNP 102	Principles of Soil Sciences	Basic						✔						
	PMNP 103	Medicinal plants	Basic			✔			✔						
	PMNP 104	Plant anatomy	Basic								✔			✔	
	PMNP 105	Biotechnology	Basic								✔				

	NTU 104	**Sport**	**Optional**	✔											
	NTU 105	**French Language**	**Optional**					✔							
	TAMO 151	**Economics of Natural Resources**	**Optional**		✔						✔				
	TAMO 152	**Agricultural Extension**	**Optional**		✔						✔				
	PMNP 151	**Laboratory Techniques**	**Optional**		✔					✔					
	PMNP 152	**Cytology**	**Optional**		✔										
	PMNP 153	**Plants Protection**	**Optional**		✔				✔						
	PMNP 154	**General Insects**	**Optional**		✔				✔						
	PMNP 155	**Molecular biology**	**Optional**		✔						✔				
	PMNP 156	**Sustainable Agriculture**	**Optional**		✔				✔						
	PMNP 157	**Desert Plants**	**Optional**		✔	✔			✔						
Second level	**NTU 200**	**English language (2)**	**Basic**					✔					✔		
	NTU 201	**Computer principles(2)**	**Basic**					✔					✔		
	NTU 202	**Arabic Language(2)**	**Basic**					✔					✔		
	NTU 203	**Crimes of the Baath regime in Iraq**	**Basic**	✔											
	NTU 204	**Professional ethics**	**Basic**	✔	✔			✔							
	TAMO 201	**Organic Chemistry**	**Basic**		✔										

	TAMO 202	**Agriculture Statistics**	**Basic**		✔										
	PMNP 201	**Natural products**	**Basic**				✔				✔				✔
	PMNP 202	**Plant environment**	**Basic**		✔				✔						
	PMNP 203	**Classification ofmeddicinal plants**	**Basic**			✔				✔				✔	
	PMNP 204	**Plant Physiology**	**Basic**		✔										
	PMNP 205	**Microbiology**	**Basic**		✔										
	PMNP 206	**Plant extracts**	**Basic**				✔				✔			✔	✔
	PMNP 207	**Decoration Plant**	**Basic**		✔									✔	
	PMNP 208	**Biological applications of volatile oils**	**Basic**		✔						✔			✔	
	PMNP 209	**Summer Training (1)**	**Basic**		✔	✔	✔		✔	✔	✔			✔	✔
	TAMO 251	**Agro nanotechnology**	**Optional**		✔				✔						
	TAMO 252	**Food Industry**	**Optional**		✔						✔				
	PMNP 251	**Production of medicinal plants**	**Optional**			✔			✔						
	PMNP 252	**Weeds**	**Optional**		✔				✔						
	PMNP 253	**Oil and Aromatic crops**	**Optional**		✔		✔			✔	✔				✔
	PMNP 254	**Soil and Plant Analysis**	**Optional**		✔										
	PMNP 255	**Plant tissue and cell culture**	**Optional**		✔										

	PMNP 256	**Genetics**	**Optional**		✔										
Third level	**TAMO 301**	**Computer Applications (3)**	**Basic**					✔					✔		
	TAMO 302	**Biochemistry**	**Basic**		✔										
	PMNP 301	**Effective compounds**	**Basic**		✔		✔			✔	✔				✔
	PMNP 302	**Protected Decoration Plants**	**Basic**		✔										
	PMNP 303	**Protected Agriculture Techniques**	**Basic**		✔				✔						
	PMNP 304	**Production of medicinal plant seeds**	**Basic**			✔			✔						
	PMNP 305	**Plant Growth Regulators**	**Basic**		✔				✔						
	PMNP 306	**Molecular Genetics**	**Basic**		✔										
	PMNP 307	**Plant Pathology**	**Basic**		✔				✔						
	PMNP 308	**Care &Storage of medicinal plants**	**Basic**		✔				✔						
	PMNP 309	**Useful Insects**	**Basic**		✔										
	PMNP 310	**Summer Training (2)**	**Basic**		✔	✔	✔		✔	✔	✔			✔	✔
	TAMO 351	**Recycling of Agricultural Wastes**	**Optional**		✔										
	TAMO 352	**Organic Agriculture**	**Optional**		✔				✔						
	PMNP 351	**Forage Crops**	**Optional**		✔										
	PMNP 352	**Fertility and fertilization**	**Optional**		✔				✔						

	PMNP 353	**Seed technology**	**Optional**		✔	✔									
	PMNP 354	**Harvesting Equipments**	**Optional**		✔										
	PMNP 355	**Economical Entomology**	**Optional**						✔						
	PMNP 356	**Modern planting techniques**	**Optional**		✔				✔						
Fourth level	**NTU 400**	**Scientific research methodology**	**Basic**					✔					✔		
	TAMO 401	**Design and Analysis of Experiments**	**Basic**		✔			✔					✔		
	TAMO 402	**Computer Applications (4)**	**Basic**					✔					✔		
	PMNP 401	**Plant Breeding(1)**	**Basic**		✔				✔						
	PMNP 402	**Metabolism**	**Basic**		✔										
	PMNP 403	**Crop Quality**	**Basic**		✔										
	PMNP 404	**Auto analysis**	**Basic**		✔										
	PMNP 405	**Plant Breeding(2)**	**Basic**		✔										
	PMNP 406	**Medicinal plant pests**	**Basic**		✔				✔						
	PMNP 407	**Biomass chemistry**	**Basic**		✔										
	PMNP 408	**Seminar and Project (1)**	**Basic**					✔					✔		
	PMNP 409	**Seminar and Project (2)**	**Basic**					✔					✔		
	TAMO 451	**Safety**	**Optional**		✔			✔							
	TAMO 452	**Agricultural marketing**	**Optional**		✔										

	PMNP 451	**Bio Fertilizers**	**Optional**		✔										
	PMNP 452	**Tobacoo Technology**	**Optional**		✔										
	PMNP 453	**Biological Control**	**Optional**		✔										
	PMNP 454	**Farm Management**	**Optional**		✔										
	PMNP 455	**Conservation Agriculture**	**Optional**		✔				✔						
	PMNP 456	**Post-Harvest Techniques**	**Optional**		✔										
	PMNP 457	**Pesticides**	**Optional**		✔				✔						

First Level Course

1. Course Name:
Democracy and human rights
2. Course Code:
NTU100
3. Semester / Year:
The first / 2025
4. Description Preparation Date:
2025/7 /17
5. Available Attendance Forms:
Paper form including name, date of attendance and signature
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours/2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Abdul Majeed Mahmoud Hamoudi **Email: Abdulmagid2020@ntu.edu.iq**
8. Course Objectives
1. Introduce the student to the most important laws related to human rights. **2. Introduce the student to the most important Iraqi constitutions and their relationship to human rights.** **3. Teach the student to respect the freedom of others in their interactions, taking into account the cultural differences in the Iraqi environment.**
9. Teaching and Learning Strategies
• Learning based on dialogue and discussion. **• Brainstorming.** **• Cooperative and group learning.** **• Practical training.** **• Self-directed learning.**

Course Structure

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Methods	Assessment Methods
1	2	Knowledge, intellectual, practical, and attitudinal skills regarding human rights (definition and goals).	Introduction to Human Rights	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests
2	2	Define roots of human rights, review historical milestones, explain justice/freedom in ancient civilizations, identify old documents & principles.	Roots of Human Rights and their Development	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests
3	2	Understand human rights in pre-Christian	Human Rights in Ancient	Presentation, explanation,	Oral & written tests, scientific reports

		civilizations, Mesopotamian laws, religious laws, and Islamic perspective.	Civilizations & Divine Laws	Q&A, interactive discussion, self-learning	
4	2	Explore medieval societies, feudal systems, important documents, and social classes' impact on rights.	Human Rights in the Middle Ages	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
5	2	Understand evolution of rights in political theories, philosophers' contributions, and schools of thought.	Human Rights in Political Theories & Declarations	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
6	2	Recognize post-WWII international recognition, role of UN & organizations, treaties, and monitoring mechanisms.	Human Rights in Modern History	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
7	2	Understand global/regional recognition of human rights and key conventions.	International and Regional Recognition of Human Rights	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
8	2	Define NGOs, their roles, types, and key organizations defending human rights.	NGOs and Human Rights	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
9	2	Understand role of national organizations in monitoring and reporting human rights violations.	National Human Rights Organizations	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests
10	2	Recognize constitutional rights in Iraq, theory vs. practice, and challenges in protection.	Human Rights in Iraqi Constitutions	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests
11	2	Understand human rights and freedoms in the Universal Declaration of Human Rights (UDHR).	Human Rights and Public Freedoms in UDHR	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, daily activities, reports

12	2	Compare freedoms in regional charters (EU, African Charter) and national constitutions.	Human Rights in Regional Charters & Constitutions	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, daily activities, reports
13	2	Analyze essential & collective rights, their role in identity, culture, and diversity.	Essential & Collective Human Rights	Explanation, Q&A, interactive discussion, self-learning	Oral & written tests, reports
14	2	Identify economic, social, cultural rights (work, education, health, housing) vs. civil & political rights (freedom, justice, participation).	Economic, Social & Cultural Rights vs. Civil & Political Rights	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, daily activities, reports
15	2	Understand contemporary human rights and their link to sustainable development goals.	Contemporary Human Rights: Development & Clean Environment	Presentation, explanation, Q&A, interactive discussion, self-learning	Oral & written tests, daily activities, reports

□ Course Assessment

- Exams + Exercises + Discussions + Q&A

□ Learning Resources

- **Required Textbook:**
  "Studies in Democracy and Human Rights" by Hadi Rabea, Dar Al-Jinan Publishing, 2016
- **Main Reference:**
  "Democracy and Human Rights: Concepts, Measures and Relationships" by Todd Landman, 2018
- **Recommended Journals & Reports:**
  The International Journal of Human Rights
- **Electronic Resources:**
  https://www.ohchr.org
  https://www.amnesty.org
  https://www.hrw.org

Course Description Form

No.	Item	Details
1	Course Title	English Language (1)
2	Course Code	NTU101
3	Semester / Year	First Semester
4	Date of Description Preparation	—
5	Available Attendance Forms	1. Weekly lecture schedule (theoretical) 2. Discussions, scientific seminars, and other extracurricular activities
6	Total Credit Hours / Total Units	30 hours
7	Course Coordinator (mention all names if more than one)	Name: Asst. Lecturer Omar Ahmed Fathi Email: omar.ah.f@ntu.edu.iq
8	Course Objectives	1. Enable the student to acquire English terminology knowledge for all agricultural specializations. 2. Enable the student to recognize the origins of words and sentences, their components, and types. 3. Enable the student to learn the correct pronunciation of English vocabulary.
9	Teaching and Learning Strategies	1. Interactive lectures 2. Brainstorming 3. Dialogue and discussion 4. Assignments and reports 5. Group work to develop leadership skills
10	Course Structure	See detailed weekly plan below
11	Course Assessment	(Oral exams / Written exams / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
12	Learning and Teaching Resources	**Required textbooks (if any):** Lecturer-prepared notes **Main references (sources):** — **Recommended books and references (journals, reports, etc.):** English books in all specializations

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Weekly Course Plan

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2 theoretical	Student can identify agricultural scientific terms in English across all specializations.	Scientific terms in agriculture	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
2	2 theoretical	Student can identify scientific terms in plant	Scientific terms in plant production	Auditory methods:	Quizzes, assignments,

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
		production.		board writing, direct dialogue	discussions
3	2 theoretical	Student can identify scientific terms in animal production.	Scientific terms in animal production	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
4	2 theoretical	Student can identify scientific terms in plant protection.	Scientific terms in plant protection	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
5	2 theoretical	Monthly exam	Monthly exam	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
6	2 theoretical	Student can identify scientific terms in food sciences.	Scientific terms in food sciences	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
7	2 theoretical	Monthly exam	Monthly exam	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
8	2 theoretical	Student can identify scientific terms in agricultural economic and social sciences.	Scientific terms in agricultural economic and social sciences	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
9	2 theoretical	Student can identify scientific terms in agricultural biotechnology.	Scientific terms in agricultural biotechnology	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
10	2 theoretical	Student can identify scientific terms in soil sciences.	Scientific terms in soil and water sciences	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
11	2 theoretical	Monthly exam	Monthly exam	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions
12–13	2 theoretical	Student can identify scientific terms in agricultural engineering.	Scientific terms in agricultural engineering	Auditory methods: board writing,	Quizzes, assignments, discussions

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
				direct dialogue	
14–15	2 theoretical	Review of all English lectures delivered during the academic year.	Review article	Auditory methods: board writing, direct dialogue	Quizzes, assignments, discussions

11. Course Assessment

(Oral exams / Written exams / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)

12. Learning and Teaching Resources

- **Required textbooks (curriculum books, if any):** Lecturer-prepared lectures
- **Main references (sources):** —
- **Recommended books and references (scientific journals, reports, etc.):** English books in all specializations

Course Description Form

1. Course Name:
Computer 1
2. Course Code:
NTU 101
3. Semester / Year:
2024 – 2025/1
4. Description Preparation Date:
11 / 6 / 2025
5. Available Attendance Forms:
Paper form including name, date of attendance and signature
6. Number of Credit Hours (Total) / Number of Units (Total)
45 / 3
7. Course administrator's name (mention all, if more than one name)
Name: Mustafa Natheer Mustafa Email: mustafa.n.m1989@ntu.edu.iq
8. Course Objectives

Course Objectives	• **Understand basic concepts in computer science such as data, software, hardware, and networks.** • **Ability to analyze problems and understand basic algorithms used in programming and software development.** • **Learn basic programming languages such as C, Python, or Java and understand the basics of writing and executing code.** • **Ability to use software development tools such as text editors and integrated development environments (IDEs).** • **Understand the concepts of information security and privacy in the context of technology use.** • **The ability to understand and analyze computer systems, networks, and communication concepts between devices.** • **Learn about artificial intelligence concepts and their basic applications.** • **Learn about the basics of operating systems and how to manage computer resources and processes.**

9. Teaching and Learning Strategies	
Strategy	1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Practical training. 5. Self-directed learning.

10.Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**

1	2	The student learns the components of the computer, its material and software.	Introduction to Computers	Lecture, presentation, illustrations	Questions and answers
2	2	The student learns to apply and execute internal and external commands of the operating system.	MS-DOS operating system	Lecture, presentation, illustrations	Questions and answers
3	2	The student learns the MS-DOS operating system and distinguishes its commands from other systems.	MS-DOS Operating System Commands	Lecture, presentation, illustrations	Questions and answers
4	2	The student will be able to identify the Windows operating system, its components, requirements, and desktop features.	Windows Operating System	Lecture, presentation, illustrations	Questions and answers
5	2	The student must be proficient in symbols, handling the mouse, the taskbar, the Start menu, and how to shut down the system.	Windows Desktop Environment	Lecture, presentation, illustrations	Questions and answers
6	2	The student should know how to format	File and Disk Management	Lecture, presentation, illustrations	Questions and answers

		disks, copy files and folders, use cut and paste operations, deal with the Recycle Bin, and recover files.			
7	2	The student will learn to change the desktop background, control the screen saver, and add/remove programs from the Start menu.	System Interface Customization	Lecture, presentation, illustrations	Questions and answers
8	2	The student should be able to use the Control Panel programs.	System Settings	Lecture, presentation, illustrations	Questions and answers
9	2	The student learns to execute programs using Run.	Executing Programs using Run	Lecture, presentation, illustrations	Questions and answers
10	2	The student must be proficient in using the calculator, entertainment programs, and other additional programs.	Entertainment and Media Programs	Lecture, presentation, illustrations	Questions and answers
11	2	Paint, Office, and Help applications	Diverse System Applications	Lecture, presentation, illustrations	Questions and answers
12	2	The student will learn about computer viruses, infection methods, types, treatment methods, and anti-virus programs.	Security and virus protection concepts	Lecture, presentation, illustrations	Questions and answers

13	2	The student will understand how to work with desktop icons and the components of the My Computer icon, including disks, folders, and files.	Content Management	Lecture, presentation, illustrations	Questions and answers
14	2	Windows 7 and Microsoft allows students to learn multiple operating systems.	Windows 7 and Microsoft Corporation	Lecture, presentation, illustrations	Questions and answers
15	2	Summarize and evaluate knowledge and skills gained during the semester.	Final Review and Assessment	Lecture, presentation, illustrations	Questions and answers
11.Course Evaluation					
12.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			The vocabulary prescribed by the Ministry of Higher Education and Scientific Research		
Main references (sources)			نظام التشغيل ويندوز 7, شركة مايكروسوفت الامريكية, موقع الشركة الرسمي Microsoft www.microsoft.com		
Recommended books and references (scientific journals, reports...)			Google scholar		
Electronic References, Websites			All sites that provide reliable sources and also artificial intelligence tools		

Course Description Form

No.	Item	Details
1	Course Title	Arabic Language
2	Course Code	NTU103
3	Semester / Year	—
4	Date of Description Preparation	—
5	Available Attendance Forms	1. Weekly lecture schedule (theoretical) 2. Discussions, scientific seminars, and other extracurricular activities
6	Total Credit Hours / Total Units	—
7	Course Coordinator (mention all names if more than one)	Name: Asst. Lecturer Amina Maher Aziz Email: amina.mahir@ntu.edu.iq
8	Course Objectives	1. Enable students to read correctly. 2. Enable students to write correctly and use punctuation properly. 3. Enable students to use the Arabic language correctly. 4. Enable students to separate elements from their groups or mixtures. 5. Enable students to pronounce Arabic words, structures, and styles correctly in an engaging way. 6. Train students to express their ideas in clear and proper expressions.
9	Teaching and Learning Strategies	1. Interactive lectures 2. Brainstorming 3. Dialogue and discussion 4. Assignments and reports 5. Group work to develop leadership skills

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Weekly Course Plan

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2 theoretical	1. Identify types of language errors 2. Differentiate between open “taa” (ت) and closed “taa marbouta” (ة)	Introduction to language errors – taa marbouta and taa maftouha	Discussion, lecture	Quizzes, assignments, discussions
2	2 theoretical	1. Differentiate between long “alif” (ا) and short “alif	Rules of writing long and short alif –	Discussion, lecture	Quizzes, assignments,

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
		maqsoura” (ى) and their positions 2. Differentiate between solar and lunar letters	solar and lunar letters		discussions
3	2 theoretical	Differentiate between “dhaad” (ض) and “thaa” (ظ)	Letters dhaad and thaa	Discussion, lecture	Quizzes, assignments, discussions
4	2 theoretical	Enable students to write hamza correctly	Writing hamza	Discussion, lecture	Quizzes, assignments, discussions
5	2 theoretical	Identify punctuation marks and use them correctly	Punctuation marks	Discussion, lecture	Quizzes, assignments, discussions
6	2 theoretical	1. Identify nouns and verbs and their signs 2. Differentiate between noun and verb 3. Identify types of verbs 4. Differentiate between verb types	Noun and verb differentiation	Discussion, lecture	Quizzes, assignments, discussions
7	2 theoretical	Identify types of objects (maf’ool) and differentiate between them	Objects (maf’ool)	Discussion, lecture	Quizzes, assignments, discussions
8	2 theoretical	Enable students to write numbers correctly	Numbers	Discussion, lecture	Quizzes, assignments, discussions
9	2 theoretical	Identify common language errors and avoid them	Applications of common language errors	Discussion, lecture	Quizzes, assignments, discussions
10	2 theoretical	Identify common language errors and avoid them	Applications of common language errors	Discussion, lecture	Quizzes, assignments, discussions
11	2 theoretical	1. Differentiate between “noon” (ن) and tanween 2. Identify meanings of prepositions	Noon and tanween – meanings of prepositions	Discussion, lecture	Quizzes, assignments, discussions
12	2 theoretical	Identify formal aspects of administrative correspondence	Formal aspects of administrative correspondence	Discussion, lecture	Quizzes, assignments, discussions
13	2 theoretical	Identify the language of administrative correspondence	Language of administrative correspondence	Discussion, lecture	Quizzes, assignments, discussions

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
14	2 theoretical	Identify the language of administrative correspondence	Language of administrative correspondence	Discussion, lecture	Quizzes, assignments, discussions
15	2 theoretical	Identify models of administrative correspondence	Models of administrative correspondence	Discussion, lecture	Quizzes, assignments, discussions

Course Assessment and Resources

No.	Item	Details
11	Course Assessment	(Oral exams / Written exams / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
12	Learning and Teaching Resources	**Required textbooks (curriculum books, if any):** *General Arabic Language for Technical Universities* by Dr. Safaa Kazem Maki and Dr. Lama Mohammed Younis **Main references (sources):** 1. *Clear Dictation* by Abdul-Majid Al-Na'imi and Daham Al-Kayyal, Dar Al-Mutannabi Library, Baghdad, 6th ed., 1987. 2. *Lessons in Language, Grammar and Dictation for State Employees* by Ismail Hammoud Atwan et al., Ministry of Education Printing Press No. (3), Baghdad, 2nd ed., 1984. 3. *Arabic Language for Third Intermediate Grade* by Fatima Nazem Al-Atabi et al., 1st ed., 2018. 4. *General Arabic Language for Non-specialization Departments* by Abdul Qadir Hassan Amin et al., Ministry of Higher Education and Scientific Research, 2nd ed., 2000. 5. *From the Inspiration of Arabic Literature* by Haval Mohammed Amin, Al-Sa'doun Press, Baghdad. **Recommended books and references (journals, reports, etc.):** *Lessons in Language, Grammar and Dictation for State Employees* by Ismail Hammoud Atwan et al., Ministry of Education Printing Press No. (3), Baghdad, 2nd ed., 1984. **Electronic references and websites:** —

Course Description Form

1. Course Name:	
mathematics	
2. Course Code:	
TAMO101	
3. Semester / Year:	
2024 – 2025	
4. Description Preparation Date:	
7 / 6 / 2025	
5. Available Attendance Forms:	
Paper form including name, date of attendance and signature	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 / 1	
7. Course administrator's name (mention all, if more than one name)	
Name: Qahtan diab salman Email: Qahtan.Th.Salman@ntu.edu.iq	
8. Course Objectives	
Course Objectives	• The undergraduate student will be able to: • Understand the concept of a function and define it. • Distinguish between a relationship and a function. • Identify types of functions (e.g., linear, quadratic, exponential, etc.). • Represent functions graphically on a coordinate system. • Find the value of a function for a given number (the value of the function at a given x). • Determine the domain and range of a function. • Solve simple problems using function laws. • Explain changes in a function (e.g., increase, decrease, or stability). **General Objectives of Mathematics** 1. Develop the student's understanding of basic mathematical concepts. 2. Develop logical thinking and mathematical reasoning skills. 3. Enable the student to use basic arithmetic operations (addition, subtraction, multiplication, and division) accurately. 4. Develop the ability to solve mathematical problems in an organized manner. 5. Train the student to use mathematical symbols and expressions correctly. 6. Enhance graphic representation and data reading skills. 7. Empower the student to use mathematics in everyday life situations. 8. Develop skills in analysis, comparison, and classification of mathematical concepts. 9. Enhance accuracy and attention in mathematical work. 10. Develop self-confidence when dealing with mathematical problems and ideas. 11. Use educational and technical means to facilitate the learning of mathematical concepts.

	12. Link mathematics to other sciences and clarify its role in various areas of life.

9. Teaching and Learning Strategies

Strategy	1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Practical training. 5. Self-directed learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	• The student understands the concept of a function as a relationship that links two or more variables in an organized manner. The student recognizes the basic components of a function, such as domain, range, and function rule. The student distinguishes between different types of functions (linear, quadratic, fractional, exponential, and logarithmic). The student learns how to represent functions graphically using coordinates. The student analyzes the properties of functions in terms of increasing, decreasing, symmetry, and terminal behavior. The student distinguishes between different functions based on their properties and graphical representation.	functions	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		The student applies the concept of functions to solve mathematical and real-life problems.			
2	1	The student will understand the concept of differentiation as a mathematical tool for measuring the instantaneous rate of change of a function at a given point. The student will recognize the properties of algebraic functions that can be differentiated. The student will distinguish between the different types of algebraic functions and their limits when applying differentiation. The student will apply basic differentiation rules, such as: • The derivative of a constant • The derivative of a power • The product rule • The quotient rule The student will solve mathematical problems that require the use of differentiation rules to find first derivatives. The student will use the derivative to interpret instantaneous changes in real-life and scientific contexts (such as velocity, growth, or decline).	Derivative of algebraic functions	Lecture, presentation, illustrations	Questions and answers + exercise solutions
3	1	The student will understand the concept	Integration of algebraic functions	Presentation, Discussions,	Oral, written and daily

		of integration as a mathematical tool for finding the original function or calculating areas under curves. The student will recognize the relationship between integration and differentiation as inverse operations. The student will distinguish between the types of algebraic functions that can be integrated (polynomial, rational, radical). The student will apply basic integration rules to various types of algebraic functions. The student will solve mathematical problems involving calculating indefinite and definite integrals. The student will use integration to solve applied problems in fields such as engineering, physics, and economics. The student will connect integration to understanding quantitative changes through spatial representation and mathematical modeling.		quizzes, report preparation, and seminars.	practical tests and scientific reports
4	1	The student will understand the concept of the logarithmic function as a non-algebraic function used to model phenomena with relative change.	Non-algebraic functions: logarithmic function - derivative of logarithmic function	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		The student will recognize the properties of the general and normal logarithmic function and its graphical representation. The student will distinguish between the different forms of the logarithmic function and determine its domain, range, and terminal behavior. The student will apply the rules of differentiation to calculate derivatives of logarithmic functions. The student will use the chain rule to derive complex expressions containing logarithmic functions. The student will solve mathematical problems involving logarithmic functions in applied contexts. The student will analyze logarithmic models related to scientific and economic phenomena such as population growth and radioactive decay.			
5	1	The student will understand the concept of integration of a logarithmic function and its importance in mathematical and scientific applications. The student will be introduced to the indefinite integral of the	Integration of a logarithmic function	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		function ln(x)\ln(x)ln(x). The student will apply appropriate integration techniques to solve integrals involving logarithmic functions, such as: The substitution method The integration by parts method The student will solve problems involving complex logarithmic expressions that require combining more than one integration technique. The student will link logarithmic integration skills to applications in fields such as physics, engineering, and economics. The student will interpret integration results in real-life and scientific contexts, such as exponential growth and logarithmic decline.			
6	1	The student will understand the concept of the exponential function as a non-algebraic function used to describe phenomena with accelerated growth or change. The student will recognize the natural exponential function exe^xex and the exponential functions with a general basis axa^xax, and their properties.	Exponential function: Derivative of the exponential function	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		The student will distinguish between the graphical representations and terminal behavior of different exponential functions. The student will apply the rules for differentiating simple and complex exponential functions. The student will use the chain rule to derive expressions containing complex exponential functions. The student will solve applied problems involving exponential changes in fields such as physics, biology, economics, and engineering. The student will interpret the results of differentiation in real-life and scientific contexts to understand accelerated changes and dynamic models.			
7	1	The student will understand the concept of integration of exponential functions and its importance in mathematical modeling and practical applications. The student will be introduced to the indefinite integral rule for the natural exponential function exe^xex and functions of the form axa^xax.	Integration of an exponential function	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		The student will apply the basic rules for integrating exponential functions in their simple and complex forms. The student will use appropriate integration techniques, such as substitution, to integrate expressions containing exponential functions. The student will solve definite and indefinite integrals involving exponential functions in mathematical and practical contexts. The student will interpret the results of integration in practical applications from fields such as population growth, compound interest, and radioactive decay. The student will relate the integration of exponential functions to models used in physics, biology, economics, and engineering.			
8	1	Assess student understanding	First semester exam	Written exam	
9	1	The student will understand the importance of integrating trigonometric functions in the mathematical modeling of periodic phenomena in the natural and engineering sciences. The student will be familiar with the basic rules for integrating	Integration of trigonometric functions	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		trigonometric functions, such as: • sin(x)\sin(x)sin(x), cos(x)\cos(x)cos(x), tan(x)\tan(x)tan(x), and others. The student will apply appropriate integration methods, such as: • Direct integration • Substitution method The student will use trigonometric transformations (such as trigonometric identities) to simplify integral expressions involving powers or complex angles. The student will solve applied problems involving trigonometric functions related to waves, vibrations, and periodic motion. The student will connect the mathematical skills in trigonometric integration to their practical applications in fields such as engineering, physics, and acoustics. The student will interpret integration results in the context of periodic phenomena, such as alternating electric currents or simple harmonic motion.			
10	1	The student will understand the concept of implicit functions and the reasons for	Integration of implicit functions	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		using them when relationships between variables are not explicit. The student will learn the steps of implicit differentiation and extract implicit derivatives from implicit mathematical relationships. The student will apply implicit differentiation techniques to introduce integration to relationships that cannot be solved explicitly. The student will use substitution methods to simplify and integrate expressions containing implicit functions. The student will solve integration problems involving implicit relationships between variables in engineering or physical contexts. The student will connect implicit integration to realistic modeling that requires dealing with indirectly related variables. The student will interpret the results of implicit integration in applications such as the motion of objects along nonlinear paths or complex physical systems.			
11	1	The student will understand the concept of implicit	Differentiation of implicit functions	Presentation, Discussions, quizzes,	Oral, written and daily practical

		differentiation as a tool for deriving derivatives when the relationship between variables is not expressed in an explicit form. The student will be familiar with the basic steps for deriving implicit equations using the chain rule. The student will apply implicit differentiation to extract dydx\frac{dy}{dx}dxdy in equations containing implicitly related xxx and yyy. The student will use the chain rule accurately when dealing with derivatives in implicit equations, especially when complex expressions are involved. The student will solve mathematical problems involving implicit relationships between variables in theoretical and applied contexts. The student will relate implicit differentiation to its practical applications in engineering, physics, and the natural sciences. The student will interpret the results of implicit differentiation in contexts that require dealing with nonlinear equations or complex related relationships.		report preparation, and seminars.	tests and scientific reports

12	1	The student will apply the method of integration by parts to problems involving the product of functions (such as polynomials, logarithmics, trigonometrics, and exponentials). The student will solve complex integrals requiring more than one step using iterated integration by parts. The student will interpret integration results in applied contexts in mathematics, physics, and engineering. The student will develop analytical and strategic skills in selecting parts of an integration to simplify complex expressions. Methods of Integration: Integration by Parts	Integration methods: integration by parts	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports
13	1	Assess student understanding	Second semester exam	Written exam	
14	1	The student will understand the concept of differential equations and their importance in describing changing phenomena in the natural sciences and engineering. The student will be familiar with the classification of differential equations based on their order and linearity. The student will apply basic methods for	Solving differential equations	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		solving differential equations according to their order and linearity. The student will analyze the behavior of dynamic systems using differential equations. The student will explain the role of differential equations in analyzing mathematical models and predicting outcomes in fields such as physics, economics, and biology. The student will develop skills in using differential equations to solve real-world problems and provide practical solutions.			
15	1	The student will understand the importance of differential equations as a mathematical tool for describing changing phenomena in the fields of physics, engineering, and economics. The student will be introduced to the classification of differential equations according to the order of the derivative and the type of linearity. The student will apply the main solution methods for first-order differential equations, such as separable equations and linear equations. The student will apply the method for solving	Solving differential equations	Presentation, Discussions, quizzes, report preparation, and seminars.	Oral, written and daily practical tests and scientific reports

		second-order differential equations with constant coefficients using the characteristic equation. The student will explain how to use general and special solutions to describe the behavior of dynamical systems. The student will develop analytical skills that enable him to understand advanced mathematical models and apply them to various scientific and real-life situations.			

11. Course Evaluation	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	The vocabulary prescribed by the Ministry of Higher Education and Scientific Research
Main references (sources)	**Written by Dr. Salman bin Abdul Rahman Al-Salman** **Dr.. Ibrahim Deeb Sarmini** **INTRODUCTION TO MATHEMATICAL ECONOMICS Third Edition** **EDWARD T. DOWLING, Ph.D.**
Recommended books and references (scientific journals, reports...)	Google scholar, researcher gate
Electronic References, Websites	All sites that provide reliable sources and also artificial intelligence tools

Course Description Form

1. Course Name:	
"Land surveying and technical drawing"	
2. Course Code:	
PLP 210	
3. Semester / Year:	
One / Two	
4. Description Preparation Date:	
17 \ 7 \ 2025	
5. Available Attendance Forms:	
Paper form including name, date of attendance and signature	
6. Number of Credit Hours (Total) / Number of Units (Total)	
90 \ 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Mahmood Shaker Mahmood Email: msh41551@ntu.edu.iq	
8. Course Objectives	
Course Objectives	1. To introduce the student to the most important basic information about modern technologies used in the field of plane surveying of the Earth's surface, how to use them, and how to select the best ones. 2. To teach and train students on the use of specialised machinery in the field of surveying the Earth's surface, which is used in fields, abattoirs, livestock pens and many other areas. 3. To teach and train the student to select the type of machinery or tools appropriate for working on each project.
9. Teaching and Learning Strategies	

Strategy	1. The learner will acquire skills in using new and modern technologies in surveying and computer-aided drawing. 2. The student will learn to manage a work site using the best equipment and tools to obtain the best accurate results in the least amount of time. 3. That the student will, in the future, develop their ideas with equipment and machinery that is appropriate to the nature of the areas in which the survey is conducted in the field.

1. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The student will be able to know the concepts and basics of surveying	General concepts of surveying	Lecture, presentation, illustrations	Questions and answers + exercise solutions
2	4	The student will learn how to use tape measure, chain, marker, peg, thread and poles, as well as the use and maintenance of tools.	Devices and instruments used in measurement	Lecture, presentation, illustrations	Questions and answers + exercise solutions
3	4	The student will learn the standard units used in the science of surveying and the types of measurement systems and their transformations	Types of units of measure and their transformations	Lecture, presentation, illustrations	Questions and answers + exercise solutions

4	4	The student will learn to use the scale of drawing and its types and how to extract real dimensions from maps using the scale	Scale	Lecture, presentation, illustrations	Questions and answers + exercise solutions
5	4	- Student will learn -correction for length bar difference -correction for height difference between two points - correction of error by orientation	Necessary corrections in measuring distances	Lecture, presentation, illustrations	Questions and answers + exercise solutions
6	4	The student will learn to extract all dimensions, areas and field works	Scanning with chain and tape	Lecture, presentation, illustrations	Questions and answers + exercise solutions
7	4	The student will learn how to interpret and read maps	Topographic maps and their uses	Lecture, presentation, illustrations	Questions and answers + exercise solutions
8	4	The student will have knowledge of the types and parts of the compass and methods of observation with the compass, as well as correcting	Scanning with a compass	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		compass observations and drawing a polygon			
9	4	The student will learn the component parts of the theodolite device, its uses and how to use it in practice	Theodolite device	Lecture, presentation, illustrations	Questions and answers + exercise solutions
10	4	**First exam**			
11	4	The student will learn what AutoCAD is and its uses	AutoCAD Program	Lecture, presentation, illustrations	Questions and answers + exercise solutions
12	4	The student will learn to use drawing commands (lines, circles, rectangles, arcs, polygons, segmentation, etc.). He also used edit commands to copy, move, rotate, expand, and many other uses	Using the user interface of the program and how to adjust all settings	Lecture, presentation, illustrations	Questions and answers + exercise solutions
13	4	The student will learn the methods of drawing squares and rectangles and methods of drawing triangles of all kinds with rhombuses	Identify the different ways to draw geometric shapes	Lecture, presentation, illustrations	Questions and answers + exercise solutions

14	4	The student will have the ability to draw up sketches for farms, fields and poultry halls	How to use the LINE command to draw different geometric shapes, such as English letters such as H-E-F -L	Lecture, presentation, illustrations	Questions and answers + exercise solutions
15	4	Practical applications			

2. Course Evaluation
Tests + Exercises + Discussions + Questions

3. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**City Survey Book 102/General Institution for Technical Education and Vocational Training/Kingdom of Saudi Arabia** **AutoCAD 2014**
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
general chemistry
2. Course Code:
TAMO104
3. Semester / Year:
2024-2025
4. Description Preparation Date:
5/6/2025
5. Available Attendance Forms:
Paper form including name, date of attendance and signature
6. Number of Credit Hours (Total) / Number of Units (Total)
4/2
7. Course administrator's name (mention all, if more than one name)
Name: dr-hala awf Abdulrahman Email: dr_hala.awf.chilmeran@ntu.edu.iq
8. Course Objectives

Course Objectives	1. At the end of the course, the student should have the following: 1. Understand the basic concepts of chemistry and the preparation of solutions 2. Explain the thermal evolution associated with chemical reactions

	3. Distinguish between the elements of chemical reactions and how to represent them with equations 4. Analyze and interpret laboratory results using scientific methods 5. Understand the molar and normal ratios and their proportions 6. Identify commercial bonds and their types 7Building a scientific foundation that qualifies the student to study organic and analytical chemistry.

9. Teaching and Learning Strategies

Strategy	There are several effective strategies for teaching the Principles of Genetics course, which aim to foster a deep understanding of genetic concepts and develop critical thinking skills: 1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Simulation-based learning. 5. Practical training. 6. Self-directed learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	4	1- The student should know the basic concepts in chemistry and methods of preparing solutions. 2- The student should understand the chemical properties of elements	Chemistry Enhancement and Solution Preparation	Lecture, presentation, illustrations	Questions and answers + exercise solutions
2	4	1- The student will understand the properties of chemical elements and their classification in the periodic table. 2- The student will know the properties of transition elements and their reactions.	Periodic table of chemical elements	Lecture, presentation, illustrations	Questions and answers + exercise solutions
3	4	1- The student should understand the properties and composition of the atom. 2- The student should know Dalton's atomic model.	Atomic structure	Lecture, presentation, illustrations	Questions and answers + exercise solutions
4	4	1- The student should know the electronic theory of valence.	Electronic theory of valence	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		2- The student should understand the advantages and disadvantages of the electronic theory of valence.			
5	4	1- The student should know the types of chemical bonds. 2- The student should understand the characteristics of ionic and covalent compounds.	Types of chemical bonds	Lecture, presentation, illustrations	Questions and answers + exercise solutions
6	4	1- The student should know the Arrhenius and Brønsted concepts of acids and bases. 2- The student should understand the Lewis concepts of acids and bases.	Acids, bases and salts	Lecture, presentation, illustrations	Questions and answers + exercise solutions
7	4	1- The student will be able to understand chemical balance. 2- The student will understand mathematical examples of oxidation-reduction reactions.	Oxidation-reduction reactions	Lecture, presentation, illustrations	Questions and answers + exercise solutions

8	4	1- The student will understand the general properties of halogens. 2- The student will learn how to prepare halogens.	Halogens	Lecture, presentation, illustrations	Questions and answers + exercise solutions
9	4	1- The student will understand electrochemical and electrolytic cells. 2- The student will understand the working principle of electrochemical and electrolytic cells.	Electrochemistry	Lecture, presentation, illustrations	Questions and answers + exercise solutions
10	4	1- The student will learn about oxidation potential and electron affinity. 2- The student will understand ionization energy.	Metallic and non-metallic elements	Lecture, presentation, illustrations	Questions and answers + exercise solutions
11	4	1- The student will learn about the general properties of the elements in Group 4. 2- The student will learn about examples of the elements in Group 4	General properties of elements in Group 4	Lecture, presentation, illustrations	Questions and answers + exercise solutions
12	4	1- The student will learn about the general properties	General properties of the elements in Group 5	Lecture, presentation, illustrations	Questions and answers

		of the elements in Group 5. 2- The student will learn about examples of the elements in Group 5.			+ exercise solutions
13		1- The student will gain an understanding of the properties of ideal gases. 2- The student will understand the laws and mathematical examples of ideal and real gases.	Ideal and real gases	Lecture, presentation, illustrations	Questions and answers + exercise solutions
14	4	1- The student will learn about the standard hydrogen potential. 2- The student will learn about the standard calomel electrode potential.	Standard Phosphorus Potential	Lecture, presentation, illustrations	Questions and answers + exercise solutions
15	4	1- The student will learn about the concept of nuclear chemistry and its application areas. 2- The student will learn about the types of nuclear	Nuclear Chemistry	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		radiation and their uses.			
11. Course Evaluation: Tests + Exercises + Discussions + Questions					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			The vocabulary prescribed by the Ministry of Higher Education and Scientific Research		
Main references (sources)			Principles of General Chemistry, Dr. Mohi El-Din Al-Bakoush 2024		
Recommended books and references (scientific journals, reports...)			Google scholar, researcher gate		
Electronic References, Websites			All sites that provide reliable sources and also artificial intelligence tools		

Course Description Form

1. Course Name:
General Botany
2. Course Code:
PMNP 101
3. Semester / Year:
2024-2025
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
My Presence, Online
6. Number of Credit Hours (Total) / Number of Units (Total)
Total 75/3 units
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1. Understand the basics of plant structure and study cellular components, plant tissues, and plant organs (roots, stems, leaves, flowers). **2. Learn about physiological processes such as photosynthesis, respiration, absorption, transport, and reproduction in plants.** **3. Classify plants, learn the principles of plant taxonomy, and understand the differences between major groups (vascular plants, non-vascular plants, angiosperms, gymnosperms, etc** **4. Study of environmental adaptations, how plants adapt to different environments (aquatic, desert, etc.) and interactions with other organisms.** **5. Connect plants to real life, understand the importance of plants in agriculture, medicine, industry, and maintaining ecological balance.** **6. Develop practical skills, learn laboratory and field techniques such as preparing microscop slides and identifying plants.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	Understand the basics of botany and classification of the plant kingdom	Introduction to Botany	Lecture + Presentation Presentation	Short discussion
	3 Practical	Learn about tools Botanical Laboratory	Laboratory Instruments and its uses	Practical offer + training	Tools Report
2	2 theoretical	Highlight cell structure Vegetarianism	Plant cell and organelles	Visual Caption + Graphics	Quiz
	3 Practical	Plant cell examination	Prepare cell slices Vegetarianism	Laboratory work Individual	Drawing and Interpretation

		Under surveillance			Report
3	2 theoretical	Understand metabolic processes In the plant	Photosynthesis and respiration	Interactive Lectu video	Writing exercises
	3 Practical	Watch the construction process Photoscientific	Starch detection experime In the papers	Group Experienc	Analysis of result
4	2 theoretical	Tissue structure analysis Vegetarianism	Plant tissues (meristemia) and fixed)	Slideshow + Stereoscopic mod	Mini Report
	3 Practical	Distinguishing tissue types Vegetarianism	Meristem tissue slices and fixed	Views Microscopic +Drawing	Comparison Rep
5	2 theoretical	distinguish root shapes and Legs	Morphology of roots andLegs	Comparative Stu Botanical photos	Classification test
	3 Practical	Study of morphology Roots and stems	Anatomy of roots and stems	Applied work + Compare	View samples
6	2 theoretical	Understand the mechanism of transporting water and food In the plant	transport in the plant (wood and Bark)	Lecture + Virtual Experien	Solve practical questions
	3 Practical	View transport vessels In the plant	The experience of rising water inPlant	Hands-on experie	Take notes
7	2 theoretical	Phytohormones Analysis	Phytohormones and their effect	Case Study+ discussion	Presentation
	3 Practical	Analysis of the effect of hormones On the plant	Experimenting with the effect of oxin on Roots	Teamwork + Data Analysis	Results Report
8	2 theoretical	Mid-term Exam	-	-	Theory test
	3 Practical	Mid Practical Test Chapter	-	-	Laboratory performance evaluation
9	2 theoretical	Understanding the reproduction of plants Avascular	Reproduction in plants Avascular	Lecture + Presentation	Brief Report
	3 Practical	Viewing reproductive organs In nonvascular flora	Preparation of spores	Laboratory work drawing	Views Report
10	2 theoretical	Discrimination Cycles The life of seed plants	Seed plants (Naked and covered)	Comparison of Types	Classification test
	3 Practical	Seed composition study And the fruits	Anatomy of seeds and seed plants	Applied work	View Forms
11	2 theoretical	Analysis of plant adaptations in different environments	Plant adaptations	Case Studies Environmental	Group discussion
	3 Practical	Adaptation Analysis Anatomical in the plant	Plants for dry + humid environments	Compare samples	Analysis Report
12	2 theoretical	Understanding symbiotic relationships in plants	Plant and other organisms (fungi, bacteria)	Lecture + Practical example	Small Research Paper

	3 Practical	Watch the symbiosis between Plants and fungi	Preparation of root slicers Interdependent	Laboratory work	Photo Report
13	2 theoretical	Analysis of the impact of factors Environmental on the plant	Plant and environmental pressures	Brainstorming + Data Analysis	Case Study Soluti
	3 Practical	Salinity Effect Study On the plant	Seed germination experier under Pressure	Group Experienc	Data Analysis
14	2 theoretical	Comprehensive review of the course	Review lectures Home	Question Session Answers	Test Review
	3 Practical	Review & Apply Comprehensive practical	Apps on all experiments	Audit activities	Evaluation of participation
15	2 theoretical	Final Exam	-	-	Comprehensive theoretical test
	3 Practical	Final Practical Test	-	-	Comprehensive Applied Testing

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**1-General Botany Dr. Ahmed Farhoud, Dr. Mohamed El-Shanti 2-Basics of Botany Dr. Ibrahim Abdel-Al 3-Practical Plant Biology A.J. Lack**
Main references (sources)	**Plant Biology of Plants | Ray Evert | W.H. Freeman | A comprehensive reference for all plant topics | | Plant Physiology | Taiz & Zeiger | Sinauer | t understand physiological processes | | Atlas of Plant Anatomy | Dr. Farouk Abdel Wahab | Dar Al-Nahda | for microscopic imag and anatomical explanation**
Recommended books and references (scientific journals, reports...)	**1-General Botany Dr. Ahmed Farhoud, Dr. Mohamed El-Shanti 2-Basics of Botany Dr. Ibrahim Abdel-Al 3-Practical Plant Biology A.J. Lack**
Electronic References, Websites	**[https://www.kew.org/science](https://www.ke org/science) [http://www.theplantlist.org/](http://www.the ntlist.org/) [https://bio.libretexts.org/Bookshelves/Botany ttps://bio.libretexts.org/Bookshelves/Botany)**

Course Description Form

1. Course Name:
Soil Basics
2. Course Code:
PMNP 102
3. Semester / Year:
Level 1
4. Date of Preparation of Description :
1/6/2025
5. Available Attendance Forms:
In-person lectures, electronic lectures, practical lectures, electronic class, seminars
6. Number of Credit Hours
(75) / Number of Units (3)
7. Name of course officer (list all names, if there is more than one)
Name: **Email:**
8. Course Objectives
1. Introducing the student to the concept of soil, its formation and its relationship to plants and t environment. **2. Understand the physical, chemical and biological processes that occur in soil.** **3. Identify soil properties, classification and agricultural uses.** **4. Develop analysis and assessment skills for soil samples in the laboratory.** **5. Recognize the relationship between soil and its fertility and sustainable agricultural practices.** **6. Use basic tools to measure and analyze soil characteristics.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical 3 Practical	Familiarize yourself with the concept of soil and its importance and main components	Theoretical Topic: Introduction to Soil Science, Soil Components Practical Topic: Learning about soil analysis tools	-Lectures Theory - Lectures Theory - Presentation Presentation	Interactive Discussions
2	2 Theoretical 3 Practical	- Understand the processes influencing soil formation Prepare samples for testing	Theoretical Topic: Origin and Formation of Soil Practical Topic: Soil Sampling and Preparation	-Lectures Theory - Lectures Theory - Presentation Presentation	Discussions Interactive + Quizzes
3	2 Theoretical 3 Practical	Soil texture analysis and its impact on plant growth	Theoretical Theme: Soil Physical Properties Practical Topic: Hydrometry	-Lectures Theory - Lectures Theory	Tests Process +

				- Presentation Presentation	Writing scientific reports
4	2 Theoretical 3 Practical	Understand the chemical reaction of soil and its effect on nutrients.	Theoretical Topic: General Chemical Properties Practical Topic: Soil pH measurement and electrical conduction	-Lectures Theory - Lectures Theory - Presentation Presentation	Tests Short
5	2 Theoretical 3 Practical	Practical application of analysis of Chemical Elements in the soil.	Theoretical topic: Chemical reactions in soil Practical topic: Analysis of cations and pH	-Lectures Theory - Lectures Theory - Presentation Presentation	Tests
6	2 Theoretical 3 Practical	Biological in Soil and its role in its fertility.	Theoretical Theme: Soil Biological Properties Practical Topic: Counting Soil Microorganisms	-Lectures Theory - Lectures Theory - Presentation Presentation	Interactive Discussions + Tests Short
7	2 Theoretical 3 Practical	- Study of the relationship between the soil and water in terms of Storage and movement	Theoretical Theme: Water in Soil Practical topic: Measurement of soil moisture and water leakage rate	-Lectures Theory - Lectures Theory - Presentation Presentation	Interactive Discussions + Tests Short
8	2 Theoretical 3 Practical	Soil and its impact on living organisms minute.	Theoretical Theme: Air in Soil and Ventilation Practical Topic: Soil Porosity Measurement	-Lectures Theory - Lectures Theory - Presentation Presentation	Interactive Discussions + Tests Short
9	2 Theoretical 3 Practical	Global Classification of Soils.	Theoretical Topic: Soil Classification Practical Topic: Soil Mapping Study	-Lectures Theory - Lectures Theory - Presentation Presentation	Practical laboratory tests and experiments
10	2 Theoretical 3 Practical	During the analysis of Nutrients.	Theoretical Topic: Soil and Nutrient Fertility Practical Topic: Nitrogen, Phosphorus and Potassium Analysis	-Lectures Theory - Lectures Theory - Presentation Presentation	Quizzes
11	2 Theoretical 3 Practical	Sustainable Agriculture Applications Depending on soil characteristics	Theoretical: Soil use in agriculture Practical Topic: Agricultural Soil Characterization	-Lectures Theory - Lectures Theory - Presentation Presentation	Practical tests + Write a report
12	2 Theoretical 3 Practical	Understand the causes of degradation Soil and methods of	Theoretical Theme: Land Degradation and Desertification	-Lectures Theory - Lectures	

		monitoring it.	Practical Topic: Soil Salinity Measurement and Degradation Monitoring	Theory - Presentation Presentation	Quizzes
13	2 Theoretical 3 Practical	- Acquire practical skills to protect the soil.	Theoretical Theme: Soil Conservation and Management Practical Topic: Applicatio Soil Conservation Methods the Field	-Lectures Theory - Lectures Theory - Presentation Presentation	Report Writing
14	2 Theoretical 3 Practical	Interpreting the results of the analysis Soil and linking them to agricultural recommendations	Theoretical Topic: Analysis and Interpretation of Soil Data Practical Topic: Data Representation and Analysis Using Tables and Graphs	-Lectures Theory - Lectures Theory - Presentation Presentation	Practical tests
15	2 Theoretical 3 Practical	- Incorporating concepts and evaluating overall applied performance.	Theoretical Topic: General Review and Discussion of Student Projects Practical Topic: Presentation of Project Reports and Practical Assessment	-Lectures Theory - Lectures Theory - Presentation Presentation	Interactive Discussions

11. Course Evaluation

Distribution of scores from 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports ... etc.

12. Learning and Teaching Resources

1. The Nature and Properties of Soils – Nyle Brady	Required textbooks
2. Soil Science Simplified – Helmut Kohnke	Key References (Sources)
3. Soils: Genesis and Geomorphology	Recommended books and references
• https://www.nrcs.usda.gov/ – • https://soilhealth.cals.cornell.edu/ • https://www.soils.org/	E-References and Websites

Course Description Form

1. Course Name:
Medicinal Plants
2. Course Code:
PMNP 103
3. Semester / Year :
Autumn /First Level
4. Date of Preparation of Description :
1/6/2025
5. Available Attendance Forms:
In-person lectures, electronic lectures, practical lectures, electronic class, seminars
6. Number of Credit Hours
(75) / Number of Units (3)
7. Name of course officer
Name: **Email:**
8. Course Objectives
The student will be able to: **1. Recall the basic concepts of medicinal plants.** **2. Develop the pharmaceutical and industrial aspects of medicinal and industrial plants, given their high economic value.** **3. Explain the various physiological processes in medicinal plants and how they are affected by geographical distribution.** **4. Apply concepts in analyzing agricultural or environmental problems related to plants.** **5. Analyzing and assessing the student's ability to classify medicinal plants and the families to which they belong.** **6. Evaluating scientific studies related to medicinal plants and judging the validity of the results and conclusions.** **7. Designing new research experiments to understand specific problems in medicinal plants.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical 3 Practical	1. Defines medicinal plants and categorize them. 2- Mention examples of plants Used in medicine Traditional.	medicinal plants and herbs, Economic importance, benefits Uses	- Lectures Theory - Offers Introductory - Lectures Video	Interactive Discussions
2	2 Theoretical 3 Practical	Defines assets Genetic for medicinal plants.	Genetic origins of plants Medical, Production and cultivation of medicinal plants	- Lectures Theory - Offers Introductory - Lectures Video	Discussions Interactive + Quizzes
3	2 Theoretical 3 Practical	Defines plant parts Medical. Understands how to use Medicinal Plants.	Used parts of plants Medical, types and methods Usage	- Lectures Theory - Offers Introductory - Lectures Video	Tests Process + Writing scientific reports
4	2 Theoretical 3 Practical	- Defines economic importance for medicinal plants. -Understand plant reproduction methods Medical.	medicinal and aromatic plants, Economic importance, ways Reproduction	- Lectures Theory - Offers Introductory - Lectures Video	Tests Short
5	2 Theoretical 3 Practical	-Understands product marketing methods Vegetarianism. - Calculates costs and payouts for a small agricultural project.	Methods of marketing medicinal plants	- Lectures Theory - Offers Introductory - Lectures Video	Tests
6	2 Theoretical 3 Practical	-Knows how to collect plants Medical - He knows when plants are to be collected.	collection of medicinal plants and the influence of Appointment Collection on the effectiveness of plants Medical	- Lectures Theory - Offers Introductory - Lectures Video	Interactive Discussions + Tests Short
7	2 Theoretical 3 Practical	- He knows the types of drying methods. -Understands methods of storage and preservation on active compounds.	Drying and storage methods medicinal plants, the effect of Storage process on active substances	- Lectures Theory - Offers Introductory - Lectures Video	Interactive Discussions + Tests Short
8	2 Theoretical 3 Practical	- Explain the relationship between Chemical Composition therapeutic efficacy.	active substances in medicinal plants, Active Ingredients	- Lectures Theory - Offers Introductory - Lectures Video	Interactive Discussions + Tests Short
9	2 Theoretical 3 Practical	-Describes extraction methods oils (distillation, juicing, solvents). -Performs an extraction experiment essential in the lab.	Use of extraction methods and disconnect Active substances	- Lectures Theory - Offers Introductory - Lectures Video	Practical laboratory tests and experiments

10	2 Theoretical 3 Practical	-Understands the extent of impacts Pharmaceutical for Medicinal Plants	Pharmacological effects and how Synthesis inside the plant	- Lectures Theory - Offers Introductory - Lectures Video	Quizzes
11	2 Theoretical 3 Practical	-Understands plant propagation methods methods of tissue transplantation.	Propagation of medicinal plants in a technical way Tissue Transplantation	- Lectures Theory - Offers Introductory - Lectures Video	Practical tests + Write a report
12	2 Theoretical 3 Practical	- Describes methods of extracting oils (distillation, squeezing, solvents). -Performs a basic extraction experiment in the laboratory.	Oils extracted from Plants Medical, its types, how to use them.	- Lectures Theory - Offers Introductory - Lectures Video	Quizzes
13	2 Theoretical 3 Practical	Knows the types of extracts And ways to use it	Juices extracted from Plants Medical, its types, how to Use it	- Lectures Theory - Offers Introductory - Lectures Video	Report Writing
14	2 Theoretical 3 Practical	The manufacture of types of ointments and knows the ways use them.	Medicinal herbal ointments, Types, how to use them	- Lectures Theory - Offers Introductory - Lectures Video	Practical tests

11. Course Evaluation

Distribution of scores from 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports ... etc.

12. Learning and Teaching Resources

quired textbooks	Medicinal Plants – A Global Heritage
Key References (Sources)	Handbook of Medicinal Plants – Zohara Yaniv & Uriel Bachrach
Recommended books and references	WHO Monographs on Selected Medicinal Plant -
E-References and Websites	/https://www.plantsoftheworldonline.org - /https://www.ncbi.nlm.nih.gov/pmc - https://phytochem.nal.usda.gov/ -

Course Description Form

1. Course Name:
Plant anatomy
2. Course Code:
PMNP 104
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
Total 60 hours/2 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1 . Study the internal structure of plants, including plant cells, tissues, and various plant organs. **2. Understand the functions of plant tissues such as structural tissues, fundamental tissues, and vascular tissues.** **3. Analyzing the relationship between structure and function in plant organs such as roots, stems, and leaves.** **4. Studying the anatomical adaptations of plants to different environments (e.g., aquatic and desert plants).** **5. Learning basic techniques for examining plant anatomy using a microscope and preparing tissue slides.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	Understanding the basics plant anatomy	Introduction to Plant Anatomy	Lecture + Presentation	Open discussion
	3Practical	Mastering the Use of a microscope	Microscope basics	Practical training	Performance evaluation
2	2 Theoretical	Components discriminat plant cell	Plant cell and its structure	Slideshow +Models	Short test
	3Practical	Preparing slides	plant cells	Individual work	laboratory report
3	2 Theoretical	Understanding types plant tissues	structural tissues	a lecture Interactive	Analytical questions
	3Practical	Growth Area Analysis	structural tissues	Group work	diagnostic test

4	2 Theoretical	Tissue differentiation Basic	Parenchymal tissues And Colonochemistry	Comparative study	Analytical report
	3Practical	Tissue differentiation	Basic tissue comparison	Dissection of specimens	Practical evaluation
5	2 Theoretical	Understanding tissues Supportive	Sclerenchyma tissues	Show cases	Written test
	3Practical	Understanding the Vascular System	wood and bark	Practical experiments	Detailed report
6	2 Theoretical	Vascular system analysis	Vascular tissue	modelD3	Oral assessment
	3Practical	Comparison of structures	Root anatomy	Manual anatomy	Sample testing
7	2 Theoretical	Understanding root structure	Plant anatomy	Educational video	Theoretical test
	3Practical	Understanding the differences	Leg anatomy	microscopic examination	Oral assessment
8	2 Theoretical	Comparison of structures legs	Leg anatomy	Charts	Group discussion
	3Practical	Adaptation analysis	Leaf anatomy	Special dyes	Photo report
9	2 Theoretical	Adaptation analysis papers	Leaf anatomy	Microscopic images	Research report
	3Practical	Adaptation study	desert plants	live samples	Presentation
10	2 Theoretical	Understanding environmental adaptatio	desert plants	Case studies	Presentation
	3Practical	Understanding Aquatic Environments	aquatic plants	Microscope + photos	Group evaluation
11	2 Theoretical	Water Adaptation analysis	aquatic plants	Workshop	Practical evaluation
	3Practical	Growth analysis	Annual episodes	wood samples	practical control
12	2 Theoretical	Understanding secondary growth	secondary structure	anatomical models	Written test
	3Practical	Application of knowledge	Integrated project	Practical work	Project evaluation
13	2 Theoretical	Linking form to function	structural and functional relationship	Panel discussion	Final Report
	3Practical	Learn techniques	Permanent samples	Laboratory training	Performance evaluati
14	2 Theoretical	Unification of concepts	General review	Question session	Pilot test
	3Practical	Skills enhancement	Practical review	Practical session	diagnostic test
15	2 Theoretical	Comprehensive evaluatio	Final Exam	Written test	Final evaluation
	3Practical	Skills assessment	Final practical exam	mprehensive test	Final grade

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**1. Practical Plant Anatomy - Dr. Mohamed Fathi Abdullah** **2. Atlas of Plant Anatomy - Dr. Ahmed Mohamed Hussein** **3. Plant anatomy: Structure and Function - Dr. Iman Elsayed Mahmoud** **4. Plant Anatomy - Katherine Esau** **5. Applied Plant Anatomy - Dr. Ali Ibrahim**
Main references (sources)	**1. Practical Plant Anatomy - Dr. Mohammed Fathi Abdullah** **2. Atlas of Plant Anatomy - Dr. Ahmed Mohamed Hussein** **3. Applied Plant Anatomy - Dr. Ali Ibrahim** **Foreign references** **1. Plant Anatomy - Katherine Esau** **2. Anatomy of Flowering Plants - Paula Rudall**
Recommended books and references (scientific journals, reports...)	**1. Practical Plant Anatomy - Dr. Mohammed Fathi Abdullah** **2. Atlas of Plant Anatomy - Dr. Ahmed Mohamed Hussein** **3. Plant anatomy: Structure and Function - Dr. Iman Elsayed Mahmoud** **4. Plant Anatomy - Katherine Esau** **5. Applied Plant Anatomy - Dr. Ali Ibrahim**
Electronic References, Websites	**plantanatomy.org](http://plantanatomy.org)** **https://botany.illinois.edu/plant-anatomy** **https://bio.libretexts.org/Plant_Anatomy** **https://www.kew.org/science/plant-anatomy](https://www.kew.org/science/plant-anatomy)**

Course Description Form

1. Course Name:
Biotechnology
2. Course Code:
PMNP 105
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(45) / Number of units (2)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
- Understanding the basic concepts of agricultural biotechnology and its importance in developing agricultural production. **- Learning basic laboratory biotechnology techniques and applying them to improve plant genetic traits.** **- Analyze the applications of biotechnology in sustainable agriculture, pest control, and food production.** **- Evaluate the ethical, legal, and environmental dimensions associated with the use of biotechnology in agriculture.** **- Develop students' research and practical skills in biotechnology laboratories.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1 theoretical 2 practical	The student will explain the concept of agricultural biotechnology, its stages of development, and its most important applications in the agricultural sector.	-entrance to Technology Vitality Agricultural (theoretical) -rules Safety and Preparation Laboratory (practical)	Lectures theory	Interactive discussions
2	1 theoretical 2 practical	The student will be able to explain the structure of DNA and RNA, and practically perform the process of extracting DNA from plant samples.	-Composition and functions of matter geneticDNA/RNA (Theoretical) DNA extraction DNA (practical)	- Lectures theory - an offer My presentation (PowerPoint)	discussions Interactive + Short tests

3	**1 theoretical 2 practical**	**The student will explain the mechanism of action of restriction enzymes and genetic vectors, and will gain practical knowledge of the plasmids used in genetic modification.**	**- Genetic engineering tools (enzymes, vectors) - Identify vectors plasmid**	**- Lectures theory - Lessons practical Laboratory**	**Tests practical + Writing scientific reports**
4	**1 theoretical 2 practical**	**The student will explain the concept of polymerase chain reaction and its importance, and successfully perform a PCR experiment in the laboratory.**	**-Practical application of technologyPCR Polymerase chain reaction PCR**	**Lectures theoretical + practical**	**Tests short**
5	**1 theoretical 2 practical**	**The student will explain the principle of DNA electrophoresis and perform gel electrophoresis analysis using extracted DNA.**	**- gel electrophoresis Agarose Gel -**	**- Offers Introductory - Activities and experiments Laboratory**	**Tests and laboratory experiments**
6	**1 theoretical 2 practical**	**The student will explain the principles of plant tissue culture, prepare MS medium, and culture a sterile plant tissue culture piece.**	**Plant tissue culture and its basics.**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**
7	**1 theoretical 2 practical**	**The student will be able to distinguish the characteristics of genetically modified plants and monitor the growth of plant tissues in a sterile environment.**	**Production of genetically modified plants**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**
8	**1 theoretical 2 practical**	**The student will describe the methods of gene transfer in plants (Agrobacterium, gene gun), and apply the transfer technique using Agrobacterium.**	**Gene transfer techniques (Agrobacterium – gene gun)**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**
9	**1 theoretical 2 practical**	**To explain the role of beneficial microorganisms in soil, and to cultivate and identify a type of these organisms microscopically.**	**Beneficial microorganisms in agriculture (soil bacteria, mycorrhizae)**	**- Lectures theory - Offers Introductory - Lectures Video**	**Practical laboratory tests and experiments**
10	**1 theoretical 2 practical**	**The student will analyze the role of biotechnology in combating agricultural pests and evaluate a case study of a modified insect-resistant plant.**	**Pest control using biotechnology**	**- Lectures theory - Offers Introductory - Lectures Video**	**Short tests**
11	**1 theoretical 2 practical**	**The student will explain how modified plants resist environmental stresses and**	**Biotechnology applications in stress resistance**	**-Lectures theory - Activities and**	**Practical tests**

		compare a modified plant to a natural one in terms of growth under saline or drought conditions.	**Environmental (salinity - drought)**	**Practical experiments Laboratory**	**+ Writing a report**
12	**1 theoretical 2 practical**	**The student will explain the DNA fingerprinting technique and apply the genetic identification technique to a plant model in the laboratory.**	**Plant DNA Fingerprinting Techniques**	**- Lectures theory - Offers Introductory - Lectures Video**	**Short tests**
13	**1 theoretical 2 practical**	**The student will discuss the ethical and environmental issues related to genetic modification and write an analytical report on them.**	**Ethical and environmental issues related to modification genetic**	**- Lectures theory - Offers Introductory - Lectures Video**	**writing reports**
14	**1 theoretical 2 practical**	**The student will present a small applied project related to one of the topics of agricultural biotechnology, document the experiment or study, and present it to his or her classmates.**	**Student Project Presentations Research**	**-Lectures theory - Activities and Practical experiments Laboratory**	**Practical tests**
15	**1 theoretical 2 practical**	**The student will review basic concepts and laboratory applications, and demonstrate proficiency in performing a comprehensive practical examination in agricultural biotechnology techniques.**	**General review and final theoretical exam And my work**	**- Activities and Practical experiments Laboratory - Offers Introductory and discussions**	**Practical tests**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Biotechnology: Applying the Genetic Revolution** – Clark & Pazdernik
Main references (sources)	**Principles of Gene Manipulation and Genomics** – Primrose
Recommended books and references (scientific journals, reports...)	**Biotechnology Fundamentals** – Firdos Alam Khan
Electronic References, Websites	• https://www.biotechniques.com/ – • https://www.nature.com/biotech/ – https://www.genengnews.com/ –

Course Description Form

1. Course Name:
Laboratory techniques
2. Course Code:
PMNP 151
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(75) / Number of units (1)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
- Understanding the basic concepts of agricultural biotechnology and its importance in - Introduce students to the principles of laboratory work and standard methods for scientific experiments. **- Teach students how to use laboratory equipment and tools.** **- Train students to apply biosafety rules in the laboratory.** **- Enabling students to document data and analyze results in a scientific manner.** **- Developing students' ability to work in teams and think critically during practical work.**
9. Teaching and Learning Strategies
- Interactive lectures (theoretical explanation + multimedia). **- Practical application in laboratories.** **- Classroom discussions and problem solving.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Learn laboratory basics and adhere to safety procedures.	Introduction to Laboratory Techniques Practical topic: Biosafety rules	Lectures theory	Interacte discussis
2	3	Distinguishing different tools and their correct use	Laboratory tools and their uses Practical topic: Identifying glassware	- Lectures theory - an offer My presentation (PowerPoint)	discussi s Interact e + Short tests
3	3	Make accurate measurements of solids and liquids	Units of measurement and conversion Practical topic: Using a sensitive balance	- Lectures theory - Lessons practical Laboratory	Tests practic al + Writing scientific reports

4	**3**	**Preparing a solution accurately from a solid and a liquid**	**Solutions (definition and types) Practical topic: Preparation of standard solutions**	**Lectures theoretical + practical**	**Tests short**
5	**3**	**pH and its applications in desalination Understanding the concept**	**Theoretical topic: Acidity and alkalinity (pH) Practical topic: Measuring pH using multiple devices**	**- Offers Introductory - Activities and experiments Laboratory**	**Tests**
6	**3**	**Perform the titration process and determine the equivalence point.**	**Calibration and its types Practical topic: Acid-base titration experiment**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interact e discussi s + Tests short**
7	**3**	**Application of separation techniques in different samples**	**Separation and types (filtration, sedimentation) Practical topic: Filtration/sedimen tation experiment**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interact ive discussi ons + Tests short**
8	**3**	**Absorbance measurement and analysis of the results**	**Theoretical topic: Spectroscopy Practical topic: Using a Spectrophotomete r**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interact ive discussi ons + Tests short**
9	**3**	**Separation and analysis of mixture components.**	**Chromatographic techniques Practical topic: Paper Chromatography**	**- Lectures theory - Offers Introductory - Lectures Video**	**Practical laboratory tests and experiments**
10	**3**	**Use of autoclave and sterile techniques**	**Sterilization techniques Practical topic: Sterilization by heat and humidity**	**- Lectures theory - Offers Introductory - Lectures Video**	**Short tests**

11	3	Practice adding steps And sample preparation.	biological sample analysis Practical topic: Taking and preparing a blood or plant sample	- Lectures theory - Offers Introductory - Lectures Video	Practical tests + Writing a report
12	3	Documenting results using Tables and charts	Recording and graphic analysis Practical topic: Drawing experimental curves	- Lectures theory - Offers Introductory - Lectures Video	Short tests
13	3	Preparing an organized scientific report Integrated	Writing scientific reports Practical topic: Preparing a practical report	-Lectures theory - Activities and Practical experiments Laboratory	writing reports
14	3	Learn about vital techniques Modern	Theoretical topic: Advanced applications (PCR, ELISA, for example) Practical topic: mini-experiment or practical demonstration	- Activities and Practical experiments Laboratory - Offers Introductory and discussions	Practical tests
15	3	Comprehensive assessment of theoretical and practical skills	Comprehensive review and evaluation Practical subject: Final practical exam	Lectures theory	Interactive discussions

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Basic Laboratory Methods for Biotechnology – Lisa Seidman**
Main references (sources)	**Laboratory Techniques in Biochemistry and Molecular Biology – Work & Burdon**
Recommended books and references (scientific journals, reports...)	**Clinical Laboratory Science Review**
Electronic References, Websites	**https://www.labtestsonline.org/** **https://www.sigmaaldrich.com/** **https://www.protocols.io/**

Course Description Form

1. Course Name:
Cytology
2. Course Code:
PMNP152
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
My Presence, Online
6. Number of Credit Hours (Total) / Number of Units (Total)
Total 60/2 units
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1. Study the structure of the cell (prokaryotic and eukaryotic) and understand the functions of its main components (such as the plasma membrane, nucleus, mitochondria, and endoplasmic reticulum). **2. Analyze basic cellular processes such as cell division (mitosis and meiosis), protein synthesis, cellular respiration, and photosynthesis (in plant cells).** **3. Understand the mechanisms of transport of substances across the cell membrane (such as diffusion, active transport, phagocytosis, and exocytosis).** **4. Study of cell communication and chemical signals between cells (such as hormones and neurotransmitters).** **5. Linking cell science to diseases such as cancer (abnormal cell division) and genetic disorders (abnormal organelles or DNA).** **6. Applying modern techniques in cell study (such as electron microscopy, genetic engineering, an tissue culture).**
9. Teaching and Learning Strategies
- Interactive lectures. **- Problem-solving activities and case studies.** **- Practical training in the laboratory.** **- Student research projects.** **- Use of visual presentations and scientific videos.** **- Visits or interviews with laboratories or experts (if available).**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1 theory	Introduction to Cytology	Understanding the basics of science and its history	Lecture + Discussion	Oral participat
	3 practice	Safety and the light microscope	Safe handling of the microscope	Internship + Supervision	Safety report
2	1 theory	The Chemical composition of the cell	Recognizing biomolecules in the cell	Visual display	Quiz
	3 practice	Preparing slides oral cells	Learn the basics of preparing slices	Individual work	Evaluate the sli

3	1 theory	Prokaryotic and eukaryotic cells	Comparing Types Cellular	Comparative ta	Written report (half page)
	3 practice	View bacteria (prokaryotic)	Recognizing primitive cells	Microscopic images	Recording notes
4	1 theory	The cell membrane And functions	Active and Passive Transportation Analysis	Computer simulation	Interactive questions
	3 practice	Try Osmosis	Understanding Cell Membrane permeability	Group experier	Scientific report
5	1 theory	Cellular organelles	Connecting organelles to their functions (e.g. mitochondria)	Video tutorial	Schematic diagram of a cell
	3 practice	Cell division in the roots of onions	Note the stages of division isometric	Microscope + Recording data	Drawing stages
6	1 theory	Cell division (Equal & Fair)	Interpreting the stages of mitosis	animation	Theoretical test
	3 practice	Mitochondrial coloring	Labeling Organelles with Chromosomes	Coloring techniques	Color micrographs
7	1 theory	Cytoskeleton and diseases	Understanding the role of the cytoskeleton in disease	Case study	Presentation (5 minutes)
	3 practice	Separating cell components by centrifugation	Understanding cellular separation techniques	Laboratory experiment	Analyze the results
8	1 theory	Review the middle of the chapter	Summarizing key concepts	Question session	Written test
	3 practice	Practical test (mid-semester)	Assessment of acquired skills	Practical test	Performance in the lab
9	1 theory	Cellular signaling	Analyzing intercellular communication	Lecture Guest	Analyze an arti
	3 practice	Cell culture	Cellular Farming Basics	Working in groups	Planting assessment
10	1 theory	Stem cells	Understanding Medical Applications	Group discussion	Mini report
	3 practice	Measuring enzymes in cells	Linking enzymes to metabolism	Standard experience	Data report
11	1 theory	Advanced Microscopic techniques	Recognizing the microscope	Virtual Lab (view)	Short questions
	3 practice	Using the microscope (view)	Understanding advanced technologies	Virtual laborat	Interactive questions
12	1 theory	Mutations and cancer	Linking mutations to disease	Data analysis	Group project
	3 practice	DNA analysis of onion cells	DNA extraction	Interactive experience	Sample evaluat
13	1 theory	Genetic engineering	Exploring gene therapy	Video + Discuss	Conceptual test
	3 practice	Watching cells cancer	Recognize changes in infected cells	Microscopic images + analysis	View results

14	1 theory	Final review	Integrating key concepts	Workshop	Oral assessment
	3 practice	Practical application	Integrating lab skills	Mini project	Final assessment
15	1 theory	Final exam	-	-	Comprehensive test
	3 practice	Submission of projects	Presentation of results and applications	Presentations	Collective assessment

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, any)	Required Textbooks (Core Curriculum) - Book:The Cell - Structure and Function / by: Dr. Ahme Mohamed Abdel Moneim. - Molecular Biology of the Cell (7th edition) / Authored b Bruce Alberts et al. (Arabic translated reference book available).
Main references (sources)	Book:Cell Biology by the Numbers / written by: Ron Mil & Rob Phillips. - Essential Cell Biology (5th Edition) / by: Alberts et al. - Dr. Sami Mahmoud: Dr. Sami Mahmoud.
Recommended books and references (scientific journals, reports...)	- Scientific Journals: Nature Reviews Molecular Cell Biology - Journal of Cell Biology Cell Report - Scientific Reports: - Stem Cell Research Institute Reports (e.g., Stem Cell Research Reports).
Electronic References, Websites	[PubMed](https://pubmed.ncbi.nlm.nih.gov/) [ScienceDirect](https://www.sciencedirect.com/) [Khan Academ- Cell Biology](https://www.khanacademy.org/science/biology/c structure) [iBiology](https://www.ibiology.org/) - [Cell Image Library](http://www.cellimagelibrary.org/ - [Virtual Cell Animations](http://vcell.ndsu.edu/animations/)

Course Description Form

1. Course Name:
Plant Protection
2. Course Code:
PMNP 153
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(60) / Number of units (2)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1 - Understanding the basics of plant protection: Introducing students to the basic concepts and principles of plant protection, including entomology, plant diseases, agricultural animals, and pesticides **2- Diagnosing and controlling agricultural pests: Identifying economically important pests (insects, fungi, weeds, nematodes, etc.) and how to diagnose and control them using chemical, biological, physical, and agricultural methods** **3- Application of integrated pest management (IPM): Training students to design and implement integrated control programs that take into account the environment and food safety and reduce dependence on pesticides.** **4- Use of modern prevention techniques: Developing capabilities in the use of advanced metho and techniques such as genetic resistance, targeted pesticides, biotechnology, and sustainable agriculture.**
9. Teaching and Learning Strategies
- Weekly lectures supported by presentations and multimedia. **- Practical lessons in the laboratory and field to apply theoretical concepts.** **- Laboratory reports and field soil analyses.** **- Use of case studies to solve real-world soil problems.** **- Short tests, assignments, and a simple final project.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1 theoretical 3 practical	General Introduction: Principles of Plant Protection + Microscope & Sample Inspection	Understands core concepts and can use a microscope.	Lecture + Presentation + Lab Practical	Short quiz + Lab report
2	1 theoretical 3 practical	Pest Classification (Insects – Fungi – Weeds) + Field Collection & Classification	Distinguishes types of pests and classifies samples, justifying their importance.	Explanation + Discussion + Field Work	Field work assessment
3	1 theoretical 3 practical	Agricultural & Physical Control Methods + Field Experiment in Class	Explains and applies agronomic and physical pest control methods.	Lecture + Field/Lab Experiment	Experiment report

4	**1 theoretical 3 practical**	**Biological Control + Rearing & Testing Natural Enemies**	**Applies use of biological agents and evaluates their effectiveness.**	**Presentation + Lab/Field Experiments**	**Lab/field test results**
5	**1 theoretical 3 practical**	**Genetic Resistance + Analysis of Plant Resistance Data**	**Understands genetic selection mechanisms and analyzes plant resistance data.**	**Explanation + Software Training/Workshop**	**Data analysis assignment**
6	**1 theoretical 3 practical**	**Mechanical/Anatomical Resistance + Comparing Plant Tissues**	**Demonstrates how plant traits affect pest defense mechanisms.**	**Lecture + Comparative Experiment**	**Comparative experiment report**
7	**1 theoretical 3 practical**	**Introduction to Integrated Pest Management (IPM) + Practical Scenario Design**	**Designs an environmentally balanced and effective IPM plan.**	**Explanation + Brainstorming + Group Work**	**Scenario design project**
8	**1 theoretical 3 practical**	**Weed Killers + Experimenting with Herbicides on the Growth of "Weedy" Plants**	**Explains pesticide mechanisms and scientifically evaluates their effectiveness.**	**Presentation + Lab Experiment**	**Lab experiment report**
9	**1 theoretical 3 practical**	**Fungicides + Testing Effects on Fungal Growth**	**Demonstrates fungicide impact on weeds and safe use.**	**Explanation + Lab Experiment**	**Experiment analysis report**
10	**1 theoretical 3 practical**	**Systemic vs. Contact Pesticides + Practical Comparison**	**Understands safe use of fungicides and their hazards.**	**Explanation + Experiment + Discussion**	**Comparative analysis**
11	**1 theoretical 3 practical**	**Systemic vs. Contact Pesticides + Practical Comparison**	**Differentiates between pesticide types and analyzes pros and cons.**	**Explanation + Comparative Experiment**	**Comparative experiment report**
12	**1 theoretical 3 practical**	**Pest Resistance to Pesticides + Field Case Studies**	**Explains resistance mechanisms and reviews enhanced protective strategies.**	**Case Study + Discussion + Lecture**	**Case study evaluation**
13	**1 theoretical 3 practical**	**Plant Nutrition & Habitat + Soil Lab Experiments**	**Understands relationship between plant nutrition and protection.**	**Presentation + Field Application + Lab Experiment**	**Lab experiment report**
14	**1 theoretical 3 practical**	**Comprehensive Assessment of Protection Methods: Effectiveness, Environment, Food Safety + Practical Workshop**	**Evaluates protection methods using multiple criteria and proposes sustainable alternatives.**	**Workshop + Brainstorming + Group Discussion**	**Workshop participation + proposal report**
15	**1 theoretical 3 practical**	**Final Review + Comprehensive Final Exam (Theory & Practical)**	**Demonstrates mastery of course's cognitive and practical skills.**	**Review + Exam + Practical Implementation**	**Final exam (70% theory + 30% practical)**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such

as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"Not available
Main references (sources)	**Scientific Terminology Dictionary in Plant Protection – Second Edition** The official reference for Arabizing and standardizing the terms used in the curriculum, published by the Arab Society for Plant Protection. **Safe Applications of Pesticides** – by Mohamed Saeed Al-Saleh Al-Zumeiti et al. wan Al-Samara'i
Recommended books and references (scientific journals, reports...)	**Plant Pathology (5th ed.) – George Agrios** This comprehensive textbook provides an in-depth exploration of plant diseases, encompassing topics from fungal, viral, and nematode pathogens to disease epidemiology and management strategies. The fifth edition, published by Academic Press in 2005, is extensively revised and includes over 900 pages of content, featuring numerous color photographs and illustrations. It serves as a fundamental resource for students, researchers, and professionals in the field of plant pathology. --- **2. Epidemiology and Plant Disease Management – Jan C. Zadoks & R.D. Schein** This seminal work, first published in 1979 by Oxford University Press, introduces the principles of plant disease epidemiology and their application in disease management. Authored by Jan C. Zadoks, a pioneer in the field, and R.D. Schein, the book emphasizes the importance of understanding disease dynamics to develop effective control strategies. It remains a critical reference for those studying or working in plant disease epidemiology and management. **)**
Electronic References, Websites	https://www.ipm.iastate.edu/video/integrated-pest-management-iowa-stat university?utm_source=chatgpt.com

Course Description Form

1. Course Name:
General Insects
2. Course Code:
PMNP 154
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(60) / Number of units (3)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1- Introduce students to entomology as a branch of zoology and its importance in the environment, agriculture, and public health. **2- Enable students to recognize the general characteristics of insects, their anatomical and functional structure, and identify their external and internal components.** **3- Classify insects and understand the basis for classification, and recognize the main orders of insects and a group of common species.** **4- Understanding the biological processes of insects, such as growth, metamorphosis, reproduction, and nutrition, and studying their behavior and environment.** **5- Distinguishing between economically important insect species, whether beneficial, such as pollinators, or harmful, such as agricultural pests and disease vectors.** **6- Provide students with basic concepts about the relationship between insects and the environment and humans, and their role in ecosystems.** **7- Prepare students to understand more specialized courses later in the field of plant protectic agricultural pests, and medical insects.**
9. Teaching and Learning Strategies
Theoretical lectures **Used to present basic concepts and scientific information about insects in an organized and simplified manner.** **Illustrative presentations** **Such as PowerPoint slides, real images and anatomical drawings of insects, and explanatory videos of insect life cycles and behavior.** **Practical and laboratory lessons** **To introduce students to the tools used in collecting and studying insects.** **Examination and dissection of real insect specimens.** **Training in insect classification using classification keys.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1 theoretical 3 practical	Introduction to Entomology	Understand the concept of entomology, its development, and importance in	Lecture + Discussion + Insect display	Pre-test + Classroom discussion

			agriculture and environment		
2	1 theoretical 3 practical	Relationship between Insects and Other Arthropods	Differentiate between insects and other arthropods based on external structure	Slide presentation + Microscope + Applied discussion	Illustration + Practical test
3	1 theoretical 3 practical	External Structure of Insects – Head	Identify parts of the head and different mouthparts according to diet	Lecture + Microscope examination + Diagram drawing	Practical report + Short questions
4	1 theoretical 3 practical	Thorax and Derivatives – Legs and Wings	Learn the structure of the thorax, functions of legs, and wing modifications	Model display + Live/dead samples	Practical test + Graphic evaluation
5	1 theoretical 3 practical	Abdomen and Digestive System in Insects	Dissect the digestive system and explain its function	Lecture + Educational slides + Microscope	Practical test + Report
6	1 theoretical 3 practical	Internal Systems (Respiratory, Nervous, Circulatory)	Explain the function of each internal system in the insect body	Video + Discussion + Microscopic slides	Theoretical test + Lab report
7	1 theoretical 3 practical	Reproductive System + Metamorphosis in Insects	Distinguish types of metamorphosis (complete/incomplete) and understand reproductive system structure	Video presentation + Case studies + Discussion	Practical test + Lab report
8	1 theoretical 3 practical	Principles of Insect Classification and Use of Identification Keys	Understand classification principles and train on using simple identification keys	Lecture + Practical lab	Classification test + Practical exercise
9	1 theoretical 3 practical	Order Coleoptera (Beetles)	Learn characteristics of beetles and their various forms	Examine real samples + Enlarged images	Classification card + Practical report
10	1 theoretical 3 practical	Order Lepidoptera (Butterflies and Moths)	Identify butterflies and moths and their body parts	Lab + Microscope examination + Video display	Practical test
11	1 theoretical 3 practical	Order Diptera (Flies)	Analyze traits of flies and their environmental and disease importance	Insect observation + Lab examination + Discussion	Lab report + Class participation
12	1 theoretical 3 practical	Order Hymenoptera (Bees, Ants, Wasps)	Understand social insects like bees, ants, and wasps	Lecture + Documentary video + Insect samples	Simple research project + Discussion
13	1 theoretical 3 practical	Economic Insects (Beneficial and Harmful)	Distinguish between beneficial and harmful	Case studies + Group activity	Student presentation + Written

			insects with practical examples		**report**
14	**1 theoretical 3 practical**	**Methods of Collecting, Preserving, and Mounting Insects**	**Apply techniques for collecting, fixing, mounting, and creating insect collections**	**Field practical + Lab**	**Insect collection kit + Comprehensive practical evaluation**
15	**1 theoretical 3 practical**	**General Review + Final Exam**	**Review basic concepts and evaluate theoretical knowledge and practical skills**	**Comprehensive discussion + Solving sample questions**	**Final written + Practical exam**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Not available
Main references (sources)	- Dr. Saddam Abdul Ameer Rasheed • Book Title: General Entomology • Description: Covers the basics of entomology, insect anatomy, classification, and main insect orders, with practical details. • Publisher: University of Mosul – College of Agriculture – Department of Plant Protection • Year of Publication: Around 2010-2015 (check for a recent edition) 2- Dr. Sami Muhammad Jassim • Book Title: Introduction to Entomology • Description: A comprehensive book covering both theoretical and practical parts of entomology, suitable for first-level students. • Publisher: University of Mosul – College of Agriculture • Year of Publication: 2012
Recommended books and references (scientific journals, reports...)	General Entomology, Dr. Saddam Abdul Ameer Rasheed, University of Mosul – College of Agriculture – Department of Plant Protection, Covers the basics of entomology, anatomy, classification, and life cycles. Introduction to Entomology, Dr. Sami Muhammad Jassim, University of Mosul, A comprehensive book covering theoretical and practical aspects. Entomology – Theory and Application
Electronic References, Websites	https://www.youtube.com/watch?v=89WUsHcsaBY

Course Description Form

1. Course Name:
General Insects
2. Course Code:
PMNP 155
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(60) / Number of units (3)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1. Identify the molecular structure of genetic material (DNA and RNA). **2. Understanding the mechanisms of replication, transcription, translation, and regulation of gene expression.** **3. Apply molecular concepts to explain basic cellular processes.** **4. Identify molecular biology techniques used in diagnosis and research.** **5. Master basic laboratory skills associated with molecular biology techniques.** **6. Promote critical thinking and analysis of molecular biological data.**
9. Teaching and learning strategies
- **Interactive lectures using multimedia.** - **Weekly practical labs accompany the theoretical aspect.** - **Discussions and analysis of case studies.** - **Short assignments and periodic tests.** - **Simple application projects using modern tools and techniques.**
10. Course structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	- Understand the general principles of molecular biology and become familiar with the laboratory environment.	Introduction to Molecular Biology Practical topic: Laboratory safety	Lectures theory	Interactive discussions

			instructions and solution preparation		
2	**3**	**- Learn about the structure of DNA and acquire the skill of extracting it.**	**Theoretical topic: Molecular structure of DNA Practical topic: Extracting DNA from plant or animal cells**	**- Lectures theory - an offer My presentation (PowerPoint)**	**discussions Interactive + Short tests**
3	**3**	**- Understand the difference Between DNA and RNA and a practical application for extracting RNA**	**Theoretical topic: Molecular structure of RNA Practical topic: RNA extraction and analysis**	**- Lectures theory - Lessons practical Laboratory**	**Tests practical + Writing scientific reports**
4	**3**	**- Analysis of the replication mechanism Use of basic equipment**	**Theoretical topic: DNA Replication Practical topic: Use of centrifugal techniques**	**Lectures theoretical + practical**	**Tests short**
5	**3**	**Understand the process of transcription and learn to separate nucleic acids.**	**Theoretical topic: Transcription Practical topic: Agarose Gel Electrophoresis**	**- Offers Introductory - Activities and experiments Laboratory**	**Tests**
6	**3**	**Translation and initial PCR application.**	**Theoretical topic: Translation Practical topic: Preparing and operating a PCR device**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**
7	**3**	**Analysis of regulatory mechanisms And the application of prefix design**	**Theoretical topic: Regulation of gene expression Practical topic: Designing Primers**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**
8	**3**	**Understanding types of mutations Its effects and interpretation of the results Laboratory**	**Theoretical topic: Mutations and their effects Practical topic: Analysis of PCR results**	**- Lectures theory - Offers Introductory - Lectures Video**	**Interactive discussions + Tests short**

9	**3**	**Genetic modification and training of restriction enzymes.**	**Theoretical topic: Genetic engineering Practical topic: Genetic cutting and pasting techniques using specific enzymes**	**- Lectures theory - Offers Introductory - Lectures Video**	**Practical laboratory tests and experiments**
10	**3**	**- Learn about technology Plasmid and transfer methods**	**Theoretical topic: Gene transfer and expression Practical topic: Constructing a plasmid and inserting it into bacteria**	**- Lectures theory - Offers Introductory - Lectures Video**	**Short tests**
11	**3**	**Distinguish between Conventional and modern PCR.**	**Theoretical topic: Advanced PCR techniques and Real-Time PCR Practical topic: Running RT-PCR and analyzing the result curves**	**- Lectures theory - Offers Introductory - Lectures Video**	**Practical tests + Writing a report**
12	**3**	**Understanding sequencing technology and analysis Results electronically.**	**Theoretical topic: Gene sequencing and the use of databases Practical topic: Using NCBI and BLAST databases**	**- Lectures theory - Offers Introductory - Lectures Video**	**Short tests**
13	**3**	**- Linking molecular biology In practical life**	**Theoretical topic: Applications of molecular biology Practical topic: Case study - Analysis of disease mutations**	**-Lectures theory - Activities and Practical experiments Laboratory**	**writing reports**
14	**3**	**Learn about editing technology Modern genetics**	**Theoretical topic: Gene editing technologies (CRISPR) Practical topic: Simulating the use of CRISPR technology**	**- Activities and Practical experiments Laboratory - Offers Introductory and discussions**	**Practical tests**

15	**3**	**- Integrating concepts and evaluating performance Theoretical and practical**	**General review and presentation of student projects Practical topic: Final assessments and project discussion**	**Lectures theory**	**Interactive discussions**

11. Course Evaluation	
Grades are distributed out of 100 based on the tasks assigned to the student, such as daily preparation, daily oral tests, monthly or written tests, reports, etc.	
12. Learning and Teaching Resources	
Essential Molecular Biology – Brown	**Required textbooks**
Molecular Biology of the Cell – Alberts (NCBI Bookshelf)	**Main References (Sources)**
Lewin's Genes XII	**Recommended books and references**
https://www.ncbi.nlm.nih.gov/ – https://www.khanacademy.org/science/biology – https://www.genome.jp/ –	**Electronic references and websites**

Course Description Form

1. Course Name:
Sustainable Agriculture
2. Course Code:
PMNP 156
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
My Presence, Online
6. Number of Credit Hours (Total) / Number of Units (Total)
15/1
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1. Preserving resources (soil, water, biodiversity). **2. Increasing productivity without harming the environment.** **3. Adapting to climate change (reducing emissions, using resistant crops).** **4. Promoting social justice (supporting farmers, improving food security).** **5. Integrating smart technologies (precision agriculture, organic farming).** **6. Raising awareness of sustainable agriculture models and their applications.** **Ultimate goal: Achieving a balance between agricultural production, environmental protecti and social well-being.**
9. Teaching and Learning Strategies
- Interactive lectures using multimedia. **- Discussions and case study analysis.** **- Short assignments and periodic tests.**
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Understanding the basics of cell science and its evolutionary history	Introduction to Cell Science	Lecture + Open Discussion	Participate in the discussion
2	1	Distinguishing cell structure Prokaryotic and eukaryotic	Cell Types and Components	Visualization + Table Comparison	Short quiz (objective questions)
3	1	Analyzing Membrane Functions Cellular	Cell membrane and material transportation	Lecture interactive+ practical examples	Report Reading Essay Reading Essay Science
4	1	Understanding the structure and function of cellular organelles	Cellular organelles (nucleus, mitochondria)	illustrations + video tutorials	Organelle diagram with explanation
5	1	Explaining the mechanisms of cell division	Cell division (mitosis and meiosis)	Digital simulation + interactive slides	Solve practical exercises

6	1	Analyze the role of proteins in the cell	Protein structure And functions	Case study (diseases related to proteins)	Small group presentation
7	1	Understanding cellular differentiation and functional specialization	Cellular and stem cell differentiation	Lecture + discussion about recent research	Quiz
8	1	Review and center course	Comprehensive review of topics 1-7	Question and answer session and answers + test review	Midterm (multiple choice)
9	1	Analysis of cellular signaling and the mechanisms of communication	Cellular connectivity and signals	Lecture + Analyze experiments Science	Solve a case study (open-ended questions)
10	1	Understanding the role of the cell in immunity The cell and the immune system	The cell and the immune system	View recent research + discussion	Peer evaluation (feedback)
11	1	Explaining the relationship between cells and cancer	Cell and Disease (cancer)	Lecture + Documentary video	Short essay (analyzing a research paper)
12	1	Understanding techniques for studying cells (microscopy, molecular biology)	Cell Science Techniques	View Lab equipment (virtual/ images)	Theoretical practical test
13	1	Analyze recent advances in cell science	Recent research in cell science	Discussion of selected papers	Presentation of recent research
14	1	Applying knowledge to scientific issues	Applied Workshop (case studies)	Teamwork + Problem Solving	Group Project Evaluation
15	1	Final review	Summarize thecourse and review concepts	Interactivesession + focused questions	Final exam (essay/objective)

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	NO
Main references (sources)	Karp, G.(2019). Cell and Molecular Biology (9th ed.). Wiley . Pollard, T.D. et al. (2017). Cell Biology (3rd ed.). Elsevier .
Recommended books and references (scientific journals, reports...)	- Nature Cell Biology - Journal of Cell Biology - Cell
Electronic References, Websites	(http://www.fao.org/sustainable-agriculture/en/)

Course Description Form

1. Course Name:
Desert plants
2. Course Code:
PMNP 157
3. Semester / Year:
First level
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars, online classes
6. Number of Credit Hours (Total) / Number of Units (Total)
(45) / Number of units (2)
7. Course administrator's name (mention all, if more than one name)
Name: **Email:**
8. Course Objectives
1- Knowledge objectives: Identify the environmental and climatic characteristics of deser environments; classify desert plants according to their adaptation to drought and heat; understand the morphological and physiological adaptations of desert plants; identify the mos important local and global desert plant species; and understand the role of desert plants in th ecosystem and economy. **2- Skill objectives: Apply methods of collecting and analyzing plant samples from desert environments, use laboratory and field tools to study soil and plants, analyze the soil and environmental conditions surrounding desert plants, and design models for environmental restoration or desert afforestation projects.** **3- Attitudinal objectives: Promoting appreciation of the importance of desert plants in maintaining ecological balance, developing positive attitudes towards desert environmental sustainability, respecting biodiversity and plant diversity in fragile environments, and caring the conservation and sustainable use of desert plant resources.**
9. Teaching and Learning Strategies
Theoretical lectures, active learning, practical activities, field education, student projects, e-learning
10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1 theoretical 2 practical	- Explains the concept of the desert and its environmental characteristics	Desert and its Environmental Characteristics	Lectures Theory	Interactive Discussions
2	1 theoretical 2 practical	- Explains the effect of desert climatic factors on plant growth	Desert Climatic Factors on Plant Growth	- Lectures Theory - View My Presentation (PowerPoint)	Discussions Interactive + Quizzes

3	**1 theoretical 2 practical**	**-Describes the characteristics of desert soils and their impact on vegetation**	**Characteristics of desert soils and their impact on vegetation**	**- Lectures Theory - Lessons Process Laboratory**	**Tests Process + Writing scientific reports**
4	**1 theoretical 2 practical**	**-Distinguish between morphological adaptations of desert plants**	**Morphological Adaptations of Desert Plants**	**Lectures Theoretical + Practical**	**Tests Short**
5	**1 theoretical 2 practical**	**-Explains the mechanisms of physiological adaptation of plants to drought**	**Mechanisms of physiological adaptation of plants to drought**	**- Offers Introductory - Activities and Experiences Laboratory**	**Tests and laboratory experiments**
6	**1 theoretical 2 practical**	**-Discusses the reproductive adaptations of plants in arid environments**	**Reproductive adaptations of plants in arid environments**	**- Lectures Theory - Offers Introductory - Lectures Video**	**Interact ive Discussi ons + Tests Short**
7	**1 theoretical 2 practical**	**-Classifies desert plants according to survival strategies**	**Desert Plants by Survival Strategies**	**- Lectures Theory - Offers Introductory - Lectures Video**	**Interact ive Discussi ons + Tests Short**
8	**1 theoretical 2 practical**	**- Identifies the most important desert pastoral plants and their environmental role**	**Desert Grazing Plants and their Environmental Role**	**- Lectures Theory - Offers Introductory - Lectures Video**	**Interact ive Discussi ons + Tests Short**
9	**1 theoretical 2 practical**	**-Analyses environmental relationships between desert plants and other organisms**	**Environmental relationships between desert plants and other organisms**	**- Lectures Theory - Offers Introductory - Lectures Video**	**Practical laboratory tests and experiments**
10	**1 theoretical 2 practical**	**-Assesses the impact of invasive plants on the desert ecosystem**	**Invasive plants on the desert ecosystem**	**- Lectures Theory - Offers**	

				Introductory - Lectures Video	Quizzes
11	1 theoretical 2 practical	-Distinguish between native desert plant species by their characteristics	Local desert plants according to their characteristics	- Lectures Theory - Activities and Practical Experiences Laboratory	Practic al tests + Write a report
12	1 theoretical 2 practical	-Explains the economic and medicinal uses of desert plants	Economic and medicinal uses of desert plants	- Lectures Theory - Offers Introductory - Lectures Video	Quizzes
13	1 theoretical 2 practical	Explains strategies for environmental rehabilitation and afforestation of deserts	Strategies for environmental rehabilitation and afforestation of deserts	- Lectures Theory - Offers Introductory - Lectures Video	Report Writing
14	1 theoretical 2 practical	-Discusses the importance of conserving plant diversity in desert environments	Conservation of plant diversity in desert environments	- Lectures Theory - Activities and Practical Experiences Laboratory	Practical tests
15	1 theoretical 2 practical	-Reviews basic concepts and analyzes their applications	Review of Key Concepts	- Activities and Practical Experiences Laboratory - Offers Introductory and discussions	Practical tests

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Desert Plants: Biology and Biotechnology** – K. G. Ramawat
Main references (sources)	**Ecophysiology of High Salinity Tolerant Plants** – A. Läuchli & U. Lüttge
Recommended books and references (scientific journals, reports...)	**Adaptations of Desert Plants** – ResearchGate
Electronic References, Websites	https://www.cabi.org/ – https://www.sciencedirect.com/ https://www.nature.com/

Second Level Course

Course Description Template

1. Course name:					
English (2)					
2. Course code:					
NTU200					
2. Semester/Year					
3. Date of preparation of the description					
4. Available forms of attendance					
1. Weekly lesson schedule (theoretical). 2. Discussions, scientific seminars, and other extracurricular activities.					
5. Number of credit hours (total)/number of units (total)					
6. Name of the person responsible for the course (list all names, if there is more than one)					
Name: M.M. Omar Ahmed Fathi Email: omar.ah.f@ntu.edu.iq					
7. Objectives of the course					
	1. 1. Students should be able to recognize all English language skills and knowledge. 2. 2. Students should be able to encourage and develop scientific research in the field of English language in general. 3. 3. Students should be able to cooperate with local and international organizations in the field of English language development.				
8. Teaching and learning strategies					
strategies	1. Interactive lectures. 2. Brainstorming. 3. Dialogue and discussion. 4. Assignments and reports. 5. Working together to reveal leadership skills.				
9. Course structure					
Week	Hours	Required	Unit	Teaching	Assessmen

		learning outcomes	name/topic	method	t method
First + Second	2 Theoretical	Parts of speech, sentences and phrases in English, comprehension	Speech parts, sentences in English, comprehension	Discussion method, lecture method	Short exams, assignments, discussions
Third	2 Theoretical	The student should be able to recognize proper nouns, indefinite nouns, material nouns, plural nouns, abstract nouns, countable and uncountable nouns, definite and indefinite articles.	Proper, common, material, collective, abstract, countable and uncountable nouns, a, an, the.	Discussion method, lecture method	Short exams, assignments, discussions
Fourth + Fifth	2 Theoretical	The student should be able to recognize pronouns and their types: personal, accusative and genitive, possessive, reflexive, demonstrative, relative, and interrogative pronouns.	Pronouns: types, personal (subject, objective), possessive, reflexive, demonstrative, interrogative, and relative pronouns.	Discussion method, lecture method	Short exams, assignments, discussions
Sixth	2 Theoretical	The student should be able to recognize auxiliary verbs and their types.	Auxiliary verbs, types	Discussion method, lecture method	Short exams, assignments, discussions

Seventh	2 Theoretical	The student should be able to identify tenses in the passive voice: simple tenses: present, past, future.	Tenses in active voice case: simple tense: present, past, future	Discussion method, lecture method	Short exams, assignments, discussions
Eighth	2 Theoretical	The student should be able to recognize continuous tenses: present, past, and future.	Continuous tense: present, past, future	Discussion method, lecture method	Short exams, assignments, discussions
Ninth	2 Theoretical	The student should be able to recognize the perfect tense: present, past, and continuous.	Perfect tense: present, past, future	Discussion method, lecture method	Short exams, assignments, discussions
Tenth	2 Theoretical	The student should be able to recognize the present continuous tense: present, past, future.	Continuous perfect tense: present, past, future	Discussion method, lecture method	Short exams, assignments, discussions

Eleventh + Twelfth	2 Theoretical	The student should be able to recognize the following types of adjectives: scientific, possessive, descriptive, long, short, comparative, and .superlative	Adjectives: names, possessive, descriptive, long, and short adjective. Comparison and similarity	Discussion method, lecture method	Short exams, assignments, discussions
Thirteenth + Fourteenth	2 Theoretical	The student should be able to recognize the sounds in the English language: vowels, consonants, and consonant clusters.	English sounds: constants, vowels	Discussion method, lecture method	Short exams, assignments, discussions
Fifteenth	2 Theoretical	Comprehensive review of all vocabulary in the material	Review of the article	Discussion method, lecture method	Short exams, assignments, discussions
10. Course evaluation					
((Oral exams/written exams/weekly reports/daily attendance/participation and interaction in lectures/midterm and final exams))					
11. Learning and teaching resources					
Required textbooks (curriculum books, if applicable)	Rapid Rewiw				

Main references (sources)	English Grammar
Recommended books and references (scientific journals, reports, etc.)	Eurasea Article
Electronic references and websites	Lib.gin

Course Description Template

1. Course name:	
Computer Basics (2)	
2. Course code:	
NTU201	
3. Semester/Year	
First semester	
4. Date of description	
5. Available attendance formats	
1. Weekly lesson schedule (theoretical and practical). 2. Scientific discussions, seminars, and other extracurricular activities	
3. Number of credit hours (total) / Number of units (total)	
4. Name of the person responsible for the course (list all names, if there is more than one)	
Name: M.M. Manhal Muhammad Bashir Email: manhalbasher@ntu.edu.iq	
5. Objectives of the course	
Objectives	1. Students should be able to define a calculator – generations of calculators – hardware and software components. 2. Students should be able to identify the most important basic information about computers and generations of computers, as well as operating systems. 3. Students should be able to understand the MS-DOS operating system, system concepts, system signals, disks, directories and their levels, files, and internal and external commands. 4. Students should be able to recognize Microsoft software and how to use it.
6. Teaching and learning strategies	

strategies	1. Interactive lectures. 2. Brainstorming. 3. Practical training. 4. Dialogue and discussion. 5. Assignments and reports. Assignments involving group work to reveal leadership skills.

7. Course Structure

Week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Assessment method
First	1 Theoretical 1 Practical	The importance of computers in our daily lives and economy Knowledge of information technology and learning about computer parts and components	Introduction to Computers Basic Concepts in Information Technology Computer Systems Information Technology Types of Computers Computer Parts Input and Output Devices Memory Central Processing Unit	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Second	1 Theoretical 1 Practical	Getting to know computer equipment and types of memory	Equipment Computer and logic units Recorders Control unit Input unit Peripheral units Memory, storage, and performance Main types of	Theoretical: Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions

			memory	Practical: Assigning tasks and reports	
Third	1 Theoretical 1 Practical	Learn how data is represented, what units of measurement are used, learn about software and compilers, and learn about types of operating systems.	Data representation in memory Memory measurement unit Secondary memory and its types Data storage in memory Computer performance Software Systems software (programming languages) Compilers, interpreters, operating systems Types of operating systems Application software	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Fourth	1 Theoretical 1 Practical	Examination on the subject	Theoretical exam (1)	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks	Short exams, assignments, discussions

				and reports	
Fifth	1 Theoretical 1 Practical	Getting to know Windows	Windows Using the mouse, minimizing and maximizing windows, closing windows	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Sixth	1 Theoretical 1 Practical	Learn about window movement and how to control it	Move windows from one place to another, control window size, taskbar, date and time	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Seventl	1 Theoretical 1 Practical	Getting to know the main Windows icons	Start Menu Programs My Documents	Theoretical: Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions

				Practical: Assigning tasks and reports	
Eighth	1 Theoretical 1 Practical	Recognizing non-essential shortcut icons	Desktop Create a shortcut icon for an application or file Recycle Bin Windows Explorer Formatting floppy disks	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Ninth	1 Theoretical 1 Practical	Identify the operations performed on the file	File management Select, choose folder, create folder, rename, delete file, copy file, move file	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Tenth	1 Theoretical 1 Practical	Explanation of screen and mouse settings	Screen settings Sleep screen Change mouse pointer Control mouse	Theoretical: Auditory methods: writing	Short exams, assignments,

			speed Control double-click speed	on the board, direct dialogue Practical: Assigning tasks and reports	discussions
Eleventh	1 Theoretical 1 Practical	Knowing how to install and delete programs from your hard drive	Installing and uninstalling programs Disk information, Requesting help	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Twelfth	1 Theoretical 1 Practical	Examination on the subject	Monthly exam (2)	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions

Thirteenth	1 Theoretical 1 Practical	Learn how to use Microsoft software and master the basics of writing.	Microsoft program and how to use it	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Fourteenth	1 Theoretical 1 Practical	Knowing how to set keyboard shortcuts	Keyboard shortcuts	Theoretical: Auditory methods: writing on the board, direct dialogue Practical: Assigning tasks and reports	Short exams, assignments, discussions
Fifteenth	1 Theoretical 1 Practical	Identify the types of tool bars and the role of each one.	Toolbars in Word documents	Theoretical: Auditory methods: writing on the board, direct dialogue Practical:	Short exams, assignments, discussions

				Assigning tasks and reports	

8. Course evaluation	
((Oral exams/written exams/weekly reports/daily attendance/participation and interaction in lectures/midterm and final exams))	
9. Learning and teaching resources	
Required textbooks (curriculum books, if any)	Metzeelaer and Scharpf / Benjamin / Cummings Pub. 1995
Main references (sources)	Library, scientific websites, access to lectures from other universities
Recommended books and references (scientific journals, reports, etc.)	
Electronic references and websites	Internet

Course Description Template

1. **Educational Institution** Ministry of Higher Education and Scientific Research / Northern Technical University / Technical College of Agriculture
2. **Academic Department** Department of Plant Production Techniques
3. **Course Name / Code** Arabic Language 2 / NTU202
4. **Available Attendance Forms**
5. Weekly theoretical lesson schedule.
6. Educational seminars, workshops, discussions, and other extracurricular activities.
7. **Semester / Year** Coursework
8. **Total Study Hours** 30 hours (theoretical)
9. **Course Coordinator Name** Asst. Lecturer Amna Maher Aziz
10. **Course Objectives (General Goals)**
11. Preparing students who are capable of correct pronunciation and writing with minimal mistakes.
12. Motivating students to follow correct spelling rules.
13. Focusing on punctuation marks and how to use them in writing.
14. **Course Outcomes, Teaching & Learning Methods, and Assessment Methods**

Outcomes	Teaching & Learning Methods	Assessment Methods
A- Knowledge		
A1 - Students should know the necessary spelling rules. A2 - Students should know punctuation marks and how to use them. A3 - Students should know some common mistakes in Arabic and how to correct them.	Theoretical lectures, discussion sessions, debates among students, brainstorming.	Oral tests, written tests, weekly reports, daily attendance, class participation and interaction, midterm and final exams.
B- Skills		
B1 - Preparing students with the ability to read aloud correctly and write accurately without mistakes. B2 - Focusing on punctuation marks, their	Theoretical lectures, discussion sessions, brainstorming.	1. Using quizzes and final exams to assess understanding of linguistic mistakes. 2. Homework. 3. Continuous

Outcomes	Teaching & Learning Methods	Assessment Methods
correct use in writing and applying them in reading. B3 - Encouraging students to use Standard Arabic and avoid colloquial dialects in official and literary writing. B4 - Helping students organize their ideas and communicate them clearly and simply.		feedback: providing students with ongoing feedback on their performance in different activities and guiding them to improve their skills.
C- Values		
C1 - Encouraging students to consider artistic foundations of expressive writing. C2 - Developing skills and knowledge to be effective readers. C3 - Enabling students to express themselves correctly in speaking, conversation, and writing.	Practical application of lecture content, reviewing examples of expressive texts and rewriting them correctly.	Evaluation of students' notebooks to monitor progress in text writing and daily notes, reflecting their application of Arabic language standards.

10. **Course Structure**

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2 hrs	Students learn basic rules of writing *taa' marbouta* (ة) and *taa' maftouha* (ت) and how to distinguish between them	Writing rules of *taa' marbouta* and *taa' maftouha*	Lecture with practical examples	Interactive discussion and questions
2	2 hrs	Students distinguish between long *alif* (ا) and short *alif maqsoora* (ى) in writing	Long *alif* vs. *alif maqsoora*	Lecture with examples	Solving exercises
3	2 hrs	Students distinguish between solar (sun) and lunar (moon) letters in pronunciation	Solar and lunar letters	Lecture and reading texts	Extracting solar and lunar words from texts
4	2 hrs	Students distinguish between ض and ظ in writing and pronunciation	Letter *Ḍād* vs. *Ẓāʾ*	Lecture with examples	Short quizzes
5	2 hrs	Students learn basic rules of writing *hamzat al-wasl* and *hamzat al-*	*Hamzat al-Wasl* and *Hamzat al-Qat'*	Lecture with examples	Pop quiz

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
		qat‘			
6	2 hrs	Students learn rules for writing medial and final hamza	Medial and final hamza	Lecture with examples	Dictation test
7	2 hrs	Students distinguish between punctuation marks and apply them correctly in texts	Punctuation marks	Lecture and practical texts	Editing a text by placing punctuation correctly
8	2 hrs	Students recognize nouns, their signs, verbs, types, and signs	Nouns and verbs: distinction	Lecture and brainstorming	Brainstorming activity
9	2 hrs	Students distinguish between different *maf‘ouls*	*Maf‘ouls*: Object & Adverbial (place/time)	Lecture, Q&A	Pop quiz
10	2 hrs	Students distinguish between other types of *maf‘ouls*	*Maf‘ouls*: Absolute, Accompaniment, Purpose	Lecture with examples	Writing a report on a selected type of *maf‘oul*
11	2 hrs	Students understand numbers, types, components, and agreement with nouns	Numbers	Lecture, explanation, examples	Test using numbers in sentences
12	2 hrs	Continuation of numbers topic	Numbers (cont.)	Lecture, explanation, examples	Test using numbers in sentences
13	2 hrs	Students recognize common language mistakes	Common language mistakes	Examples and discussion	Each student collects 5 common mistakes and corrects them
14	2 hrs	Continuation of common mistakes	Common language mistakes (cont.)	Examples and discussion	Exam correcting a text with mistakes
15	2 hrs	Comprehensive review of previous lessons	Review	—	Comprehensive exam

11. **Course Development Plan**
12. Introducing curricula focused mainly on syntactic structures of Standard Arabic in speech and writing.
13. **Infrastructure**

- Classrooms, laboratories, and workshops: Available
- Required textbooks: Available

- Main references (sources): *Clear Spelling*, Abdul-Majid Al-Na‘imi & Dahham Al-Kayyal, Al-Mutanabbi Library, Baghdad, 6th ed., 1987.

a) Recommended books and references (scientific journals, reports, etc.):
Lessons in Language, Grammar, and Spelling for Government Employees, Ismail Hamoud Atwan et al., Ministry of Education Printing Press No. (3), Baghdad, 2nd ed., 1984.

b) Electronic references, websites, etc.:
Inspired by Arabic Literature, Haval Mohammed Amin, Al-Saadoon Press, Baghdad.

Course Description Template

1. Course name:	
Crimes of the Baath regime in Iraq	
2. Course code:	
NTU203	
3. Semester/Year	
First semester	
4. Date of preparation of the description	
5. Available forms of attendance	
1. Weekly lesson schedule (theoretical and practical). 2. Scientific discussions, seminars, and other extracurricular activities.	
6. Number of credit hours (total)/number of units (total)	
7. Name of the person responsible for the course (list all names, if there is more than one)	
Name: M.D. Ahmed Fares Al-Sawaf Email: ahmedalsawaf@ntu.edu.iq	
8. Objectives of the course	
Objectives	1. Students should be able to understand and comprehend basic concepts related to the definition, types, and categories of crimes. 2. Students should be able to define crimes and violations committed by the former regime and types of international crimes. 3. Students should be able to define crimes related to mass graves and violations of Iraqi laws. 4. Students should be able to address environmental crimes, the destruction of cities, policies of demographic change, and extrajudicial detention.
9. Teaching and learning strategies	
strategies	1. Interactive lectures. 2. Brainstorming. 3. Dialogue and discussion.

	4. Assignments and reports. 5. Group work assignments to reveal leadership skills.

10. Course structure					
Week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Assessment method
first	2 Theoretical	Theoretical: Students should be familiar with the concept of crimes and their categories .	Theoretical: - Crimes committed by the Ba'ath regime according to the 2005 Iraqi Supreme Criminal Court Law - The concept of crimes and their categories - The definition of crime in language and terminology	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Second	2 Theoretical	Theoretical: Students should be able to recognize the crimes of the Baath regime according to the Criminal Court.	Theoretical: - Categories of crimes - Crimes of the Baath regime according to the documentation of the Iraqi Supreme Criminal Court in 2005	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Third	2 Theoretical	Theoretical: Students should be able to	Theoretical: - Types of international crimes - Decisions issued	Theoretical: Auditory methods: writing on	Short tests,

		identify types of internatio nal crimes	by the International Criminal Court	the board, direct dialogue	assign ments, discuss ions
Fourth	2 Theoretical	Theoretica l: Students should be able to distinguis h between psycholog ical and social crimes.	Theoretical: - Psychological and social crimes and their effects. - Psychological crimes - Mechanisms of psychological crimes Effects of psychological crimes	Theoretica l: Auditory methods: writing on the board, direct dialogue	Short tests, assign ments, discuss ions
Fifth	2 Theoretical	Theoretica l: Students should be able to recognize social crimes and the Baath regime's stance on religion.	Theoretical: - Social crimes - Militarization of society - The Baath regime's stance on religion	Theoretica l: Auditory methods: writing on the board, direct dialogue	Short tests, assign ments, discuss ions
Sixth	2 Theoretical	Theoretica l: Students should be able to define violations of Iraqi law and their manifestat	Theoretical: - Violations of Iraqi law Manifestations of human rights violations and crimes of authority	Theoretica l: Auditory methods: writing on the board, direct dialogue	Short tests, assign ments, discuss ions

		ions.			
Seventh	2 Theoretical	Theoretical: Students should be able to recognize decisions that constitute political and military violations.	Theoretical: Some decisions that constitute political and military violations of the Baath regime.	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Eighth	2 Theoretical	Theoretical: Students should be able to identify prisons and detention centers.	Theoretical: Students should be able to identify prisons and detention centers.	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Ninth	2 Theoretical	Theory: The student should be able to identify environmental crimes committed by the Baath regime.	theory: Environmental crimes committed by the Baath regime in Iraq	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Tenth	2 Theoretical	Theoretical: Students should be able to	Theoretical: War pollution, radiation, and mine explosions.	Theoretical: Auditory methods: writing on	Short tests, assign

		understand war pollution and mine explosions.		the board, direct dialogue	ments, discussions
Eleventh	2 Theoretical	Theoretical: Students should be able to recognize scorched earth policy.	Theoretical: - Destruction of cities and villages Scorched earth policy	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Twelfth	2 Theoretical	Theoretical: The student should be able to recognize how to clear palm groves.	Theoretical: - Drainage of marshes Clearing palm groves, trees, and crops	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Thirteenth	2 Theoretical	Theoretical: Students should be able to identify mass graves	Theoretical: - Crimes involving mass graves – - Introduction to mass graves	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions
Fourteenth	2 Theoretical	Theoretical: The student should be	Theoretical: The creation of mass graves and the genocide committed by the	Theoretical: Auditory methods: writing on	Short tests, assign

		able to identify the mass graves created by the Ba'athist regime.	Ba'athist regime.	the board, direct dialogue	ments, discuss ions
Fifteenth	2 Theoretical	Theoretical: The student should be able to chronologically classify genocide graves.	Theoretical: Chronological classification of genocide graves in Iraq.	Theoretical: Auditory methods: writing on the board, direct dialogue	Short tests, assignments, discussions

11. Course evaluation
((Oral exams/written exams/weekly reports/daily attendance/participation and interaction in lectures/midterm and final exams))

12. Learning and teaching resources	
Required textbooks (curriculum books, if any)	
Main references (sources)	Publications on crimes, criminal law, and human rights available in the college library and the university's central library.
Recommended books and references (scientific journals, reports, etc.)	
Electronic references and websites	**Human rights websites.**

1. **Course Name:** Professional Ethics
2. **Course Code:** NTU204
3. **Semester / Year:** First Semester
4. **Course Description Preparation Date:** —
5. **Available Attendance Forms:**
6. Weekly lesson schedule (theoretical).
7. Discussions, scientific seminars, and other extracurricular activities.
8. **Total Credit Hours / Units:** —
9. **Course Coordinator (list all names if more than one):** Name: Dr. Ahmed Faris Al-Sawaf Email: ahmedalsawaf@ntu.edu.iq
10. **Course Objectives:**
11. Introducing students to the concepts of occupational safety and health, and their importance in protecting people, property, and the environment.
12. Understanding different types of hazards (electrical, mechanical, chemical, physical, biological, etc.) and methods of prevention.
13. Providing students with knowledge of local and international systems and laws related to occupational safety and health.
14. **Teaching and Learning Strategies:**
15. Interactive lectures.
16. Brainstorming.
17. Dialogue and discussion.
18. Assignments and reports.
19. Group work assignments to identify leadership skills.
20. **Course Structure:**

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2 theoretical	Ability to define ethics and law	Ethics and Law	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
2	2 theoretical	Ability to define ethics and ethical analysis	Ethics and Ethical Analysis	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
3	2 theoretical	Ability to define ethics and professions	Ethics and Professions	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
4	2 theoretical	Ability to identify privacy and civil liberties	Anonymity, Security, Privacy, and Civil Liberties	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
5	2 theoretical	Ability to recognize intellectual property rights and computer technology	Intellectual Property Rights and Computer Technology	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
6	2 theoretical	Ability to define the concept of cybercrime and Iraqi law	Cybercrime Concept and Iraqi Law	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
7	2 theoretical	Ability to identify types of attacks on computer systems	Types of Attacks on Computer Systems	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
8	2 theoretical	Examination	Exam	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
9	2 theoretical	Ability to recognize motivations of computer crimes	Motivations of Computer Crimes	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
10	2 theoretical	Ability to recognize social costs and consequences	Social Costs and Consequences	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
11	2 theoretical + 3 practical	Ability to understand strategies to prevent computer crimes	Strategies to Prevent Computer Crimes	Theoretical: auditory methods: writing on the board, direct dialogue Practical: assignments and reports	Short exams, assignments, discussions
12	2 theoretical + 3	Ability to define Iraqi cybercrime law	Iraqi Cybercrime Law	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
	practical				
13	2 theoretical	Ability to define —	—	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
14	2 theoretical	Ability to define —	—	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions
15	2 theoretical	Ability to define —	—	Auditory methods: writing on the board, direct dialogue	Short exams, assignments, discussions

11. **Course Assessment:** (Oral tests / Written tests / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
12. **Teaching and Learning Resources:**
• Required textbooks (curriculum books, if any): —
• Main references (sources): —
• Recommended books and references (scientific journals, reports, etc.): —
• Electronic references and websites: —

Course Description (in English)

#	Item	Details
1	Course Title	Agricultural Statistics
2	Course Code	TAMO202
3	Semester / Year	First Semester
4	Date of Description Preparation	1 / 7 / 2025
5	Available Attendance Forms	1. Weekly lesson schedule (theoretical and practical)2. Discussions, scientific seminars, and other extracurricular activities
6	Total Credit Hours / Units	—
7	Course Coordinator (List all names if more than one)	Name: Asst. Prof. Dr. Asaad Ibrahim MustafaEmail: —
8	Course Objectives	1. Students should be able to define the science of statistics.2. Students should be familiar with methods of measuring variation, averages, and tests (F, T, Z).3. Students should be able to determine differences and averages when performing statistical comparisons.
9	Teaching and Learning Strategies	1. Interactive lectures.2. Brainstorming.3. Practical training (laboratory and field).4. Dialogue and discussion.5. Assignments and reports.6. Group work to develop leadership skills.
10	Course Structure	**See detailed table below**
11	Course Assessment	(Oral tests / Written tests / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
12	Learning Resources	**Required Textbooks:** *Principles of Statistics*, Dr. Khasha' Al-Rawi, 2000.**Main References (Sources):** Ministry-approved curricula & instructor-prepared materials.**Recommended Books and References (Journals, Reports…):** 1. Ministry-approved curricula 2. Instructor-prepared materials.**Electronic Resources and Websites:** 1. Ministry-approved curricula 2. Instructor-prepared materials

Course Structure (Detailed Weekly Plan)

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2 Theoretical + 3 Practical	Theoretical: Define the principle of statistics.Practical: Solve exercises in statistics.	Theoretical: Introduction to Statistics.Practical: Exercises on principles of statistics.	Theoretical: Blackboard writing, direct dialogue.Practical: Assignments & reports.	Quizzes, homework, discussions.
2	2 Theoretical + 3 Practical	Theoretical: Understand statistical symbols.Practical: Solve exercises using symbols.	Theoretical: Statistical Symbols.Practical: Exercises on statistical symbols.	Same as above.	Same as above.
3	2 Theoretical + 3 Practical	Theoretical: Understand frequency distribution.Practical: Solve exercises on frequency tables.	Theoretical: Frequency Distribution Table.Practical: Exercises on frequency distribution.	Same as above.	Same as above.
4	2 Theoretical + 3 Practical	Theoretical: Interpret ascending & descending frequency distribution tables.Practical: Solve related exercises.	Frequency distribution tables (ascending & descending).	Same as above.	Same as above.
5	2 Theoretical + 3 Practical	Theoretical: Understand histogram, frequency polygon & curve.Practical: Construct graphs.	Histogram, Polygon, Frequency Curve.	Same as above.	Same as above.
6	2 Theoretical + 3 Practical	Theoretical: Define measures of central tendency.Practical: Solve related exercises.	Measures of Central Tendency & Dispersion.	Same as above.	Same as above.
7	2 Theoretical + 3 Practical	Monthly Exam 1	Exam 1 (Theory & Practice)	—	Exam.
8	2	Theoretical: Basics of	Standard Score,	Same as above.	Same as

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
	Theoretical + 3 Practical	standard score.Practical: Exercises on permutation & combination.	Probability, Permutation, Combination.		above.
9	2 Theoretical + 3 Practical	Theoretical: Understand normal distribution & hypothesis testing.Practical: Solve related exercises.	Normal Distribution, Hypothesis Testing.	Same as above.	Same as above.
10	2 Theoretical + 3 Practical	Theoretical: Understand T-test.Practical: Apply T-test calculations.	T-Test.	Same as above.	Same as above.
11	2 Theoretical + 3 Practical	Theoretical: Understand Z-test.Practical: Apply Z-test calculations.	Z-Test.	Same as above.	Same as above.
12	2 Theoretical + 3 Practical	Theoretical: Define correlation & regression.Practical: Solve related problems.	Correlation & Regression.	Same as above.	Same as above.
13	2 Theoretical + 3 Practical	Monthly Exam 2	Exam 2 (Theory & Practice)	—	Exam.
14	2 Theoretical + 3 Practical	Theoretical: Understand Chi-Square test and applications.Practical: Solve Chi-Square exercises.	Chi-Square Test (X^2).	Same as above.	Same as above.
15	2 Theoretical + 3 Practical	Monthly Exam 3	Exam 3 (Theory & Practice)	—	Exam.

#	Item	Details
23	Course Assessment	(Oral tests / Written tests / Weekly reports / Daily attendance / Participation and interaction in lectures / Midterm and final exams)
24	Learning and Teaching Resources	**Required Textbooks (If any):** *Principles of Statistics*, Dr. Khasha' Al-Rawi, 2000.**Main References (Sources):**- Ministry-approved curricula.- Instructor-prepared materials.**Recommended Books and References (Journals, Reports, etc.):**1. Ministry-approved curricula.2. Instructor-prepared materials.**Electronic References and Websites:**1. Ministry-approved curricula.2. Instructor-prepared materials.

Course Description Form

1. Course Name:
Natural Products
2. Course Code:
PMNP 201
3. Semester / Year:
First Semester / 2024-2025
4. Description Preparation Date:
June 1, 2025
5. Available Attendance Forms:
In-person lectures, online lectures, seminars.
6. Number of Credit Hours (Total) / Number of Units (Total)
75 Credit Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

1. Understanding the Sources of Natural Products:
   - Identify the plant, animal, and microbial sources of natural products.
   - Classify natural products according to their biosynthetic origin.

2. Studying Chemical Structure:
   - Understanding the chemical structure of natural compounds such as alkaloids, terpenoi glycosides, flavonoids, and polyphenols.

3. Distinguishing Between Different Chemical Classes:
   - Classifying compounds according to their chemical and physical properties.

4. Applying Isolation and Identification Methods:
   - Identifying the various methods for extracting, separating, and purifying natural compound
   - Using spectroscopic methods (such as UV, IR, NMR, MS) to analyze and determine structure of compounds.

5. Understanding the Biological Role of Natural Products:
   - Identifying the biological and pharmacological importance of natural products.
   - Understanding the mechanism of action of some natural products, such as antibiot antioxidants, anti-inflammatory agents, and others.

6. Assessing the economic value of natural products:
   - Study the industrial and medical applications of natural products.

- • Explore their role as a source of modern medicines, cosmetics, and food products.

9. Teaching and Learning Strategies

1. Relying on both theoretical and practical learning to integrate knowled and application.
2. Lectures are delivered using a simplified and interactive approach, linki information to real-world situations.
3. Using multiple teaching methods, such as:

- PowerPoint presentations
- Scientific videos
- Models and illustrations

4. Conducting open class discussions to exchange views and gain a deep understanding of topics.
5. Conducting practical laboratory experiments to extract and isolate natu compounds.
6. Project-based learning to stimulate critical thinking and research.
7. Analyzing real-life cases (case studies) to apply theoretical concepts to re world problems.
8. Delivering student presentations to enhance presentation and scienti communication skills.
9. Using a variety of assessments, including:

- Short tests
- Practical reports
- Project and presentation evaluation
- Participation

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Definition of natura products and their ty	Introduction to Natural Produc	Lecture + Discussion	Oral Question + Participation
2	2	Classification of nat products	Classifications of Natural Compounds	Presentation	Quiz
3	2	Identification of the sources of compoun	Sources of Natural Products	Lecture + Explanatory Video	Written Assignme
4	2	Interpretation of chemical structures	Basic Chemical Structures	Interactive Explanatio	Test

5	2	Explanation of extraction methods	Methods of Extracting Compounds	Case Study	Report
6	2	Analyzing differenc between products	Comparison of Product Types	Comparative Presenta	Class Discussion
7	2	Linking structures t effects	Biological Activity of Natural Products	Lecture + Discussion	Midterm Exam
8	2	Review of previous concepts	Review and Integration of Information	Interactive Questions	Self-Assessment
9	2	Explanation of identification metho	Methods of Compound Identification	Lecture + Mind Map	Group Activity
10	2	Using separation methods	Chromatographic Separation Methods	Video + Discussion	Practical Exam
11	2	Pharmaceutical applications of prod	Pharmaceutical Applications o Natural Products	Research Presentation	Summary
12	2	Nutritional applicat of products	Food Applications of Nat Products	Lecture + Examples	Presentation
13	2	Analyzing their he effects	Safety and Toxicity of Nat Products	Open Discussion	Analytical Exam
14	2	General review	Final Review	Dialogue and Review	Final Exam
15	2	Definition of nat products and their ty	Introduction to Natural Pro du	Lecture + Discussio n	Oral Question Participation

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Familiarization laboratory equipmer	Introduction to Instruments Tools	Practical Explanation	Preliminary Test
2	3	Practice extrac steps	Macro Extraction	Experience + Observa	Practical Report
3	3	Extract sin compounds	Sochlotte Extraction	Practical Implementat	Teacher's Notes
4	3	Apply distilla methods	Steam Distillation	Execution Experiment	Practical Assessme
5	3	Use chromatography	TLC for Detection of Compou	Practical Experiment	Results Sheet
6	3	Analysis of TLC res	Spot and Color Interpretation	Explanation + Gr Work	Analytical Assessment
7	3	Simple chem analysis	Alkaloid Detection	Experiment Discussion	Laboratory Report
8	3	Analysis of flavor compounds	Extraction and Identification	Execution + Calculati	Practical Test
9	3	Comparing effectiveness extraction methods	Comparison of Two Methods	Group Project	Practical Presentat
10	3	Preparation of p extracts	Aqueous and Alcoholic Extrac	Complete Experiment	Technical Assessn
11	3	Use of mod equipment	UV Separation and Analysis	Practical Training	Laboratory Record
12	3	Evaluation of proc properties	Biological Activity Testing	Experience + Analysis	Worksheet
13	3	Comprehensive practical application	Mini-Project Implementation	Application + Review	Oral Presentation
14	3	Final review	Review + Practical Test	Comprehensive Discussion Evaluation	Final Practical Tes
15	3	Final review	Review + Practical Test	Comprehensive Discussion Evaluation	Final Practical Tes

11. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

12. Learning and Teaching Resources

Main references (sources)	Trease and Evans' Pharmacognosy • Authors: Evans W.C. et al. • One of the best books in the field of pharmacolo and natural products. • Includes an explanation of structures, extracti and pharmaceutical applications. • Natural Products: The Secondary Metabolites • Author: J. Mann • Discusses secondary metabolites (alkaloi terpenoids, flavonoids, etc.), their sources, a structures. • Pharmacognosy and Phytochemistry • Author: Vinod D. Rangari • A simple and student-friendly reference, includi botanical and practical applications. • Natural Products Chemistry: Sources, Separatio and Structures • Author: Raymond Cooper • A specialized reference on structure, extraction, a separation. • Biological and Phytochemical Studies of Natu Products • • Discusses the biological evaluation and chemi analysis of natural products.
	1. PubChem A massive database of chemical compoun including natural products.

Recommended books and references (scientific journals, reports…)	https://pubchem.ncbi.nlm.nih.gov 2. ScienceDirect A website containing thousands of peer-review scientific articles on natural products and pla materials. https://www.sciencedirect.com 3. ResearchGate A scholarly network that provides access research and articles on natural compounds a their uses. https://www.researchgate.net 4. Google Scholar An excellent academic search engine for findi specialized research in phytochemistry and natu products. https://scholar.google.com

Course Description Form

1. Course Title:
Plant environment
2. Course Code:
PMNP202
3. Semester /Year
The first /2025
4. History of the preparation of the description
1/6 /2025
5. Available Attendance Forms
Theoretical and practical
6. Number of Credit Hours (Total) / Number of Units (Total)
2Theoretical +3Practical =5*15 = 75 hours / 3 units
7. Course administrator name (list all names, if more than one)
Name: Email:
8. Course Objectives
They are the relationship between the plant and its natural environment. **Study the impact of environmental factors on the growth and distribution of plants.** **Analysis of environmental interactions between plants and their environments.** **Application of environmental concepts in the field of horticulture and garden engineering**
9. Teaching and Learning Strategies
Theoretical lectures (direct traditional education) Field Practical Learning (Field Work) Visits to natural areas Assessment tools related to learning strategies
10. Course structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reporting	Theoretical explanation	Definition of plant ecology and its importance. Environmental factors affecting plant growth.	Introduction to Plant Environment	2	First
Quiz	Explanation and discussion	Heat, humidity and light. The effect of these factors on Physiological processes of the plant	Climatic factors	2	Second
Group discussion	Presentation	Soil composition, physical and chemical properties. The effect of soil on plant growth	Soil and its properties	2	Third
Reporting	Explanation and discussion	The role of water in plant life. Irrigation methods and their impact on	Water & Irrigation	2	Fourth

		productivity			
Short exam	Explanation and discussion	Competition and cooperation between plants. The effect of other organisms on plants.	Ecological plant interactions	2	V
Discussion of reports	Presentation	The role of plants in improving the urban environment. The effect of pollution on plants.	Plants and urban ecology	2	Sixth
Reporting	Theoretical explanation	The impact of agricultural practices on the environment. Environmental Resource Management in Agriculture	Plants and agricultural ecology	2	Seventh
Topic Discussion	Presentation	Distribution of plants in natural environments. The effect of environmental changes on plants.	Flora and natural environment	2	Eighth
Reporting	Explanation and discussion	Adaptation mechanisms to different environmental conditions. Examples of adaptations in plants.	Plant ecological adaptations	2	Ninth
Reporting	Explanation and discussion	Types of pollution and their effect on plants. Strategies to reduce environmental pollution.	Environmental pollution and vegetation	2	X
Short exam	Explanation and discussion	The importance of biodiversity in ecosystems. The role of plants in biodiversity conservation	Biodiversity and plants	2	atheistten
Reporting	Presentation	The role of plants in the cycle of natural elements. The impact of natural resource exploitation on plants	Flora and natural resources	2	Second ten
Short exam	Explanation and discussion	The impact of climate change on the growth and distribution of plants. Climate change adaptation strategies	Climate change and plants	2	Third ten
Daily test	Group discussion	The role of plants in achieving sustainable development. Sustainable Agricultural Practices	Plants and sustainable development	2	Fourth ten

Preparation for final exams	Review key concepts	Comprehensive review	2	Fifteenth

Practical Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reporting	Presentation	Explain the basics of work Field and laboratory and biosafety	Introduction to plant ecology	3	First
Practical application	Presentation	Experience the effect of light on Growing cultivated plants	Environmental factors Specific	3	Second
Short exam	Explanation and discussion	Study the effect of temperatures Different on seed germination	Temperature conditions and the plant	3	Third
Practical application	Presentation	Soil Properties Test Physical and chemical	Soil and plant	3	Fourth
Practical application	Presentation	Measurement of the rate of transpiration in Different plants	Moisture and transpiration	3	V
Practical application	Presentation	Photosynthesis rate measurement Under different light levels	Light and photosynthesis	3	Sixth
Practical application	Field trip	Study of vegetation types In a field area	Plant communities	3	Seventh
Practical application	Presentation	Apply the line or square method To estimate density or frequency	Community Analysis Vegetarianism	3	Eighth
Practical application	Presentation	Calculation of diversity indicators (Shannon, Simpson) from Field plants	Plant biodiversity	3	Ninth
Reporting	Explanation and discussion	Classification of foamy plants in Local Environment and Assessment Its foam efficiency	Foamy plants	3	X
Practical application	experience	Study of the effect of plant density On growth	Competitive relationships between Plants	3	atheisten
Application and	Questionnai	Study of the impact of human activity on plant	Environmental impact of humans	3	Second

discussion	re	diversity at a selected site			ten
Practical application	experience	Collection and analysis of samples from Aquatic plants if available	Marsh plants and aquatic environments	3	Third ten
Reports taken from scientific journals		Training students to write a report Scientific using their data	Scientific Report Writing	3	Fourth ten
Field Applied Test		Final practical exam		3	V ten

11. Course Evaluation

Weekly Reports 30%
Field Activities 20%
Mid-term Practical Exam 20%
Final Practical Test 30%

12. Learning and Teaching Resources

Curriculum of the Department of Horticulture and Garden Engineering, College of Agriculture and Forestry, University of Mosul Scheme of the Department of Horticulture and Garden Engineering, Faculty of Agriculture, University of Diyala	**Required textbooks (curriculum books, if applicable)**
Abdul-Jabbar Dawood Salman 2006). Plant ecology. University of Baghdad Publications.) **Dr. Majeed Abdul Hussein Khalil 2010)** Iraq Plants Guide. University of Qadisiya). **Al-Rubaie, Kazem Jaber (2008).** Basics of plant ecology. Babylon University Press. **Al-Asadi, Abdul Qadir.** Vegetation in Iraq - an environmental study. Basra Research Center	**Main references (sources)**
"Plant Ecology" written by Dr. Hussein Abdul Latif / University of Baghdad Lectures published on the colleges' electronic platforms	**Recommended books and references (scientific journals, reports...)**
.sci.uobasrah.edu.iq	**Websites & References**

Course Description Form

1. Course Name:	
Classification of Medicinal Plants	
2. Course Code:	
PMNP 203	
3. Semester / Year:	
First Semester / 2024–2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
75 credit hours / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	**1. Understand the scientific basis for classifying medicinal plants according different taxonomic systems (traditional and modern).** **2. Distinguish the morphological and anatomical characteristics of medici plants to determine their identity.** **3. Understand the importance of botanical classification in identifying plants medicinal value and distinguishing them from toxic or useless ones.** **4. Identify common plant families in medicinal plants, such as the Mint fam Apiaceae, Zingiberaceae, and others.** **5. Use taxonomic keys to identify medicinal plants in the field or laboratory.** **6. Promote environmental awareness and conserve plant diversity throu identifying endangered medicinal plants.**
9. Teaching and Learning Strategies	
Strategy	1. Interactive theoretical lectures to explain basic concepts plant taxonomy. 2. Field visits to collect real medicinal plant samples and train

	their classification in the natural environment. 3. Practical laboratory training to examine the morphological a anatomical characteristics of plants. 4. Use of multimedia (photos, microscopes, educational videos) illustrate the differences between plant families and species. 5. Practical use of dichotomous keys to identify species. 6. Group discussions and research reports on local internationally renowned medicinal plants. 7. Linking the taxonomy and chemical composition of medici plants to understand the relationship between taxonomy a plant use in folk medicine or pharmacology. 8. 8. Stimulating critical thinking by comparing differe classification systems (Linnaean, Cronquist, molecu taxonomy, etc.).

13. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Recognize the importance of classification in medicinal plants	ntroduction to Medicinal Plant Classification	Lecture + Discussion	Short Test
2	2	Distinguish between different taxonomic systems	Classification Systems, Old an New	Lecture	Homework
3	2	Understand basic taxonomic terms	General Terms in Classificatio	Lecture + Slides	Test
4	2	Define levels of plar classification	Order – Family – Genus – Spe	Lecture + Interactive Activity	Short Test
5	2	Recognize the characteristics of medicinal plant families	Medicinal Families: Mint, Apiaceae	Lecture + Examples	Test
6	2	Describe the characteristics of otl medicinally importa families	Medicinal Families: Zingiberaceae, Liliaceae	Lecture + Video	Descriptive Assessment
7	2	Analyze plant morphological characteristics	Taxonomy of Flowers and Lea	Lecture + Illustration	Test
8	2	Relate characteristic precise classificatior	Characteristics of Fruits and Roots	Lecture + Case Studie	Oral Presentation
9	2	Be able to use taxonomic keys	Introduction to Taxonomic Ke	Lecture + Practical Exercise	Test
10	2	Apply keys to identi medicinal plants	Training on Taxonomic Keys	Explanation + Interact Training	Exercise
11	2	Explain the classification of wel	Case Studies of Medicinal Plar	Discussion + Case Stu	Test

		known medicinal pl			
12	2	Recognize relationship betw classification medicinal use	Classification and its Relation to Active Compounds	Lecture + Video	Assignment
13	2	Discuss mo taxonomic problems	Challenges of Medicinal P Classification	Lecture + Discussion	Report
14	2	Comprehensive co review	Review of Concepts and Famil	Discussion	Preparatory Test
15	2	Final knowl e assessment	Final Exam	Comprehensive Exam	Final Test

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Learn about p taxonomy tools	Introduction to Classifica Tools	Explanation + Pract Presentation	Attendance Recor
2	3	Practice collec plant specimens	Collecting Medicinal Plants	Field Training	Collection Report
3	3	Observe morpholog characteristics	Leaves and Flowers of Medic Plants	Examination + Scien Drawing	Practical Test
4	3	Recognize differer between families	Comparing Plant Species	Group Training	Exercise
5	3	Prepare microsc slides of plants	Preparing Slides and Dissectio	Practical Lab	Lab Report
6	3	Use a light microsco	Observing Anatom Characteristics	Laboratory + Discussi	Practical Test
7	3	Apply taxonomic ke	Identifying Plant Species	Training + Workshop	Practical Exercise
8	3	Study different fam practically	Mint, Zingiberaceae, Apiaceae	Descriptive Analysis	Report
9	3	Draw p characteristics	Accurate Scientific Drawings	Practical Training	Drawing Evaluatio
10	3	Conduct a field visit	Field Trip to the Botanical Site	Visit + Recording	Field Notes
11	3	Document the colle plants	Personal Classification Notebo	Individual Work	Record Submissio
12	3	Compare classifica according to diffe keys	Old and New Keys	Group Work	Group Presentatio
13	3	Review classification preserved specimens	Laboratory Plant Classificatio	Practical Lab	Quizzle
14	3	Prepare a s taxonomic project	Project: Classification of Medicinal Plants	Individual Work	Practical Project
15	3	Comprehensive evaluation of practical application	Final Practical Exam	Comprehensive Exam	Final Practical Exa

14. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

15. Learning and Teaching Resources	
Main references (sources)	1. Medicinal Plants: Classification and Properties Author: Christina P. McCarthy • Includes an explanation of medicinal pla families with chemical compositions. • Link to the book on Google Books 2. Textbook of Pharmacognosy and Phytochemistry Author: Biren Shah and A.K. Seth • Includes the classification of medicinal plar and the study of their families. • Link to the version on Elsevier 3. WHO Monographs on Selected Medicinal Plar (World Health Organization) • An encyclopedia containing classificatic and scientific descriptions of global medici plants. • Direct link from the WHO website 4. The Families and Genera of Vascular Plants Springer • An extensive reference in plant taxonor suitable for understanding medicinal pla families. • Link to Springer
Recommended books and references (scientific journals, reports…)	1. Plants of the World Online – Kew Science • Amassive botanical database providing pla classification and distribution. • https://powo.science.kew.org 2. The Plant List (a joint project of Kew and t Missouri Botanical Garden) • To confirm the correct scientific name a classification of medicinal plants. • http://www.theplantlist.org 3. Dr. Duke's Phytochemical and Ethnobotani Databases • From the United States Department Agriculture (USDA) contains pla

	classifications and benefits. • https://phytochem.nal.usda.gov 4. PubMed Central – Open access research medicinal plants and their classification • https://www.ncbi.nlm.nih.gov/pmc 5. Tropicos – A plant database from the Misso Botanical Garden • https://www.tropicos.org

Course Description Form

1. Course Title:	
Plant physiology	
2. Course Code:	
PMNP204	
3. Semester /Year	
The first /2025	
4. History of the preparation of the description	
1/6/2025	
5. Available Attendance Forms	
Theoretical and practical	
6. Number of Credit Hours (Total) / Number of Units (Total)	
1 theoretical + 3 practical = 4 * 15 = 60 hours / 2 units	
7. Course administrator name (list all names, if more than one)	
Name Email:	
8. Course Objectives	
Understanding physiological foundations: Introduce students to how plants work at the cell and tissue level. Study of biological processes: examination of processes such as respiration, photosynthesis, and water absorption. Interaction with the environment: Study how environmental factors such as light, heat, and humidity affect plant growth. Crop improvement strategies: through physiological techniques aimed at improving agricultural production	**Goals**
9. Teaching and Learning Strategies	
Group discussions: Using group discussions to stimulate students to think critically and share their ideas about physiological processes in plants. Use of software and simulation: Students can use software that simulates physiological processes of plants such as photosynthesis or the water cycle Emphasis on interrelationships: Emphasize the relationships between different physiological processes such as the relationship between photosynthesis and respiration or how nutrients affect plant growth Use illustrations and charts (diagrams, mind maps)	**Strategy**

10. Course Structure **(Theoretical Vocabulary)**					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reportin g	Explanation and discussi	1- Definition of plant physiology and its relationship to other sciences 2Introduction to the structure Cellular and Plant Grov Mechanisms	Introduction Physiology Plant	1	First
Reporting	Presentation	Study of the structure of plant cells. Explain the functions of different plant tissues	Cellular structure and tiss functions	1	Second
Short exam	Theoretical explanation	The mechanism of photosynthesis. The influence of environmental factors on photosynthesis.	Photosynthesis (photosynthesis)	1	Third
Reportin g	Theoretical explanation discussion	The difference between aerobic and anaerobic respiration., the role of respiration in the energy production of the plant., the effects of environmental factors on the process of respiration.	Cellular respirati in Plants	1	Fourth
Reportin g	Presentation	The process of water absorption through the roots. Water balance in the plant. The effect of soil and the surrounding environment on nutrient absorption.	Absorption water a substances Dietary	1	V
Short	Theoretical explanation and discussi	The mechanism of transport of water and nutrients through plant tissues. The role of vascular tissue in the transport of	Transport in plants	2	Sixth

exam		nutrients. Chemical reactions affecting transport within a plant			
Practical applicati on	Presentation and discussi	Definition of phytohormones and their functions. Study hormones such as auxin, cytokinin, and ethylene. Effects of plant hormones on growth and development	Plant hormones	1	Sevent
Reportin g	Presentation discussion	The effect of heat and light on plant growth., the response of plants to drought, salinity, and cold, Vegetarian adaptation strategies.	Responding stress Environmental	2	Eighth
Student Discussion	Presentation	Types of reproduction in plants: sexual and asexual. Mechanisms of cellular reproduction, pollination, and fertilization. The role of the environment in plant reproduction	Reproduction the plant	2	Ninth
Daily test	Theoretical explanation	The relationship between plants and soil microorganisms. The role of microorganisms in improving the absorption of nutrients by plants. Interchanges between plants and fungi	Interactions between plants and microorganisms	1	X
Quiz	Theoretical explanation	The influence of environmental factors on plant growth. The role of light in light	Flora a organisms	1	atheist ten

		orientation and bud formation. Effects of humidity, temperature, and nutrients	Subtleties		
Reportin g	Theoretical explanation discussion	Adaptations in internal and external structures. Physiological adaptations against extreme environmental factors. Environmental impacts on physiological processes.	Physiological adaptations in Plant	1	Second ten
Short test	Presentation	How hormones affect growth and development. The role of auxin in determining root and stem directions. The effect of hormones on the resistance of plants to pests.	Hormonal coordination In plant respons	1	Third ten
Reportin g	Theoretical explanation	Applications of plant physiology in crop improvement. Genetic modifications and genetic engineering technology in improving plants., genetically modified plants and their tolerance to environmental stresses.	Plant Physiolo Applications In mode agriculture	1	Fourth ten
Reportin g preparat ion	discussion	A comprehensive review of the concepts studied, a discussion on the application of plant physiology in the field of modern agriculture.	Auditing and final exams	1	V ten

Course structure (practical vocabulary)

Evaluation method	Learning method	Unity or Theme	Output Units	Hours	Week
Reporting	Theoretical explanation	Measuring the rate of photosynthesis using an oxygen meter.	**Photosynthesis in Plants**	3	First
Reporting	Theoretical explanation	The Role of Light, Chlorophyll, and Carbon Dioxide in Photosynthesis	**Photosynthesis in Plants**	3	Second
Practical application	Explanation and discussion	Measurement of oxygen consumption and carbon dioxide production in plant cells.	Breathing in plant	3	Third
Quiz	Presentatio	: The difference between aerobic and anaerobic respiration, and the effect of environmental factors on the process of respiration	Breathing in plant	3	Fourth
Reporting	Explanation and discussion	Study the effect of nutrient solution concentration on water absorption.	Absorption Water a elements Dietary	3	V
Reporting	Explanation and discussion	Capillary property, semotic pressure, and transport of nutrients through the roots.	Absorption Water a elements Dietary	3	Sixth
Short exam	Presentatio	Monitor the movement of water and sodium in plant tissues using colored pigments.	Transport tissues Vegetarianism	3	Seventh
Short	Explanation and discussion	explain the concepts of wood and phloem, and the mechanisms responsible for transport	Transport tissues Vegetarianism	3	Eighth

exam		in plants,			
Practical applicatio n	Presentatio	: Study the effect of light, temperature, and humidity on plant growth.	The influence environmental factors on pl growth	3	Ninth
Reporting	Presentatio	Study the influence of environmental factors on plant biological processes	The influence environmental factors on pl growth	3	X
Reporting	Theoretical explanation	Study the effect of auxin, cytokinin, and ethylene on plant growth and development.	Phytohormones	3	atheist ten
Short exam	Presentatio	**Clarification of the concept**: the role of hormones in the regulation of vital processes	Phytohormones	3	Second ten
Reporting	Presentatio	Monitor the response of plants to environmental changes such as drought or pollution.	Plant interaction and environment	3	Third ten
	Presentatio	**Explain the concepts** of: mechanisms of adaptation and interaction between the plant and its	Plant interaction and environment	3	Fourth ten
11. Course Evaluation					
Final exam: 30%			Weekly test30 % Practical and laboratory works: 20% Midterm exam: 20%		
12. Learning and Teaching Resources					
"Plant Physiology" - authored by Dr. Amani Al-Sayed, University of Baghdad. Agricultural Physiology: Principles and Applications" - Dr. Falah Al-Kaabi, University of Basra. Plant Physiology" - authored by Dr. Suad Jassim, University Kufa.			**Required textbooks (curriculum books, if applicable)**		
University of Baghdad - Course Description of the			**Main references**		

Department of P Plant hormones a Mohammed, Uni Recent Studies ir Press. **Remember th YouTube chan according to th Quiz**					
Preparing a comprehe nsive report of the material	discussion	Prepare a comprehensive report that includes data analysis and scientific conclusions.And **develop scientific writing skills and critical analysis**	Final Assessm & Report	3	V ten

Course Description Form

1. Course Title:
Microbiology
2. Course Code:
PMNP205
3. Semester /Year
First Semester / 2024-2025
4. History of the preparation of the description
1/7/2025
5. Available Attendance Forms
Theoretical + Practical
6. Number of Credit Hours (Total) / Number of Units (Total)
2n + 3p = 5×15 = 75 / 3 units
7. Course administrator name (list all names, if more than one)
Name: Email:
8. Course Objectives

1- Understand the basic principles of microbiology 2- Identify the classification of microorganisms and their environmental medical importance 3- Acquire skills in laboratory work techniques related to microbiology 4. Understand the relationship between microbiology and human health	**Goals**

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

Writing research from international journals Laboratory visits and learning the practical diagnostic method Explanation of the material using modern projectors	**Strategy**

10. Course Structure **(Theoretical Vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Topic Discussion	Lectures Presentation	Learn about biology Microscopy, ori classification Microorganisms	Comprehensive understanding pathology	2	First

			For microorganisms		
Quiz	Lecture & Discussion	Understand the syste and classification objects Microscopy	Classification microorganisms	2	Second
Preparation of a report	Lecture and a presentation	Study, Cellular Structu wall, Gram-,Gram+	Cytological structure bacteria	2	Third
Topic Discussion	Lecture & Discussion	Understanding functions of cells Bacterial	Functions of bacte cells	2	Fourth
Daily test	Lecture & Presentation Presentation	Identification of fung and its importance	Fungus, molds a yeasts	2	V
report	Lecture & Discussion	Algae study a classification	Algae and classificatio and characteristics	2	Sixth
Topic Discussion	Lecture and presentation	Introduction to virus Characteristics, classification, reproduction	Virus Composition a types	2	Seventh
Monthly test	Lecture & Discussion	Getting to know biolo Microscopic Pathoge	Pathogenic microbiolo	2	Eighth
discussion	Lecture and presentation	Study microbiology In water	Microbiology in Water	2	Ninth
Report & Discussion	Lecture and discussio	Learn ways to save far Microscopic cells	Save cell cultures Microscopy	2	X
Daily test	Lecture and presentation	Identify devices Microbiology Laboratory	Biology Lab Equipmer Microscopy	2	atheist ten
discussion	Lecture and discussio	Learn ways to prepa Agricultural media	Preparation of plant media	2	Second ten

Quiz	Lecture Presentation	Study of sterilizat methods Disinfection laboratories	Sterilization a disinfection	2	Third ten
Discussion, Exam	Lecture, discussion	Learn simple dye techniques	Simple pigmentation	2	Fourth ten
Daily test	Lecture and presentation	Learn ways to isolate Microbiology	Isolation microorganisms	2	V ten

Course Structure (Practical Vocabulary)					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	Week
Using a microscope	Explanation and presentation	Learn to use light microscopes for all forces,	Using an optical microscope	3	First
Learn how to staining	Explanation and presentation	Staining of Cram dye and classification of bacteria	Cram tincture	3	Second
Bacteria isolation is practical	Explanation and presentation	Isolation and identification of typical pathogenic bacteria	Bacterial isolation	3	Third
Tests	Explanation and presentation	Bacterial culture, microbiological examination	Biochemical andIMVIC tests	3	Fourth
Practical application	Explanation and presentation	Teaching the method of preparing agricultural media and transplantation standards	Preparation of agricultural media	3	V
Daily test	Explanation and presentation	Learn to grow fungi	Cultivation of fungi	3	Sixth
Daily test	Explanation and discussion	Microscopic learning of worm phases	Microscopic phases	3	Seventh
Practical application	Explanation and presentation	Cell culture techniques, immunofluorescence	Cell Transplantation	3	Eighth
Practical application	Explanation and presentation	Collection, diagnosis and analysis of water samples	Hydrophilic microscopy	3	Ninth

Preparation of a report and discussion	Explanation and presentation	Analysis of food samples of pathogens	Analysis of pathogenic organisms	3	X
Practical application	Explanation and presentation	Diagnosis of urine and blood sample segments	Blood diagnosis	3	atheist ten
discussion	Explanation and presentation	Polymerase reaction Molecular sequencing	Polymerase reaction	3	Second ten
Practical application	Explanation and presentation	DNA Cutting Binding and Cloning Enzymes	DNA Cuts	3	Third ten
Practical application	Explanation and presentation	Learn to read on the ELISA device (biofilm)	ELISA ,agglutiation	3	Fourth ten
Monthly exam	examination	Exam and reporting	examination	3	V ten

11. Course Evaluation

1- Practical exam 10%

2- Daily Tests 5%

3- Monthly Tests 30%

4- Project or Reports 5%

5- Final Exam 50%

12. Learning and Teaching Resources

1- Principles of Biology d. Mohamed Abd l Emam Others **2- Microbiology foundations and applicatio** **d. Najwa Muhammad Jameel**	**Required textbooks (curriculum books, if applicable)**
	Main references (sources)
1- Iraqi Academic Journals **2- Recent scientific articles in the field c Microbiology**	**Recommended books and references (scientific journals, reports...)**
1- Digital libraries for universities **2- Websites of refereed scientific journals**	**Websites & References**

Course Description Form

1. Course Name:	
Plant Extracts	
2. Course Code:	
PMNP 206	
3. Semester / Year:	
First Semester / 2024–2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	1. Introduce the student to the active compounds in plants • Understand the types of plant compounds such as alkaloids, flavonoi volatile oils, terpenoids, and others. 2. Introduce the student to the concepts and techniques of extraction • Learn the basic principles of plant compound extraction processes, types solvents, and different extraction techniques. 3. Train the student on practical methods for extracting plant extracts • Enabling the student to use extraction techniques in the laboratory such maceration, boiling, distillation, organic solvent extraction, and macro- ultrasound. 4. Introduce the student to the factors affecting extraction efficiency • Such as plant species, particle size, solvent type and concentrati temperature, and extraction duration. 5. Qualify the student to analyze and evaluate plant extracts • Using biochemical analysis techniques such as thin-layer chromatograp (TLC) and measuring bioactivity.
9. Teaching and Learning Strategies	
	First: Theoretical Methods 1. Interactive Lectures

Strategy	• Explain basic scientific concepts (types of plant compounds, extract methods, biological applications). • Use PowerPoint presentations, charts, and illustrative drawings. 2. Problem-Based Learning (PBL) • Present real-life problems related to the extraction of plant compounds students to analyze and propose scientific solutions. 3. Project-Based Learning (PBL) • Assign students to prepare a research project on a specific extract fron medicinal plant, including the steps of extraction, analysis, and application. 4. Brainstorming and Class Discussions • To exchange ideas on the importance of plant extracts in various fie (pharmaceutical, nutritional, environmental). **Second: Practical Methods** 1. Laboratory Experiments • Perform steps to extract active compounds from plants using differ techniques. • Compare extraction results using different solvents or conditions. 2. Field Visits (if possible) • To pharmaceutical or medicinal plant laboratories or factories to exp students to real-world applications. 3. Data Analysis and Interpretation of Results • Training students to use analytical techniques such as TLC, UV, and GC- (depending on available capabilities).

16. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Introducing the stud to the general conce of plant extracts	Introduction to Plant Extracts	Lecture + Slide Presentation	Pre-test + Discussi
2	1	Distinguishing betw types of active compounds	Types of Active Compounds i Plants	Lecture + Instructiona Video	Oral Question
3	1	Explaining methods collecting medicinal plants	Plant Collection and Preparati for Extraction	Lecture + Case Studie	Short Report
4	1	Understanding dryin and storage methods	Drying, Grinding, and Storage	Lecture + Practical Examples	Quick Quiz
5	1	Comparing different extraction methods	Traditional Extraction Method	Lecture + Discussion	Written Assignme
6	1	Explaining extractio using water and org solvents	Maxing, Boiling, Distillation	Lecture + Video Presentation	Multiple-Choice T
7	1	Understanding advanced extraction	Supercritical Extraction, Ultrasound	Lecture + Case Studie	Group Discussion
8	1	Classifying extracts according to preparation method	Classification of Plant Extracts	Lecture + Diagram	Weekly Report

9	1	Analyzing extract properties	Physicochemical Properties of Extracts	Lecture + Case Studie	Analytical Exercis
10	1	Identifying pharmaceutical and food applications	Uses of Extracts	Lecture + Discussion	Midterm Exam
11	1	Explaining chemica evaluation methods	Quality Evaluation of Plant Extracts	Lecture + Explanatory Video	Assignment
12	1	Evaluating the risk contamination extracts	Purity and Quality Standards Extracts	Lecture + Clinical C Studies	Interactive Activit
13	1	Linking extracts medical uses	Extracts in Alternative Medici	Discussion + Stu Presentation	Scientific Discussi
14	1	Applied case studies	Case Studies of Popular Extrac	Review + Test	Project Presentatio
15	1	Comprehensive co summary	General Review and Final Ex a	Lecture + Slide Presentation Final Exam	

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Familiarization v laboratory equipmer	Preparing extraction equipmen	Live Lab Work	Practical Evaluatio
2	3	Identification various medic plants	Classifying plant samples	Sample Examination Discussion	Observation Card
3	3	Practicing plant dry steps	Drying and grinding plants	Practical Implementat	Practical Report
4	3	Preparing an extrac solution	Preparing extraction solvents	Implementation Discussion	Trainer's Notes
5	3	Performing maceration extractio	Making extraction experiment	Practical Experiment	Individual Performance Evaluation
6	3	Performing a boi extraction	Thermal extraction	Applied Experiment	Short Practical Tes
7	3	Practicing st distillation	Extraction of essential oils	Practical Implementat	Group Report
8	3	Using ultrasound	Application of modern extracti	Practical Presentation Implementation	Evaluation Questionnaire
9	3	Determining ext concentration	Extract content analysis	Practical Analysis Results Table	Data Analysis
10	3	Evaluating ext purity	Purity testing using chem methods	Laboratory Experimer	Worksheet
11	3	Comparing ext efficacy	Biochemical experiment extracts	Laboratory Test	Comparison Results
12	3	Analyzing antimicrobial activit	Evaluating antimicrobial activi	Experiment Documentation of Res	Lab Report
13	3	Testing extracts biological models	Using extract on cells/plants	Guided Practical Activ	Verbal Feedback
14	3	Conducting a pract project	Comprehensive extraction proj	Group Work	Project Presentatio
15	3	Comprehensive rev and evaluation	Summary assessment + s correction	Review + Final Pract Exam	Practical Test

17. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5

Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

18. Learning and Teaching Resources

Main references (sources)	1. Botanical Extracts and Their Phytochemicals: Potentiality in Development of Sustainable Agriculture This book covers the extraction of active plant compone their preparation, and analytical methods. It begins wit comprehensive overview of the application of organic extra in sustainable agriculture, with a focus on packaging meth such as nanotechnology. 2. Plant-based natural products: extraction, isolation, phytochemical screening methods (Vajira P. Bulugahapiti 2013) Begins with the basics of extraction, separation of compone and chemical analysis. Suitable for students and researchers phytochemistry. 3. Methods of Extraction of Phytochemicals (Chowdhury et 2023) A specialized research chapter that delves into extract mechanisms such as microwaves and ultrasound, featurin modern research nature.
Recommended books and references (scientific journals, reports…)	• Phytochemical Methods – Harborne A classic book presenting methods for extracti and analyzing plant compounds. Direct link (free PDF): http://archive.org/details/phytochemicalmethods

Course Description Form

1. Course Name:	
Plant Extracts	
2. Course Code:	
PMNP 206	
3. Semester / Year:	
First Semester / 2024–2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	1. Introduce the student to the active compounds in plants • Understand the types of plant compounds such as alkaloids, flavonoi volatile oils, terpenoids, and others. 2. Introduce the student to the concepts and techniques of extraction • Learn the basic principles of plant compound extraction processes, types solvents, and different extraction techniques. 3. Train the student on practical methods for extracting plant extracts • Enabling the student to use extraction techniques in the laboratory such maceration, boiling, distillation, organic solvent extraction, and macro- ultrasound. 4. Introduce the student to the factors affecting extraction efficiency • Such as plant species, particle size, solvent type and concentrati temperature, and extraction duration. 5. Qualify the student to analyze and evaluate plant extracts • Using biochemical analysis techniques such as thin-layer chromatograp (TLC) and measuring bioactivity.
9. Teaching and Learning Strategies	
	First: Theoretical Methods 1. Interactive Lectures

Strategy	• Explain basic scientific concepts (types of plant compounds, extract methods, biological applications). • Use PowerPoint presentations, charts, and illustrative drawings. 2. Problem-Based Learning (PBL) • Present real-life problems related to the extraction of plant compounds students to analyze and propose scientific solutions. 3. Project-Based Learning (PBL) • Assign students to prepare a research project on a specific extract fron medicinal plant, including the steps of extraction, analysis, and application. 4. Brainstorming and Class Discussions • To exchange ideas on the importance of plant extracts in various fie (pharmaceutical, nutritional, environmental). **Second: Practical Methods** 1. Laboratory Experiments • Perform steps to extract active compounds from plants using differ techniques. • Compare extraction results using different solvents or conditions. 2. Field Visits (if possible) • To pharmaceutical or medicinal plant laboratories or factories to exp students to real-world applications. 3. Data Analysis and Interpretation of Results • Training students to use analytical techniques such as TLC, UV, and GC- (depending on available capabilities).

19. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Introducing the stud to the general conce of plant extracts	Introduction to Plant Extracts	Lecture + Slide Presentation	Pre-test + Discussi
2	1	Distinguishing betw types of active compounds	Types of Active Compounds i Plants	Lecture + Instructiona Video	Oral Question
3	1	Explaining methods collecting medicinal plants	Plant Collection and Preparati for Extraction	Lecture + Case Studie	Short Report
4	1	Understanding dryin and storage methods	Drying, Grinding, and Storage	Lecture + Practical Examples	Quick Quiz
5	1	Comparing different extraction methods	Traditional Extraction Method	Lecture + Discussion	Written Assignme
6	1	Explaining extractio using water and org solvents	Maxing, Boiling, Distillation	Lecture + Video Presentation	Multiple-Choice T
7	1	Understanding advanced extraction	Supercritical Extraction, Ultrasound	Lecture + Case Studie	Group Discussion
8	1	Classifying extracts according to preparation method	Classification of Plant Extracts	Lecture + Diagram	Weekly Report

9	1	Analyzing extract properties	Physicochemical Properties of Extracts	Lecture + Case Studie	Analytical Exercis
10	1	Identifying pharmaceutical and food applications	Uses of Extracts	Lecture + Discussion	Midterm Exam
11	1	Explaining chemica evaluation methods	Quality Evaluation of Plant Extracts	Lecture + Explanatory Video	Assignment
12	1	Evaluating the risk contamination extracts	Purity and Quality Standards Extracts	Lecture + Clinical C Studies	Interactive Activit
13	1	Linking extracts medical uses	Extracts in Alternative Medici	Discussion + Stu Presentation	Scientific Discussi
14	1	Applied case studies	Case Studies of Popular Extrac	Review + Test	Project Presentatic
15	1	Comprehensive co summary	General Review and Final Ex a	Lecture + Slide Presentation Final Exam	

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Familiarization v laboratory equipmer	Preparing extraction equipmen	Live Lab Work	Practical Evaluatic
2	3	Identification various medic plants	Classifying plant samples	Sample Examination Discussion	Observation Card
3	3	Practicing plant dry steps	Drying and grinding plants	Practical Implementat	Practical Report
4	3	Preparing an extrac solution	Preparing extraction solvents	Implementation Discussion	Trainer's Notes
5	3	Performing maceration extractic	Making extraction experiment	Practical Experiment	Individual Performance Evaluation
6	3	Performing a boi extraction	Thermal extraction	Applied Experiment	Short Practical Tes
7	3	Practicing st distillation	Extraction of essential oils	Practical Implementat	Group Report
8	3	Using ultrasound	Application of modern extracti	Practical Presentatior Implementation	Evaluation Questionnaire
9	3	Determining ext concentration	Extract content analysis	Practical Analysis Results Table	Data Analysis
10	3	Evaluating ext purity	Purity testing using chem methods	Laboratory Experimer	Worksheet
11	3	Comparing ext efficacy	Biochemical experiment extracts	Laboratory Test	Comparison Results
12	3	Analyzing antimicrobial activit	Evaluating antimicrobial activi	Experiment Documentation of Res	Lab Report
13	3	Testing extracts biological models	Using extract on cells/plants	Guided Practical Activ	Verbal Feedback
14	3	Conducting a pract project	Comprehensive extraction proj	Group Work	Project Presentatic
15	3	Comprehensive rev and evaluation	Summary assessment + s correction	Review + Final Pract Exam	Practical Test

20. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5

Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

21. Learning and Teaching Resources

Main references (sources)	4. Botanical Extracts and Their Phytochemicals: Potentiality in Development of Sustainable Agriculture This book covers the extraction of active plant compone their preparation, and analytical methods. It begins wit comprehensive overview of the application of organic extra in sustainable agriculture, with a focus on packaging meth such as nanotechnology. 5. Plant-based natural products: extraction, isolation, phytochemical screening methods (Vajira P. Bulugahapiti 2013) Begins with the basics of extraction, separation of compone and chemical analysis. Suitable for students and researchers phytochemistry. 6. Methods of Extraction of Phytochemicals (Chowdhury et 2023) A specialized research chapter that delves into extract mechanisms such as microwaves and ultrasound, featurin modern research nature.
Recommended books and references (scientific journals, reports…)	• Phytochemical Methods – Harborne A classic book presenting methods for extracti and analyzing plant compounds. Direct link (free PDF): http://archive.org/details/phytochemicalmethods

1. Course Title:
Decoration Plant
2. Course Code:
PMNP207
3. Semester /Year
First / 2025
4. History of the preparation of the description
1/6/2025
5. Available Attendance Forms
Theoretical and practical
6. Number of Credit Hours (Total) / Number of Units (Total)
2Theoretical +3 Practical = 5*15=75 Hours / 3 Units
7. Course administrator name (list all names, if more than one)
Name: Email:
8. Course Objectives

Understanding the scientific fundamentals: Introduce students to basic concepts in pharmacology, including the classification of plant and animal medicines, and methods of extraction and preparation. **Application of knowledge**: Enable students to apply the knowledge gained in the preparation of natural medicines, and to understand their therapeutic and toxic effects. **Practical Skills Development**: Provide students with the necessary skills to use natu medicines safely and effectively in pharmaceutical practice	**Goals**
9. Teaching and Learning Strategies	
1. Methods of extraction, separation and identification of active compounds. 2. Evaluation of the therapeutic efficacy and metabolism of these compounds. 3. Study toxic or adverse effects on biological systems. 1- Education is enhanced through equipped laboratories and modern curricula in line with the branch's developmental vision.	**Strategy**
4. Course structure **(remember all theoretical vocabulary**	

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reporting	Theoretical explanation	Definition of plant medicinal drugs and their importance in medicine. Recent trends in discovery Medicines from natural sources	Introduction Pharmacognosy Medical	2	First
Daily test	Presentatio	Types of plant drugs: herbs, plant medicines, extracts are classified according to the part used	Classification drugs Vegetarianism	2	Second
Practical application	Presentatio	Basic principles of extraction of active compounds. Separation methods: distillation, solvent extraction, filtration. The importance of purity concentration in extracts	Extraction methods and separation	2	Third
Practical application	Presentatio	Chromatography: types and applications. High performance liquid chromatography (HPLC). Ion exchange chromatography	Advanced Separation Techniques	2	Fourth
Reporting	Presentatio	Qualitative and quantitative analysis. Spectral use: infrared (IR), nuclear magnetic resonance (NMR). Mass spectroscopy (MS).	Chemical Analys For medici plants	2	V
Group discussion	Explanation and discussion	Alkaloid compounds: classification and characteristics. Phenolic compounds,flavonoids: biological effects.and therapeutic uses	Effective compounds medicinal plants	2	Sixth
Reporting	Presentatio	Methods of evaluating effectiveness: Clinical and laboratory studies. Biomarkers used in the assessmen	Evaluation therapeutic efficacy	2	Seventh
Daily exam	Presentatio	Biometabolism of plant compounds. Distribution, absorption, and excretion. Factors affecting bioavailability	Metabolism and intrabo distribution	2	Eighth
Practical applicatio Safety practices in use of plant drugs	Presentatio	Possible side effects of plant compounds. Interactions of drugs with	Safety and toxici	2	Ninth

		medicinal plants.			
Scientific reports support the effectiveness of these plants	Detailed explanation	Traditional and modern therapeutic uses. Clarification on common medicinal plants: turmeric, ginger, mint.	Medicinal plants Common and th uses	2	X
Reporting	Presentatio	The role of folk medicine in the use of medicinal plants. Challenges and opportunities in integrating traditional medicine with modern medicine	Medicinal plants Folk medicine	2	atheist ten
Reports on plant-derived medicines	Theoretical explanation	The role of plants in the development of medicines. Challenges in the manufacture plant medicines	Medicinal plants in the pharmaceutical industry		Second ten
Comprehensive Test	Examples of research Modern in thi Domain	The latest studies and innovations in the field of plant drugs. Future trends in the discovery of medicines from natural sources.	Recent research in Plant drugs	2	Third ten
Reporting	Discussion the results Applications Operation	Field visit to pharmaceutical laboratories or factories. Practical applications on the extraction and analysis of plant compounds.	Practical applicatic	2	Fourth ten
Final Exam	Student Research Discussion		Comprehensive review	2	V ten

Practical Course Structure for Pharmacognosy

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reporting	Presentatio	Introducing medical drugs and their importance. Introduction to laboratory techniques used in the study of medicinal plants	Introduction Pharmacognosy Medical	3	First
Practical application	Presentatio	Methods of collecting plants and preparing specimens. Drying and storage technologies.	Preliminary preparation For medici plants	3	Second
Reporting	Explanatio and discussion	Determination of specific weight and density. Measurement of humidity and gray content	checkups Physical of medici plants	3	Third
Practical application	explain and presentatio	Testing for phenolic compounds. Use of appropriate chemical reagents	Chemical Tests Initial	3	Fourth
Practical application	Explanatio and discussion	Use methods such as distillation, solvent extraction. Preparation of liquid and dry extracts.	Separation a purification techniques	3	V
Practical application	Explanatio and discussion	Determine concentrations using techniques such as spectrophotometry. and make appropriate calibrations	Quantitative Analysis For act ingredients	3	Sixth
Practical application	Explanatio and discussion	Preparation of ointments, extracts, tinctures. Application of standard preparation techniques	Preparation of pharmaceuticals	3	Seventh
Daily test	Presentatio	Conductstability and efficacy tests. Analysis and interpretation of results	Quality a Effectiveness Assessment	3	Eighth

Practical application	Theoretical explanation	Analysis of clinical conditions requiring the use of natural preparations. Discuss treatment options	Scientific Ca Studies	3	Ninth
	Presentatio	Observance of safety standards in the laboratory and professional ethics in pharmaceutical work	Occupational Safety and Ethic	3	X
Discuss challenges and solutions		Implement advanced hands-on experiments	Practical applications	3	Eleventh
Analysis of common mistakes and ways to avoid them. By preparing reports		A review of the concepts and techniques used.	Comprehensive review	3	Twelfth
Discussion of findings and recommendations		Write a detailed report on the experiments carried out.	Preparation of practical report	3	Thirteenth
Discuss presentations with teaching colleagues		Prepare a presentation of the results of experiments.	Presentation	3	Fourteenth
Practical Evaluation Test		Conduct a thorough practical test. Provide a final assessment of practical performance.		3	Fifteenth

5. Course Evaluation

- **Semester Exams** : 40%
- **Practical experiences and reports** : 30%
- **Final Exam** : 30%

6. Learning and Teaching Resources

"Curriculum" – Faculty of Pharmacy, Al-Maaref University Curriculum" – College of Pharmacy, University of Baghdad	Required textbooks (curriculum books, if applicable)
Pharmacognosy" – University of Basra	**Main references (sources)**
	Recommended books and references (scientific journals, reports...)
pharmacy.uobasrah.edu.iq	**Websites &**

alkutcollege.edu.iq+8pharmacy.uobasrah.edu.iq+8uoa.edu.iq+8 alkutcollege.edu.iq .uomosul.edu.iq uomustansiriyah.edu.iq+2pharmacy.alzahraa.edu.iq+2ph.almaaqal.edu.iq+ 2pharmacy.alzahraa.edu.iq+2uomosul.edu.iq+2pharm.alayen.edu.iq+2	**References**

Course Description Form

1. Course Name:	
Biological Applications of Essential Oils	
2. Course Code:	
PMNP 208	
3. Semester / Year:	
First Semester / 2024-2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	1. Introducing the Student to Essential Oils: 1. The nature of essential oils and their plant sources. 2. Understanding their general chemical composition and main active ingredients. 2. Understanding the Methods of Extracting Essential Oils: 3. Studying the different extraction methods (such as steam distillation, solv extraction, pressing, etc.). 4. Evaluating the advantages and disadvantages of each method and choosing most appropriate method based on the plant type. 3. Analyzing Chemical and Physical Properties: 5. Understanding the chemical properties of essential oils and their impact on effectiveness of compounds. 6. Conducting laboratory experiments to analyze their components (such as GC-MS 4. Studying the Biological Applications of Essential Oils: 7. Exploring their effects as antimicrobials, antioxidants, antifungals, anti-inflamma agents, etc. 8. Their applications in the medical, pharmaceutical, agricultural, and food industries 5. Developing Scientific Research Skills: 9. Training the student to conduct scientific experiments using essential oils

	analyze their results. 10. Developing scientific and research report writing skills. 6. Identify side effects and safety: 11. Study the potential toxic effects of essential oils. **12. Safe usage methods and recommended concentrations.**
1. Teaching and Learning Strategies	
Strategy	1. Theoretical Lectures: a)Introducing basic concepts about essential oils, th composition, properties, and biological mechanisms of action b) Using visual presentations (PowerPoint, videos, microsco models). c) Incorporating stimulating questions and discussions duri lectures to increase engagement. 2. Problem-Based Learning (PBL): a. Presenting realistic problems, such as: A new essential has proven effective against antibiotic-resistant bacteri b. .Dividing students into groups to solve problems a propose scientific solutions. 3. Practical Lab Work: a. Training students on methods for extracting essent oils (such as steam distillation). b. Analyzing oils using techniques such as GC or GC-MS. c. Experimenting with the effects of oils microorganisms or living cells in the laboratory. 4. Project-Based Learning: a. Assign students to prepare a short research project o specific application of a volatile oil. b. Present the projects at the end of the semester a discuss them with classmates. 5. Presentations and Group Discussions: a. Provide students with the opportunity to give individ or group presentations on selected course topics. b. Encourage knowledge sharing among students a enhance presentation and research skills. 6. Use of e-learning:

	a. Upload lectures, scientific resources, and educatio videos to e-learning platforms (such as Google Classroom

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Identify essential oil and their concept	Introduction to Essential Oils	Lecture + Discussion	Pre-test
2	1	Classify essential oi	Types of Plant Essential Oils	Lecture + Presentation	Oral Question
3	1	Explain essential oil extraction methods	Traditional and Modern Extraction Methods	Lecture + Video	Written Assignme
4	1	Understand the facto affecting oil quality	Environmental and Agricultura Factors	Lecture + Case Studie	Quiz
5	1	Distinguish between the chemical composition of oils	Active Chemical Compounds	Lecture + Graphic Analysis	Analytical Exercis
6	1	Explain the physical and chemical proper	Properties of Essential Oils	Lecture + Discussion	Report
7	1	Explain pharmaceut applications	Essential Oils in the Pharmaceutical Industry	Lecture + Case Studie	Oral Assessment
8	1	Study the biological effects of oils	Antibacterial and Antifungal Effects	Lecture + Practical Examples	Midterm Exam
9	1	Review therapeutic applications	Oils in Aromatherapy	Lecture + Discussion	Student Presentati
10	1	Compare oils used medicinally and nutritionally	Food Uses	Lecture + Video	Individual Assessment
11	1	Analysis of the relationship betwee composition and biological activity	Relationship between Chemica Structure and Biological Activ	Lecture + Case Studie	Analytical Assignment
12	1	Evaluation toxicological and sa aspects	Safe Doses and Side Effects	Lecture + Discussion	Evaluative Test
13	1	Understand the rol oils in dis prevention	Essential Oils and Chr Diseases	Lecture + Resea Resources	Research Report
14	1	Presentation of re studies	Recent Research on Essential (	Research Discussion	Research Pa Submission
15	1	Comprehensive rev and final evaluation	General Course Review	Review + Final Exam	Final Exam

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Learn about extraction tools	Laboratory Preparation Equipment	Practical Training	Evaluation Card
2	3	Classification preparation of p samples	Selection of Oil-Rich Plants	Group Work	Field Evaluation
3	3	Applying traditi extraction methods	Hydrodistillation and St Distillation	Practical Implementat	Laboratory Report
4	3	Extraction u organic solvents	Ethanol and Hexane Extractio	Laboratory Experimer	Result Analysis

5	3	Analysis of the phys properties of oils	Color, Aroma, and Texture	Sensory Experiments Measurement	Group Examinatio
6	3	Learn about chem analysis methods	Thin Layer Chromatography	Practical Training	Laboratory Presentation
7	3	Evaluation antibacterial activity	Diffusion Test in Plates	Bio Application	Documented Resu
8	3	Evaluation antifungal activity	Fungal Bioassays	Practical Application	Data Analysis
9	3	Extraction of oils f multiple sources	Comparison of Plants	Group Work	Presentation
10	3	Experiment of blend oils	Effect of Mixtures on Biolog Activity	Practical Implementat	Group Evaluation
11	3	Determination of dosages	Safety Tests	Simulation + Calculat	Evaluation Sheet
12	3	Skin irritation testin oils	Application on Artificial Mode	Real-Life Experiment	Detailed Report
13	3	Designing a proc using oils	Therapeutic or Aromatic Produ	Group Work	Mini-Project
14	3	Presentation of app projects	Product Presentation to a Pane	Practical Presentation	Comprehensive Evaluation
15	3	Final practical rev and evaluation	Comprehensive Testing of Experiments	Group Review + Test	Final Practical Exa

23. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

24. Learning and Teaching Resources

Main references (sources)	Applications K. Hüsnü Can Baser and Gerhard Buchbauer Publisher: CRC Press Issue: Second (2016) Chapter on the biological activities of essential oils, su as: o Antibacterial o Antifungal o Antioxidant o Cellular and immunomodulatory activities o Use of essential oils in traditional and mode medicine o Extraction and analysis methods using GC-MS o Case studies of plant species containing bioacti oils

Recommended books and references (scientific journals, reports…)	13. Essential Oils: Science, Technology, a Applications – Baser and Buchbauer 1. Handbook of Essential Oils: Science, Technolo and Applications – Hüsnü Can Baser, Gerha Buchbauer 2. Medicinal Plants: Chemistry and Properties – A Sharma 3. Pharmacognosy and Phytochemistry – V Ahluwalia https://www.researchgate.net – Access specialized research and theses fr researchers in this field. 4. Dr. Duke's Phytochemical and Ethnobotani Databases https://phytochem.nal.usda.gov – A database containing accurate information plant compounds, especially volatile oils.

Course Description Form

1. Course Name:	
Medicinal Plant Production	
2. Course Code:	
PMNP 251	
3. Semester / Year:	
First Semester / 2024-2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45 credit hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	**1. Introduce students to medicinal plants in terms of their economic, health, a industrial importance.** **2. Provide students with basic skills for medicinal plant production, fr selecting suitable soil to harvesting, drying, and storage.** **3. Introduce students to the environmental and physiological factors affecting growth and production of medicinal plants.** **4. Empower students to understand propagation techniques (seed a vegetative) of medicinal plants.** **5. Identify common medicinal plant species locally and globally in terms of th botanical characteristics and active ingredient content.** **6. Qualify students to address agricultural problems facing medicinal pl production, such as pests and diseases.** **7. Promote environmental and economic awareness of the importance of utiliz medicinal plants in the pharmaceutical and aromatic industries.** **8. Train students on the use of Good Agricultural Practices (GAP) in medici plant production.**

	9. **Link practical and theoretical aspects through field visits or laborat activities that demonstrate cultivation and processing methods.** 10. **Motivate students to engage in scientific research and development in the fi of medicinal plant cultivation and production.**
9. Teaching and Learning Strategies	
Strategy	25. Adopting a competency-based approach The course focuses on providing students with the knowled skills, and attitudes necessary to produce high-qual medicinal plants, with an emphasis on field application. 26. Using theoretical lectures To introduce basic concepts about the importance of medici plants, their varieties, growing conditions, propagati methods, planting dates, fertilization management, irrigati pest control, harvesting, drying, and storage. 27. Practical applications These are carried out in the field, nurseries, or greenhous Students are trained in the stages of cultivating select medicinal plants, from land preparation to harvesting, dryi and possibly extracting active ingredients. 28. Using problem-based learning (PBL) Real-life problems in the field of medicinal plant production a presented (such as low yields or a specific pest outbreak), a students are asked to analyze the problem and propo appropriate solutions. 29. Conducting field visits To link the theoretical aspects with actual practice, studer visit farms or companies specializing in the production processing of medicinal plants, providing students w practical and realistic experience. 30. Cooperative Learning and Group Projects Students are assigned to work in groups to prepare reports applied projects on specific medicinal plants, includi environmental studies, production requirements, a economic returns. 31. Integration of Digital Media and Technology Educational videos, PowerPoint presentations, and electro

	resources are used to support theoretical and practical conte and encourage self-directed learning. 32. Comprehensive and Diverse Assessment Includes theoretical exams, practical performance assessmen evaluation of reports and research, classroom participati and presentations to ensure the measurement of knowled understanding, skills, and attitudes.

33. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Understanding concept and importa of medicinal p production	Introduction to Medicinal P Production	Lecture – Discussion	Short Quiz Participation
2	1	Understanding environmental fac affecting production	Climatic and Environme Factors	Lecture – Slide Show	Homework
3	1	Distinguishing types of soil suit for medicinal plants	Soil and Its Properties	Lecture – Discussion	Short Quiz
4	1	Understanding seed asexual propaga techniques	Propagation Methods	Lecture – Educati Video	Oral Question
5	1	Understanding plan and fertiliza programs	Cultivation and Fertiliza Practices	Lecture – Case Study	Written Report
6	1	Describing appropr irrigation techni for medicinal plants	Irrigation and Water Managem	Lecture – Discussion	Test
7	1	Identifying the r important pests diseases of medic plants	Pest and Disease Management	Lecture – Real-Cases	Presentation
8	1	Midterm review evaluation	Midterm Review	Discussion – Test	Midterm Exam
9	1	Analyzing the stage harvesting, drying, storage	Harvesting and Processing	Lecture – Illustrations	Assignment
10	1	Understanding principles of org cultivation of medic plants	Organic Agriculture	Lecture – Comparison	Short Research Pa
11	1	Explaining the im of technology production	Modern Technology Production	Lecture – Video	Mini-Report
12	1	Comparing diffe production systems	Traditional vs. Mod Production Systems	Lecture – Discussion	Group Participatio
13	1	Understanding qua controls for medic plants	Production Quality and Standa	Lecture – Case Analys	Short Quiz
14	1	Explaining	Costs and Returns	Lecture – Prac	Problem Solving

		economic aspects production		Exercise	
1	15	Comprehensive co evaluation	Review and Final Exam	Review – DiscussioN	Final Exam

Practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Familiarization v tools and equipment	Agricultural Tools Techniques	Practical Applicatior Presentation	Practical Evaluatic
2	2	Preparing soil planting	Cultivation Media Preparation	Experiment - F Supervision	Practical Report
3	2	Performing propaga	Seed and Asexual Propagation	Practical Implementat	Direct Evaluation
4	2	Cultivating medic plants in pots or bas	Practical Agriculture	Actual Planting	Observation Evaluation
5	2	Applying appropr fertilization	Fertilization of All Types	Field Work	Practical Record
6	2	Implementing a reg irrigation plan	Irrigation Application	Practical Experiment	Performance Evaluation
7	2	Monitoring p growth and recor data	Growth Monitoring	Recordings and Notes	Practical Record
8	2	Performing biolog control procedures	Pest Control	Field Application	Practical Evaluatic
9	2	Harvesting plants evaluating quality	Harvesting and Drying	Field Training	Product Evaluatior
10	2	Storing medicinal p material	Storage and Packaging	Testing and Packaging	Practical Presentat
11	2	Cultivating org plants	Organic Agriculture Applicatic	Mini-Project	Implementation Follow-up
12	2	Assessing san quality	Field Quality Tests	Field Analysis Tools	Practical Report
13	2	Preparing a small-s production project	Mini-Agricultural Project	Group Work	Project Evaluation
14	2	Project presenta and discussion	Student Presentations	Presentation and Presentation	Presentation Evaluation
15	2	Final review evaluation	Comprehensive Practical Test	Test - Discussion	Practical Final Exa

34. Course Evaluation

Grade out of 100	Evaluation
5	Daily Exams
70	Monthly Exams
5	Report
10	Attendance and Participation
10	Laboratory Performance Evaluation
100	Total Grade

35. Learning and Teaching Resources

Main references (sources)	Handbook of Medicinal Herbs A comprehensive guide containing information on t characteristics of medicinal plants and their cultivati methods.

	Manual for the Propagation and Cultivation of Medici Plants of Ghana Covers nursery establishment techniques and the id environment for practical propagation of medici plants. Guidelines for Cultivation, Collection, Conservation a Propagation of Medicinal Herbs (Islamabad, 2006) A structured guide covering site selection, soil, harvesti methods, and quality standards. Cultivation of Medicinal Plants (ResearchGate, 2022) Covers cultivation methods for 35 essential medici plants with economic and commercial information. Good Agricultural and Collection Practices for Medici Plants (FAO) A distinguished guide with a focus on qual management, safety, and documentation to ensu optimal plant yields and purity.
Recommended books and references (scientific journals, reports…)	https://www.rwaq.org Sometimes offers courses on medicinal plants and herbs http://elearning.agri.cu.edu.eg It includes agricultural courses, and you may find units medicinal plants.

Course Description Form

1. Course Title:
Weeds
2. Course Code:
PMNP252
3. Semester/Year
First semester2025
4. History of the preparation of the description
1/6 /2025
5. Available Attendance Forms
Theoretical and practical
6. Number of Credit Hours (Total) / Number of Units (Total)
1T + 3P 4=*15= Hours60 , Units 2
7. Course administrator name (list all names, if more than one)
Name: Email:
8. Course Objectives

Knowledge: Understand the types and components of forests and their ecological functions. Mastery of forest control and planning techniques. 2- Skills: Apply environmental measurements and analyze data using software and field tools. 3- Final Presentations: Prepare practical projects: (e.g.) create an afforestation plan or a sustainable management program.	**Goals**

9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
Effectiveness of interactive lectures: Encouraging classroom debate.	**Strategy**

Field work: Visits to laboratories and applied agricultural sites. Active learning: Through group projects and self-assessment. Expert seminars: Similar to workshops at forestry colleges	

10.Course structure **(remember all theoretical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Reporting	Explanation a discussion	Definition of bu classification (herbs, perennials, aqua	Introduction The concept of jung and their types	1	First
Daily exam	Theoretical explanation	Focus on bush species that exist in Iraq	Anatomy a definition of species Popular in Iraq	1	Second
Sample Analysis	Simulation model	Temperature and humic effect and climate	The climatic environment of the bush	1	Third
Practical Activit	Presentation	Understanding the grow cycle and influencing factors	The life cycle of bus growth	1	Fourth
Discussion of the results	Sample Analy	Study of soil properties Water transport	Soil impact and resources Water	1	V
Topic Discussion	Case Studies	Disease identification Common diagnostic methods	Diseases Jungle and fungus	1	Sixth
Field Practice	Theoretical lecture	Classification of insects and their effect On the lid	Insects and fungi Bush	1	Seventh
Worksho p	Presentation	Measurement meth and data analysis Environmental	Manufacturing Processes and data analysis	1	Eighth
discussio	Case Study	Business & Econo Opportunities in forest products	Forest Developm and Investment	1	Ninth

n					
Reporting	Use methodology Project Analy	Planning investm projects	Project Design Jungle Investment	1	X
Practical application	Presentation	Excess control & Technical Systems	Anti technology Vegetation transfer	1	atheist ten
Daily test	Analysis experiments Precedent	Effective afforestat methods	Afforestation techniques & Maintenance	1	Second ten
Discussio n	Theoretical lecture	Study management plar and forest protection	Planning & Policy environment	1	Third ten
Research Discussion	preparation Comprehensiv Research	Project Evaluation	Forest Systems and its sustaina development	1	Fourth ten
Final Exam	Discussions	Summarizing lectures	Review and Exam Final	1	V ten

Practical Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	numbe Hours	Week
Preparation of a report	Lecture	Acquaintance with the ty of bush process ergonomics, accompany crop growers	**Definition of laborat and fields**:	2	First
Fieldwork	Presentation	Photographing observing properties Plant, flowers and branc	**Know the shapes of bush**	2	Second
Daily test	Explanation a discussion	Evaluation of efficiency of chem methods	Experiments of con methods Mechanical	2	Third
Fieldwork	Presentation	Watch the effect of soi on Its capabilities in the fig against the bush	Tillage and insertion into Control	2	Fourth

Reporting	Theoretical explanation and discussion	Understanding biolog concepts in Control	Biological methods	2	V
Daily exam	Explanation a discussion	Determine the role of crop rotation In reducing the spread of the bush	**Application of agricultural rotation As a result of competition**: agriculture Jungle alternati and comparison their effects	2	Sixth
Reporting	Presentation	Effects of heat use and coverage on terrestrial life	Methods of burn and mulching	2	Sevent
Reporting	Lecture Jungle classificatio	Raising classificat capabilities by Plant Identificat Systems	Terms a classifications Universality	2	Eighth
Practical application	Presentation	Acquire practical skills in Calibration and dilution	Preparation pesticide solutio	2	Ninth
Practical application	Lecture	Acquisition of prevent techniques in environment Guide	Fighting bush entry in Gardens and nurserie	2	X
Practical applicat	For mechanical, chemical, biological methods types such as Nile flower and bush crocodile		Dealing w bushes Aquatic	2	atheist ten
Daily test	**Practical experiences**	Developing strategies Especially in protected environment	Jungles in houses Protected area	2	Second ten
Practical application	Explanation a discussion	Absorption analysis and pestici transmission to t plant	Laboratory experiments	2	Third ten
Practical application		Experiences in protected environment	Physiological experiments	2	Fourth ten

	To know the metho of control			
Presenting and discussing student projects	Complete and discu the results of Physiology absorption	Follow up experiments Week 14	2	V ten

11. Course Evaluation

10% Attendance and Participation
20% Practical Reports
20% Semester Practical Exams
30% Final Exams
20% Field Activities
Total 100%

12. Learning and Teaching Resources

The book "Jungle Life" (Diyala University, 2018) – Part I presents the physiolog basics and scope of Proliferation The book "The Jungle and Methods of Combating it" (Muhammad Hathal a Baqir Al-Jubouri, 1985-2011) - Curriculum practical and theoretical	**Required textbooks (curriculum books, if applicable)**
Remember references (sources) if any	**Main references (sources)**
Write the name of the recommended reference for each course	**Recommended books and references (scientific journals, reports...)**
aujecs.uoanbar.edu.iq+3agriculture.uodiyala.edu.iq+3agriculture.uodiyala.edu.iq+3. uoanbar.edu.iq+4coagri.uobaghdad.edu.iq+4agriculture.uodiyala.edu.iq+4	**Websites & References**

Course Description Form

1. Course Name:	
Oil and Aromatic Crops	
2. Course Code:	
PMNP 253	
3. Semester / Year:	
First Semester / 2024-2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	**1. Introduce the student to the economic, nutritional, and industrial importa of oil and aromatic crops.** **2. Distinguish between the different types of oil and aromatic crops and t botanical and environmental characteristics.** **3. Explain the methods of cultivation, production, and agricultural practi appropriate for each type of crop.** **4. Analyze the factors affecting the productivity and quality of each of th crops.** **5. Identify the methods of extracting vegetable and aromatic oils, as well as methods of analyzing and evaluating their quality.** **6. Understand the industrial and commercial importance of these crops and t role in supporting the national economy.** **7. Apply practical skills in cultivating some oil and aromatic crops addressing their common problems.** **8. Promote positive attitudes toward investing in local resources to prod vegetable and aromatic oils.**

	9. . **Use scientific information to make appropriate decisions related to c management.**

9. Teaching and Learning Strategies

Strategy

First: Teaching and Learning Methods

1. Theoretical Lectures:
- A structured theoretical presentation of the basic concepts a different types of oil and aromatic crops.
- Use of PowerPoint slides and educational videos.
2. Classroom Discussions:
- Encouraging dialogue between students and the teacher analyze information and link it to practical reality.
3. Field Study (Field Visits):
- Visiting farms or oil extraction factories.
- Practical application of concepts learned in lectures.
4. Practical Training:
- Carrying out activities in the field or laboratory, such planting, collecting, drying, and extracting oils.
5. Cooperative Learning:
- Dividing students into groups for projects or presentations.
6. Problem-Based Learning (PBL):
- Presenting real-life agricultural problems for analysis a proposing scientific solutions.
- Second: Educational Activities
- Preparing research reports on a specific plant.
- Delivering oral presentations.
- Prepare a mini-project on a plan for planting or producing oil or aromatic crop.
- Analyze oil samples for quality control.

Third: Assessment Strategies

1. Theoretical tests (midterm and end-term).
2. Practical tests (field and laboratory skills assessment).
3. Evaluation of research reports and projects.
4. Class participation, interaction, and discussions.
5. Self- and group assessment of some collaborative tasks.

36. Course Structure

Week	Hours	Required	Unit or subject name	Learning	Evaluation

		Learning Outcomes		method	method
1	1	Understand the basi concepts of oil and aromatic crops	General Introduction to Oil an Aromatic Crops	Lecture + PowerPoint Presentation	Class Participation
2	1	Distinguish the characteristics of oil crops	Classification and Economic Importance of Oil Crops	Lecture + Discussion	Quiz
3	1	Explain the requirements for growing oil crops	Environmental Factors and Soi Requirements	Lecture + Case Study	Homework
4	1	Understand propaga and seed methods	Propagation Methods of Oil Crops	Video Presentation + Lecture	Practical (Oral) Te
5	1	Define harvesting ar storage methods	Harvesting and Storage of Oil Crops	Discussion + Illustrati	Participation and Follow-up
6	1	Analysis of well-kn oil plants	Soybean - Cottonseed	Lecture + Case Analys	Written Test
7	1	Derive the oil benef of specific plants	Sesame - Sunflower	Lecture + Video	Group Activity
8	1	Link production to industrial use	Industrial Uses of Oils	Case Study + Presentation	Written Report
9	1	Define aromatic pla and their uses	Introduction to Aromatic Crop	Lecture + Discussion	Quiz
10	1	Compare aromatic plant species	Mint, Basil, Rosemary	Lecture + Illustrations and Models	Oral Test
11	1	Describe essential o extraction methods	Extraction and Distillation Techniques	Practical Presentation Discussion	Analytical Assessment
12	1	Understand applications of esse oils	Use in Perfumery and Therapy	Lecture + Scientific Fi	Individual Report
13	1	Link arom production to environment	Sustainable Cultivation Aromatic Crops	Group Discussion	Group Assessment
14	1	Comprehensive co review	General Review and Applicati	Review Session	Mock Achieven Test
15	1	Comprehensive knowledge assessm	Final Exam	Written Exam	Final Exam

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Distinguishing betw oil and aromatic see	Seed and Sample Identificatio	Practical Application	Examination Observation
2	3	Implementing plan steps	Soybean or Sesame Planting	Field Experiment	Follow-up Log
3	3	Documenting gro stages	Plant Growth Monitoring	Group Work	Weekly Report
4	3	Measuring parameters	Soil Characteristics Testing	Laboratory Work	Worksheet
5	3	Clarifying irriga and fertiliza methods	Irrigation Systems for Oil Cro	Practical Application	Field Follow-up
6	3	Distinguishing betw harvesting methods	Sesame Drying - Ma Harvesting	Field Training	Direct Evaluation
7	3	Extracting oil fro plant	Manual Sesame Oil Extraction	Laboratory Experimer	Practical Evaluatic
8	3	Analyzing properties of oils	Density and Visc Measurement	Laboratory Experimer	Practical Log

9	3	Sorting aromatic pla	Species Identification by Ar and Form	Practical Activity	Diagnostic Test
10	3	Performing hydrodistillation	Mint or Basil Distillation	Experimental Work	Performance Evaluation
11	3	Evaluating the qua of aromatic oils	Comparing Distillation Results	Group Activity	Practical Report
12	3	Presenting m projects	Extraction or Drying Project	Presentation	Group Evaluation
13	3	Linking production economic outcomes	Comparing Production Different Species	Field Case Study	Achievement File
14	3	Comprehensive co review	Comprehensive Review Evaluation	Applied Activity	Practical Test
15	3	Final practical l assessment	Comprehensive Practical Test	Implementation	Final Pract Evaluation

37. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

38. Learning and Teaching Resources

Main references (sources)	1. "Oil, Aromatic, and Medicinal Field Crops" • Author: Dr. Abdel Hamid Shehata • Covers oil crops (sesame, sunflower, flax, etc.) a aromatic crops such as mint and basil. 2. "Field Crops - Part Two (Oil and Forage Crops)" • Author: Dr. Ahmed Abdel Aziz • Includes the characteristics and methods of growing crops, and their economic importance. 3. "Medicinal and Aromatic Plants: Their Cultivation a Oil Extraction Methods" • Author: Dr. Hassan Fathy
Recommended books and references (scientific journals, reports…)	**1.** Agricultural Encyclopedia - Agricultural Engineeri Website https://www.agriceg.com Contains detailed articles on crops such as fl sesame, castor oil, mint, and lavender. **2.** Agricultural Knowledge Portal - Academy Scientific Research (Egypt) http://agri.knowledgetransfer.eg A large database including oil and aromatic crops.

	3. FAO (Food and Agriculture Organization) Website https://www.fao.org You can search using the terms "Oil Crops" "Aromatic Plants." Contains recent reports on the production, trade, a global importance of these crops.

Course Description Form

1. Course Name:	
Soil and Plant Analysis	
2. Course Code:	
PMNP 254	
3. Semester / Year:	
First Semester / 2024-2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Credit Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	1. Understanding the Scientific Basis of Soil and Plant Analysis: • Introducing the student to the basic components of soil and the biological, physi and chemical processes that affect its fertility. 2. Learning the techniques of chemical and physical soil and plant analysis: • Enabling the student to use laboratory methods and tools to analyze soil and p elements. 3. Assessing soil fertility and plant nutritional needs: • Using analysis results to determine nutrient deficiencies or excesses in soil and pla 4. Linking analysis results to fertilizer recommendations: • Training the student to write analytical reports and provide pract recommendations for agricultural management. 5. Developing laboratory work and data analysis skills: • Acquiring applied skills in analysis, measurement, and scientific interpretation results.
9. Teaching and Learning Strategies	
Strategy	1. Interactive Theoretical Lectures: • Introducing theoretical concepts using presentatio illustrative models, and examples from real-life agricultu contexts.

	2. Practical Laboratory Applications: • Conducting actual soil and plant sample analyses under dir supervision to teach students the steps of laboratory work. 3. Field Study: • Field visits to take and analyze soil and plant samples, a interpret the results in the context of their environment. 4. Using Cooperative Learning: • Encouraging students to work in groups to analyze samp and discuss the results. 5. Analyzing Real-Life Case Studies: • Discussing real-life cases of soil or plant problems and linki them to analysis results and treatment methods. 6. Intermediate and Summative Assessment: • Using short tests, laboratory reports, presentations, a applied projects to assess performance.

39. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Recognize the importance of soil a plant analysis	Introduction to Soil and Plant Analysis	Lecture - Discussion	Diagnostic Test
2	1	Understand soil components and typ	Physical and Chemical Soil Components	Presentation - Interact	Short Questions
3	1	Identify soil sample and how to take ther	Methods of Soil Sample Preparation and Preparation	Lecture - Explanatory Video	Class Participation
4	1	Distinguish between factors affecting soi fertility	Soil Fertility and Factors Affecting It	Demonstration	Written Assignme
5	1	Understand the importance of plant analysis in detecting nutritional deficienc	Importance and Objectives of Plant Analysis	Lecture - Case Analys	Short Quiz
6	1	Compare chemical analysis methods	Methods of Total and Partial Chemical Analysis	Presentation + Discuss	Written Questions
7	1	Explain pH and electrical conductivi analysis methods	Measuring Soil pH and EC	Lecture + Examples	Practice Test
8	1	Distinguish between different extraction methods	Methods of Nutrient Extractio	Theoretical Explanatic	Practice Exercise
9	1	Interpret major elem analysis results	Analysis of Nitrogen, Phospho and Potassium	Lecture + Examples	Written Test
10	1	Interpret minor elem results	Analysis of Iron, Zinc, Manganese, and Copper	Lecture - Individual Activity	Written Assessme
11	1	Explain the relations	Fertility Evaluation and Fertili	Data Analysis	Worksheet

		between analysis results and plant nee	Recommendations		
12	1	Understand international stand for soil analysis	Soil and Plant Analysis Stand (ISO - FAO)	Scientific Discussion	Homework
13	1	Distinguish betw types of errors analysis	Potential Errors in Analysis Methods for Reducing Them	Interactive Explanatio	Case Study
14	1	Analyze real-life studies	Practical Application of Anal Results	Case Study	Mini Project
15	1	Comprehensive co review	Review and Final Exam	Open Dialogue	Final Exam

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Familiarize your with analyt instruments and tool	Laboratory preparation familiarization with tools	Orientation Practical	Observed Evaluati
2	3	Learn the steps taking soil samples	Practical application for tal field samples	Field Work	Practical Evaluatic
3	3	Prepare samples analysis	Drying, grinding, and sto samples	Laboratory Applicatio	Practical Record
4	3	Soil moisture analys	Heat moisture measurement	Practical Experiment	Laboratory Report
5	3	Ph and EC analysis	Ph and electrical conducti measurement	Laboratory Experimer	Results Record
6	3	Chemical analysis major elements	Soil NPK analysis	Practical Lab	Worksheet
7	3	Micronutrient extraction	Zn, Fe, Cu, and Mn analysis	Practical Experiment	Technical Evaluati
8	3	Carbonate bicarbonate analysis	Chemical testing of alkaline sc	Laboratory Training	Analysis Report
9	3	Element extrac from plants	Preparing plant samples analysis	Practical Application	Direct Observatior
10	3	NPK analysis in pla	Detecting plant nutrients	Practical Lab	Laboratory Report
11	3	Interpretation analysis results	Comparing different samples	Analysis Workshop	Analytical Test
12	3	Processing labora data	Using tables and software	Practical Application	Oral Presentation
13	3	Preparing comprehensive repo	Writing a scientific report for analysis	Individual Work	Report Evaluation
14	3	Presentation discussion of results	Presenting results to colleague	Student Presentation	Submission Evaluation
15	3	Comprehensive practical test	Analysis of a complete sample	Practical Test	Final Examination

40. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

41. Learning and Teaching Resources

Main references (sources)	First: Reliable Scientific Books and References 1. Soil and Plant Analysis – Dr. Abdulaziz Abdullah Ajimi A comprehensive Arabic book on the basics chemical and physical analysis of soil and plants. 2. Soil Fertility and Fertilizers – John L. Havlin et al. A global reference specializing in soil fertility a nutrients. 3. Methods of Soil Analysis – Part 1 & 2 – A (American Society of Agronomy) 4. Soil and Plant Analysis Laboratory Manual – SSSS A practical guide to soil and plant analysis, w step-by-step procedures. 5. . Plant Analysis Handbook III – Benton Jones Jr.
Recommended books and references (scientific journals, reports…)	1. FAO - Soil Laboratory Manual A guide from the Food and Agriculture Organizati for soil analysis. https://www.fao.org/3/i7957e/i7957e.pdf 2. NRCS USDA - Soil Health & Testing Contains reports and resources on soil analysis. https://www.nrcs.usda.gov/resources/data-and 3. eXtension - Soil and Plant Tissue Testing A US resource that provides simple and accura explanations. https://extension.org/soil-and-plant-tissue-testing/ 4. Soil Science Society of America (SSSA) A leading resource for research and courses in s science. https://www.soils.org/ 5. ScienceDirect - Journals and Articles

	Contains numerous peer-reviewed research pape on soil and plant analysis. https://www.sciencedirect.com/ 6. ResearchGate – Soil & Plant Analysis Publications A network for researchers, where books a articles can be downloaded. https://www.researchgate.net

Course Description Form

1. Course Name:	
Plant Tissue and Cell Culture	
2. Course Code:	
PMNP 255	
3. Semester / Year:	
First Semester / 2024–2025	
4. Description Preparation Date:	
June 1, 2025	
5. Available Attendance Forms:	
In-person lectures, online lectures, seminars.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 credit hours / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Email:	
8. Course Objectives	
Course Objectives	1. Understand the basic principles of plant tissue and cell culture and th various techniques. 2. Identify the types of culture media and their components used in tissue cultu 3. Master sterilization methods and sterile environments to ensure success tissue culture. 4. Understand the practical applications of tissue culture in agricultural a research fields (such as micropropagation, production of virus-free plants, a preservation of germplasm). 5. Develop practical skills in preparing media, culturing plant parts, a monitoring their growth. 6. Analyze common problems in tissue culture and find solutions. 7. . Identify the uses of biotechnology associated with tissue culture in c improvement and the production of phytopharmaceuticals, exploring their r as a source of modern medicines, cosmetics, and food products.
2. Teaching and Learning Strategies	
Strategy	1. Interactive theoretical lectures to explain basic principles a concepts. 2. Presentations and educational videos to demonstrate tiss culture techniques and steps. 3. Intensive practical laboratory work to apply skills in mec

	preparation, sterilization, and tissue culture. 4. Problem-based learning (PBL) through case studies such treating contamination or poor growth. 5. Mini-research projects such as designing an experiment propagate a specific plant tissue. 6. Field visits to tissue culture centers or advanced laboratories link theoretical knowledge with practical application. 7. Group discussions and scientific reports to develop criti thinking and data analysis.

42. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Identify basic conce	Introduction to Plant Tissue Culture	Lecture + Slide Presentation	Diagnostic Test
2	1	Understand the principles of plant c growth in vitro	Basics of Plant Cell Biology	Lecture + Discussion	Participation
3	1	Distinguish the components of a cul medium	Components of the Culture Medium	Lecture + Examples	Written Assignme
4	1	Understand the importance of sterilization	Sterilization Techniques in Tis Culture	Lecture + Video	Quiz
5	1	Identify media types	Types of Media Used by Purpo	Lecture + Discussion	Formative Assessment
6	1	Analyze the conditio for successful cultur	Factors Affecting the Success Tissue Culture	Case Study	Mini-Report
7	1	Classify tissue cultu techniques	Types of Tissue Culture Techniques	Lecture + Comparison	Monthly Test
8	1	Relate technology to application	Applications of Tissue Culture Plant Propagation	Lecture + Explanatory Video	Presentation
9	1	Understand the use technology in disinfection	Production of Disease-Free Pla	Lecture + Example Analysis	Individual Report
10	1	Relate technology to genetic diversity	Tissue Culture and Preservatio of Genetic Resources	Lecture + Brainstormi	Group Assessment
11	1	Identify genetic transformations	Mutations and Genetic Change in Tissue Culture	Lecture + Directed Reading	Class Discussion
12	1	Study applied cases	Successful Case Studies	Case Analysis	Quiz
13	1	Evaluate econo impact	Economic Feasibility of Tis Culture Techniques	Lecture + Brainstormi	Analytical Paper
14	1	Comprehensive revi	General Review and E Preparation	Interactive + Training	Group Review
15	1	Evaluate acade achievement	Final Exam	Comprehensive Ex an	Final Exam

practical

Week	Hours	Required Learn Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Familiarize your with labora equipment	Laboratory Tour	Demonstrative Pract Training	Direct Assessment
2	2	Prepare necessary to	Steam and Dry Sterilization	Practical Implementat	Performance Observation
3	2	Prepare a sin culture medium	MS Medium Preparation	Practical Experiment	Experiment Submission
4	2	Sterilize plant mater	Sterilization of Plant Parts	Practical Application	Practical Assessme
5	2	Cultivate a sterile p part	Tissue Culture in Media	Practical + I Recording	Technical Assessm
6	2	Monitor growth contamination	Observing Plates and No Changes	Practical Implementa in a Clean Room	Practical Record
7	2	Perform a ste transplant	Transferring Tissue to N Media	Comparative Experim	Performance Evaluation
8	2	Study plant response	Comparing Growth in Diffe Media	Practical Application	Practical Report
9	2	Apply propaga techniques	Tissue Propagation of a Spec Plant	Field Work in Laboratory	Short Presentation
10	2	Identify signs contamination	Diagnosing Media Contaminat	Experiment	Individual Assessment
11	2	Stimulate formation	Using Growth Regulators	Practical Application	Practical Test
12	2	Transplant seedling the outc environment	Preparing for Transfer Outside Laboratory	Guidance and Directio	Observation
13	2	Write the final repor	Preparing the Practical Report	Discussion	Report Submissior
14	2	Review acquired ski	Comprehensive Practical Revi	Laboratory Test	Comprehensive Evaluation
15	2	Final assessment	Final Practical Exam	Demonstrative Pract Training	Final Practical Exa

43. Course Evaluation

Evaluation	Grade out of 100
Daily Exams	5
Monthly Exams	70
Report	5
Attendance and Participation	10
Laboratory Performance Evaluation	10
Total Grade	100

44. Learning and Teaching Resources

Main references (sources)	Books in Arabic Books in Arabic: 1. Plant Tissue Culture Author: Dr. Mohamed Abdel Hamid Shehata Publisher: Dar Al Fikr Al Arabi Discusses basic principles, culture media, a various applications. 2. Plant Tissue Culture and its Applications

	Author: Dr. Ahmed Abdel Moneim Hassan Useful for students and researchers in agricultu sciences and biotechnology. Books in English: 1. Plant Tissue Culture: Theory and Practice Authors: S.S. Bhojwani & M.K. Razdan A comprehensive, classic academic reference everything related to plant tissue culture. 2. Plant Tissue Culture: Techniques a Experiments Author: Roberta H. Smith A very practical book containing detail experiments and steps for beginners. 3. Principles of Plant Biotechnology Authors: S.H. Mantell, J.R.L. Mathews, R.A. McKee Covers plant tissue culture as a component of pla biotechnology.
Recommended books and references (scientific journals, reports…)	1. Plant Tissue Culture Information Exchange http://www.plant-tc.co.uk A specialized website containing articles a educational resources on plant tissue cultu techniques. 2. Biotechnology for Beginners – Plant Tissue Cultu Section (BiotechLearn) https://biotechlearn.org.nz A dedicated section on tissue culture w illustrated explanations and interactive activities. 3. NCBI Bookshelf https://www.ncbi.nlm.nih.gov/books/ Contains free advanced science chapters on tiss culture under the Biotechnology section.

	4. ScienceDirect - Plant Tissue Culture Journals a Articles https://www.sciencedirect.com You can search for recent articles using keywor such as: "Plant tissue culture," "micropropagatio "in vitro plant regeneration." 5. SpringerLink https://link.springer.com Contains free and paid books and research in t field of tissue culture.

Third Level Course

Course Description Form

1. Course Name:
Biochemistry
2. Course Code:
TAMO 302
3. Semester / Year:
THIRID/2024-2025
4. Description Preparation Date:
5/6/2025
5. Available Attendance Forms:
Paper form including name, date of attendance and signature
6. Number of Credit Hours (Total) / Number of Units (Total)
5/3
7. Course administrator's name (mention all, if more than one name)
Name: dr-hala awf Abdulrahman Email: dr_hala.awf.chilmeran@ntu.edu.iq
8. Course Objectives

Course Objectives	Ultimately, the student should be able to: 1. Understand the basics of biochemistry 2. Identify the types of catabolism and anabolism in cells 3. Identify respiratory processes and the role of oxygen in large quantities

	4. Understand how enzymes function as catalysts in biological reactions 5. Understand the role of oxygen and bioregulation 6. Identify the structure and functions of biomolecules and vitamins 7. Understand how energy is produced in cells

9. Teaching and Learning Strategies

Strategy	There are several effective strategies for teaching the biochemistry course, which aim to foster a deep understanding of genetic concepts and develop critical thinking skills: 1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Simulation-based learning. 5. Practical training. 6. Self-directed learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	1- The student will understand the basic concepts of biochemistry. 2- The student understands the	Introduction to Biochemistry	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		non-molecular physical structure.			
2	5	1- The student is not aware of diabetes, which is an important component of metabolic processes. 2- The student understands that sugars are the primary source of energy needed for bodily functions.	Carbohydrates	Lecture, presentation, illustrations	Questions and answers + exercise solutions
3	5	1- The student will know the types of monosaccharides, disaccharides, and polysaccharides. 2- The student will understand the chemical structure of monosaccharides, disaccharides, and polysaccharides.	Carbohydrates	Lecture, presentation, illustrations	Questions and answers + exercise solutions
4	5	1- The student will know the importance and functions of lipids. 2- The student will know the difference between oils and fats.	Lipids	Lecture, presentation, illustrations	Questions and answers + exercise solutions

5	5	1- The student will know the chemical structure of neutral lipids. 2- The student will know the importance of lipids for energy production.	Lipids	Lecture, presentation, illustrations	Questions and answers + exercise solutions
6	5	1- The student should know the difference between saturated and unsaturated fats. 2- The student should know fat metabolism.	Lipids	Lecture, presentation, illustrations	Questions and answers + exercise solutions
7	5	1- The student should know the types of amino acids. 2- The student should understand the importance of amino acids for plants.	Amino acides and peptide	Lecture, presentation, illustrations	Questions and answers + exercise solutions
8	5	1- The student should know the types of amino acids and how they are linked to form peptides. 2- The student should understand	Amino acides and peptide	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		examples of peptides found in plants.			
9	5	1- The student should know the concept of proteins and their importance. 2- The student should understand the functions of proteins.	Proteins	Lecture, presentation, illustrations	Questions and answers + exercise solutions
10	5	1- The student will understand the types of globular and fibrous proteins. 2- The student will understand the shapes and structures of proteins.	Proteins	Lecture, presentation, illustrations	Questions and answers + exercise solutions
11	5	1- The student will understand the role of enzymes as catalysts in biological reactions. 2- The student will understand the mechanism of enzyme action.	Enzymes	Lecture, presentation, illustrations	Questions and answers + exercise solutions
12	5	1- The student will understand the types of enzymes.	Enzymes	Lecture, presentation, illustrations	Questions and answers + exercise solutions

		2- The student will understand enzyme activity, the active site of the enzyme, and the specific activity of the enzyme.			
13	5	1- The student will understand the theories of enzyme function.	Enzymes	Lecture, presentation, illustrations	Questions and answers + exercise solutions
14	5	1- The student will understand the importance of nucleic acids. 2- The student will understand the chemical composition of nucleic acids (DNA and RNA).	Nucleic acids	Lecture, presentation, illustrations	Questions and answers + exercise solutions
15	5	1- The student will know the types of nucleic acids (RNA). 2- The student will understand the difference between nucleic acids (DNA and RNA).	Nucleic acids	Lecture, presentation, illustrations	Questions and answers + exercise solutions
11. Course Evaluation: Tests + Exercises + Discussions + Questions					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			The vocabulary prescribed by the Ministry of Higher Education and Scientific Research		

Main references (sources)	Lehninger Principles of Biochemistry David L. Nelson, Michael M. Cox, Aaron A. Hoskins th edition-2021
Recommended books and references (scientific journals, reports...)	Google scholar, researcher gate
Electronic References, Websites	All sites that provide reliable sources and also artificial intelligence tools

Course Description Form

1. Course Title:	
Active compounds	
2. Course Code:	
PMNP 301	
3. Semester / Year :	
First Semester / Third Year	
4. Date of preparation of the description :	
1 / 6 / 2025	
5. Available Forms of Attendance:	
Came	
6. Number of Credit Hours (Total) / Number of Units (Total):	
75	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
1- Understand the basics of effective compounds - Define basic concepts such as: chemical activity, thermal stability, and catalysis. - Study the relationship between chemical composition and physicochemical properties of compounds. 2- Analysis of physicochemical properties - Study the factors affecting the effectiveness of compounds such as: - Polarity, solubility, chemical equilibrium. - Molecular reactions (e.g. hydrogen bonds, van der Waals forces). 3- Efficient Vehicle Applications - Understand the role of active compounds in: - Pharmaceutical industries (e.g. pharmaceutical design) - Chemical industries (e.g. catalysts, solvents) - Materials science (e.g. polymers, nanomaterials)	**Goals**

4- Study of chemical reactions - Analysis of the mechanisms of reactions that increase the effectiveness of compounds. - Understand the role of catalysts in accelerating reactions or improving their selectivity. 5- Analytical techniques - Identify the tools used to study active compounds such as: - Infrared (IR) spectroscopy, nuclear magnetic resonance (NMR) - Thermal analysis (e.g. DSC, TGA) 6- Chemical balances and thermodynamics - Study of the laws of thermodynamics and their applications to active compounds. - Analysis of equilibrium in chemical systems and calculation of constants such as K,{eq} 7- Molecular design and prediction of effectiveness - Use computer modeling to predict the characteristics of vehicles before they are manufactured. - Apply the principles of quantum chemistry in understanding molecular behavior. 8- Environmental dimensions and safety - Assess the impact of active compounds on the environment. - Study safety standards when dealing with high-efficiency vehicles.	

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- Theoretical strategies: - Problem-Based Learning (PBL): - Present real case studies (e.g., designing a new drug production process, improving the efficiency of a chemical reaction). - Analysis of challenges in the manufacture of active compounds (compound purity, stability, conversion efficiency).	**Strategy**

- Interactive lectures - Use practical examples from industry (e.g. production of antibiotics, hormones). - Linking chemical concepts (reactions, catalysis) to engineering design. 2- Practical/laboratory strategies: - Design-Lab: - Assigning students to design an experiment to synthesize an effective compound (such as: aspirin) taking into account the influencing factors (temperature, catalysts). - Focus on the characterization of compounds using techniques (e.g., HPLC, mass spectrometry, XRD). - Simulation of industrial processes: - Use software such as Aspen HYSYS or COMSOL to simulate production processes (distillation, crystallization, extraction). 3- Integration with the industrial context: - Field visits: - Pharmaceutical factories or research and development (R&D) laboratories. - Expert guest lectures: - Hosting chemical engineers from industry to explain the applications of quality (GMP), reactor sizing, and waste management. 4- Promoting safety and ethics: - Workshops on chemical safety: - Handling hazardous substances (e.g. organic solvents, toxic reagents) - Discussion of pharmaceutical industry ethics: - Balance between profit and access to medicines, intellectual property rights. Practical example of a lesson plan: - Subject: Preparation of "Paracetamol". - Theoretical: Explanation of the mechanism of reaction (electrophilic substitution reaction) -Practical: Laboratory preparation experience with purity measurement (HPLC). - Technological: Simulation of product purification using	

Aspen Plus software. - Evaluation: A report that analyzes the efficiency of the interaction and suggests improvements.	

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to Active Compounds - Definition of active compounds and their role in pharmacy and medicine. - Sources of active compounds (natural, industrial, biological) - The relationship between chemical structure and vital activity.**	**- The student must be able to differentiate Among the Active compounds and inert vehicles - The student should be able to On the description of the mechanism General Impact Vehicles Effective - The student should be able to On discussing the role of Active compounds Extracted from nature In preserving diversity Dynamic**	2 Theoretical 3 Practical	First
Discussions Interactive +	**-Lectures Theory -width Presentation (Power Point**	**Fundamentals of Organic Chemistry of Active Compounds - Rapid review of chemical bonds (covalent, ionic, hydrogen). - Main functional**	**- The student must be able to differentiate between Types of links Chemical . - The student must be**	2 Theoretical 3 Practical	Second

Quizzes		**groups (hydroxyl, carbonyl, amine, etc.).** **- Isomerism and its effe On biopotency.**	**able to distinguish Between functions Effective groups such as a group Hydroxyl and other Totals**		
Tests operation + Writing scientific reports	**-Lectures Theory** **-Tutorial operation Laboratory**	**Organic acids and bases** **- Acid-base concept according to Brønsted-Lowry and Lewis.** **- Effect of pH on ionization of active compounds.** **- Examples of drugs based on their acid/base properties.**	**- The student must be Able to understand the impact of Change in pH In active compounds** **- The student should be able to distinguish between the acidic and basic properties of active compounds.**	2 Theoretical 3 Practical	Third
Tests Short	**Lectures theoretical + practical**	**Stereochemistry** **- The importance of stereochemistry in pharmacological activity (e.g. thalidomide).** **- R/S and E/Z concepts.**	**The student should be able to Distinguish between vehicles that has the same Covalent arrangement for atoms but they differ In its properties such as Vehicles CIS – Trans**	2 Theoretical 3 Practical	Fourth
Tests and	**-Offers Introductio** **- Activities a Experiences Laboratory**	**Aromatic compounds and phenols** **- The structure of the aromatic ring and its**	**The student should be able to to distinguish between Vehicles**	2 Theoretical 3 Practical	Fifth

laboratory experiments		**interactions.** **- Phenolic compounds and their applications (antioxidants, disinfectants).** **- Examples: aspirin, paracetamol.**	**Aromatic and its interactions** **- The student must be Able to Knowledge of antidotes Oxidative Stress , Antiseptics**		
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Amines and nitrogenous compounds** **- Classification of amines (primary, secondary, tertiary)** **- The role of amines in medicines (antihistamines, topical drugs).** **- Heterocyclic amines.**	**The student should be able to On the classification Vehicles Effective as Amines and its role in medicines And the secretaries are not homogeneous ,**	2 Theoretical 3 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Carbohydrates andglycosides** **- Structure of sugars (mono, di, poly).** **- Cardiac glycosides (e.g. dicoxin)** **- The role of sugars in the delivery of medicines.**	**The student should be able to On the distinction between structure Monosaccharides Bilateral and multiple To be able to Learn about the role of Sugars in the delivery of Pharmaceuticals**	2 Theoretical 3 Practical	Seventh
Interactive Discussi	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Fats and steroids** **- Fatty acids, simple and complex fats.** **- Steroids (cortisone, sex hormones)** **- Prostaglandins and**	**The student should be able to Distinguish between acids Simple fatty**	2 Theoretical 3 Practical	Eighth

ons + Tests Short		**their pharmacological applications.**	**and the vehicle**		
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introduction -Lectures Video**	**Alkaloids and compounds of natural origin - Definition of alkaloids and their properties (e.g. morphine, caffeine). - Extraction of alkaloids from plants. - Mechanisms of pharmacological action.**	**The student should be able to extract alkaloids from the plant parts The student should be able to know the mechanism action of these extracts**	2 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introduction -Lectures Video**	**Vitamins and elements - Classification of vitamins (water/fat soluble). - The role of vitamins in metabolic reactions. - elements (iron, Zinc, Selenium)**	**The student should be able to On the classification vitamins and to be able to Know the role of these Vitamins in Metabolic reactions**	2 Theoretical 3 Practical	Tenth
Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Active compounds of microbial origin - Antibiotics (penicillin, tetracycline). - The mechanism of action of antibiotics and resistance to bacteria. - Compounds derived from fungi and**	**The student should be able to On the knowledge antidotes Vitality and its mechanism action The student should be able to**	2 Theoretical 3 Practical	Eleventh

		bacteria.	**To know Vehicles derived from Fungi and bacteria**		
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Pharmacological design of active compounds - The relationship between structure and activity (SAR). - Chemical modifications to improve effectiveness. - Examples of chemically designed drugs.**	**The student should be able to To know the designs Pharmacokinetics compounds Effective**	2 Theoretical 3 Practical	Twelfth
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Drug metabolism - Stages of drug metabolism - Cytochrome P450 enzymes and their effect on the effectiveness of the drug. - Drug interacti resulting fr metabolism.**	The student should be able to To know all Stages of drug metabolism and to know the effect of interactions Pharmacokinetics resulting from Metabolism	2 Theoretical 3 Practical	Thirteen
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Effective compound separation and analysis techniques - Chromatography (HPLC, GC). - Spectroscopy (UV, IR, NMR). - Determination of the purity of active compounds.**	The student should be able to On the use of techniques Separation analysis Effective compounds Cal HPLC and others	2 Theoretical 3 Practical	Fourte enth
Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductio**	**Practical applications and case studies - Analysis of real-life examples of drugs derived from active compounds.**	The student should be able to On the procedure applications	2 Theoretical 3 Practical	Fifteenth

	and discussions	**- Discuss recent research in the field.** **- General Review**	Operation and drug analysis Derived from compounds Effective		

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12.Learning and Teaching Resources	
Active compounds in the plant , **Industrial and pharmaceutical crops**	**Required textbooks (curriculum books, if applicable)**
Active Ingredients and their Classification, **Practical Guide** **For Active Material Extraction Methods /** **Al-Nahrain University**	**Main references (sources)**
Distribution of active ingredients in parts Plant , Analysis Active compounds	**Recommended books and references (scientific journals, reports...)**
https//pubmed.ncbi.nlm.nih.gov/	**Websites & References**

Course Description Form

1. Course Name:	
Production of ornamental plants	
2. Course Code:	
PMNP 302	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
1 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
60	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
1- Definition of the types of ornamental plants and their uses - Study of the classification of ornamental plants (cut flowers, potted plants, landscaping, ornamental trees) - Understand its role in the internal and external coordination of gardens, parks and urban areas . 2- Providing practical skills in production and reproduction - Learn the techniques of propagation of ornamental plants (by seeds, cuttings, grafting, tissue culture). - Apply methods of establishing and managing nurseries, including controlling environmental factors (light, moisture, soil). 3- Garden design and landscaping applications - Study the foundations of garden design (balance, repetition, color) and the use of plants in spatial coordination . - Applying the concepts of agricultural engineering in the creation of green spaces and landscaping .	**Goals**

4- Department of Agricultural Operations and Prevention - Identify diseases and pests that affect ornamental plants and integrated management methods . - Training students on the use of modern techniques such as protected agriculture and soilless agriculture . 5. Linking knowledge to economic and environmental applications* - Stimulating innovation in small projects (ornamental plant nurseries, flower export) - Enhancing environmental awareness through the use of plants to improve air quality and reduce pollution . 6- Community service and scientific research - Preparing cadres capable of providing agricultural consultations to the public and private sectors . - Encourage applied research to improve the varieties of local ornamental plants and adapt them to climatic conditions .	

9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1. Project-based learning - Applications: - Allocate a small space (on campus or greenhouses) for students to design and implement a complete production cycle for a specific ornamental plant (e.g. roses, bulbs, ornamental palms) - Follow-up of the production stages from reproduction to marketing. - Benefits: Developing planning, problem-solving and responsibility skills. 2. Field Visits* - Applications: - Visiting specialized nurseries, plant exhibitions, public gardens, and research institutions. - Analysis of irrigation, fertilization, and pest control	**Strategy**

systems in real locations. - Advantages: Linking theory to industrial reality, exploring practical challenges. 3. Cooperative Learning - Applications: - Dividing students into small groups for different experiments (cuttings, grafting, tissue culture) - Discuss results and share notes. - Benefits: Enhance teamwork and communication skills. 4. Modern technologies and multimedia* - Applications: - Use simulation programs (such as garden design programs). - View videos of complex production processes (e.g. hybridization, specialized pruning). - Plant recognition applications (PlantNet, iNaturalist). - Advantages: clarify abstract concepts and provide visual references. 5. Workshops - Applications: - Plant propagation workshop (cuttings, grafting, root division). - Workshop on diagnosing pests and diseases of ornamental plants. - Training in the use of specialized equipment (irrigation systems, pruning tools) - Advantages: Acquire direct manual skills. 6. Case Studies - Applications: - Analysis of the success or failure of a local ornamental plant production project. - Discuss influence factors (climate, market, costs). - Advantages: Apply knowledge to real-life scenarios. 7. Integration between design and production - Applications: - Small garden design projects require the selection of suitable ornamental plants based on their productive characteristics. - Study the compatibility of plants with the target environment. - Advantages: linking the aesthetic aspect to agricultural requirements. 8. Continuous and diverse assessment	

- Applications: - Evaluate the performance of students in practical projects (quality of productive plants). - Knowledge tests on plant taxonomy and production methods. - Presentations of research on a specific ornamental plant. - Advantages: Measure the overall understanding of the course. 9. Hosting industry experts - Applications: - Lectures from successful producers or garden designers. - Workshops with specialized farmers. - Benefits*: Transfer field experience and expand students' career horizons. 10. Inquiry-Based Learning - Applications: - Small research experiments (e.g. the effect of different agricultural media on ornamental plant growth). - Data analysis and drawing conclusions. - Advantages: Development of scientific and analytical thinking.	

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	Introduction to Ornamental Plants - Definition of ornamental plants and its economic importance and Environmental. - Classification of ornamental plants (indoor, outdoor, climbing, succulent, etc.)	The student must be Able: To know the importance Ornamental plants . Classification ornamental plar	1 Theoretical 3 Practical	First

Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin**	Influencing environmental factors On the growth of ornamental plants - Light (intensity, duration, light quality) - Temperature and humidity. - Soil and aquatic environment (for aquatic plants)	**The student must be on Know all the circumstance Environmental affecting the growth and production ornamental plants**	1 Theoretical 3 Practical	Second
Tests operation + Writing scientific reports	**-Lectures Theory -Tutorial operation Laboratory**	Propagation of ornamental plants (sexual reproduction) - Collection and storage of seeds. - Requirements for germination of seeds of ornamental plants. - Production of seedlings in nurseries.	**The student should be able to propagate most of the ornamental plants in nurseries**	1 Theoretical 3 Practical	Third
Tests Short	**Lectures theoretical + practical**	Propagation of ornamental plants (vegetative propagation) - Cuttings (wooden, half-timbered, paper cuttings) - Vaccination and vaccination. - Tissue Culture (Introduction to Modern Techniques)	**The student should be able to On the propagation ornamental plant In different ways like the mind and enrollment, well as Reproduction cultivation technique Hestology**	1 Theoretical 3 Practical	Fourth

Tests and laboratory experiments	**-Offers Introductio** **- Activities a Experiences Laboratory**	Agricultural and compost environments - Types of environments (House Moss, Perlite, Sand, Compost) - Fertilization requirements (NPK and microelements) - Preparation of agricultural mixtures suitable for different types of plants	**The student must be Familiar with the needs Ornamental plants from Fertilizers**	1 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	Production of indoor ornamental plants - The most popular types of indoor ornamental plants (pots, zamia, dieffenbachia, etc.) - Care of indoor plants (irrigation, pruning, pest control). - The use of plants in interior decoration.	**The student should be able to On the production of plants Interior decorations and foreign affairs**	1 Theoretical 3 Practical	Sixth
Interactive	**-Lectures Theory** **-Offers Introductio** **-Lectures**	Production of outdoor ornamental plants - Fence plants and	**The student must be Knowledgeable agriculture Ornamental**	1 Theoretical 3 Practical	Sevent

Discussions + Tests Short	**Video**	climbers (jasmine, bougainvillea) - Landscaping plants (shrubs and ornamental trees) - Single-season plants (annuals)	**plants by Planting dates**		
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	Pot Plants and juicers - Potted selection and appropri materials. - Plant care in pots (drainage, Watering, pruning) - Plant species Succulents and c for them.	**The student should be able to On the production plants Succulent decorations in Stories**	1 Theoretical 3 Practical	Eighth
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introductio -Lectures Video**	Production of cut flowers - The most important types of cut flowers (rose, gerbera, chrysanthemum) - Techniques to extend the life of flowers after picking. - Post-harvest transactions.	**The student should be able to produce type s of cut flowers And its Treatment after picking**	1 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	Pest and dise control in ornamen plants - Common pests (Aphids, insects) Cortical arachnids).	**The student should be able to control the pests that Infect ornamental**	1 Theoretical 3 Practical	Ten

		- Fungal diseases and bacterial. - Integrated control (organic a chemical).	**plants before infection**		
Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	Techniques for encouraging flowering and shaping - The use of phytohormones. - Pruning and shaping techniques (e.g. topiary). - Control flowering dates (pruning, fertilization, lighting).	**The student should be able to On the use of Modern technologies in Production ornamental plants**	1 Theoretical 3 Practical	Eleven
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	Ornamental Plant Nurseries Management - Nursery design and planning. - Economic feasibility of producing ornamental plants. - Quality standards in the marketing of ornamental plants.	**The student should be able to On a study Economic feasibility of During management nurseries Ornamental plants**	1 Theoretical 3 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	Atypical ornamen plants - Aerobic plants (e.g. Tillandsia) - Vertical gardens and hanging gardens - Insectivorous plants (like a trap plant).	**The student should be able to produce ornamental plants Unconventional**	1 Theoretical 3 Practical	Thirtee h

Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	Practical applications (field visit or workshop) - Visit a nursery or botanical garden. - Practical application of propagation or pruning. - Discuss students' projects.	**The student should be able to On setting up courses Workshops about plants Decorations**	1 Theoretical 3 Practical	Fourteenth
Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	Practical applications in nurseries	**The student should be able to On investing plants Decorations as a project economic**	1 Theoretical 3 Practical	Fifteen

11. Course Evaluation

Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.

12. Learning and Teaching Resources

Book of Ornamental Plants and Landscapin Dr. Ibrahim Abu Saad	**Required textbooks (curriculum books, if applicable)**
Ornamental Plant Propagation Technology Dr. Fathi Abdulaziz	**Main references (sources)**
Scientia Horticulturae	**Recommended books and references (scientific journals, reports...)**
https://ashs.org	**Websites & References**

Course Description Form

1. Course Name:	
Protected Farming Techniques	
2. Course Code:	
PMNP 303	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
2 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
75	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
1- Mastering the control of environmental factors 2- Water conservation and pollution reduction, adaptation to climate change 3- Nurseries management and project design 4- Meeting market needs 5- Development of new plant varieties	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
- Traditional lectures on theoretical concepts - Practical demonstrations of cultivation methods - Field crops for existing projects - Use of technology in agriculture	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation	Method of	Unit / Subject	Required	Hours	The

method	education	Name	Learning Outcomes		week
Interactive Discussions	**Lectures Theory**	**Introduction to Protected Agriculture** **- The concept and objectives of protected agriculture.** **- The difference between protected and open farming.** **- A brief history of its development.** **- The importance of protected agriculture in achieving food security.**	The student must be Able understand that protected agriculture Able to Achieving food security	2 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin**	**Types of protected systems** **- Greenhouses:** **- Classified (glass - plastic - multi-tunnel.** **- Cultivation systems under covers:** **- Low and high tunnels.** **- Vertical farming and soilless farming.**	**The student should be able to To understand and apply systems Protected agriculture including That's the farming system. Verticality**	2 Theoretical 3 Practical	Second
Tests operation + Writing scientifi	**-Lectures Theory -Tutorial operation Laboratory**	**Basic greenhouse components** **- Structure (metal, wood).** **- Covering materials (polyethylene, polycarbonate).** **- Natural and standard ventilation systems.**	**The student should be able to improve the selection of good structures used in greenhouses and economically**	2 Theoretical 3 Practical	Third

c reports			**feasible**		
Tests Short	**Lectures theoretical + practical**	**Environmental Control in Greenhouses (Part 1) - Lighting Management (Natural – Industrial) - Light intensity measuring devices. - Plant shading techniques.**	**The student should be able to On the management houses Protected Integrated Management**	2 Theoretical 3 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio - Activities a Experiences Laboratory**	**Environmental Control (Part 2) - Heating systems (boilers – radiators). - Cooling systems (evaporation – fans) - Relative humidity control.**	**The student should be able to On the management houses Protected in terms of Heating Systems Cooling & Control BThe humidity**	2 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Irrigation systems in protected agriculture - Drip irrigation and design of its networks. - Irrigation by fine sprinkling. - Automatic irrigation systems (soil moisture sensors).**	**The student should be able to On the management of modern irrigation systems with rationing High water consumption**	2 Theoretical 3 Practical	Sixth
Interactive Discussions	**-Lectures Theory -Offers Introductio -Lectures Video**	**Composting and nutrient management - Balanced fertilization programs. - Food injection**	**The student shou be able to On level control Items in Nutrient solut used for fertilizing**	2 Theoretical 3 Practical	Sevent

+ Tests Short		**techniques (Fertigation).** **- Monitor the level of elements in the nutrient solution**			
Interact ive Discussi ons + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Soilless agriculture (hydroponics)** **- Basics of hydroponics.** **- Main systems (NFT** **- DWC - intermediate systems).** **- Preparation of nutrient solutions.**	**The student should be able to** **On mastering the basics Hydroponics**	2 Theoretical 3 Practical	Eighth
Tests and practica l laborato ry experim ents	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Alternative soil substrates** **- Types of substrates (perlite - moss house - rock wool)** **- Characteristics of substrates and their selection according to the crop.** **- Treatment and reuse of piles.**	**The student should be able to** **On discrimination the use of** **The main pillars of Edamah** **Types of crops** **By planting dates**	2 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Pest and disease management** **- Preventive practices (sterilization of the environment - insect nets).** **- Biological control in protected environments.** **- The use of safe pesticides in enclosed**	**The student should be able to** **For optimal use** **For agricultural pesticides** **Which does not leave damage** **Environmental & Health**	2 Theoretical 3 Practical	Ten

		spaces.			
Practica l tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Pollination and fruiting techniques - Manual pollination. - The use of bumblebees. - Fruiting stimulation coefficients (hormones).**	**The student should be able to produce seedlings Horticultural crops in Scheduled times**	2 Theoretical 3 Practical	Eleven
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Production of vegetable seedlings - Seed selection criteria. - Management of greenhouse nurseries. - Grafting (composition) techniques for seedlings.**		2 Theoretical 3 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Economic Feasibility Studies - Costs of establishing greenhouses. - Calculation of economic return. - Profitability and risk factors.**	**The student should be able to On a study Economic feasibility From construction houses Protected area**	2 Theoretical 3 Practical	Thirtee h
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Advanced Technologies - Smart Agriculture Systems (IoT – Automation). - Use of renewable energy (solar energy). - Vertical farming and space saving.**	**The student should be able to On Systems Management Smart Agricultur and the use energies Renewable energy Solar**	2 Theoretical 3 Practical	Fourt eenth

Practical tests	**- Activities a Practical experiences Laboratory -Offers Introduction and discussions**	**Challenges and solutions - Salinity and hyperthermia problems. - Agricultural waste management. - Future directions for protected agriculture**	**The student should be able to On recycling Waste Agricultural and its utilization**		Fifteen

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
Books on protected agriculture a lectures	**Main references (sources)**
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Production of seeds of medicinal plants	
2. Course Code:	
PMNP 304	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
3 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
75	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
1 - Introducing students to the importance of medicinal and aromatic plants: in terms of medicinal, pharmaceutical, industrial, and food uses. 2- Identify the different methods of propagation of medicinal plants: especially seed propagation, and when it is the preferred method compared to other methods such as cuttings or tissue culture. 3- Understand the factors affecting the production and quality of seeds: such as pollination, environmental factors, agricultural treatments, and the purity of the breed. 4- Acquire the skills of selecting mother plants and proper seed production: including collecting, drying, cleaning, and storing seeds. 5- Identify scientific methods for the production of high quality seeds: in terms of vitality, germination, freedom from diseases, and genetic purity. 6- Studying production systems and	**Goals**

techniques used: such as organic production, sustainable agriculture, and modern agricultural techniques. 7- Training on seed quality assessment and laboratory tests: such as germination, purity, and moisture tests. 8- The student's knowledge of the economic and marketing aspects of the production of medicinal plant seeds.	

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

- Theoretical teaching (theoretical lectures) - Practical teaching (conducting practical experiments in the production of seeds of some medicinal plants) - Project-based and collaborative education	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**General introduction** **Definition of medicinal and aromatic plants and their economic and medicinal importance.** **A historical look at their use and seed production.** **Challenges and opportunities in the medicinal plant seed market.**	The student must be Able to Get to know most Returning seeds For Medicinal plants	2 Theoretical 3 Practical	First

Discussions Interactive + Quizzes	**-Lectures Theory** **- Practi lessons** **-width Presentatio (Power Poin**	**The importance of seed production** **The role of high-quality seeds in the successful cultivation of medicinal plants.** **The difference between seeds of traditional crops and seeds of medicinal plants (specialization, quality, value).**	The student must be Able to Distinguish between Crop seeds Traditional and seeds Medicinal plants	2 Theoretical 3 Practical	Second
Tests operation + Writing scientific reports	**-Lectures Theory** **-Tutorial operation Laboratory**	**Fundamentals of medicinal plant seed science** **Flowering and pollination biology:** **Types of flowers and their compositions in important medicinal plants.** **Pollination mechanisms (autologous, humour, insect/wind) and their effect on breed purity.** **The phenomenon of self-incompatibility.**	The student must be Able to Distinguishing between self-pollinated and cross-pollinated plants	2 Theoretical 3 Practical	Third
Tests Short and laboratory experiments	**Lectures theoretical + practical + Video Offe**	**Seed composition and ripening:** **The process of fertilization and the development of the embryo and endosperm.** **Physiological and environmental factors affecting the growth and ripening of seeds.** **Signs of physiological**	The student must be Able to Getting to know Marks Maturity Physiological and morphological	2 Theoretical 3 Practical	Fourth

		and morphological maturity of seeds			
Tests and laboratory experiments	**-Offers Introductio** **- Activities a Experiences Laboratory**	**Selection and improvement of plant materials** **Collection and study of genetic resources: The importance of genetic diversity in medicinal plants.** **Methods of collecting genetic material from the wild and field populations**	The student must be Able to **Collection and study Genetic resources**	2 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Breeding and genetic improvement programs:** **Objectives of breeding medicinal plants (increasing effective content, resistance, productivity)** **Breeding methods (selection, hybridization, mutations).** **The concept of homogeneous breeds and varieties.**	**The student should be able to** **On understanding programs Education and improvement and plant breeding methods Medical**	2 Theoretical 3 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Lectures Video**	**Basic seed production technologies** **Planning and management of seed production fields:** **Choose the right site and soil.** **Isolation requirements to prevent cross-pollination (distances, barriers).** **The crop cultivation cycle.**	The student should be able to know the techniques of seed production	2 Theoretical 3 Practical	Seventh

Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Special agricultural operations: Planting dates and optimal plant densities for seed production. Fertilization and irrigation programs dedicated to the stages of seed formation. Pest and disease control in seed production fields (with emphasis on seed safety)**	The student should be able to know all the agricultural processes that occur in the soil form seeds	2 Theoretical 3 Practical	Eighth
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introductio -Lectures Video**	**Harvesting and processing seeds after harvest Seed harvesting: Determine the optimal timing of harvesting based on seed ripening. Harvesting methods (manual, automatic) and their suitability for different plant species.**	The student should be able to process and know the methods of harvesting seeds	2 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Drying and cleaning of seeds: Safe drying techniques (natural air, dryers) to prevent quality loss. Cleaning operations (separation of impurities, ablation, volumetric classification). The importance homogeneity of the s batch.**	The student must be Able to know Drying methods and seed cleaning	2 Theoretical 3 Practical	Tenth
	- Lectures	**Seed Quality**	The student	2 Theoretical	Eleventh

Practica l tests + Report Writing + Scientifi c visits	**Theory - Activities a Practical experiences Laboratory**	**Inspection and Assessment Basic seed quality tests: Purity tests (pure seed ratio, impurities, seeds of other crops/herbs) Humidity test and its importance in storage.**	must be We are able to examine Seed quality And knowing its purity	3 Practical	
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Vital performance tests: Germination test (ISTA standards): determination of ratio, speed, strength. Biometric tests (TZ) and seedling tests. Assessment of seed health (detection of pathogens).**	**The** student must be able to evaluate Seed health and biotests	2 Theoretical 3 Practical	Twelfth
Practica l lectures + report writing	**-Lectures Theory -Offers Introductio**	**Seed storage and quality assurance Seed storage: Factors affecting the viability of seeds during storage (humidity, temperature, relative humidity, oxygen). Storage methods (traditional, refrigerated, frozen). Monitor the quality seeds during storage.**	The student must be Able to know Seed storage methods	2 Theoretical 3 Practical	Thirteent
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Controls and standards for the production and marketing of seeds Quality Control and Assurance: Good Seed Production Practices (GSP). Certification and accreditation systems**	The student must be Able to Control controls and seed quality	2 Theoretical 3 Practical	Fourte enth

		for seeds. **National and international standards for the quality of seeds of medicinal plants.**			
Practica l tests	**-** **Practical experiences Laboratory** **-Offers Introductior and discussions**	**Marketing of seeds of medicinal plants: Marketing channels (seed companies, cooperatives, specialized markets)** **Practical application on the production of seeds of selected medicinal plants (such as: chamomile, medicinal basil, sage, fennel).** **Discuss challenges and solutions in the production of seeds of specific varieties.**	The student must be Able to know How to market Seeds of medicinal plants	2 Theoretical 3 Practical	Fifteenth

11. Course Evaluation

Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.

12. Learning and Teaching Resources

	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Plant Growth Regulators	
2. Course Code:	
PMNP 305	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
4 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
60	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
- Introducing students to the concept of plant growth regulators and studying the chemical composition and physical and chemical properties of each type of plant hormone. - Study of plant hormones (oxins, cytokinins, gibberellins, episic acid, ethylene) - Assimilation of the physiological effects of these hormones - Discuss the side effects of using growth regulators.	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- Preamble (mental configuration) **2- Theoretical Explanation (Interactive Lecture)** 3- Active Education (Student Engagement) 4- Practical application (laboratory experiments) 5- Teaching aids	**Strategy**
10. Course structure **(remember all theoretical and practical vocabulary)**	

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	
Interactive Discussions	**Lectures Theory + Educational Videos**	Introduction to Plant Growth Regulators - Definition of plant hormones and biosystems - history of their discovery of auxins, gibberellins, general classification (endogenous hormones - industrial regulators).	The student should be able to On the definition of Hormones and differentiate between them And between organizations Vitality	1 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin**	Auxins - Chemical composition IAA, NAA, 2,4-D).) - Biosynthesis and apical transport. - Its role in cellular elongation and phototropism.	The student must be Able to distinguish Vital cells and knowledge Chemical composition	1 Theoretical 3 Practical	Second
Tests operation	**-Lectures Theory -Tutorial operation**	Gibberellins (Gibberellins) - Composition and	The student should be able to know With	1 Theoretical 3 Practical	Third

+ Writing scientifi c reports	**Laboratory + Scient** visits	sources of production (gibberella mushroom) - its role in seed germination and elongation of stems - applications in the production of seedless fruit.	gibberellins as well as mushrooms and their role in seed germination		
Tests Short	**Lectures theoretical + practical + Presentatio**	Cytokinins - Synthesis (synthetics, xytin) - its role in cell division and bud formation - interaction with auxins in the regulation of differentiation.	The student should be able to expand in knowledge What are cytoxins and their role in splitting Cells	1 Theoretical 3 Practical	Fourth
Tests and laborato ry experim ents	**-Offers Introductio - Activities a Experiences Laboratory**	Abscisic acid (ABA) - The role of the "stress hormone" - its effect on stomata closure and seed dormancy - mechanisms of plant response to drought	The student should be able to know what it is Abscisic acid and its components and composition and the role of the hormone Stress in the process of	1 Theoretical 3 Practical	Fifth

			closing the stomata		
Interact ive Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	Ethylene (Ethylene) - Its properties as a gaseous hormone - a role in fruit ripening and leaf fall - applications in agriculture (ethylene inhibitors).	The student should be able to To know the role of Ethylene and its properties	1 Theoretical 3 Practical	Sixth
Interact ive Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	Secondary growth regulators - Jasmonic acid, polyamines, salicylic - their role in defending against disease and stress	The student should be able to to distinguish between Acids Jasmunic - polyamines - salicylic and their role in defending against diseases and stress	1 Theoretical 3 Practical	Seventh
Interact ive Discussi ons + Tests	**-Lectures Theory -Offers Introductio**	Mechanisms of action of hormones - Phytohormone receptors - cellular signaling pathways (gene expression) - synergy and competition	The student should be able to To know the mechanism of action of plant hormones and competition between them	1 Theoretical 3 Practical	Eighth

Short		between hormones.			
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introduction -Lectures Video**	The role of hormones in the life cycle of a plant - Germination, vegetative growth, flowering - fruit formation, aging, dormancy.	The student should be able to know the role of The action of hormones In plant life and germination process	1 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video + Laborat visits**	Hormone measurement techniques - Chemical extraction methods - Chromatography (HPLC, GC) - Bioassays.	The student should be able to On distinguishing hormone measurement techniques and ways Plant extraction	1 Theoretical 3 Practical	Tenth
Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	Agricultural applications - Growth regulators in plant propagation (cuttings, tissue culture) - Weed control (synthetic hormones such as 2,4-D) - Increasing crop productivity	The student should be able to To know the role of growth organizations in propagation Plants and the role of Hormones Industrial and	1 Theoretical 3 Practical	Eleventh

		and fruit quality.	increase Crop productivity And the fruits		
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	Hormones and environmental stress - Hormone responses to salinity, dehydration, heat. - Engineering plants to resist stress	The student should be able to To know influence Hormones and its response For salinity Dehydration and heat	1 Theoretical 3 Practical	Twelfth
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	Biotechnology and growth regulators - Modify tracks Hormonal adjustment Genomic – examples: plants Ethylene resistant, rice Short stature	The student should be able to To know The role of technology Vitality and growth regulators	1 Theoretical 3 Practical	Thirteen
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	Discussion of recent research - Case studies of new discoveries (e.g. Strigolactones). - Future trends in hormone research.	The student should be able to Research Extraction Modern and knowledgeable on it and discuss it	1 Theoretical 3 Practical	Fourte enth
Practica	**- Activities a Practical**	General review and	The student should be able	1 Theoretical 3 Practical	Fifteenth

l tests	**experiences Laboratory -Offers Introductior and discussions**	evaluation - summarizing basic concepts - an applied discussion of the uses of hormones. - Preparation for the final exam.	to to retrieve all the information that Got it During the semester		

12. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:
Molecular genetics
2. Course Code:
PMNP 306
3. Semester /Year :
First Semester / Third Year
5. Date of preparation of the description :
5 / 6 / 2025
6. Available Forms of Attendance :
Came
7. Number of credit hours (total) / number of units (total):
75
7. Name of the course administrator (mention all names, if there is more than one):
Name: Email:
8. Course Objectives

- Understand the basic principles of molecular genetics such as the structure and function of DNA and RNA - Discrimination of molecular processes (replication, transcription, translation) - Understanding genetic mutations.	**Goals**

9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**

1- Boot 2- Active Education 3- Practical side (applied) 4- Calendar	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation	Method of	Unit / Subject	Required	Hours	The

method	education	Name	Learning Outcomes		week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theoretical and practica**	**Introduction to Molecular Genetics Definition of molecular genetics and its domains The history of the development of molecular genetics The relationship between classical and molecular heredity**	The student should be able to To understand the areas of Molecular genetics And what is genetics And how it developed	2 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin -Laboratory lessons**	**Genetic material (DNA and RNA) Synthesis of DNA and RNA Chemical and physical properties Experiments that have proven that DNA is genetic material (Griffith, Avery, Hershey-Chase)**	The student should be able to to distinguish between acids Nuclear RNA and DNA and know its chemical and physical properties	2 Theoretical 3 Practical	Second
Tests operation + Writing scientific reports	**-Lectures Theory -Tutorial operation Laboratory**	**Molecular organization of genetic material Chromosomes and the triple structure ofDNA Chromatin and histones Differences between DNA in prokaryotes and eukaryotes**	The student should be able to understand genetic material, chromosomes and their molecular organization	2 Theoretical 3 Practical	Third

Tests Short	**Lectures theoretical + practical**	**DNA replication Recurrence models: conservative, semi-conservative, non-conservative Recurrence enzymes and their mechanism Repetition in prokaryotes and eukaryotes**	The student must be Able to understand genetic material Acids Nuclear RNA and DNA and know their properties	2 Theoretical 3 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio - Activities a Experiences Laboratory Video lectur**	**Repair DNA damage Types of DNA damage Mismatch repair, Base excision, Nucleotide excision, SOS response**	The student must be Able to repair and damage DNA	2 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Transcription RNA Polymerase enzyme and its types Transcription stages Transcription in protokaryotes and eukaryotes**	The student must be Capable and knowledgeable of the process Transcription of enzymes And know the stages of copyin	2 Theoretical 3 Practical	Sixth
Interactive Discussions +	**-Lectures Theory -Offers Introductio -Lectures Video**	**RNA Processing Add a 5' hat and a 3' Poly-A tail Removing introns (splicing) Types of RNA (mRNA, tRNA, rRNA, miRNA)**	The student must be Able to know Modulation methods RNA and	2 Theoretical 3 Practical	Sevent

Tests Short			removal Introns		
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Translation (Translation) Genetic code and its characteristics Ribosome synthesis Translation stages: start, lengthen, end**	The student must be Able to know Genetic code and characteristics and ribosome synthesis	2 Theoretical 3 Practical	Eighth
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introductio -Lectures Video**	**Regulation of gene expression – prokaryotes Regulation of Oberon (e.g. Oberon Lactose and Tryptophan) Various regulatory mechanisms**	The student must be Able to know Regulatory mechanisms and gene expression For primitive nuclei	2 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Regulation of gene expression – eukaryotes Pre-copying, post-copying organization Catalysts, Boosters, Inhibitors Transcription factors**	The student must be Able to know Regulatory mechanisms and gene expression Pre-copy regulation, catalysts and inhibitors	2 Theoretical 3 Practical	Tenth
	- Lectures	**Mutations and their**	The student	2 Theoretical	Eleven

Practica l tests + Report Writing	**Theory - Activities a Practical experiences Laboratory**	**types Definition of mutation and its causes Point Jumps, Delete, Insert, Frame Jumps Effects of mutations on proteins**	must be Able to Familiarity with mutations Genetic that It happens and its causes	3 Practical	
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Techniques in molecular genetics Polymerase chain reaction (PCR) Electrophoresis Molecular hybridization (Southern, Northern blot)**	The student must be Able to know Genetics Techniques Molecular and molecular hybridization	2 Theoretical 3 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Genetic engineering and modern technologies Use of restriction enzymes Genetic cloning CRISPR Applications**	The student must be Able to use Modern techniques in genetic engineering	2 Theoretical 3 Practical	Thirte h
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Gene expression and genetic modification Applications in Agriculture and Medicine Genetically modified organisms (GMOs) Ethics of genetic modification**	The student must be able to modify genetics and genetics and use them in agriculture	2 Theoretical 3 Practical	Fourt eenth
Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductio and discussions**	**Comprehensive review and preparation for the final test Comprehensive vocabulary review Question-solving and conceptual sessions**	The student must be Mama is comprehensive all the details and lectures of the class and can solve the questions	2 Theoretical 3 Practical	Fifteen

			addressed to him		

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Plant Pathology	
2. Course Code:	
PMNP 307	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
6 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
60	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
- Providing the student with a comprehensive understanding of the mechanisms that lead to infection of plants with diseases and identifying methods of prevention and control. - Classification and diagnosis of plant pathogens - Explain the life cycle of pathogens And acquire microscopic examination skills.	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- View photos of plants with different diseases 2- Theoretical explanation of plant diseases 3- Practical side (examination of infected plant samples under a microscope) 4- Teaching aids (microscope, videos)	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theoretical and practica**	**Introduction to Plant Pathology - History of Plant Pathology, Economic and Environmental Importance of Plant Diseases. - Basic concepts: plan disease, host, pathogen symptoms, signs.**	The student should be able to To know plant diseases and know their history and diseases that affect plant species	1 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin -Laboratory lessons**	**Plant pathogens (1): fungi - The structure of fungi, their life cycle, methods of reproduction. - Examples: powdery mildew diseases, funga wilt.**	The student should be able to distinguish between fungi and know the pathogens	1 Theoretical 3 Practical	Second
Tests operation +	**-Lectures Theory -Tutorial operation Laboratory**	**Plant pathogens (2): bacteria and phytoplasma - Characteristics of plant pathogenic bacteria, mechanisms of infection.**	The student should be able to know the bacterial species that infect plants	1 Theoretical 3 Practical	Third

Writing scientific reports		**- Examples: coronary tuberculosis, bacterial wilt.**			
Tests Short	**Lectures theoretical + practical**	**Plant pathogens (3): viruses and nematodes*** **- Structure of plant viruses, modes of transmission.** **- The role of nematodes in plant diseases (e.g. root knots)**	The student should be able to distinguish between viruses Nematodes and their role in plant disease	1 Theoretical 3 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio** **- Activities a Experiences Laboratory Video lectur**	**Physiology of plant disease** **- Stages of disease development (contact, penetration, spread).** **- Mechanisms of disease inducement (enzymes, toxins, hormones)**	The student should be able to know Physiological Plant disease and stages of its development	1 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Wilt and root diseases** **- Diseases such as: fusarium wilt, downy mildew.** **- Factors affecting its spread.**	The student should be aware of diseases that affect the roots and symptoms of wilting	1 Theoretical 3 Practical	Sixth
Interactive Discussi	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Diseases of leaves and stems** **- Spot diseases (fungal and bacterial), rust, smut.**	The student should be able to know Diseases that affect	1 Theoretical 3 Practical	Sevent

ons + Tests Short			Leaves and stems		
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Post-harvest diseases - Fruit rot (e.g. gray rot, black smut).**	The student should not be able to know the diseases that affect Post-plants Harvest	1 Theoretical 3 Practical	Eighth
Tests and practical laboratory experiments	**-Lectures Theory -Offers Introductio -Lectures Video**	**Diseases caused by non-living organisms - Environmental stresses (salinity, drought), pesticide poisoning, deficiency of elements.**	The student should be able to know the diseases resulting from non-living organisms such as pesticide poisoning and lack of elements	1 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Plant Epidemiology - Dynamics of dise spread, influenc factors (weather, soil).**	**The student mu be Able to define science Plant epidemiology and factors affecting**	1 Theoretical 3 Practical	Tenth

			Spread of diseases		
Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Biological and genetic control - Use vital enemies, devise resistant varieties.**	The student should be able to know the methods of control and distinguish between biological and genetic control	1 Theoretical 3 Practical	Eleven
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Biological and genetic control - Use vital enemies, devise resistant varieties.**	The student should be able to distinguish between biological and genetic control	1 Theoretical 3 Practical	Twelft
Report Writing	**-Offers Introductio -Lectures Video -Theoretical lectures**	Chemical and agricultural control - Types of fungicides/bacteria, agricultural practices (crop rotation, soil sterilization).	The student should be familiar with all methods of control And know the types of exterminators Necessary for control	1 Theoretical 3 Practical	Thirtee th
Practical tests + Reports	**- Lectures Theory - Activities a Practical experiences Laboratory -Scientific vi**	Laboratory diagnosis of plant diseases - Isolation techniques, microscopy, molecular testing (PCR).	The student should be able to On laboratory diagnostics, isolation methods and microscopic examination	1 Theoretical 3 Practical	Fourt eenth

Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	**General review and practical applications - Case studies of epidemic diseases, discussion of recent research.**	The student must be Familiar with all the vocabulary of the classroom and its discussion	1 Theoretical 3 Practical	Fifteen

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Care and storage of medicinal plants	
2. Course Code:	
PMNP 308	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
7 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
60	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
Preparing staff capable of dealing with medicinal plants after harvest in a scientific and practical way that ensures their access to the consumer or the pharmaceutical and aromatic industry with the highest possible quality, retaining their therapeutic effectiveness and safe for use while reducing losses and economic waste.	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- Theoretical explanation (the importance of medicinal plants and methods of storing them) 2- Practical side (implementation of the experiment of drying medicinal plants) 3- Teaching aids (samples of medicinal plants,	**Strategy**

drying tools, illustrative images)	

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to Medicinal Plants Definition of medicinal and aromatic plants The importance and benefits of medicinal plants History of the use of medicinal plants**	The student should be able to Illustrates the concept of medicinal and aromatic plants	1 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theoretical and practica -width Presentatio (Power Poin**	**Botanical classification of medicinal plants Foundations of classification of medicinal plants Common plant hosts in medicinal plants**	**That the student can Defines plants Medicinal and aromatic With scientific accuracy**	1 Theoretical 3 Practical	Second
Tests operation + Writing scientific reports	**-Lectures Theory -Tutorial operation Laboratory - operatio**	**Factors affecting the growth and quality of medicinal plants Soil and climate Lighting and watering Organic and mineral fertilizers**	To be able to enumerate the health, economic and environmental benefits of medicinal plants.	1 Theoretical 3 Practical	Third
Tests	**Lectures theoretical**	**Basic agricultural operations Planting with seeds and**	The student should be able to	1 Theoretical 3 Practical	Fourth

Short	**+ practical**	**cuttings** **Plant care (weeding, fertilizing, watering)**	It traces the history of the use of medicinal plants in ancient civilizations·		
Tests and laboratory experiments	**-Offers Introductio** **- Activities a Experiences Laboratory** **Video lectur**	**Pests and diseases affecting medicinal plants** **The main insect and fungal pests** **Integrated pest management**	The student should be able to Explains foundations classification General vegetarian.	1 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Harvesting and collection** **Timing of collection of plant parts** **Manual and automatic collection methods**	That the student can Clarifies the criteria Used in Classification medicinal plants.	1 Theoretical 3 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Drying and pre-processing** **Drying Objectives** **Drying methods (sun, shade, industrial drying)**	To be able to Recognize important plant hosts such as mint, tent, ginger·	1 Theoretical 3 Practical	Sevent
Interactive	**-Lectures Theory** **-Offers Introductio**	**Storage of medicinal plants** **Ideal storage conditions (temperature,**	**Soil and climate** • Demonstrates the impact of	1 Theoretical 3 Practical	Eighth

Discussions + Tests Short	**-Lectures Video**	**humidity, lighting) Types of packaging used**	soil type and climate on the productivity of medicinal plants. **- Lighting and irrigation** • It explains the optimal lighting and watering requirements for growing medicinal plants. **Organic and mineral fertilizers** • Determines the types of fertilizers suitable for medicinal plants and their impact on quality.		
Tests and practical experiments	**-Lectures Theory -Offers Introductio -Lectures Video**	**Post-harvest transactions Screening, purification, sorting Packaging**	The student can apply the techniques of planting with seeds and cuttings.	1 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Effect of storage on pharmacological efficacy Chemical changes that occur during storage Effective Quality Maintenance Methods**	The student can Distinguish between Different types of pests Insectivorous and fungal.	1 Theoretical 3 Practical	Tenth

Practica l tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Quality standards in medicinal plants Standard specifications for medicinal plants Quality Tests (Moisture, Volatile Oils, Contaminants)**	The student can Determines timing Optimized harvesting Medicinal plant parts·	1 Theoretical 3 Practical	Eleven
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Decoction and preparation methods Extraction of active substances (distillation, soaking, boiling) Preparation of extracts and pharmacological forms**	The student should be able to explain importance drying preserving On effectiveness of plant.	1 Theoretical 3 Practical	Twelfth
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Modern technologies in the care and storage of medicinal plants The use of technology in drying and storage Cooling, Air Vacuum, Smart Packaging**	**The student can use technology in drying and storage** He explained the role of technology in improving post-harvest processes.	1 Theoretical 3 Practical	Thirtee h
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Industrial & Commercial Applications The use of medicinal plants in the pharmaceutical and cosmetic industries Marketing & Supply Chain**	The student can use medicinal plants in the pharmaceutical and cosmetic industries It connects	1 Theoretical 3 Practical	Fourt eenth

			medicinal plants with their use in industry.		
Practical tests	**- Activities a Practical experiences Laboratory** - **Discussic**	**General review and final evaluation Comprehensive review of the course Solve mock questions and quizzes**	The student summarize Full content of course.	1 Theoretical 3 Practical	Fifteen

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Poisonous plants	
2. Course Code:	
PMNP 309	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
8 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
75	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
The course aims to provide students with a comprehensive scientific concept of poisonous plants and not only to know their danger and avoidance, but also to understand the mechanism of action of their toxins and how to deal with poisoning, as well as to realize their potential value in medicine and other sciences.	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- View photos of poisonings 2- Definition of poisonous plants, their effect by type of poison 3- The practical side of visiting a field and seeing poisonous plants	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Discussions	**Lectures Theory**	**Introduction to toxic botany** **- Definition of poisonous plants and the importance of studying them.** **- Scientific classification of poisonous plants.** **- The difference between poisonous plants and medicinal plants.**	The student must be Vadra to know the science of toxic plants and differentiate between poisonous plants and medicinal plants	2 Theoretical 3 Practical	The fir
Discussions Interactive + Quizzes	**-Lectures Theory** **- (Pov Point)** **-Tutorial Laboratory and practica**	**Phytotoxicity mechanisms** **- Types of plant toxins (alkaloids, glycosides, toxic proteins)** **- How toxins are absorbed and their effect on the body.**	The student should be able to distinguish between Types of plant poisons and how it affects Body	2 Theoretical 3 Practical	Second
+ Writing scientific reports	**-Lectures Theory** **-Tutorial operation Laboratory**	**Common poisonous plants (1)** **- Poisonous ornamental plants: dieffenbachia, azaleas, digitalis.** **- Their effects and symptoms of poisoning.**	The student should be able to know the types of poisonous plants and the symptoms of poisoning	2 Theoretical 3 Practical	Third

Practical tests	**Lectures theoretical + practical**	**Common poisonous plants (2)** **- Poisonous wild plants: hemlock, belladonna, Set El Hassan.** **- Areas of their spread and characteristics.**	The student should be able to To know Poisonous plants and areas of spread	2 Theoretical 3 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio** **-Lectures Video**	**Poisonous fungal plants** **- Poisonous mushrooms (such as Amanita faloids).** **- The difference between edible and poisonous mushrooms.**	The student should be able to know fungal plants and differentiate between good mushrooms and poisonous mushrooms	2 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**Poisonous plants in food** **- Plants containing natural toxins (such as green potatoes, bitter almonds).** **- Ways to reduce toxicity during cooking.**	The student should be familiar with all kinds of toxic intentions and ways to reduce the risk of toxicity	2 Theoretical 3 Practical	Sixth
Interactive Discussions + Tests	**-Lectures Theory** **-Offers Introductio** **-Lectures Video**	**The effect of poisonous plants on animals** **- Plants that cause cattle poisoning (calcelandin, aconitin).** **- Prevention methods in pastures.**	The student should be able to know ways to prevent poisonous plants	2 Theoretical 3 Practical	Sevent

Short					
Interact ive Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Diagnosis of phytotoxicosis - Clinical symptoms (digestive, neurological, cardiac) - Laboratory tests to detect toxins.**	The student should be able to diagnose plant poisoning And know the symptoms that appear in the body	2 Theoretical 3 Practical	Eighth
Tests and practica l laborato ry experim ents	**-Lectures Theory -Offers Introductio -Lectures Video**	**First aid for phytotoxicosis - Treatment protocols (detoxification, use of activated charcoal). - The role of anti-toxins available**	The student must be Able to Ambulance Application Primary plant poisoning	2 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Poisonous plants and ecology - The role of toxins in protecting plants from pests. - The impact of climate change on the spread of poisonous plants.**	The student should be able to To know the impact of climate change and the environment on the spread of toxic plants	2 Theoretical 3 Practical	Tenth
Practica	**- Lectures Theory**	Poisonous plants in heritage and	**That the stud can**	2 Theoretical 3 Practical	Eleven

l tests + Report Writing	**- Activities a Practical experiences Laboratory**	traditional medicine - Historical uses of poisonous plants (as poisons or medicines). - Examples: opium, chorer.	• Comparison of plant toxicity in humans and animals. • Identify veterinary conditions resulting from eating poisonous plants.		
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Plant toxins in industry - Detoxification for medical purposes (e.g. digoxin from digitalis). - Applications in agricultural pesticides.**	**The student should be able to know the methods of extracting plant skoum for medical purposes**	2 Theoretical 3 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Prevention of phytotoxicosis - Methods of safe identification of plants. - Safety procedures in parks and laboratories.**	The student should be able to develop prevention and awareness strategies. **Application environmental agricultural safety principles**	2 Theoretical 3 Practical	Thirtee
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Global Case Studies and Reports - Analysis of famous poisonings (such as Socrates' hemlock poisoning). - WHO reports on plant poisoning.**	The student should be able to discuss the positive applications of some poisonous plants. And learn about the extraction of active substances in safe ways.	2 Theoretical 3 Practical	Fourt eenth

Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	**Review and Final Evaluation - Comprehensive review of key concepts. - Discuss recent research in the field of poisonous plants.**	The student should be able to comprehensively summarize the material. Analysis and open discussion of advanced cases.	2 Theoretical 3 Practical	Fifteen
11. Course Evaluation					
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.					
12. Learning and Teaching Resources					
	Required textbooks (curriculum books, if applicable)				
	Main references (sources)				
	Recommended books and references (scientific journals, reports...)				
	Websites & References				

Course Description Form

1. Course Name:	
Summer Internship 2	
2. Course Code:	
PMNP 310	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
9 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
75	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
- Linking the theoretical aspect with practical application - Professional skills development - Understand the work environment - Enhancing future employment opportunities - Acquire new skills - Building professional relationships - Stimulate entrepreneurship and innovation	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- Explanation of the objectives of the summer training 2- Training on medicinal herbal farms 3- Learn about plantings and harvesting medicinal plants	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**	

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theoretical and practica**	Poisonous plants, types, methods of influence	The student should be able to recognize the concept of poisonous plants. • To distinguish between types of plant toxins. • To explain the mechanism of the effect of plant toxins on humans and animals.	2 Theoretical	First
Discussions Interactive + Quizzes	-Lectures Theory -width Presentation (Power Point) -Laboratory lessons	Identify the poisonous parts in the most important plants	**The student shou be able to** • To identify the poisonous parts in the most famous poisonous plants. • To differentiate between poisonous plants and non-toxic plants in terms of the poisonous part. • To explain why toxicity is present in some parts but	2 Theoretical 2 Practical	Second

			not others.		
Tests operation + Writing scientific reports	**-Lectures Theory -Tutorial operation Laboratory**	The most important toxic plants for children and ways to avoid them	**The student should be able to** • **To list the most important poisonous plants that pose a danger to children.** • **Explain ways to prevent exposure to these plants.** • **Apply family awareness methods to avoid poisoning.**	2 Theoretical 2 Practical	Third
Tests Short	**Lectures theoretical + practical**	Methods of infection with poisonous plants	**The student must able to** • Explain the different ways of infection with poisonous plants (ingestion, touching, inhaling...). • To link the type of exposure to the resulting symptoms.	2 Theoretical 2 Practical	Fourth
Tests and laborato	-Offers Introduction - Activities and Experiences Laboratory Video lectures	How to treat when exposed to poisonous plants	**The student shou be aware** • Describe the steps of first aid for plant	2 Theoretical 2 Practical	Fifth

ry experiments			poisoning. • Identify cases that require immediate medical intervention. • Prepare a rapid response plan in case of poisoning.		
Interactive Discussions + Tests Short	-Lectures Theory -Offers Introduction -Lectures Video	Poisoning, methods of poisoning with poisonous plants	**The student should be able** to explain the concepts of acute and chronic poisoning. To distinguish between different methods of poisoning and their effect on the body. To recognize the relationship between the amount consumed and the symptoms.	2 Theoretical 2 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	Cases of human poisoning with poisonous plants, how to treat them	• The student should cite examples of real poisoning cases. • Analyze the symptoms associated with each case. • To suggest appropriate treatment methods according to the	2 Theoretical 2 Practical	Sevent

			type of poisoning.		
Interact ive Discussi ons + Tests Short	-Lectures Theory -Offers Introduction -Lectures Video	Poisoning of ruminants due to the presence of parts of poisonous plants in the diet	**The student shou be able to interpr** Causes of poisoning of ruminants with poisonous plants. To distinguish between toxic plants for ruminants by species. To assess the risk of ruminants eating feed contaminated with toxic plants.	2 Theoretical 2 Practical	Eighth
Tests and practica l laborato ry experim ents	-Lectures Theory -Offers Introduction -Lectures Video	Damage of feeding ruminants on diets containing poisonous plants	**The student should be able to** **n analyzes the health and productivity effects of nutrition on contaminated diets**.	2 Theoretical 2 Practical	Ninth
Quizzes	-Lectures Theory -Offers Introduction -Lectures Video	How to treat cases of poisoning of ruminants as a result of feeding on poisonous plants	The student should be able to develop an emergency treatment plan for cases of poisoning in animals. And to apply appropriate veterinary	2 Theoretical 2 Practical	Tenth

			methods of disinfection and support.		
Practical tests + Report Writing	- Lectures Theory - Activities and Practical experiences Laboratory	The economic importance of medicinal plants	• The student should be able to explain the economic value of medicinal plants in the markets. • To evaluate the role of medicinal plants in supporting the agricultural economy and industries.	2 Theoretical 2 Practical	Eleven
Quizzes	-Offers Introduction -Lectures Video	Uses of medicinal plants as organic fertilizers	**The student should be** able to demonstrate how some medicinal plants contribute to improving soil fertility. • List the types of plants that are used as organic fertilizers.	2 Theoretical 2 Practical	Twelfth
Report Writing	-Lectures Theory -Offers Introduction -Lectures Video	The use of medicinal plant extracts as insecticides	The student should explain the mechanism of action of natural pesticides extracted from plants. • List examples of plants used as pesticides.	2 Theoretical 2 Practical	Thirteenth

Practical tests	- Lectures Theory - Activities and Practical experiences Laboratory	The use of medicinal plant extracts as herbicides	• Demonstrate how plant extracts work to combat weeds. • To list the benefits of this method compared to chemical pesticides.	2 Theoretical 2 Practical	Fourteenth
Practical tests and reports	- Activities and Practical experiences Laboratory -Offers Introduction and discussions	Conclusion of the summer training	• To summarize what has been learned during the training period. • To evaluate his benefit from the theoretical and practical aspects.	2 Theoretical 2 Practical	Fifteen

11. Course Evaluation
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.

12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:
Forage crops and pastures
2. Course Code:
PMNP 352
3. Semester /Year :
First Semester / Third Year
5. Date of preparation of the description :
1 / 6 / 2025
6. Available Forms of Attendance :
Came
7. Number of credit hours (total) / number of units (total):
45
7. Name of the course administrator (mention all names, if there is more than one):
Name: Email:
8. Course Objectives

1- Introducing the student to the types of fodder crops 2- Understand the environmental and climatic characteristics of forage crops and pastures 3- Acquire basic skills in the management of fodder crops and pastures 4- Estimating the role of pastures and fodder in livestock production 5- Identify problems facing forage crops and pastures	**Goals**

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- View photos of fodder crops and pastures 2- Theoretical explanation (definition and classification of fodder crops) 3- Activities to design an agricultural cycle 4- Practical part (field visits to fodder farms and pastures)	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**	

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theoretical and practica**	**Introduction to forage crops and pastures** **- The importance of fodder crops in livestock production systems** **- Classification of fodder crops (grasses, legumes, pastoral plants)** **- Global and regional importance of rangelands**	The stude should be able t • Explains the importance of fodder crops in supporting sustainable livestock production. • Classifies fodder crops into weeds, legumes, and pastoral plants.	1 Theoretical 2 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory** **-width Presentatio (Power Poin** **-Laboratory lessons**	**Biology and physiology of forage plants** **- Stages of growth in forage plants** **- Photosynthesis and nutrient distribution** **- Environmental factors affecting (temperature, light, water)**	**The student should distinguish the different stages of growth of fodder plants**	1 Theoretical 2 Practical	Second
Tests operation + Writing scientifi	**-Lectures Theory** **-Tutorial operation Laboratory**	**The main forage weeds** **- Species: *Rigers, Visco, Bermuda grass, Sudan Grass** **- Morphological characteristics, adaptation zones, nutritional value** **- Comparison of**	The student should identify common types and compare them in terms of shape, adaptation, and nutritional value. • Distinguish between weeds of	1 Theoretical 2 Practical	Third

c reports		**weeds of temperate and tropical regions**	temperate and tropical regions in terms of ecological characteristics and production.		
Tests Short	**Lectures theoretical + practical**	**The main fodder legumes - Species: *Alfalfa, alfalfa, vetch, spania - Nitrogen stabilization and soil improvement - Nutritional benefits and anti-nutritional factors**	**The student should able to describe types of fodder legumes and their benefits in nitrogen fixation and soil improvement.**	1 Theoretical 2 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio - Activities a Experiences Laboratory Video lectur**	**Establishment of pastures - Site selection and soil preparation - Seed quality, planting methods, seeding rates - Weed control during establishment**	**The student should be able to determine seed quality standards, planting methods, and seeding rates.**	1 Theoretical 2 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Feed crop management - Fertilization strategies (N, P, K) - Irrigation and water management - Pest and disease control in pastures**	**Explains the needs Fertilizing with elements N, P, K**	1 Theoretical 2 Practical	Sixth
Interactive Discussi	**-Lectures Theory -Offers Introductio -Lectures**	**Grazing Management Systems - Rotary grazing vs. Continuous grazing - Animal load rates**	**The student should be able to** distinguish between	1 Theoretical 2 Practical	Sevent

ons + Tests Short	**Video**	**and pastoral capacity - Rest periods and pasture restoration**	circular and continuous grazing and compare them in terms effectiveness		
Interact ive Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Harvesting and storage of feed - Threshing industry (cutting, drying, pressing) - Silage production (silage process, additives) - Storage methods a maintaining quality**	**The student Should explain the steps Manufacture of hay and silage and maintain its quality.**	1 Theoretical 2 Practical	Eighth
Tests and practica l laborato ry experim ents	**-Lectures Theory -Offers Introductio -Lectures Video**	**Nutritional value of feed - Approximate analysis (crude protein, fiber, NDF, ADF) - Digestion and palatability coefficients - Anti-nutritional compounds (tannins, alkaloids)**	The student should be able to **interpret the results of the approximate analysis of feed (protein, fiber, NDF, ADF).** • **Evaluates digestion and palatability coefficients**.	1 Theoretical 2 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Forestry and agroforestry systems - Integration of trees with pastures (e.g. acacia, leucine) - Benefits to local climate and biodiversity - Challenges and management**	**That the student can Explain the concept integrating For trees with pasture Examples of Types used.**	1 Theoretical 2 Practical	Tenth

Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Management of natural meadow rangelands - Difference between natural and improved pastures - Sustainable grazing in arid and semi-arid areas - Combating desertification and overgrazing**	• Differentiate between natural and improved pastures. • Demonstrates the principles of sustainable grazing in dry environments.	1 Theoretical 2 Practical	Eleven
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Breeding and improvement of fodder crops - Selection criteria (yield, quality, resistance) - breeding methods (traditional vs. biotechnology) - Varietal adaptation experiments**	• The student should determine the criteria for selecting good varieties. • Compare traditional methods with modern techniques in plant breeding.	1 Theoretical 2 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Climate change and feed production systems - Effect of drought, heat and carbon dioxide - Climate-resistant fodder species - Mitigation strategies (carbon storage)**	**The student should be able to explain the impact of climatic factors on** feed production.	1 Theoretical 2 Practical	Thirteenth
Practical tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Economic aspects of feed production - Cost-benefit analysis of feed production systems - Forage and livestock value chains - Policies in support of sustainable rangelands**	The student should evaluate the feasibil of feed production projects from Terms of cost and return.	1 Theoretical 2 Practical	Fourteenth

Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	**Future challenges and innovations - Accurate management of rangelands (sensors, drones) - New sources of fodder (insects, hydroponics) - Review the course and prepare for the final exam**	• The student should be able to describe micromanagement techniques (sensor, drones). It reviews innovative feed sources (e.g. insects, hydroponics). Review the basic concepts in preparation for the final exam.	1 Theoretical 2 Practical	Fifteen

11. Course Evaluation
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.

12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Fertility and fertilization	
2. Course Code:	
PMNP 353	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
2 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
60	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
1- Understand the basics of soil fertility 2- Recognize macro and micro nutrients 3- Knowledge of soil fertility assessment methods 4- Acquire the skills to identify fertilizer needs 5- Study of fertilizer types (organic, chemical, biological)	**Goals**
9. Teaching and Learning Strategies **Remember all the teaching and learning strategies that follow each course**	
1- Preparing knowledge and how soil fertility affects plant productivity 2- Theoretical explanation Definition of soil fertility	**Strategy**

and its importance 3- Types of fertilizers and their properties 4- Micro and macro nutrients and their role in plant productivity 5- Case study on fertilization problems on a particular farm	

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**definition of soil fertilit Influencing factors (physical, chemical, biological)**	The student must be Able to know What is fertility? Soil and its types	1 Theoretical 3 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin**	**Soil sample analysis to determine basic properties (texture, organic matter, pH).**	**The student should be able to analyze soil samples and measure pH and organic matter**	1 Theoretical 3 Practical	Second
Tests operation + Writing scientific	**-Lectures Theory -Tutorial operation Laboratory**	**Key nutrients (nitrogen, phosphorus, potassium)**	**The student should be able to know the major elements in the soil and methods of measuring them**	1 Theoretical 3 Practical	Third

reports					
Tests Short	**Lectures theoretical + practical**	**The role of each element in plant growth, forms of absorption, symptoms of deficiency of elements.**	**The student shou be able to distinguish between the symptoms of deficiency of each element**	1 Theoretical 3 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio - Activities a Experiences Laboratory**	**Micro and secondary elements (iron, zinc, calcium)**	**The student should be able to Distinguish between minor elements and know methods measuring them**	1 Theoretical 3 Practical	Fifth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**The functions of the elements, methods of facilitating them in the soil, the effect of salinity on their availability .**	**The student should be able to know the functions elements in the soil and the degree of their availability**	1 Theoretical 3 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Organic fertilization and biofertilizers Types of organic fertilizers (manure, compost, water purification waste), the role of bacterial inoculation (root nodes)**	**The student should be able to distinguish between organic and inorganic fertilization**	1 Theoretical 3 Practical	Sevent

Interact ive Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Balanced Fertilizat Management**	**The student should be able to apply fertilization with balance**	1 Theoretical 3 Practical	Eighth
Tests and practica l laborato ry experim ents	**-Lectures Theory -Offers Introductio -Lectures Video**	**Calculation of fertilizer needs, timing of addition, fertilizer interactions with soil .**	**The student should be able to know the needs Fertilizer for soil**	1 Theoretical 3 Practical	Ninth
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Soil and heavy metal pollution Sources of pollution (industrial waste, unmanaged fertilizers), the effect of heavy metals on fertility .**	**The student should be able to know the types of heavy elements in the soil and soil pollutants**	1 Theoretical 3 Practical	Tenth
Practica l tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Reclamation of degraded soils**	**The student should be able to know the methods of reclamation Soil**	1 Theoretical 3 Practical	Eleven
	-Lectures Theory -Offers	**Treatment of saline and gypsum soils (washington, organic**	**The student should be able treat soils**	1 Theoretical 3 Practical	Twelft

Quizzes	**Introductio -Lectures Video**	**fertilization, soil conditioners).**	**and Washing methods**		
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Modern techniques in fertilization Smart fertilizati remote sensi supplementary irrigat systems .**	**The student should be able to apply smart fertilization techniques**	1 Theoretical 3 Practical	Thirt eenth
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Fertilization efficiency assessment Quality indicators (productivity, crop quality, balance of elements), economic analysis of costs .**	**The student should be able to distinguish the efficiency of fertilization and productivity**	1 Theoretical 3 Practical	Fourt eenth
Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	**Review of previous topics.**	**The student should be able to distinguish the efficiency of fertilization and productivity**	1 Theoretical 3 Practical	Fifteen

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Seed technology	
2. Course Code:	
PMNP 354	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
3 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
45	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
• **Understand the importance of seeds in agriculture and plant production.** • **Recognize the physiological and morphological characteristics of seeds.** • **Study the processes of seed production, processing, and packaging.** • **Understand seed quality testing methods** (germination, purity, moisture, vitality). • **Identify seed preservation and storage techniques** to ensure their validity. • **Familiarity with the principles of classification and accreditation of**	**Goals**

improved seeds. • **Know the factors that affect the validity and germination of seeds.** • **Appreciate the importance of modern technology in improving the productivity and quality of seeds**	

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- Presentation of video or photos of the stages of commercial seed production. 2- Theoretical explanation Definition of seeds and their agricultural and economic importance. 3- Stages of seed production (planting - harvesting - cleaning - processing - packaging). 4- Practical training (seed inspection training (in vitro germination or purity test)	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to seed technology Definition of seeds and their importance in agricultural production The history and development of seed technology Seed classifications (seed seeds, commercial seeds, hybrid seeds, genetically modified seeds)**	The student should be able to know the concept of seeds and explain their importance in agricultural production	1 Theoretical 2 Practical	First

Discussions Interactive + Quizzes	**-Lectures** **Theory a** **presentation** **Presentatio**	**Seed composition and biology** **Seed structure and parts** **Pollination and fertilization processes** **Stages of seed development and ripening**	**That the student can** **Row to know** **Structural structure** **For seed and functions** **Its parts.**	1 Theoretical 2 Practical	Second
Tests operation + Writing scientific reports	**-Lectures** **Theory** **-Tutorial** **operation** **Laboratory**	**Seed production** **Basic principles for the production of high quality seeds** **Seed production systems (open-pollinated, hybrid)** **Factors affecting the yield and quality of seeds**	• The student should explain the basic principles of producing high-quality seeds. • Differentiates between seed production systems (open-pollinated and hybrid).	1 Theoretical 2 Practical	Third
Tests Short	**Lectures** **theoretical**	**Collection and harvesting of seeds** **Proper timing of seed collection** **Manual and automated harvesting techniques** **Reduce loss during harvest**	**Determines the right timing** **To collect seeds according to the yield.**	1 Theoretical 2 Practical	Fourth
Tests and laboratory	**- Theoreti** **lectures** **-Offers** **Introductio** **-Activities** **-Experience** **Laboratory**	Post-harvest transactions Separation and cleaning of seeds Drying (natural and industrial) Get rid of impurities	Applying Separation methods And clean the seeds.	1 Theoretical 2 Practical	Fifth

experiments					
Interactive Discussions	**-Offers Introductio -Lectures Video**	**Seed Quality Tests - Part I Purity Tests Weight and humidity tests Physical tests**	To conduct tests Purity of seeds·	1 Theoretical 2 Practical	Sixth
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Seed Quality Tests - Part Two Germination and Bioability Tests Aging Acceleration Test**	• The student should be able to apply germination and vital ability tests.	1 Theoretical 2 Practical	Sevent
Interactive Discussions + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Seed storage Factors affecting storage (temperature, humidity) Storage methods (traditional, modern) Seed Shelf Ages**	**The student should be able to explain the effect of temperature and humidity on the viability of seeds.**	1 Theoretical 2 Practical	Eighth
Tests and practica	**-Lectures Theory -Offers Introductio -Lectures Video**	**Seed treatment Paint & Packaging Chemical treatments (with pesticides and nutrients) Seed biostimulation (priming)**	• The student should explain the importance of painting and	1 Theoretical 2 Practical	Ninth

l laboratory experiments			packaging seeds. • Applies appropriate chemical treatments to protect seeds.		
Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Seed classification and packaging Classification of seeds by size and weight Packaging & Transportation Marking a specifications**	The student should able to To classify the seeds By size and weight	1 Theoretical 2 Practical	Tenth
Practical tests + Report Writing	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Production of certified and registered seeds The different stages of seed propagation (basic, registered, certified) Legal and regulatory procedures The role of government and private institutions**	It explains the legal and regulatory actio in seed production. It explains the stages of seed propagation (basic, registered, certified).	1 Theoretical 2 Practical	Eleven
Report Writing + Quizzes	**-Lectures Theory -Offers Introductio -Lectures Video**	**Marketing & Management Marketing seeds locally and globally Seed Value Chain Analysis Seed Production Project Management**	Analyzes the seed market Locally and internationally.	1 Theoretical 2 Practical	Twelft
Report	**-Lectures Theory -Offers Introductio -Lectures Video**	**Biotechnology in seed technology Genetic engineering and genetically modified seeds Biotechnology applications in seed**	The student should be able to explain the role of genetic engineering in the production of genetically	1 Theoretical 2 Practical	Thirt teenth

Writing		**improvement Ethical and legal aspec**	modified seeds. • Evaluates biotechnology applications in improving seed genetic traits		
Practica l tests	**- Lectures Theory - Activities a Practical experiences Laboratory**	**Pests and diseases affecting seeds Seed-borne diseases Detection and control methods The importance of clean seeds in prevention**	• The student should identify seed-borne diseases and their transmission methods. • Applies available detection and control methods.	1 Theoretical 2 Practical	Fourt eenth
Practica l tests	**- Activities a Practical experiences Laboratory -Offers Introductior and discussions**	**General review and final evaluation Comprehensive review of the course**	• The student should review the main concepts and principles in seed technology. • Links theories and practical applications.	1 Theoretical 2 Practical	Fifteen
11. Course Evaluation					
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.					
12. Learning and Teaching Resources					

	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports…)
	Websites & References

Course Description Form

1. Course Name:
Reaping and harvesting equipment
2. Course Code:
PMNP 357
3. Semester /Year :
First Semester / Third Year
5. Date of preparation of the description :
4 / 6 / 2025
6. Available Forms of Attendance :
Came
7. Number of credit hours (total) / number of units (total):
45
7. Name of the course administrator (mention all names, if there is more than one):
Name: Email:
8. Course Objectives

1. **Understand the importance of harvesting and harvesting processes** in the stages of agricultural production. 2. **Identify the types of equipment and machinery used** in harvesting and harvesting different crops (grains, vegetables, fruits...). 3. **Understand the components and functions of harvesting machines** such as harvesters, threshing machines, picking and chopping machines. 4. **Acquire the skills of operating and maintaining harvesting and harvesting equipment.** 5. **Identify the impact of the type of equipment on the quality of the agricultural product and reduce waste.** 6. **Know the technical foundations for choosing the right equipment** according to the type of crop and environmental conditions. 7. **Understand modern harvesting techniques** such as intelligent and computer-guided automated harvesting. 8. **Promote awareness of occupational safety during the use of harvesting and harvesting equipment.**	**Goals**

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- Boot view video or illustrations of harvesting machines in the fields. 2- Definition of types of harvesting and harvesting equipment 3- Explain the components and functions of each type of machine (e.g. harvesters, fruit pickers, grain threshers). 4- Training workshops on the operation and maintenance of machines (if available). 5- Use models or simulations to explain how machines work.	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to harvesting and harvesting operations - Basic concepts: the difference between manual and automatic harvesting. - The importance of harvest timing accordi to climate and type of crop .**	• To explain the difference between manual and automatic reaping and determine the uses of each.	1 Theoretical 2 Practical	First
Discussions Interactive + Quizzes	**-Lectures Theory -width Presentatio (Power Poin**	**Factors affecting the choice of equipment - Analysis of soil (depth, aeration, moisture) and climate (sensitivity to frost, temperature) - Case Study: Cannal Plant Requirements as Example**	**The student should be able to Analyzes the influen of soil and climate characteristics on the selection of harvesting equipment.**	1 Theoretical 2 Practical	Second
Tests	**-Lectures**	**Traditional hand tools**	The student should be able	1 Theoretical 2 Practical	Third

operation + Writing scientific reports	**Theory -Tutorial operation Laboratory**	**- Machetes and knives: design, uses, and limitations in small fields . - Risks of broken stems and the effect of long duration**	to It shall determine the risks of using hand tools on the crop and labor, such as breaking stems and the long period of harvesting.		
Tests Short	**Lectures theoretical + practical**	**Mechanical harvesting machines - Design of machines for cutting and assembling stems (e.g. cannabis harvesting machines). - Efficient machines in large fields and reduce waste.**	• The student explains the design and function of stem cutting and assembly machines, with a focus on crops such as cannabis.	1 Theoretical 2 Practical	Fourth
Tests and laboratory experiments	**-Offers Introductio - Activities a Experiences Laboratory**	**Post-shear techniques - Drying operations (spreading the crop on the ground for 3–4 days) - Packing and transportation to warehouses.**	**The student should be able to apply drying techniques Terrestrial in the fields.**	1 Theoretical 2 Practical	Fifth
Interactive Discussions +	**-Lectures Theory -Offers Introductio -Lectures Video**	**Quality standards in equipment - The effect of machinery on fiber quality (e.g. avoid cracking hemp stalks). - Balancing speed and maintaining**	The student assesses the impact of equipment on crop quality, such as avoiding damage to hemp fibers.	1 Theoretical 2 Practical	Sixth

Tests Short		**plant characteristics.**			
Interact ive Discussi ons + Tests Short	**-Lectures Theory** **-Offers Introductio**	**Environmental challenges** **- The effect of rain and drought on harvesting processes .** **- Adaptation of equipment to changing weather conditions.**	The student should be able to To explain the effect of Climate change (e.g. rain and drought) on harvest scheduling	1 Theoretical 2 Practical	Sevent
Interact ive Discussi ons + Tests Short	**-Offers Presentatio as theoretical lecture** **-Lectures Video**	**Comparative studies between crops** **- Comparison of cannabis harvesting equipment with other crops (cereals, vegetables)** **- Different plant density and its relationship to the amount of seeds used .**	The student should be able to Compare cannabis harvesting techniques and equipment with other crops such cereals and vegetables.	1 Theoretical 2 Practical	Eighth
Tests and practica l laborato ry experim ents	-Lectures Theory -Offers Introduction -Lectures Video	**Recent innovations** **- Machines capable of sorting the stems by sex (male / female) as in cannabis .** **- The use of drones to monitor crop maturity.**	• Advanced sex stem sorting machines (male/female) will be offered in cannabis crops. • Explains the role of drones in monitoring crop ripeness and improving harvest timing.	1 Theoretical 2 Practical	Ninth

Quizzes	**-Lectures Theory**	**Economic feasibility - Analysis of mechanized versus manual farming costs. - Study of s quantity and its effect production (80–100 kg for fiber)**	**The student analy the economic costs manual ver mechanized harvesti**	1 Theoretical 2 Practical	Tenth
Practica l tests + Report Writing	- Lectures Theory - Activities and Practical experiences Laboratory	**Preventive maintenance of equipment - Maintenance of cutting and assembly machines before and after the season. - Manage common faults in wet or dry areas.**	**The student should apply the steps of periodic maintenance of cutting and assembly machines.**	1 Theoretical 2 Practical	Eleven
Quizzes	**-Lectures Theory -Lectures Video**	**Sustainability in harvesting equipment - reducing the carbon footprint of machines. - Recycling of crop residues in industry (e.g. hemp fiber for paper)**	**Assesses ways to reuse crop residues such as hemp fiber sustainable industries.**	1 Theoretical 2 Practical	Twelft
Report Writing	**-Lectures Theory -Offers Introductio -Lectures Video**	**Practical Applications (Workshop) - Simulate harvesting different crops using scale models of machines. - Measurement of energy efficiency and time.**	Carry out simulations of harvesting operations using miniature models or digital simulation programs.	1 Theoretical 2 Practical	Thirtee h
Practica l tests	- Lectures Theory - Practical experiments Laboratory	**Performance Appraisal - Productivity measurement standards (crop quantity/unit**	**Applies performance evaluation criteria (e.g. yield per unit area/time)**	1 Theoretical 2 Practical	Fourt eenth

		area/time). **- Analysis of cannabis harvest data: 160–180 plants/m² .**			
Practica l tests	- Practical experiments Laboratory -Offers Introduction and discussions	**Final review and the future of technology** **- Updates in artificial intelligence to improve harvest accuracy.** **- Discuss students' projects and make recommendations.**	• **See technological advances in AI to guide harvesting equipment more accurately.** • **Presents student projects and discusses recommendations and proposals for improving harvesting processes.**	1 Theoretical 2 Practical	Fifteen

11. Course Evaluation
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.

12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Economic insects	
2. Course Code:	
PMNP 359	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
5 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
45	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
• **Identify the economic importance of insects** and their role in agriculture and the environment. • **Classification of economic insects** into beneficial and harmful. • **Knowledge of harmful insects in agricultural crops** and their impact on production. • **Understand the life cycle of harmful insects to** determine the most appropriate time to combat them. • **Identify beneficial insects** (such as bees, natural predators and	**Goals**

pollinators). • **Study of economic insect control methods** (chemical, biological, agricultural, mechanical).	

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- View photos or videos of insects attacking agricultural crops 2- Classification of economic insects (harmful and beneficial). 3- Identify insects harmful to crops and their life cycle. 4- Collect insect specimens from the field and classify them. 5- Use a microscope to examine insect parts.	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to economic entomology (definition, economic importance, classification).**	• The student should know the concept of economic insects and distinguish them from harmless insects. • Explains the economic importance of insects in terms of their positive and negative impact.	1 Theoretical 2 Practical	First
Discussions	-Lectures Theory	**Insect morphology (exoskeleton, sensory organs, adaptations)**	The student should be able to identify the basic	1 Theoretical 2 Practical	Second

Interact ive + Quizzes	-width Presentation (Power Point)		components of the insect's external structure and functions.		
Writing scientifi c reports	**-Lectures Theory -Tutorial operation Laboratory**	**Insect physiology (digestion, respiration, reproduction)**	The student should be able to explain the mechanisms of digestion in insects and types of the digestive system.	1 Theoretica 2 Practical	Third
Tests Short	**Lectures theoretical and theoretical**	**Insect ecology (interaction with the environment, dynamics of populations)**	• The student should be able toanalyze the relationship between insects and their surrounding environment. • Explains the dynamics of insect populations and the factors affecting them	1 Theoretica 2 Practical	Fourth
Tests and laborato ry experim ents	- Activities and Experiences Laboratory	**Fruit pests (e.g. tree stem borer, fruit fly)**	To be able to distinguish between types of Fruit pests such as tree stem bore and fruit flies.	1 Theoretica 2 Practical	Fifth
Interact	-Lectures Theory -Offers	**Pests of stored grains (rice weevil, flour**	• The student should describe	1 Theoretica 2 Practical	Sixth

ive Discussi ons + Tests Short	Introduction -Lectures Video	**beetles) .**	the behaviors of warehouse pests such as rice weevil and flour beetles.		
Interact ive Discussi ons + Tests Short	-Lectures Theory -Offers Introduction -Lectures Video	**Greenhouse pests (aphids, thrips) .**	The student should be able to identify common protected crop pests such as aphids and thrips.	1 Theoretica 2 Practical	Seventh
Interact ive Discussi ons + Tests Short	-Lectures Theory -Offers Introduction -Lectures Video	**Forest pests and woody trees (pine worm, woodborer)**	The student should be able to Describes common species such as pine worm and wood digger.	1 Theoretica 2 Practical	Eighth
Practica l tests	-Lectures Theory -Offers Introduction -Lectures Video	**Basics of beekeeping (castes, breeds, equipment)**	The student should be able to Explains the social structure of bee sects (queen, workers, males)	1 Theoretica 2 Practical	Ninth

Quizzes	**-Lectures Theory** **-Lectures Video**	**Community management (nutrition, bee transfer, disease management)**	To be able to explain the requirements for feeding bees in different seasons·	1 Theoretica 2 Practical	Tenth
Practica l tests + Report Writing	- Lectures Theory - Activities and Practical experiences Laboratory	**Bee products (honey, royal jelly, wax) and the impact of environmental factors on them .**	Distinguish between different bee products (honey, wax, royal jelly).	1 Theoretica 2 Practical	Eleventh
Quizzes	-Lectures Theory -Offers Introduction -Lectures Video	**Biological control (predators, parasitoids, nurses)**	To differentiate between types Vital enemies (predators, intruders, nurses)	1 Theoretica 2 Practical	Twelfth
Field Visits + Report Writing	-Lectures operation -Offers Introduction -Lectures Video	**Chemical Control (Pesticide types, assessment Risks)**	• The student should be able to classify the types of pesticides according to the method of work and use. • Explains the principles of environmental and health risk assessment of pesticides.	1 Theoretica 2 Practical	Thirteen
Practica l tests	- Lectures Theory - Activities and Practical experiences Laboratory	**Integration of methods (IPM) with case studies such as the red palm weevil .**	The student should be able to explain Control concept Integrated and their components·	1 Theoretica 2 Practical	Fourteenth
Practica l tests	- Activities and Practical experiences Laboratory -Offers	**Final assessment (research project on the application of IPM to a specific lesion).**	Design an applied research project on the	1 Theoretica 2 Practical	Fifteenth

	Introduction and discussio		application of IPM to a specific pest.		

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Course Description Form

1. Course Name:	
Modern cultivation techniques	
2. Course Code:	
PMNP 360	
3. Semester /Year :	
First Semester / Third Year	
5. Date of preparation of the description :	
6 / 6 / 2025	
6. Available Forms of Attendance :	
Came	
7. Number of credit hours (total) / number of units (total):	
45	
7. Name of the course administrator (mention all names, if there is more than one):	
Name: Email:	
8. Course Objectives	
• **Identify the basic concepts of modern agriculture** and their importance in the development of agricultural production. • **Understand the types of modern agricultural techniques** such as: • Soilless agriculture (hydroponic and aerobic farming). • Drip irrigation and smart irrigation. • Greenhouses and vertical farming. • **Identify digital technologies used in agriculture** (such as remote sensing, geographic information systems (GIS), and artificial intelligence). • **Understand how to improve resource efficiency** (water, fertilizer,	**Goals**

energy) using modern technologies. • **Appreciate the role of modern agriculture in achieving food security and environmental sustainability.** •	

9. Teaching and Learning Strategies

Remember all the teaching and learning strategies that follow each course

1- Preface video or photo presentation of modern agricultural techniques (hydroponics, greenhouses, vertical farming 2- Definition of modern agriculture and its types. 3- Explanation of smart irrigation systems 4- Workshops or field visits to farms using modern technologies. 5- PowerPoint slides – videos – educational models – smart planting tools or miniature models	**Strategy**

10. Course structure **(remember all theoretical and practical vocabulary)**

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Interactive Discussions	**Lectures Theory**	**Introduction to Modern Agriculture Definition of traditional and modern agriculture. The importance of switching to modern agriculture. Global challenges facing agriculture (water, climate, population...)**	The student should be able to understand modern agriculture and the developmen of the world	1 Theoretical 2 Practical	First
Discussions	-Lectures	**Protected Agriculture (greenhouses)**	The student should be able	1 Theoretical 2 Practical	Second

Interacti ve + Quizzes	Theory -width Presentation (Power Point)	**The concept of protected agriculture. Types of greenhouses (plastic, glass). Their components, advantages and disadvantages.**	to understand protected agriculture and the difference between it and traditional agriculture		
Tests operatio n + Writing scientifi c reports	**-Lectures Theory -Tutorial operation Laboratory**	**Modern irrigation and its techniques Traditional versus modern irrigation systems. Drip irrigation, sprinkler, subsurface. Smart irrigation control (sensor and humidity).**	The student should be able to know modern irrigation methods and types	1 Theoretical 2 Practical	Third
Tests Short	**Lectures theoretical + practical**	**Soilless farming (hydroponics and aerobic farming) Hydroponics and aeroponics. System components and advantages. Practical applications.**	The student should be able to know how to farm without soil	1 Theoretical 2 Practical	Fourth
Tests and laborato ry experim ents	-Offers Introduction - Activities and Experiences Laboratory	**Modern fertilization techniques Fertilization via irrigation systems (phytoging) Smart fertilization and nutrient control. Its impact on reducing waste and increasing efficiency**	The student should be able to differentiate between modern and smart fertilization methods	1 Theoretical 2 Practical	Fifth
Interacti ve	-Lectures Theory -Offers Introduction -Lectures	**Precision Agriculture Definition and concepts.**	The student should be able t know the	1 Theoretical 2 Practical	Sixth

Discussi ons + Tests Short	Video	**Remote sensing technologies, drones. GPS in agriculture.**	techniques of remote sensing i agriculture		
Interacti ve Discussi ons + Tests Short	**-Lectures Theory -Offers Introductio -Lectures Video**	**Smart farming Internet of Things (IoT) in agriculture. Sensors and Big Data. Automatic remote control.**	The student should be able t use smart agriculture	1 Theoretical 2 Practical	Sevent
Interacti ve Discussi ons + Tests Short	-Lectures Theory -Offers Introduction -Lectures Video	**Agricultural modeling and simulation Use software to simulate growth and production. Digital Farm Management. Analysis of agricultural data.**	The student should be able to apply agricultural modeling and simulations in agriculture	1 Theoretical 2 Practical	Eighth
Tests and practica l laborato ry	-Lectures Theory -Offers Introduction -Lectures Video	**The use of robots in agriculture Agricultural robots (planting, harvesting, spraying). Real-life case studies. Adoption challenges.**	The student should be able to know how to use robots in agriculture	1 Theoretical 2 Practical	Ninth

experim ents					
Quizzes	-Lectures Theory -Offers Introduction -Lectures Video	**Climate control technologies Cooling and heating systems inside greenhouses. Humidity control and lighting systems. Ventilation and shading systems.**	The student should be able to know how to determine the appropriate climate and humidity in ventilation and shading systems	1 Theoretical 2 Practical	Tenth
Practica l tests + Report Writing	- Lectures Theory - Activities and Practical experiences Laboratory	**Biotechnology in Agriculture Genetic modification of crops. Plants resistant to diseases and drought. Ethical and legal challenges.**	The student should be able to understand and know biotechnology	1 Theoretical 2 Practical	Eleven
Quizzes	-Lectures Theory -Offers Introduction -Lectures Video	**Organic farming and its techniques The difference between organic and modern farming. Techniques used in modern organic farming. Global certifications and standards.**	The student should be able to know modern farming techniques	1 Theoretical 2 Practical	Twelft
Report Writing	**-Lectures Theory -Lectures Video**	**Renewable Energy in Agriculture Use of solar and wind energy. Solar water pumps. On-farm power generation technologies.**	The student should be able to understand renewable energy and solar energy	1 Theoretical 2 Practical	Thirt eenth
Practica l tests	**- Lectures Theory - Practical experiences**	**Sustainability and Circular Economy in Agriculture Recycling of water and agricultural**	The student should be able to know sustainability	1 Theoretical 2 Practical	Fourt eenth

	Laboratory	**waste. Techniques to reduce agricultural losses. Ecological agriculture.**			
Practica l tests	Introduction and discussions	**General Review and Student Projects Comprehensive review. View student projects or reports. Final discussions and readiness for testing.**	The student should be able to retrieve all information	1 Theoretical 2 Practical	Fifteen

11. Course Evaluation	
Distribution of grades out of 100 according to the tasks assigned to the student such as daily preparation, daily oral tests, monthly or written tests, reports... Etcetera.	
12. Learning and Teaching Resources	
	Required textbooks (curriculum books, if applicable)
	Main references (sources)
	Recommended books and references (scientific journals, reports...)
	Websites & References

Fourth Level Course

1. **Course Name:** Scientific Research Methodology
2. **Course Code:** NTU 410
3. **Level / Academic Year:** Level Four / 2024–2025
4. **Course Description Preparation Date:** 09/06/2025
5. **Available Attendance Forms:** Paper form including name, date of attendance, and signature
6. **Total Credit Hours / Units:** 30 / 2
7. **Course Coordinator (list all names if more than one):** Name: Fahad Khalaf Yaseen Email: fahadbiologymycology@ntu.edu.iq
8. **Course Objectives:** The objective of this course is to train students in scientific thinking and research, how to conduct scientific experiments and apply them in practice, how to take measurements, analyze them, and provide logical interpretation of the results. Thus, students will be able to think scientifically in solving any problem, develop a strategy for research, investigate scientific facts to solve problems, collect and analyze data logically, and produce recommendations for addressing problems.
9. **Teaching and Learning Strategies:**
10. Dialogue and discussion-based learning.
11. Brainstorming.
12. Cooperative learning.
13. Self-learning.
14. **Course Structure:**

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	2	Student understands the modern scientific method	Modern Scientific Method	Lecture + Presentation + Explanations	Test + Q&A
2	2	Student understands scientific theory and its steps	Beginning of Scientific Theory and Its Steps	Lecture + Presentation + Explanations	Test + Q&A
3	2	Key hypotheses	Assumptions underlying the scientific method in dealing with natural	Lecture + Presentation + Explanations	Test + Q&A

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
			phenomena		
4	2	Student understands basic characteristics of scientific research	Basic Characteristics of Scientific Research	Lecture + Presentation + Explanations	Test + Q&A
5	2	Traits of a successful researcher and scientific integrity	Traits of a Successful Researcher	Lecture + Presentation + Explanations	Test + Q&A
6	2	Academic vs. applied research	Types of Research and Applications	Lecture + Presentation + Explanations	Test + Q&A
7	2	Types of research institutions	Research Institutions	Lecture + Presentation + Explanations	Test + Q&A
8	2	How to select a research problem	Principles of Selecting a Research Problem	Lecture + Presentation + Explanations	Test + Q&A
9	2	Methods of presenting information	Methods of Presenting Information	Lecture + Presentation + Explanations	Test + Q&A
10	2	Writing research papers	Research Discussions	Lecture + Presentation + Explanations	Test + Q&A
11	2	Mechanism of publishing research and reputable journals	Publishing Research	Lecture + Presentation + Explanations	Test + Q&A
12	2	How to use the internet in scientific research	Introduction to the Internet and Its Uses	Lecture + Presentation + Explanations	Test + Q&A
13	2	Reviewing different types of research	Exploratory Readings and Review of Previous Research	Lecture + Presentation + Explanations	Test + Q&A
14	2	How to formulate research hypotheses	Formulating Research Hypotheses	Lecture + Presentation + Explanations	Test + Q&A
15	2	Experimental designs in agricultural research	Methods of Conducting Agricultural Experiments	Lecture + Presentation + Explanations	Test + Q&A

11. **Course Assessment:**
Tests + Exercises + Discussions + Q&A

12. **Teaching and Learning Resources:**
• **Required Textbooks (curriculum, if any):** Approved syllabus by the Ministry of Higher Education and Scientific Research
• **Main References (sources):** *Lectures on Scientific Research Methodology* / Prof. Dr. Iyad Youssef Al-Haj Ismail / 2019
• **Recommended Books and References (scientific journals, reports…):** Google Scholar, Researcher's Gateway
• **Electronic References, Websites:** All websites providing reliable sources as well as AI tools

Course Description Form

1. **Course Name:** Design and Analysis of Experiments
2. **Course Code:** TAMO 401
3. **Level / Academic Year:** Fourth Year
4. **Course Description Preparation Date:** 08/06/2025
5. **Available Attendance Forms:** Paper form including student's name, date, and signature
6. **Total Credit Hours / Units:** 60 – 2
7. **Course Coordinator (list all names if more than one):** Name: Dr. Zahraa Abdulrahman Sabri Email: zahraa@ntu.edu.iq85
8. **Course Objectives:** The course aims to provide students with the knowledge and skills necessary to design effective scientific experiments and analyze their results using statistical methods. It introduces students to the importance of planning and implementing agricultural experiments, controlling experimental error, and studying designs used in agricultural research. Students will be able to plan and conduct an experimental design and analyze its data.
9. **Teaching and Learning Strategies:**
10. Interactive lecture
11. Brainstorming
12. Dialogue and discussion
13. Blackboard writing
14. Assignments and reports
15. **Course Structure:**

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
1	4	1- Learn the basic concepts of experimental design. 2- Understand the basic rules of design. 3- Recognize terms related to design and analysis of experiments. 4- Learn the steps followed in experiments.	Basic concepts and fundamental rules in design and analysis of experiments	Lecture + Presentation	Test + Q&A
2	4	1- Identify sources of variation in	Completely	Lecture +	Test + Q&A

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
		design. 2- Learn how to construct ANOVA table. 3- Ability to plan an experiment.	Randomized Design (CRD): advantages, disadvantages, ANOVA	Presentation + Blackboard writing	+ Exercises
3	4	1- Understand CRD when replications are equal or unequal. 2- Continue data collection despite missing observations.	CRD with unequal replications	Lecture + Presentation	Test + Q&A + Exercises
4	4	1- Learn Randomized Complete Block Design (RCBD). 2- Identify sources of variation. 3- Apply design in experiments. 4- Construct ANOVA table.	RCBD: conditions, advantages, disadvantages, sources of variation	Lecture + Presentation + Blackboard writing	Test + Q&A + Exercises
5	4	1- Estimate missing values. 2- Analyze results and apply practically.	ANOVA, number of replications, estimation of one or more missing values in blocks	Lecture + Presentation	Test + Q&A + Exercises
6	4	1- Learn Latin Square Design (LSD). 2- Identify sources of variation. 3- Apply design in experiments. 4- Construct ANOVA table.	LSD: conditions, advantages, disadvantages, ANOVA	Lecture + Presentation	Test + Q&A + Exercises
7	4	Compare efficiency of RCBD and LSD	Efficiency of RCBD vs. LSD	Lecture + Presentation	Test + Q&A + Exercises
8	4	Learn how to estimate missing values	Sources of variation in LSD, ANOVA, estimation of missing values	Lecture + Presentation	Test + Q&A + Exercises
9	4	1- Learn testing methods. 2- Understand when to conduct tests (before/after experiment). 3- Identify use with quantitative or qualitative factors. 4- Learn independent comparisons, sums of squares for treatments and comparisons.	Significance tests between means: independent comparisons	Lecture + Presentation	Test + Q&A + Exercises
10	4	1- Understand when to use tests	Trend Analysis,	Lecture +	Test + Q&A

Week	Hours	Intended Learning Outcomes	Unit / Topic	Teaching Method	Assessment Method
		(before/after experiment, quantitative/qualitative factors). 2- Construct ANOVA table.	Duncan's Multiple Range Test	Presentation	+ Exercises
11	4	1- Identify factorial experiments. 2- Understand whether they study one factor or more.	Factorial Experiments: conditions, advantages, disadvantages	Lecture + Presentation	Test + Q&A
12	4	1- Construct ANOVA table. 2- Identify levels of each factor.	Sources of variation in factorial experiments, ANOVA	Lecture + Presentation	Test + Q&A + Exercises
13–14	4	1- Learn Split-Plot Design. 2- Construct ANOVA table. 3- Identify most important factors. 4- Divide experiment into levels.	Split-Plot Design: conditions, advantages, disadvantages, sources of variation, ANOVA	Lecture + Presentation	Test + Q&A + Exercises
15	4	1- Understand relation between dependent and independent variables. 2- Learn effect of each independent variable on dependent variable. 3- Recognize types of regression.	Regression Analysis	Lecture + Presentation	Test + Q&A + Exercises

11. **Course Assessment:**
Q&A + Discussion + Tests + Exercises

12. **Teaching and Learning Resources:**

- **Required Textbooks (curriculum, if any):** *Design and Analysis of Experiments*
- **Main References (sources):** —
- **Recommended Books and References (scientific journals, reports…):** Lectures and textbooks published in Iraqi universities
- **Electronic References, Websites:** Specialized websites on design and analysis of experiments

Course Description Form

1. Course Name:
Plant Breeding and Improvement 1
2. Course Code:
PMNP 401
3. Semester / Year:
2024 – 2025
4. Description Preparation Date:
2025/7/1
5. Available Attendance Forms:
My Presence, Online
6. Number of Credit Hours (Total) / Number of Units (Total)
60
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

Course Objectives	By the end of the course, the student is expected to be able to: 1.Understand the basic principles of plant breeding: 2.Familiarize with various breeding methods: 3.Acquire practical skills in plant breeding programs: 4.Analyze agricultural production problems from a genetic perspective: 5.Raise awareness about the role of plant breeding in food security and resistance, and stress tolerance.

9. Teaching and Learning Strategies

Strategy	strategies for teaching the basic principles of plant breeding, which aim to foster a deep understanding of breeding concepts and develop critical thinking skills: 1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Simulation-based learning. 5. Practical training. 6. Self-directed learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	4	Explain the importance and historical development of pla breeding.	Introduction to Pl Breeding: Hist and Importance	Lecture, presentation, illustrations	Questions a answers exercise solutions
2	4	Describe basic genetic laws and th relevance to plant improvement.	Genetic Principles Plant Breeding	Lecture, presentation, illustrations	Questions a answers exercise solutions
3	4	Analyze the concep of genetic variation and how it is measured.	Variation a Heritability	Lecture, presentation, illustrations	Questions a answers exercise solutions
4	4	Differentiate betwe mass and pure-line selection and apply their principles.	Selection Metho Mass and Pure L Selection	Lecture, presentation, illustrations	Questions a answers exercise solutions
5	4	Describe hybridization techniques and thei objectives.	Hybridization: Techniques a Objectives	Lecture, presentation, illustrations	Questions a answers exercise solutions
6	4	Explain heterosis a the effects of self-pollination and cro pollination.	Inbreeding a Heterosis	Lecture, presentation, illustrations	Questions a answers exercise solutions
7	4	Apply breeding strategies for self- and cross-pollinate crops.	Breeding Self- a Cross-Pollinated Crops	Lecture, presentation, illustrations	Questions a answers exercise solutions
8	4	Evaluate the use of mutation as a breeding tool and i advantages/risks.	Mutation Breeding	Lecture, presentation, illustrations	Questions a answers exercise solutions
9	4	Explain the princip of backcrossing an recurrent selection.	Backcrossing a Recurrent Selectio	Lecture, presentation, illustrations	Questions a answers exercise solutions
10	4	Describe polyploid and its applications plant improvement	Polyploidy in Pl Breeding	Lecture, presentation, illustrations	Questions a answers exercise solutions
11	4	Analyze breeding methods for resistance to biotic and abiotic stress.	Resistance Breed (Biotic and Abio Stress)	Lecture, presentation, illustrations	Questions a answers exercise solutions

12	4	Apply concepts of Distinctness, Uniformity, and Stability in cultivar testing.	Testing a Evaluation of N Varieties	Lecture, presentation, illustrations	Questions a answers exercise solutions
13	4	Explain the role of molecular markers modern breeding programs.	Use of Molecu Markers in Pl Breeding (Intro)	Lecture, presentation, illustrations	Questions a answers exercise solutions
14	4	Relate theoreti knowledge practical cases a field applications.	Field Visit / C Studies	Lecture, presentation, illustrations	Questions a answers exercise solutions
15	4	Summarize and evaluate knowledg and skills gained during the semeste	Final Review a Assessment	Lecture, presentation, illustrations	Questions a answers exercise solutions

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricu books, if any)	The vocabulary prescribed by the Ministry of Hig Education and Scientific Research
Main references (sources)	Sleper, D.A., and Poehlman, J.M. (2006). *Breeding Field Crops*. 5th Edition. Fehr, W.R. (1987). *Principles of Cultivar Development*. Acquaah, G. (2012). *Principles of Plant Genetics and Breeding*.
Recommended books and references (scientific journals, reports...)	Google scholar, researcher gate
Electronic References, Websites	All sites that provide reliable sources and also artific intelligence tools

Course Description Form

1. Course Name:
Metabolism
2. Course Code:
PMNP 402
3. Semester / Year:
Autumn/Fourth
4. Description Preparation Date:
1/7/2025
5. Available Attendance Forms:
Physical presence in classrooms and college laboratories
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours / 2 units
7. Course administrator's name (mention all, if more than one name)

8. Course Objectives	
Course Objectives	1- Understanding the basic metabolic processes in plants 2- Study basic metabolic pathways such as photosynthesis and respiration. Cellular, and synthesis of secondary compounds 3- To focus on secondary metabolism and its applications. 4- Technical applications in the analysis of metabolic compounds 5- Linking plant metabolism to industry and practical applications

9. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

10. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to Plant Metabolism	Knowing the concept of plant metabolism Finding the paths Main metabolism in plants	Introductory theoretical lecture	Oral and discussion tests with students
2	1	Photosynthesis (light stage)	Learn about the mechanism of light energy absorption. Light reactions in chloroplasts	Theoretical lecture + presentations with pictures and videos	Reports on the lecture topic

3	1	Photosynthesis (Calvin cycle)	Understanding the process of carbon dioxide fixation Stages of the Calvin cycle and saccharification Factors affecting the efficiency of photosynthesis	lecture + interactive lecture in which students participate	Written test
4	1	Cellular respiration (glycolysis)	Learn how glucose is converted to pyruvate ATP and NADH production enzymatic regulation of glycolysis	theoretical lecture	Presentations made by students in groups
5	1	Cellular respiration (Krebs cycle)	Knowing how to oxidize pyruvate . Understand the reactions of the Krebs cycle and the production of NADH and FADH2 . The connection between the Krebs cycle and the respiratory chain	theoretical lecture	Report submitted by the student
6	1	Cellular respiration (Krebs cycle)	Explain electron transport and ATP production . Knowing how ATP works Synthese . Knowing the role of respiratory chain inhibitors	lecture + presentations with pictures and videos	Written test (semester)
7	1	Introduction to Secondary Metabolism	Identify secondary metabolism and its importance in medicinal plants. Knowing the classification of secondary compounds (alkaloids , terpenes , phenols). Knowing the functions of secondary compounds in plants	theoretical lecture	Oral and interactive tests with students
8	1	Aromatic amino acid composition	Identify the pathway for amino acid formation Knowing the most important plants that contain aromatic amino acids	Theoretical lecture + explanation with pictures and video	Short test
9	1	Turbine	Identifying the pathways of	theoretica	Analytical

		manufacturing and steroids	terpene formation and steroids Knowing the most important plants that contain terpenes and steroids	l lecture	report for each group of students
10	1	alkaloids manufacturing	Knowing the pathway of alkaloid production in plants Learn about the most prominent plants that contain alkaloids	theoretical lecture	Short test
11	1	regulation of plant metabolism	Identify hormonal control of metabolism (auxin , gibberellin). Knowing the effect of environmental stress (drought, salinity) on metabolism. metabolic adaptation mechanisms	theoretical lecture	a report
12	1	regulation of plant metabolism	Integration of primary and secondary metabolic pathways. How changes in one path affect another. Examples of medicinal plants with complex metabolic pathways	theoretical lecture	a report
13	1	Modern techniques in the study of metabolism	Learn about the devices and methods used in the study of plant metabolism.	theoretical lecture	Written midterm test
14	1	Industrial applications of plant metabolism	Learn about the devices and methods used in the study of plant metabolism. How to extract active compounds from medicinal plants. How to improve essential oil production by modifying metabolism. Case Studies: Plants of Economic Importance	theoretical lecture	Presentations made by the student
15	1	General review and evaluation	Summarize the most important metabolic pathways. Discussion of practical	theoretical lecture	Oral and discussion tests with students

			applications Answering students' questions and preparing for the final exam		

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Learn about safety rules	Learn about safety rules	Lab visit	Oral discussion with students
2	2	Handling basic tools	Handling basic tools	Chlorophyll extraction using a spectrophotometer in the laboratory	Writing a report on the experiment by the student
3	2	Measurement of chlorophyll a and b concentrations	Measurement of chlorophyll a and b concentrations		Writing a field report on the experiment and observations
4	2	Study its relationship to photosynthesis	Study its relationship to photosynthesis	Measuring changes in biomass of plants growing in the field	Writing a report on the experiment by the student
5	2	Determine the effect of light intensity	Determine the effect of light intensity		Writing a report on the experiment by the student
6	2	rate of photosynthesis	rate of photosynthesis	laboratory experiment	Writing a report on the experiment by the student
7	2	oxygen consumption measurement	oxygen consumption measurement	laboratory experiment	semester exam
8	2	Study the effect of heat	Study the effect of heat	laboratory experiment	Writing a report on the experiment by the student
9	2	Soluble	Soluble sugars	Comparison of	Writing a report on

		sugars analysis	analysis	plant compound extraction methods using the coxsorptiostat And the clowns in the lab	the experiment by the student
10	2	Turkish account Z	Turkish account Z	laboratory experiment	Writing a report on the experiment by the student
11	2	Hydrogen peroxide degradation measurement	Hydrogen peroxide degradation measurement	laboratory experiment	Writing a report on the experiment by the student
12	2	optimal conditions	optimal conditions	laboratory experiment	Writing a report on the experiment by the student
13	2	Comparison of extraction methods	Comparison of extraction methods	laboratory experiment	semester exam
14	2	Percentage calculation	Percentage calculation	laboratory experiment	Oral discussions between students + assigning students to record the readings
15	2	Total concentration estimation	Total concentration estimation	and video presentations and interactive screens	Post-test to interpret the results obtained in the experiment

12. Course Evaluation

1- Written semester exams (theoretical part) 60%
2- Written midterm exams (practical part) 10%
3- Daily written tests 10%
4- Student reports 10%
5- Student attendance 10%

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	" Plant Physiology and Development" (Taiz & Zeiger) Basic concepts in plant metabolism
Main references (sources)	Recent Scientific Papers
Recommended books and references (scientific journals, reports...)	University Course References
Electronic References, Websites	https://www.youtube.com /

Course Description Form

1. Course Name:					
Crop quality					
2. Course Code:					
PMNP 403					
3. Semester / Year:					
Autumn/Fourth Year					
4. Description Preparation Date:					
1/6/2025					
5. Available Attendance Forms:					
Physical presence in classrooms, laboratories and college fields					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 hours / 3 units					
7. Course administrator's name (mention all, if more than one name)					
8. Course Objectives					
Course Objectives	1. Understanding the quality standards of medicinal and aromatic crops 2. Study the factors affecting crop quality. 3. Learn quality analysis and evaluation techniques. 4. Identify local and international quality standards. 5. Linking quality to industrial and marketing applications				
9. Teaching and Learning Strategies					
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, fields , projects) 3- Practical demonstrations (live experiments)				
10. Course Structure (Theoretical vacobulary)					
Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	General introduction and overview of the concept of crop quality	Knowing the differen between quantitative and qualitative quality factors affecting Main quality (genetic, (environmental	theoretical lecture	Oral discussion with student
2	2	Local and international quality standards	Learn about local and international quality methods and standards for .crop quality	Digital lecture + and photo video presentation s	Writing a report on the lecture topic

3	2	Physical characteristics of crops	Learn how to use physical characteristics (color, smell, texture, size) to determine crop quality.	Theoretical lecture + physical observations of plants	Simple written exam
4	2	Chemical standards for crops	Use of chemical properties active compounds,) essential oils, alkaloids) to determine crop quality	Theoretical lecture + field observations of plant extract samples	Students present the lecture topic in groups.
5	2	Agricultural factors affecting crop quality	Knowing the effect of soil, irrigation and fertilization. The importance of harvest time Agricultural practices affecting crop quality	Theoretical lecture + presentations with pictures and videos	Simple written exam
6	2	Impact of post-harvest processes on quality	Learn about drying methods (solar, industrial, freezing). Learn about crop storage conditions	Theoretical lecture + scientific visit to plant drying factories	Writing a visit report
7	2	crop quality deterioration during storage	Know what oxidation is, microbial growth.	theoretical lecture	Quarterly written exam
8	2	Quality analysis methods	Learn about the most important methods of quality analysis (sensory and chemical)	Theoretical lecture + field visit and viewing of plant samples	Oral discussions with students
9	2	Quality standards in the pharmaceutical and aromatic industries	Knowing the requirements of pharmaceutical and herbal preparation factories Examples of product -due to non rejection conformity	Theoretical lecture + visit to a pharmaceutical and cosmetics factory	Writing a visit report
10	2	Quality and Marketing	Understand the relationship between quality, price, and marketing value. Case Study: Marketing Essential Oils in Global	theoretical lecture	Writing a report on the lecture topic

			Markets		
11	2	Contemporary challenges in crop quality	Knowing the impact of climate change on crop . quality Knowing the impact of crop water scarcity on quality and production quantities	theoretical lecture	Simple written exam
12	2	Quality-based pricing policies	Identify quality standards .and link them to prices	theoretical lecture	Writing a simple report on the lecture topic
13	2	Innovations in Quality	Learn about technological applications Learn about smart agriculture in quality control	theoretical lecture	Quarterly written exam
14	2	The future of the medicinal plant industry	Identifying the economic quality of cultivating and compounds extracting from medicinal plants	theoretical lecture	Simple writing test
15	2	Final review	Summarize the key .concepts Solve sample questions for .the final exam Open discussion on material topics	Open discussion lecture with students	Discussing student reports

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Laboratory Safety and Sampling Vegetarianism	Mastering laboratory safety rules Learn plant sampling methods random/syste) (matic	Short lecture on laboratory safety Practical application by students of taking plant samples	Evaluating student performance during sampling
2	2	Harvesting Medicinal –Plants Timing and	Knowing the optimal time to harvest each plant	Laboratory and field lecture	Writing a report on collecting and harvesting plant samples

		Method	according to the active ingredient		
3	2	Identify the economic parts of the plant	Distinguishing between the in parts used medicinal and aromatic plants	Laboratory and field lecture	Write a report on the plant parts used in preparing medicinal and aromatic materials in .each plant
4	2	Sensory and visual evaluation	Distinguishing external characteristics ,color, shape) (smell Use of sensory measurement tools	Display plant specimens of different quality Work in groups to fill out the .evaluation forms	Report showing the differences between the samples
5	2	Chemical evaluation	Chemical Specifications Discrimination	Display plant samples with different chemical contents	Report showing the differences between the samples
6	2	Moisture content measurement	Mastering the use of the laboratory oven Calculating humidity mathematicall y	Explanation of the convection oven method (10 (minutes Divide students into groups (3 (students/group Practical application with data recording	Comparing student results with standard values
7	2	Total ash estimation	Understanding the relationship between ash content and crop quality Mastering the use of sensitive scales	View a video demonstration (5 (minutes Practical application with recording weight before and after burning Discussion and interpretation of results	Writing a report on the practical experience
8	2	Extraction of essential oils	Knowing how to install a water	Extraction experiment using a Clevenger	Simple written test

			distillation device	apparatus	
9	2	Analysis of the physical properties of oils	Proficiency in the use of optical devices	Practical application experiment for measuring density	Writing a report about the experiment
10	2	Detecting fraud	Knowing how to detect foreign materials Determine the percentage of fraud	Analysis of suspicious samples light microscope	Written midterm test
11	2	Analysis of active compounds	Knowing how to separate compounds active compounds	Apply the method Chromatography In the lab Interpretation of results	Discuss the results with the .students
12	2	Packaging techniques	Learn how to fill and package extracted .products	Field lecture + laboratory	Practical test in packaging
13	2	Extract quality analysis	Knowing the quality standards for extracts	Laboratory lecture laboratory + experiment	Written midterm test
14	2	Integrated application project	Learn how to active produce ingredients from plant .parts	Practical application from seed to field product	Writing a comprehensive report on the results of the operation
15	2	Comprehensive review	Review all the topics you .have studied	Discussion lecture	Discussing reports student

12. Course Evaluation

1- Written semester exams (theoretical part) 60%
2- Written midterm exams (practical part) 10%
3- Daily written tests 10%
4- Student reports 10%
5- Student attendance 10%

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Medicinal and Aromatic Plants:

	Cultivation and Quality" - Dr. Mohamed Fathy Ibrahim
Main references (sources)	" Journal of Medicinal Plants Research "
Recommended books and references (scientific journals, reports...)	Journal of Agriculture and Biochemistry
Electronic References, Websites	https://www.youtube.com /

Course Description Form

1. Course Name:
Auto analysis
2. Course Code:
PMNP 404
3. Semester / Year:
Fourth
4. Description Preparation Date:
1/7/2025
5. Available Attendance Forms:
Physical presence in classrooms and college laboratories
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours / 2 units
7. Course administrator's name (mention all, if more than one name)

8. Course Objectives	
Course Objectives	1. Understand the principles and applications of modern analytical techniques 2. Develop practical skills in operating instruments 3. Analyze and evaluate the quality of medicinal and aromatic plants 4. Interpret analytical data and draw conclusions 5. Apply laboratory safety and ethics standards

9. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

10. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to Botanical Analysis	Introducing students to the concept of botanical analysis and its importance in the study of medicinal and aromatic plants.	Lecture + group discussion	Participate in the discussion + short questions
2	1	The basic chemical components of plants	Identify the basic chemical compounds in plants carbohydrates, proteins, fats,) .etc).	Presentation + Plant Examples	Short test multiple) choice)
3	1	Secondary compounds in medicinal plants	Understanding the role of secondary compounds (alkaloids , flavonoids , terpenes) in therapeutic properties.	Case study + analysis of typical plants	Short report on a specific plant

4	1	Methods of extracting plant compounds	Learn about different methods of extracting compounds (e.g., distillation, solvent extraction).	Practical video presentation + theoretical explanation	Panel discussion + open questions
5	1	Chromatographic Analysis Basics))	Understand the principles of chromatography and its applications in the separation of plant compounds.	Theoretical explanation + practical examples	Short written test
6	1	Types of chromatography(TLC, HPLC, GC)	Distinguish between types of chromatography and their uses in plant analysis.	Comparison of types + practical applications	Evaluation through participation in solving activities
7	1	Spectroscopy (UV and Visible)	Understand the basics of spectroscopy and its application in the identification of plant compounds.	Demonstrate laboratory experiments virtual if) necessary)	Analytical report
8	1	**Midterm review and discussion**	Review basic concepts and correct common mistakes.	Interactive session + questions and exercises	Midterm exam
9	1	Infrared (IR) spectroscopy	Learn how to use infrared radiation to analyze the chemical structure of compounds.	Real spectral data analysis	Sample analysis and report writing
10	1	Mass Spectrometry	Understand the basics of mass spectrometry and its role in determining the molecular weight of compounds.	Case studies	Short quiz + group discussion
11	1	Rapid phytochemi	Learn simple chemical tests to detect compounds (such as	Virtual or real	Evaluating students'

		cal tests	alkaloid tests).	experienc es	performance in practical application
12	1	Quality control in medicinal plant analysis	Understanding quality control standards in plant analysis (e.g., standard specifications).	Study global standards such as) WHO)	Group discussion + participation evaluation
13	1	Industrial applications of plant analysis	Linking plant analysis to pharmaceutical and aromatic industries.	Guest lecture industry) expert if possible)	Industrial application report
14	1	Challenges and Recent Research in Botanical Analysis	Introducing students to the latest research and challenges in the field of plant analysis.	Display simplified scientific papers	Discussion of a scientific article
15	1	**Final review and summative assessment**	Summarize the scientific content and evaluate students' comprehension of the material.	Q&A session + comprehe nsive review	Final exam written or) oral)

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction to Laboratory Analysis of Plants	Introducing students to the basics of laboratory analysis, its tools, and its importance in the study of medicinal plants.	- Presentation lab tour +. - Open discussion.	Student participation in the discussion.
2	2	Plant sampling and preparation	Learn how to collect and prepare plant samples for analysis.	- Practical explanation demo)). - Practical application by students.	'Evaluating students performance during practical application
3	2	Morphologic al analysis of plants	Distinguishing the morphological	- Use microscopes and plant	A report summarizing the observations.

			characteristics of medicinal plants (leaves, flowers, roots).	specimens. - Draw observations.	
4	2	Detection of primary compounds (alkaloids)	Learn the methods of detecting alkaloids in plant extracts.	- Chemical experiments (Mayer's reagent , Wagner's). - Analysis of the results.	Evaluate the accuracy of the recorded results.
5	2	Detection of glycosides	Understanding the methods of analysis of cardiac glycosides and flavonoids.	- Experiments using specific reagents -Keller) Kleiani).	Short test about the steps.
6	2	of Analysis volatile oils	Learn techniques for isolating and identifying volatile oils distillation,) chromatograph y).	- Steam distillation experiment. - Using GC device.	Report on the results .
7	2	Detection of tannins	distinguish tannins And its qualitative tests .	- Experiments using reagents ferric) chloride).	Discuss the results collectively.
8	2	**term -Mid evaluation**	Assess students' understanding of the practical skills covered.	- Practical test analysis of an) unknown sample).	Practical test (20% of the grade).
9	2	paper chromatogra phy(TLC)	Learn to separate plant compounds usingTLC.	- Practical application on plant extracts. - Interpretation of results.	Evaluate the accuracy of the results.
10	2	Gas chromatogra phy(GC)	Understand the working principle ofGC in the analysis of volatile oils.	- GC device viewing. - Data analysis .	Answer analytical questions.
11	2	UV-Vis spectrophoto metry	Learn to identify plant compounds using spectra.	- Analyze samples using the device. - Compare	Technical report.

				results.	
12	2	Purity tests moisture,) ash)	Learn to measure the purity of plant samples moisture, total) ash, insoluble ash).	- Practical experiments oven, stove)).	Evaluate the accuracy of calculations
13	2	Applications on the analysis of plant extracts	Apply all techniques to a complete plant sample.	- Group work comprehensiv) e sample analysis).	Display the results and create a report.
14	2	Quality Assurance in Botanical Analysis	Understanding quality standards (GMP ,ISO) in plant analysis.	- Case studies. - Discussion of laboratory ethics.	Short written test.
15	2	**Final evaluation**	Overall assessment of practical skills.	- Practical test analysis of an) unknown sample + interpretation of results).	Practical test (30% of the grade).

12. Course Evaluation
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%

13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"**Instrumental Methods of Analysis" – Hobart H. Willard**
Main references (sources)	**United States Pharmacopeia (USP**.–
Recommended books and references (scientific journals, reports...)	**Journal of Ethnopharmacology**
Electronic References, Websites	**https://www.youtube.com**/

Course Description Form

1. Course Name:
Plant Breeding and Improvement 2
2. Course Code:
PMNP 405
3. Semester / Year:

2024 – 2025
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
My Presence, Online
6. Number of Credit Hours (Total) / Number of Units (Total)
60
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

Course Objectives	By the end of the course, the student is expected to be able to: 1. Equip students with advanced knowledge of methods and techniques used in breeding field and horticultural crops. 2. Understand the genetic principles underlying hybridization and trait improvement programs. 3. Apply techniques of genetic variance analysis in selection and breeding programs. 4. Learn the theories explaining heterosis (hybrid vigor) and methods for its measurement. 5. Understand hybrid production systems, synthetic varieties, and how to evaluate their performance in different environments. 6. Study breeding techniques for vegetatively propagated plants and their genetic improvement. 7. Distinguish between general and specific combining ability and apply them for parent selection. 8. Understand strategies for breeding resistance to diseases and insect pests. 9. Recognize the role of chromosomal duplication and genetic mutations in enhancing diversity and crop improvement. Explore the applications of genetic engineering and gene trans techniques in modern plant breeding programs

9. Teaching and Learning Strategies

Strategy	strategies for teaching the basic principles of plant breeding, which aim to foster a deep understanding of breeding concepts and develop critical thinking skills: 1. Dialogue- and discussion-based learning. 2. Brainstorming. 3. Collaborative learning. 4. Simulation-based learning. 5. Practical training. 6. Self-directed learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Analyzing ge frequency using Hardy-Weinberg law	Analyzing ge frequencies using Hardy-Weinberg law	Lecture, presentation, illustrations	Questions a answers exercise solutions
2	4	Identifying import genetic traits in pl breeding programs.	Identifying key gene traits in plant breed programs.	Lecture, presentation, illustrations	Questions a answers exercise solutions
3	4	Explaining a estimating hybrid vig (heterosis) us genetic theories.	Interpreting a estimating hybrid vig (heterosis) us genetic theories.	Lecture, presentation, illustrations	Questions a answers exercise solutions
4	4	Applying differ hybridization metho in self-pollinated a cross-pollinated crop	Applying varie hybridization metho in self-pollinated a cross-pollinated crop	Lecture, presentation, illustrations	Questions a answers exercise solutions
5	4	Evaluating performance of hybr and synthetic variet and predicting th yield.	Evaluating performance of hybr and synthetic varieti and predicting th yield.	Lecture, presentation, illustrations	Questions a answers exercise solutions
6	4	Recognizing methods of breed vegetatively propagated plants.	Understanding methods of breed vegetatively propaga plants.	Lecture, presentation, illustrations	Questions a answers exercise solutions
7	4	Analyzing compone of genetic variance a calculating heritabili	Analyzing compone of genetic variance a calculating heritabilit	Lecture, presentation, illustrations	Questions a answers exercise solutions
8	4	Estimating general a specific combin abilities a interpreting the resul	Estimating general a specific combin ability (GCA and SC and interpreting results.	Lecture, presentation, illustrations	Questions a answers exercise solutions
9	4	Designing breed programs to impro resistance to disea and pests.	Designing breed programs for improv resistance to disea and pests.	Lecture, presentation, illustrations	Questions a answers exercise solutions
10	4	Utilizing chromoso doubling and mutatio in culti development.	Utilizing chromosor duplication and induc mutations in culti development.	Lecture, presentation, illustrations	Questions a answers exercise solutions

11	4	Applying gene engineering tools a gene trans techniques.	Applying gene engineering tools a gene trans techniques.	Lecture, presentation, illustrations	Questions a answers exercise solutions
12	4	Comparing differ plant breeding meth in terms of efficie and outcomes.	Comparing differ breeding methods terms of efficiency a outcomes.	Lecture, presentation, illustrations	Questions a answers exercise solutions
13	4	Utilizing gene banks improve pl populations.	Utilizing gene banks improve gene populations.	Lecture, presentation, illustrations	Questions a answers exercise solutions
14	4	Understanding proge testing techniques a integrating theoreti and practical aspects	Understanding concept of proge testing in pl breeding, importance, a comparison with ot breeding methods.	Lecture, presentation, illustrations	Questions a answers exercise solutions
15	4	Learning inbreed and outbreed methods for pl populations.	Breeding pl populations throu inbreeding a outbreeding approaches, and us genetic informat databases.	Lecture, presentation, illustrations	Questions a answers exercise solutions

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	The vocabulary prescribed by the Ministry Higher Education and Scientific Research
Main references (sources)	Sleper, D.A., and Poehlman, J.M. (2006). *Breeding Field Crops*. 5th Edition. Fehr, W.R. (1987). *Principles of Cultivar Development*. Acquaah, G. (2012). *Principles of Plant Genetics and Breeding*.
Recommended books and references (scientific journals, reports...)	Google scholar, researcher gate
Electronic References, Websites	All sites that provide reliable sources and a artificial intelligence tools

Course Description Form

1. Course Name:
Medicinal plant pests
2. Course Code:
PMNP 406
3. Semester / Year:

Fourth					
4. Description Preparation Date:					
1/6/2025					
5. Available Attendance Forms:					
Physical presence in classrooms and college laboratories					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 hours / 3 units					
7. Course administrator's name (mention all, if more than one name)					
8. Course Objectives					
Course Objectives	1. Understanding the types of pests and diseases that affect medicinal plants 2. Analysis of the impact of pests on the quality of active ingredients and synthesis of secondary compounds. 3. Learning integrated pest control methods (organic and chemical) 4. Applying pest prevention principles in sustainable agriculture 5. Linking theoretical knowledge to practical applications				
9. Teaching and Learning Strategies					
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)				
10. Course Structure (Theoretical vacobulary)					
Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction to Medicinal Plant Pests	Understanding the studying importance of medicinal plant pests Identifying pest types and their damage	Theoretical lecture + discussion	Safiya's participation
2	2	Classification of medicinal plant pests	Distinguish between pest types (insect, fungal, (.bacterial, etc the Understanding characteristics of each group	Lecture + Visual Presentation	Reports on the lecture topic
3	2	Insect pests of medicinal (plants (1	Identify the most important harmful insects Study of its life cycle and its effect on the plant	Case studies + illustrations	Simple written test
4	2	Insect pests of medicinal (plants (2	Analysis of routes of injury and economic damage Discuss practical examples (e.g., manna, borer)	Workshop + insect samples	Presentations made by students in groups

5	2	Fungal diseases of medicinal plants	Understanding the types of pathogenic fungi Study of infection symptoms and methods of spread	Lecture + Lab Experiments Data) (Presentation	Report submitted by the student
6	2	Bacterial and viral diseases	between Distinguishing bacterial and viral diseases	Scientific videos + discussion	Written test (semester)
7	2	Animal pests rodents,) (birds	insect -Identifying non pests and their impact	Case study + scientific research	Oral and interactive tests with students
8	2	Midterm review	Comprehensive review of previous content	Panel discussions + Q&A	Short written test
9	2	Methods of diagnosing pests	Learn pest diagnosis (methods (laboratory, field	My lab work real + samples	Analytical report for each group students of
10	2	Chemical pest control	Pesticide use evaluation	Lecture + Research Analysis	Short test
11	2	Biological and agricultural control	Study of natural enemies	Workshop + applied projects	a report
12	2	Integrated Pest Managemen) tIPM (	Understanding Integrated Pest Management Strategies	Global case studies	a report
13	2	The impact of climate change on pest spread	Linking environmental changes to pest spread	Lecture + discussion panels	Written midterm test
14	2	Specific Medicinal Plant Pests Case) (Study	Apply knowledge to specific plants (e.g., (thyme, mint	Student presentations	Presentations made by the student
15	2	Final review and exam	Summary of basic concepts	Interactive session +	Applied projects

		preparation		open questions	

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Learn about safety rules	Understanding pest types and their economic importance	+ Lecture Discussion + Sample Presentation	Participate in the discussion Preliminary report
2	2	Handling basic tools	Distinguish between harmful insect species and their effects on medicinal .plants	Examination of live/dried samples under a microscope	Drawing and Labeling Samples Short Test
3	2	Measurement of chlorophyll a and b concentration s	Analysis of the life cycle of insects and their direct .damage	Group work + case analysis	Practical report presentation +
4	2	Study its relationship to photosynthes is	Diagnosis of - fungal diseases and their association with environmental .conditions	Laboratory experiments (isolation of fungi)	Diagnostic test lab report +
5	2	Determine the effect of light intensity	Understand - the difference between bacterial and viral .symptoms	Preparing microscopic slides analyzing the + results	Slide Evaluation Answer Written Questions
6	2	rate of photosynthes is	Identify - harmful nematodes , snails and .spiders	Soil test + samples under a microscope	Drawing + Illustrations Practice Test
7	2	oxygen	Application of	Group work +	Case Diagnosis

		consumption measurement	field and laboratory diagnostic .methods	application of diagnostic steps	Report + Group Discussion
8	2	Study the effect of heat	Assess students' understanding of basic diagnostic .skills	Practical test diagnostic) (samples	Midterm written test
9	2	Soluble sugars analysis	Preparation and use of natural enemies (e.g., .(predators	Laboratory experiment (raising (predatory insects	Experiment report + results analysis
10	2	Turkish account Z	Evaluating the effectiveness of pesticides and selecting the most appropriate ones for medicinal .plants	Data analysis + discussion of scientific papers	Panel discussion comparative + report on pesticides
11	2	Hydrogen peroxide degradation measurement	Design preventive plans (such as .(crop rotation	Practical application in the college field	drug plan -Anti design project
12	2	optimal conditions	Analyze pest problems of a specific plant and suggest .solutions	Group work + field research	Presentation + Final Report
13	2	Comparison of extraction methods	Linking theoretical knowledge to industrial .applications	Field visits + interviews with specialists	Visit Report + Participation Evaluation
14	2	Percentage calculation	Assessing the ability to apply knowledge to life -real .problems	Student presentations + group discussion	Project Evaluation Content +) (Presentation
15	2	Total concentration estimation	Measuring the student's diagnostic and analytical .ability	Practical Test (Pest Diagnosis + (Problem Solving	Applied projects

12. Course Evaluation	
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%	
13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Required textbooks
Main references (sources)	(Main References (Sources
Recommended books and references (scientific journals, reports...)	books and references Recommended (...scientific journals, reports)
Electronic References, Websites	Electronic references and websites

Course Description Form

1. Course Name:
Biomass Chemistry
2. Course Code:
PMNP407
3. Semester / Year:

Fourth					
4. Description Preparation Date:					
1/6/2025					
5. Available Attendance Forms:					
Physical presence in classrooms and college laboratories					
6. Number of Credit Hours (Total) / Number of Units (Total)					
5 hours / 3 units					
7. Course administrator's name (mention all, if more than one name)					
8. Course Objectives					
Course Objectives	1. Understanding the chemical composition of plant materials 2. Identify the compounds responsible for therapeutic efficacy and odor. 3 . Mastering techniques for extracting and analyzing active ingredients 4 . Determine the optimal conditions for extracting oils and active compounds 5 . Relating chemical properties to industrial applications				
9. Teaching and Learning Strategies					
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)				
10. Course Structure (Theoretical vacobulary)					
Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction to Biomass Chemistry Definition,) Importanc, (Applications	Understanding the basics of biomass and its uses in the pharmaceutical and energy industries	a lecture Group discussio n	Student participation in the discussion
2	2	Chemical composition of biomass carbohydrates,) lipids, proteins, (lignin	Analysis of the basic components of biomass and their chemical functions	theoretica l lecture Presentati on	A short report on the components of a particular plant
3	2	Chemical composition (2): Lignin, lipids, proteins in .biomasses	Analysis of the basic components of biomass and their chemical functions	theoretica l lecture Presentati on	A short report on the components of a particular plant
4	2	Chemical reactions in biomass: hydrolysis, oxidation, .condensation	Analysis of the basic interactions affecting the stability of .biomasses	Lecture + Interactiv e Exercises	Solving chemical problems
5	2	Methods of	Knowledge of	theoretica	Report on

		extracting bioactive compounds	appropriate extraction techniques for different types of biomass	l lecture	the lecture topic
6	2	Solvent extraction,) distillation, modern (methods	Identify solvents and equipment used in .extractions	theoretica l lecture	Solutions to practical exercises
7	2	Biomass to energy conversion fermentation,) (pyrolysis, biogas	Understanding the mechanisms of converting biomass into renewable .energy	theoretica l lecture	Small experiment presentation
8	2	Green Chemistry and Biomass	Linking biomass chemistry to green .chemistry principles	Lecture + Panel Discussio n	Short written test
9	2	Applications of biomass in the pharmaceutical -industry (plant (derived medicines	Determine how biomasses can be used in pharmaceutical .manufacturing	Show practical examples virtual + visits	Report on a drug derived from a plant
10	2	Applications of biochemical blocks in the pharmaceutical industry	Knowing the benefits of biomass applications in the pharmaceutical industry	theoretica lecture l Open discussio n	Effective Participation Evaluation
11	2	Midterm exam	Measuring students' level of comprehension of the first half of the .subject	Written test	Written midterm test
12	2	Analytical techniques for studying biomasses chromatography,) ,mass spectrometry HPLC (	Understanding bioassay tools and .interpreting results	Virtual Lab + Simulatio n	Laboratory data analysis
13	2	Chemical reactions in biomass ,enzymatic reactions) oxidation and (reduction	Analysis of major chemical reactions in .biological systems	a lecture Interactiv e exercises	Quarterly written exam
14	2	Biomasses in the perfume and essential oil industry	Understand the role of biochemistry in the extraction of .perfumes and oils	Worksho p + Real Samples	Presentation on vegetable oils

15	2	Environmental and economic challenges of biomass use	Discuss the pros and cons of using .biomass in industry	Student debate + -mini research	Debate performance evaluation

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	3	Laboratory safety and instrument identification	Understand safety rules and basic tools in use .biomass analysis	Practical presentation + tool training	test and discussion with and among students
2	3	Preparation of plant samples drying,) grinding, (preservation	Preparation of plant samples drying, grinding,) (preservation	Practical application in the laboratory	Quality assessment of prepared samples
3	3	Extraction of basic compounds water, organic) (solvents	Implementation of extraction of -polar and non polar compounds .from biomass	Individual experiences Data recording	Report explaining the steps and results
4	3	Estimation of total sugars content (Antron (method	Measurement of sugar concentration in plant samples using spectrophotomete .rs	laboratory experiment	Experimental report
5	3	Dietary fiber) analysisNDF ,ADF (	Determination of fiber content in biomass using standard .methods	laboratory experiment	Experimental report
6	3	Extraction of essential oils steam) (distillation	Separation of essential oils from plants and evaluation of extraction .efficiency	Application lab + distillation device	Calculating oil yield and purity
7	3	Analysis of phenolic compounds	Measurement of phenolic compounds as an	laboratory experiment	Simplified exam written

		-Follin) Ciocalteau (method	indicator of antioxidant .activity		
8	3	Enzyme activity assessment amylase,) (cellulase	Understand the role of enzymes in biomass decomposition and measure their .activity	Enzyme activities + colorimetry	Simplified written exam
9	3	Thermal) analysisTGA ,DSC of (biomass	of the Study thermal decomposition of biomass and determination of moisture and ash .content	Thermal analysis devices + data analysis	Interpretation of thermal curves
10	3	Chromatograph) y applications TLC for separation of (compounds	Separation of plant compounds using thin layer and determination of Rf .	Lab work + platelet analysis	Evaluate the accuracy of the chapter and calculations
11	3	Biofuel production converting) sugars into ethanol by (fermentation	Implementation of sugar fermentation process to produce ethanol and measuring .the efficiency	Fermentation experiment + alcohol measurement	Ethanol yield calculation
12	3	Lignin analysis Clason) (method	Estimation of lignin content in plant samples using chemical .methods	Advanced Lab Calibration +	Report explaining the steps and results
13	3	Biomass quality assessment moisture, ash,) (volatile matter	Analysis of the physicochemical properties of biomass and its .effect on quality	Multiple experiments + accurate measurements	Sample comparison table
14		Design an integrated practical project optional:) extraction, analysis,	Apply acquired skills in a project that combines different .technologies	Teamwork + Supervision	Written project report

		(applications			
15	3	Project presentation and final evaluation	Presenting results and discussing challenges and solutions in practical .experiments	Presentations Group + Discussion	Presentation and discussion evaluation

12. Course Evaluation
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%

13. Learning and Teaching Resources	
Fundamentals of biomass chemistry and its applications in medicinal plants. Author: Shilin Chen, et al .	" Plant Physiology and Development" (Taiz & Zeiger) Basic concepts in plant metabolism
Journal of Agricultural and Food Chemistry : Research on the analysis of biomasses and active compounds.	Recent Scientific Papers
Food and Agriculture Organization (FAO): Reports on sustainable biomass chemistry .	University Course References
https://www.youtube.com /	https://www.youtube.com /

Course Description Form

1. Course Name:
Biofertilizers
2. Course Code:
PMNP 451
3. Semester / Year:

Fourth					
4. Description Preparation Date:					
1/6/2025					
5. Available Attendance Forms:					
Physical presence in classrooms and college laboratories					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 hours / 2 units					
7. Course administrator's name (mention all, if more than one name)					
8. Course Objectives					
Course Objectives	1. Understanding the basics of biofertilizers and their role in agriculture 2. Enhance students' knowledge of the interactions between microorganisms a plants. 3 . Application of biofertilizer production and use technologies 4 . Linking biofertilizers to improving the quality of medicinal and aroma plants 5 . Promoting awareness of sustainable agriculture and environmental protecti				
9. Teaching and Learning Strategies					
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)				
10. Course Structure (Theoretical vacobulary)					
Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to Plant Metabolism	Understanding the concept of biofertilizers and their importance in agriculture	Interactive lecture Presentation	Participate in the discussion
2	1	Photosynthesis (light stage)	Distinguish between the types of biofertilizers and their functions	theoretical lecture	Written report on types of fertilizers
3	1	Photosynthesis (Calvin cycle)	Understanding the between interactions fertilizers and roots	theoretical lecture	A simple written test
4	1	Cellular respiration (glycolysis)	Identify the most important enriching bacteria	Lecture + presentation of microscopic specimens .(photos)	Participation evaluation
5	1	ؤCellular	Understanding the	theoretical	Student

		respiration (Krebs cycle)	symbiotic relationship between fungi and plants	lecture	report submission
6	1	Cellular respiration (Krebs cycle)	Understanding the use of Azolla as a biofertilizer	theoretical lecture	Evaluating students' participation in the discussion
7	1	Introduction to Secondary Metabolism	Learn about the role of algae in improving soil	theoretical lecture	Written midterm test
8	1	Aromatic amino acid composition	the steps Understanding of fertilizer production	theoretical lecture Video presentation	Report on production steps
9	1	Turbine manufacturing and steroids	Analysis of fertilizer success factors ,humidity, temperature) pH (	theoretical lecture	Evaluating student discussion in lecture
10	1	alkaloids manufacturing	Linking fertilizers to sustainable agriculture	theoretical lecture Photo and video presentation	A simplified report on the lecture topic
11	1	regulation of plant metabolism	Understanding the effect fertilizers on the of quality of medicinal plants	theoretical lecture	Writing a report
12	1	regulation of plant metabolism	Analysis of the pros and cons of each type	theoretical lecture	Written semester exam
13	1	Modern techniques in the study of metabolism	Discussing the obstacles to the use of fertilizers	Lecture + presentation of recent research	Student assessment through participation
14	1	Industrial أأأأفاا applications of plant metabolism	Analysis of successful international experiences	Student presentation (groups)	Evaluation of presentations
15	1	General review and evaluation	Preparing for the final exam	Question and Answer Session	Student participation

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or	Required	Learning method	Evaluation

		subject name	Learning Outcomes		method
1 ע	2	Introduction to the laboratory and its tools	Learn basic - laboratory tools and safety .rules	Practical presentation .Lab tour	Short oral test on safety and .tools
2	2	Preparing a growing medium for biofertilizers	Learn how to - prepare suitable culture media for fertilized bacteria and .fungi	Theoretical - explanation + practical application preparing media) such asPDA, NA .(	Evaluating students' performance in preparation
3	2	Isolation of rhizobia bacteria from legume roots	Knowing how to isolate fixing -nitrogen bacteria from the root nodules of leguminous plants	laboratory experiment Working in groups	Report showing the steps and results (with (pictures
4	2	Isolation of mycorrhizal fungi from soil	Learn techniques for isolating symbiotic fungi from soil .samples	Use of filtration and culture techniques on .selective media	Evaluation of isolated samples under the microscope
5	2	Microbial count in biofertilizers	Learn microbial enumeration methods	Practical - application using .series attenuators	Analyze data and prepare a table of results
6	2	Evaluation of the effectiveness of bacterial fertilizers on seed germination	Comparison of seed germination with/without bacterial .fertilizers	Comparative experience	Recording field readings
7	2	Evaluation of the effect of mycorrhizae on plant growth	Study of the effect of symbiotic fungi on the growth of medicinal plants	Growing plants in with/without pots .mycorrhizae	Measure biomass and visually document .results
8	2	Quality	Examine -	Use a light -	Written

		Analysis Microscopic) (Examination	commercial fertilizers under a microscope to ensure the presence of living .organisms	microscope to bacteria or observe .fungi	semester exam
9	2	Production of biofertilizer from agricultural waste (compost)	Converting organic waste into fertilizer using microorganism .s	Practical experiment mixing waste with) biostimulants and monitoring .(decomposition	Compost yield evaluation report
10	2	Measuring the effectiveness of fertilizers in improving soil fertility	Analysis of - changes in soil properties nitrogen,) phosphorus) after adding .fertilizers	Use of analytical - kits (e.g. pH meter , .(nitrogen tests	Compare the - results between groups + discuss .the conclusions
11	2	Applying fertilizers to medicinal plants (basil (or thyme	Evaluation of - the effect of fertilizers on the chemical of content medicinal .plants	Growing plants - with different treatments bacterial)vs fungal .(fertilizers	Data analysis - e.g.) measurement of .(volatile oils
12	2	Comparison between biological and chemical fertilizers field -mini) (experiment	Comparison - growth and of quality between plants treated with different .methods	Experiment in a - greenhouse or pots measure length,) .(weight, color	Present the - results in a final report with .graphs
13	2	Liquid fermented)) biofertilizer manufacturin g	Learn to - prepare a liquid fertilizer using stimulating microorganism .s	Fermentation of a - liquid medium such as molasses)) with selected .bacteria	Quality - assessment opacity, odor,) microbial .(count
14	2	Student Project Presentation Practical) Presentations (	Apply - knowledge in designing a experiment -self on .biofertilizers	Group work - designing an) experiment, collecting data, .(analyzing it	Evaluation of - the presentation methodology,) accuracy, .(creativity

15	2	Final Practical Exam + Review	Assessing students' understanding of the practical applications of biofertilizers	Practical test - e.g., identification) of microscopic organisms, data .(analysis	Evaluate - performance in required tasks accuracy,) .(speed, analysis

12. Course Evaluation
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%

13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Organic farming and biofertilizers Sayyid Arnaout-Dr. Muhammad Al
Main references (sources)	Journal of Plant Nutrition and Soil Science (Studies on soil fertility improvement).
Recommended books and references (scientific journals, reports...)	Food and Agriculture Organization(FAO): Reports on sustainable biofertilizers.
Electronic References, Websites	https://www.youtube.com /

Course Description Form

13. Course Name:
Tobacco technology
14. Course Code:
PMNP 452
15. Semester / Year:

Fourth	
16. Description Preparation Date:	
1/7/2025	
17. Available Attendance Forms:	
Physical presence in classrooms and college laboratories	
18. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours / 2 units	
19. Course administrator's name (mention all, if more than one name)	
20. Course Objectives	
Course Objectives	1. Understand the basics of tobacco cultivation and its agricultural practices. 2. Understanding harvesting and post-harvest processes 3. Tobacco processing and manufacturing 4. Quality Control and Evaluation 5. Economic and environmental aspects
21. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

22. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to the tobacco plant and its economic importance	Introducing students to the importance of tobacco as an economic crop and its industrial uses.	Lecture + group discussio n	Participate in the discussion
2	1	Botanical classificatio n and main types of tobacco	Distinguish between tobacco plant species and their characteristics.	Visual presentati on + plant samples	Short test objective) questions)
3	1	Environmen tal requirement s for tobacco cultivation	Understanding the climatic and soil factors suitable for tobacco cultivation.	Lecture + Climate Data Analysis	Written report on soil requirements
4	1	Tobacco seed propagation and nursery management	Learn seed propagation methods and tobacco nursery management.	Practical presentati on video) +) workshop	group presentation

5	1	Agricultural operations for tobacco cultivation	Study the steps of agriculture from plowing to harvesting.	Lecture + Case Study of a Model Farm	Solutions to practical exercises
6	1	Pests and diseases affecting tobacco	Identify the most important pests and ways to combat them.	Image display + case analysis	Short test
7	1	Irrigation and fertilization techniques in tobacco	Understanding optimal irrigation systems and fertilization programs.	Lecture + Spreadsheets	Analysis of a proposed fertilization schedule
8	1	Harvesting and drying tobacco leaves	Learn the stages of harvesting and drying and their impact on quality.	Explanatory video + discussion	Report on the drying stages
9	1	Tobacco processing and fermentation	Explaining the processing and fermentation processes to improve flavor and quality.	Lecture + laboratory models photos))	Theoretical test
10	1	Tobacco leaf classification and grading	Distinguishing the quality grades of tobacco leaves according to international specifications.	Show samples real or) pictures)	Classifying paper samples practical) activity)
11	1	Tobacco product manufacturing technology	Learn about cigarette production lines and other products.	Virtual Factory Tour Video))	Essay questions
12	1	Quality control in tobacco production	Understanding quality standards and laboratory testing.	Lecture + Quality Data Analysis	Case study solution
13	1	Health and environmental dimensions of tobacco production	Discuss the health and environmental impacts of tobacco cultivation and manufacturing.	Open discussion + scientific research	Submit a small research
14	1	Global Tobacco Marketing and Trade	Global tobacco market analysis and marketing strategies.	Lecture + Market Data Analysis	Marketing Project Groups))

15	1	General review and final evaluation	Summarizing key concepts and preparing for the final exam.	Q&A Session + Review	Theoretical exam optional/ess) ay)

12. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction to the tobacco plant and its economic importance	Introducing students to the importance of tobacco as an economic crop and its industrial uses.	Lecture + group discussion	Participate in the discussion
2	2	Botanical classification and main types of tobacco	Distinguish between tobacco plant species and their characteristics.	Visual presentation + plant samples	Short test (objective questions)
3	2	Environmental requirements for tobacco cultivation	Understanding the climatic and soil factors suitable for tobacco cultivation.	Lecture + Climate Data Analysis	Written report on soil requirements
4	2	Tobacco seed propagation and nursery management	Learn seed propagation methods and tobacco nursery management.	Practical presentation video) +) workshop	group presentation
5	2	Agricultural operations for tobacco cultivation	Study the steps of agriculture from plowing to harvesting.	Lecture + Case Study of a Model Farm	Solutions to practical exercises
6	2	Pests and diseases affecting tobacco	Identify the most important pests and ways to combat them .	Image display case analysis +	Short test
7	2	Irrigation and fertilization techniques in tobacco	Understanding optimal irrigation systems and fertilization	Lecture + Spreadsheets	Analysis of a proposed fertilization schedule

			programs.		
8	2	Harvesting and drying tobacco leaves	Learn the stages of harvesting and drying and their impact on quality.	Explanatory video + discussion	Report on the drying stages
9	2	Tobacco processing and fermentation	Explaining the processing and fermentation processes to improve flavor and quality.	Lecture + laboratory models photos))	Theoretical test
10	2	leaf Tobacco classification and grading	Distinguishing the quality grades of tobacco leaves according to international specifications.	Show samples real or) pictures)	Classifying paper samples (practical activity)
11	2	Tobacco product manufacturing technology	Learn about cigarette production lines and other products.	Virtual Factory Tour Video))	Essay questions
12	2	Quality control in tobacco production	Understanding quality standards and laboratory testing.	Lecture + Quality Data Analysis	solution Case study
13	2	Health and environmental dimensions of tobacco production	Discuss the health and environmental impacts of tobacco cultivation and manufacturing.	Open discussion + scientific research	Submit a small research
14	2	Global Tobacco Marketing and Trade	Global tobacco market analysis and marketing strategies.	Lecture + Market Data Analysis	Marketing Project Groups))
15	2	General review and final evaluation	Summarizing key concepts and preparing for the final exam.	Q&A Session Review +	Theoretical exam optional/essay))
13. Course Evaluation					

1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%	
14. Learning and Teaching Resources	
Required textbooks (curricular books, if ar	" -Tobacco Production and Manufacturing" Sayyid Arnaout or Dr. -Dr. Muhammad Al Ahmed Fouad Hassan, from specialized Arab references
Main references (sources)	Food and Agriculture Organization**(FAO) -** Reports on tobacco production, quality standards, and new technologies**.**
Recommended books and references (scientific journals, reports...)	**Journal of Tobacco Science and Technology –** Publishes research on ng tobacco productionimprovi**.**
Electronic References, Websites	**https://www.youtube.com** /

Course Description Form

1. Course Name:
Biological Control
2. Course Code:
PMNP 453
3. Semester / Year:

Fourth	
4. Description Preparation Date:	
1/6/2025	
5. Available Attendance Forms:	
Physical presence in classrooms and college laboratories	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
8. Course Objectives	
Course Objectives	1- Introducing students to the concept of bio-resistance and its importance in field of medicinal and aromatic plants. 2- Developing students' skills in analyzing and evaluating the biologi properties of medicinal and aromatic plants. 3- Enhancing students' understanding of the role of bio control in improving quality and productivity of medicinal and aromatic plants. 4- Enabling students to apply modern techniques in studying the biologi interactions of medicinal and aromatic plants. 5- Preparing students to benefit from bio-resistance in the fields of indust research and development of medicinal and aromatic plants.
9. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

10. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to the basic concepts of biocontrol	Introducing students to the importance of biocontrol and its application in .agriculture	Interactive lecture and group discussion	Oral participatio n in the discussion
2	1	Identify organisms used in biocontrol	Identify the types of beneficial organisms (such as bacteria, fungi, insects) .and their role in control	Visual lecture with pictures and video	Short report on the samples on display
3	1	Preparing a culture medium for beneficial organisms	how to prepare Learn appropriate media for growing organisms used in .resistance	Laboratory experiment preparing) culture (media	Student performanc e evaluation in the laboratory
4	1	Isolation of	Mastering object isolation techniques.	Laboratory experiment	Report explaining

		beneficial organisms from soil		microbe) isolation)	the isolation steps and results
5	1	Cultivation of beneficial organisms in the laboratory	Understand the correct methods of propagating organisms to ensure their effectiveness.	Microbe/insect propagation experiment	Short written test
6	1	Evaluation of the effectiveness of organisms against pathogens	Learn to design experiments to measure the effectiveness of organisms in inhibiting plant pathogens.	Lab experiment vs. useful	Analyze the results of the experiment .in a report
7	1	Biocontrol applications using fungi	Understanding the role of such as) fungi Trichoderma) in disease resistance.	Viewing samples under a microscope	Short test
8	1	Biocontrol applications using bacteria	Analysis of the role of bacteria.	Laboratory experiment	Laboratory report evaluation
9	1	Use of beneficial nematodes in biocontrol	Identify beneficial nematodes and their applications in pest control .	Lecture in the field and laboratory	Panel discussion -with mini presentation
10	1	Techniques for releasing beneficial organisms into the environment	Learn safe and effective methods for releasing organisms into the field.	Practical simulation + demonstration video	Written semester exam
11	1	Design of a field experiment for biocontrol	Apply knowledge in designing a field experiment to test the effectiveness of organisms .	Practical lecture in the laboratory	Short written test
12	1	Field visit to a field	Linking the theoretical aspect to the field reality to see practical applications.	Field visit + direct evaluation	Visit report with application

		application of biocontrol			analysis
13	1	Evaluation of the impact of environmental factors on beneficial organisms	effect Understanding the of (temperature, humidity, light) on beneficial organisms	laboratory experiment	Discussion of results and data analysis
14	1	Student Projects Creative) Applications)	Developing innovative ideas for employing biocontrol in organic agriculture.	Student presentations	Evaluating the creativity and scientific quality of the idea
15	1	General review and final evaluation	Assess students' understanding of practical .skills and basic concepts	Review Workshop + Comprehensive Questions	Written midterm exam

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Learn about safety rules	Understanding pest types and their economic importance	+ Lecture Discussion + Sample Presentation	Participate in the discussion Preliminary report
2	2	Handling basic tools	Distinguish between harmful insect species and their effects on medicinal .plants	Examination of live/dried samples under a microscope	Drawing and Labeling Samples Short Test
3	2	Measurement of chlorophyll a and b concentrations	Analysis of the life cycle of insects and their direct .damage	Group work + case analysis	Practical report presentation +

4	2	Study its relationship to photosynthesis	Diagnosis of - fungal diseases and their association with environmental .conditions	Laboratory experiments (isolation of fungi)	Diagnostic test lab report +
5	2	Determine the effect of light intensity	Understand - the difference between bacterial and viral .symptoms	Preparing microscopic slides analyzing the + results	Slide Evaluation Answer Written Questions
6	2	rate of photosynthesis	Identify - harmful nematodes , snails and .spiders	Soil test + samples under a microscope	Drawing + Illustrations Practice Test
7	2	oxygen consumption measurement	Application of field and laboratory diagnostic .methods	Group work + application of diagnostic steps	Case Diagnosis Report + Group Discussion
8	2	Study the effect of heat	Assess students' understanding of basic diagnostic .skills	Practical test diagnostic) (samples	Midterm written test
9	2	Soluble sugars analysis	Preparation and use of natural enemies (e.g., .(predators	Laboratory experiment (raising (predatory insects	Experiment report + results analysis
10	2	Turkish account Z	Evaluating the effectiveness of pesticides and selecting the most appropriate ones for medicinal .plants	Data analysis + discussion of scientific papers	Panel discussion comparative + report on pesticides
11	2	Hydrogen peroxide degradation measurement	Design preventive plans (such as .(crop rotation	Practical application in the college field	drug plan -Anti design project
12	2	optimal	Analyze pest	Group work + field	Presentation +

		conditions	problems of a specific plant and suggest .solutions	research	Final Report
13	2	Comparison of extraction methods	Linking theoretical knowledge to industrial .applications	Field visits + interviews with specialists	Visit Report + Participation Evaluation
14	2	Percentage calculation	Assessing the ability to apply knowledge to life -real .problems	Student presentations + group discussion	Project Evaluation Content +) (Presentation
15	2	Total concentration estimation	Measuring the student's diagnostic and analytical .ability	Practical Test (Pest Diagnosis + (Problem Solving	Applied projects

12. Course Evaluation	
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%	
13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"**Biological Control: Measures of Success** " :Authors**Gurr , G., Wratten ,** .S
Main references (sources)	**Journal of Biological Control**
Recommended books and references (scientific journals, reports...)	Food and Agriculture Organization**(FAO)** **(** Reports on sustainable biological control **).**
Electronic References, Websites	**https://www.youtube.com** /

Course Description Form

1. Course Name:
Farm Management
2. Course Code:
PMNP 454
3. Semester / Year:

Second Course
4. Description Preparation Date:
2025/6/1
5. Available Attendance Forms:
In-person attendance in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
45
7. Course administrator's name (mention all, if more than one name)
Name: Doaa Qasim Sabri Email: dqasm0478@ntu.edu.iq
8. Course Objectives

Course Objectives	1. : Enabling students to understand the fundamental principles of field design and development, including land planning, equipment selection, and the application of modern technologies in agriculture and livestock production. 2. **Development of Practical Skills**: Equipping students with the necessary practical skills for field management, such as organizing planting and harvesting operations, managing water resources, and maintaining agricultural equipment. 3. **Enhancing Productive Efficiency**: Teaching students how to improve productivity by applying best practices in field management, including the use of modern technologies and agricultural data analysis. .

9. Teaching and Learning Strategies

Strategy	**First: Educational Strategy Objectives** 1. Develop theoretical understanding of farm management concepts and rela economic principles. 2. Enhance practical skills in analyzing agricultural problems and mak decisions. 3. Stimulate critical and strategic thinking among students. 4. Bridge the gap between academic knowledge and local agricultural reality. **Second: Teaching and Learning Methods and Strategies** **Method** — **Description and Application** **Interactive Lectur** — Presenting key concepts and theories with direc

		questions to students to encourage discussion a participation.
	Case Study	Analyzing real administrative problems in loca virtual farms and proposing practical solutions.
	Project-Based Learning	Assigning students to develop a farm plan or feasibility study for a real agricultural project a present and discuss it.
	Brainstorming	Generating new ideas in resource management risk reduction methods in agriculture.
	Field Visits	Visiting actual farms to observe management systems, resources, and technologies in use.
	Work in Teams (Collaborative Learning)	Dividing students into small groups to solve practical problems or present on selected topics
	Simulation	Using software or spreadsheets to simulate agricultural production management or resourc planning.
	Quantitative Exercises	Solving numerical problems related to costs, returns, efficiency, break-even point, and finan analysis.
	Student Presentations	Encouraging students to present selected topics their peers to develop communication and analytical skills.

10. Course Structure

Week	Hours	Unit / Topic Title	Intended Learning Outcomes	Teaching Method	Assessment Method
1	Theory + Practical	Concep of Farm Manag ment: Object s and Duties	- Define farm management ar its role in ensuring sustainable profitability, resource efficiency, and risk management.- List the key functions of a farm manager (planning, organizing, supervising, evaluating).	- Interactive lectures- Real-life case studies- Class discussions on managerial roles	Quiz, rticipat on in cussio ns

2	Theory + 2 ractical	Science f Farm Manage ent and conomi c oundati ons	- Explain how economic inciples (costs–returns, production function, marginal alysis) apply to agricultural cision-making.- Clarify the relationship between farm anagement and other sciences such as soil science and agricultural engineering.	- Theoretical presentations- Economic analysis workshops- egration activities (economics + soil/engineering)	ecture, case study
3	Theory + 2 ractical	gricultu ral oductio n and conomi c erivativ s of the oductio n unction	- Draw and explain the production function and its input-output relationship.- Derive marginal and average eturns from the production function and interpret them.	- Graphical ssroom exercises- olving quantitative xercises using real data	ractical rkshop s, ercises
4	Theory + 2 ractical	Law of minish ing Returns	Understand the stage of diminishing arginal returns as one input increases while others are held nstant.- Identify the inflection point where returns begin to decrease and marginal yield falls.	- Applied graph xplanation- Graph table analysis exercises- Categorized mathematical questions	ecision mulatio ns, case studies
5	Theory + 2	athema tical	- Solve quantitative	termining optimal oduction level for	alytica l

	ractical	uestion on the Law of minish ing Returns	problems to culate marginal and average returns using actual data.- Identify the tarting point of diminishing returns via functions or tables.	maximum profit.	ercises
6	Theory + 2 ractical	inciple of etermin ing Optimal oductio n Level	- Apply the MR=MC rule arginal return = arginal cost) to ermine optimal production.- Interpret the relationship between naximum profit vels, costs, and arginal returns.	- Quantitative applications- Data analysis using conomic software- Case study discussions from real farms	orksho ps, applied ercises
7	Theory + 2 ractical	inciple of bstituti on and esource llocatio n	Understand how o substitute one nput for another at the lowest possible cost using the marginal rate of substitution concept.	Applied exercises on partial substitution- raphing isoquants- mulation activities for resource selection	ecture, group scussio n
8	Theory + 2 ractical	inciple of portun ty Cost	- Define pportunity cost d incorporate it nto agricultural ecision-making analysis.- Use l-life examples to illustrate the effect of lternative costs on production choices.	Applied exercises on partial substitution- soquant graphing- Resource selection mulation activities	Applied ercises
9	Theory + 2 ractical	inciple of mparat	- Explain comparative advantage in	- Numerical examples in agricultural trade	ecture, applied ercises

		ive vantag e and Equal arginal Returns	allocating ources between different agricultural activities.- Distinguish etween absolute nd comparative advantage rough practical examples.- Use the principle of equal marginal returns to ermine optimal resource location among ferent activities or products.		
10	Theory + 2 ractical	Farm anning	Enable students to develop comprehensive farm plans including crop selection, scheduling, and resource requirements.- Use techniques such as partial and whole dgets and linear rogramming for integrated quantitative lanning.- Learn how to prepare nancial records nd performance reports (budget, ome statement, cost-benefit nalysis) as part of effective planning.	- Individual/group ractical project on rm planning- Use of linear programming	orksho ps, anning ercises
11	Theory + 2	Farm Manage	- Distinguish tween different	Practical exercises ing financial data-	ecture, case

	ractical	ment ethods	management approaches (traditional, modern, ustainable) and nderstand their requirements.- Develop the ability to make operational and strategic decisions in production, marketing, finance, and ccounting.- Use basic economic inciples such as ariable cost law and resource substitution.	Analysis of real farm budgets	studies, applied ercises
12	Theory + 2 ractical	conomi c asibilit y of rojects	- Analyze costs and returns and determine the reak-even point for evaluating project feasibility.- Understand and use efficiency dicators such as enefit-cost ratio nd profitability metrics.	- Comparison of different management models- Student presentations on local case studies- oup discussion on vantages/disadvan tages of each method	ecture, alytical ercises
13	Theory + 2 ractical	easures of conomi c ficienc y	- Identify the difference tween technical efficiency ptimal resource use) and economic efficiency (integration of ost and return).- Ability to calculate efficiency	- Theoretical discussions supported by ractical examples- Comparison tables and performance analysis of two farms	orksho ps, applied ercises

			dicators such as technical efficiency, allocative efficiency, and total economic efficiency.		
14	Theory + 2 ractical	isk and certain ty	Classify sources of risk (natural, arket, technical, institutional, personal) and their effects on arm decisions.- Use strategies to educe risk such diversification, insurance, sensitivity analysis, and stochastic budgets.	- Risk simulation games- Sensitivity analysis exercises	ecture, group scussio ns
15	1 Theo + 2 Practic	Final Exam	nal examination	Comprehensive evaluation of earning outcomes hieved throughout the course.	

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular boo if any)	"Not available
Main references (sources)	Concept of Farm Management: Objectives and Duties Dr. Hashim Al-Alwan Al-Samara'i Science of Farm Management and Economic Foundations Dr. Hashim Al-Alwan Al-Samara'i Farm Revenues Dr. Hashim Al-Alwan Al-Samara'i Farm Decision-Making Dr. Hashim Al-Alw Al-Samara'i
Recommended books and references (scientific journals, reports...)	**1. Agricultural Marketing – Concepts and Farm Management and Agricultural Extension – Part One College of Agriculture Library, University of Al-Qadisiyah (agr.qu.edu.iq)**

	2. Natural Pasture Management Dr. Ramadan Ahmed Al-Tikriti et al.; College of Agriculture, University of Al-Qadisiyah (agr.qu.edu.iq) **Farm Management George Frederick Waug Noor Electronic Library (noor-book.com)**
Electronic References, Websites	https://www.youtube.com/channel/UCwC-E-UQXZpk2HaLzC2e1Eg https://www.youtube.com/watch?v=1nb6H3nW1fM

Course Description Form

1. Course Name:
Conservation Agriculture
2. Course Code:
PMNP 455

3. Semester / Year:
Second Course/ Level One
4. Description Preparation Date:
2025/6/1
5. Available Attendance Forms:
In-person attendance in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
45
7. Course administrator's name (mention all, if more than one name)
Name: Email:
8. Course Objectives

Course Objectives	To introduce students to the concept of conservation agriculture, its fundamental principles, and its role in achieving sustainable agriculture and preserving natural resources. • To enable students to distinguish between conventional and conservation farming systems in terms of their impact on soil, productivity, and the environment. • To familiarize students with modern techniques and practices in reduced tillage, soil cover, and crop rotation, and their effects on improving soil fertility and reducing erosion. • To provide students with knowledge on the management of plant residues and their use in enhancing the physical, chemical, and biological properties of the soil. • To develop students' abilities to use appropriate agricultural machinery for conservation agriculture systems, and to understand their mechanisms and areas of application. • To introduce students to weed management techniques in conservation agriculture systems, avoiding total reliance on tillage or chemical herbicides. • To enhance students' understanding of the role of conservation agriculture in mitigating the effects of climate change by reducing carbon emissions and increasing soil organic matter. • To develop students’ practical and field skills through projects and applied experiments, linking theoretical knowledge with real-world applications. • To encourage critical and analytical thinking in students through the analysis of local and

	international case studies on conservation agriculture practices. • To motivate students to engage in scientific research and innovation in the fields of sustainable agriculture and conservation agriculture techniques suitable for the Iraqi environment.
9. Teaching and Learning Strategies	
Strategy	• **Interactive Theoretical Lectures:** • Presenting scientific content in an interactive manner that encourages dialogue and discussion. • Providing real-life examples and linking them to the students' local environment. • **Presentations (PowerPoint & Video):** • Using visual aids to explain scientific and practical concepts. • Showing explanatory videos on conservation agriculture techniques and field reports. • **Project-Based Learning:** • Assigning students practical projects to design a conservation agriculture system. • Working in groups to promote collaboration and problem-solving. • **Field Study:** • Visiting agricultural sites that implement conservation agriculture. • Conducting on-site experiments and observations. • **Problem-Based Learning:** • Presenting real-world problems (e.g., soil erosion or lack of vegetation cover) and asking students to propose solutions. • Encouraging critical and analytical thinking. • **Workshops and Practical Training:** • Hands-on exercises on the use of agricultural equipment specific to conservation agriculture. • Practical activities for planting crops according to conservation agriculture principles. • **Brainstorming and Group Discussions:** • Stimulating student thinking on topics such as "How to reduce pesticide use in a conservation system." • Encouraging the exchange of opinions and multiple perspectives. • **Case Study-Based Learning:** • Analyzing real-life experiences in Iraq or other countries regarding

	conservation agriculture. • Discussing lessons learned and challenges faced. • **Self-Directed Learning:** • Encouraging students to search for scientific resources online or in the library. • Submitting individual reports on selected topics. • **Use of E-Learning Tools (when available):** • Uploading lectures or visual resources via university platforms. • Conducting online quizzes or remote research presentations.

10. Course Structure

Week	Hours	Unit / Topic Name	Required Learning Outcomes	Teaching Method	Assessment Method
1	Theory + Practical	roduction to onservatio n griculture: Definition d Basic Concepts	e student ines the ncept of conservation iculture and plains its portance in sustainable agriculture	cture + Classroom Discussion	Short Quiz
2	Theory + Practical	story and evelopme of onservatio n griculture Globally d in the rab World	e student ntifies the ges of velopment and tivations of conservation agriculture	PowerPoint sentation + Worksheet	Written Report
3	Theory + Practical	ifferences Between onvention and onservatio n griculture	e student compares methods regarding environmental d productivity impacts	Analytical mparison + Field Examples	ractical Report
4	Theory + Practical	e Three Principles of onservatio n griculture	e student plains the basic principles duced tillage, l cover, rotation)	eractive Lecture + Practical Demonstration	Written Test
5	Theory +	Reduced	e student	deo Presentation	Field

	Practical	Tillage echniques	distinguishes ween no-till l minimum lage techniques	Practical Application	aluatio n
6	heory + Practical	Crop Residue anagemen and Soil Cover	e student plains the role residues in educing erosion	ld Experiment + Discussion	ractical Test
7	heory + Practical	Crop Rotation and versificati on	e student derstands the ign of cessful crop rotations	ercises + Field Visit	alytica l orkshe et
8	heory + Practical	eed Management	e student learns ategies to ntrol weeds in conservation agriculture	Theoretical sentation + Practical Application	Short iz + ractical aluatio n
9	heory + Practical	e of Machinery and quipment	e student comes familiar h direct ders and utting machines	Watching Demonstration deos + Practical Application	On-site ractical Test
0	heory + Practical	Erosion Reduction l Soil nproveme nt	e student aluates the pact of conservation riculture on soil	aphing + Data Analysis	Case Study nalysis
1	heory + Practical	nservatio n griculture l Climate Change	e student links conservation iculture with carbon sequestration	eractive Lecture + Environmental Discussion	Written Test
2	heory + Practical	Applied dies in Iraq	e student analyzes cessful local experiences	se Study + Presentation	Field Report
3	heory + Practical	hallenges in Iraq	e student discusses nomic and technical obstacles	ainstorming + Group Discussion	Class rticipat ion
4	heory + Practical	Field Project	e student igns a conservation agriculture	oup Field Training	Project esentati and Group

			tem for a specific crop		aluatio n
5	heory + ractical	view + nal Exam	e student evaluates oretical and practical understanding	neral Review + Comprehensive Exam	eoretic + actical Exam

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbo (curricular books, if any)	"Not available
Main references (sources)	1- **Sustainable Agriculture and Natural Resource Conservation**, Dr. Abdel Jalil Al-Karkhi, Dar Ibn Al-Atheer – University of Mosul Includes principles of conservation agriculture and its role in rural development. 2- **Tillage and Land Preparation Techniques for Agriculture**, Dr. Khalil Ibrahim Al-Daud, University of Baghdad Press Covers no-till and reduced tillage techniques and the tools used. wan Al-Samar
Recommended books and references (scientific journals, reports...)	**1- Modern Agricultural Practices and No-Till Applications**, Dr. Amer Jassim Hassan, University of Basrah Press Covers machinery used in conservation agriculture and their impact on soil. **2- - Principles of Sustainable Agriculture**, William Lockeretz (Translated by Agricultural Research Center – Egypt) Available in translated editions in some university libraries, useful for covering environmental challenges and conservation agriculture in an international context.
Electronic Referenc Websites	**https://www.youtube.com/watch?v=oEeqQIKxXaU&t=38s**

Course Description Form

1. Course Name:
Post-harvest techniques
2. Course Code:

PMNP 456	
3. Semester / Year:	
Fourth	
4. Description Preparation Date:	
1/7/2025	
5. Available Attendance Forms:	
Physical presence in classrooms and college laboratories	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
8. Course Objectives	
Course Objectives	1. Understanding basic post-harvest processes 2. Learn techniques for preserving quality and therapeutic value. 3. Mastering proper drying and storage methods. 4. Identify quality and safety standards. 5. Application of modern technologies in post-harvest management
9. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

10. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	General Introduction -to Post Harvest Technologies	Introducing students to the harvest -importance of post techniques and their impact on the quality of medicinal and aromatic plants.	Interactive theoretical lecture.	Student participation and short questions.
2	1	Factors affecting harvest -post crop quality	Understanding the environmental and biological factors that affect crop decline.	Presentation	Short report on the influencing factors.
3	1	Postharvest physiology of medicinal plants	Explain the physiological changes that occur after harvest and how to control them.	theoretical lecture	Short test
4	1	Optimal harvesting techniques	Learn best harvesting practices to maintain quality and active ingredients.	Tutorial video + discussion.	Evaluation through a discussion panel.
5	1	Postharvest treatment of	Introduce students to methods of cleaning, sorting,	Visual presentati	Written report

		medicinal plants	and preliminary drying.	on of photos + video.	submitted by the student
6	1	Drying techniques and types	Comparison between natural and industrial drying methods and their impact on quality.	Comparat ive lecture + explanato ry tables.	Written semester test .
7	1	Storage and environment al control	Understanding optimal storage conditions (humidity, temperature, ventilation).	Case studies of successfu l and failed storage.	Group project Planning an) ideal store).
8	1	**Midterm review and discussion**	Review basic concepts and correct common mistakes.	Q&A session + summary .	Oral assessment random) questions).
9	1	Packaging	Analysis of the types of materials used in packaging and their effect on preservation.	View packagin g samples + discussio n.	Report on the selection of packaging materials.
10	1	Postharvest pest and disease control	Identify common pests and ways to prevent them.	Lecture + diagnosti c images.	Short quiz + Identify pests from photos
11	1	Preservation techniques using natural materials	Study alternatives to chemicals (such as essential oils).	Scientific research + discussio n.	Student presentation .
12	1	Quality Assurance and Laboratory Analysis	Understanding quality standards and laboratory tests for evaluation.	Laborator y data + results analysis.	Solutions to practical exercises
13	1	harvest -Post marketing	Linking quality to market requirements and the cost of the technologies used.	Lecture + examples from the local market.	Marketing situation analysis.
14	1	Modern technologies such as)	Review of advanced techniques in the preservation of medicinal plants.	Recent research +	Group discussion + creative

		nano, irradiation)		explanato ry video.	evaluation.
15	1	Final review and evaluation	and Summarize the course .answer students' questions	Interactiv e session mock + .test	Final exam written or) .(electronic

11. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction -to Post Harvest Technologies	Introducing students to the importance of harvest -post techniques and their impact on the quality of medicinal and aromatic plants .	Lecture + discussion + presentation of practical examples	Student Participation Short Report +
2	2	Collecting and preparing plant samples	Students learn the correct methods for collecting and preparing plant specimens for preservation.	Practical explanation + laboratory application	short exam
3	2	Cleaning and disinfection techniques for plants	Understand the methods of cleaning and disinfecting medicinal plants before storage.	Practical presentation + lab experiments	Report on the results obtained
4	2	Traditional drying techniques	Learn natural drying methods air and sun)) and evaluate their effect on the active ingredients.	Practical experiments + comparison of results	Evaluation of dried samples
5	2	Industrial drying techniques dryers))	Understand the use of industrial dryers and set appropriate	Practical application of drying devices	Industrial drying efficiency evaluation

			drying conditions.		
6	2	Dried material quality assessment	Learn quality assessment criteria (color, smell, moisture content).	Laboratory sample analysis + discussion	short exam
7	2	Milling and packaging techniques	Mastering appropriate grinding methods and their impact on preserving active ingredients.	Practical application + comparison of methods	Evaluation of the quality of the resulting powder
8	2	Storage techniques refrigeration) freezing ,)	Study the effect of cold storage on the preservation of medicinal plants.	Storage experiments + analysis of results	Quarterly written exam
9	2	Vacuum packaging techniques	Understand the importance of vacuum packaging in maintaining quality.	Practical application + comparison with regular packaging	Evaluation of samples after a period of time
10	2	Use of natural preservatives	Learn how to use antioxidants and essential oils in preservation.	Laboratory experiments + analysis of results	Report on the effectiveness of preservatives
11	2	Primary extraction techniques such as) distillation)	Application of essential oil extraction techniques and quality evaluation.	Steam distillation experiments in the laboratory	short exam
12	2	Quality control during storage	Learn quality control tests water activity,) fungal growth).	Stored Sample Analysis + Data Recording	Report on quality changes during storage
13	2	Practical applications on the	Application of all techniques on specific	Group work + practical project	Final project evaluation

		conservation of selected plants	medicinal and aromatic plants .		
14	2	Field visits to storage and processing units	Linking the theoretical aspect to the practical reality in industrial facilities.	Field visit + visit report	Report evaluation and participation
15	2	Project submission and results evaluation	Assess students' understanding of practical applications and analyze the results.	Project presentation + group discussion	Quarterly written exam

12. Course Evaluation	
1- Written semester exams (theoretical part) 60% 2- Written midterm exams (practical part) 10% 3- Daily written tests 10% 4- Student reports 10% 5- Student attendance 10%	
13. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	" Postharvest Technology of Horticultural Crops" – Adel A. Kader
Main references (sources)	Journal "Postharvest Biology and Technology" (Elsevier).
Recommended books and references (scientific journals, reports...)	University Course References
Electronic References, Websites	https://www.youtube.com /

Course Description Form

14. Course Name:
Pesticides
15. Course Code:
PMNP 457

16. Semester / Year:
Fourth
17. Description Preparation Date:
1/7/2025
18. Available Attendance Forms:
Physical presence in classrooms and college laboratories
19. Number of Credit Hours (Total) / Number of Units (Total)
3 hours / 2 units
20. Course administrator's name (mention all, if more than one name)

21. Course Objectives	
Course Objectives	1. Understanding the basics of pesticides and their types 2. Identify the effects of different pesticides on medicinal and aromatic plants. 3. Resistance and Sustainability Management 4. Environmental and health safety 5. Legislation and ethical aspects

22. Teaching and Learning Strategies	
Strategy	1- Theoretical understanding (lectures, discussions) 2- Practical application (laboratories, projects) 3- Practical demonstrations (live experiments)

23. Course Structure (Theoretical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	1	Introduction to pesticides and their classifications	Understand the general definition of pesticides and their main types (insecticide, .fungicide, herbicide, etc).	Interactive lecture group + discussion	Participate in the discussion
2	1	Mechanism of action of chemical pesticides	Explain how pesticides affect pests at the cellular or physiological level.	theoretical lecture	written report
3	1	Organophosphates chlorophos) phates)	Distinguishing the properties of organic pesticides and their impact on the environment.	theoretical lecture l	Simple written exam
4	1	Biopesticides and plant extracts	Learn about natural pesticides and methods of extracting them from medicinal plants.	theoretical lecture	Oral presentation by a student group
5	1	The effect of pesticides on soil	Analysis of the side effects of pesticides on the environment .	theoretical lecture	surprise test basic

6	1	The effect of pesticides on soil biodiversity	Analysis of the side effects of pesticides on beneficial soil organisms	theoretical lecture	Editorial report
7	1	Pest resistance to pesticides	Understanding the causes of pest resistance development and ways to prevent it.	a lecture	Submit an editorial report
8	1	Pesticides used in medicinal and aromatic plants	Determine safe and appropriate pesticides for medicinal plants according to quality standards.	Lecture and field case study	Quarterly written exam
9	1	International legislation on the use of pesticides	FAO and WHO standards and safe use regulations.	Lecture + Legal Documents	Open discussion and evaluation of student participation
10	1	Pesticide application methods spraying,) fumigation, .etc)	Distinguishing the best methods for applying pesticides according to the type of pest and crop.	Visual presentation with photos and video	Written report on the lecture topic
11	1	Pesticide toxicity and its impact on human health	Analysis of pesticide poisoning risks and personal protection methods.	theoretical lecture	Short written test
12	1	Modern alternatives to pesticides biotechnolo) gy)	Explore alternatives such as biocontrol or genetic engineering.	Theoretical lecture and scientific research study	Students present in .groups
13	1	Integrated Pest Management(IPM)	pesticide application strategies	Workshop and lecture	Workshop participation evaluation
14	1	Modern techniques in pest monitoring and control	Learn about artificial intelligence or remote sensing tools in pest control.	Lecture + Technical Presentation	Short technical report
15	1	Final review and exam	Integrate key concepts and . solve exam questions	Interactive session	Quarterly written exam

		preparation		and lecture	

24. Course Structure (Practical vacobulary)

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
1	2	Introduction to pesticide types and classifications	Introducing students to the types of pesticides insecticides,) fungicides, herbicides) and their chemical classifications.	Lecture + Sample Presentation	discussion Share the with students and evaluate their .participation
2	2	Preparing a diluted insecticide solution in the laboratory	Train students to calculate concentrations and prepare dilute solutions safely.	practical experience	Laboratory report
3	2	Fungicide efficacy evaluation	Understanding the effect of fungicides on fungal growth and measuring the inhibition zone.	laboratory experiment	Analysis of results + group discussion
4	2	Applying a herbicide to greenhouse plants	Observation of the effect of herbicides on medicinal plants under controlled conditions.	Practical application	Editorial report
5	2	Study of pest resistance to pesticides	Analysis of the phenomenon of insect resistance to pesticides through field data.	Field and laboratory lecture	Simple written exam
6	2	Measurement of pesticide residues in medicinal	Learn to use pesticide residue meters.	laboratory experiment	report on the results

		plants			
7	2	Field visit to a farm or pesticide factory	Linking the theoretical aspect to the practical reality in the production or use of pesticides.	Field trip + observation reports	Field Report + Interactive Questions
8	2	Evaluation of pesticide effects on target -non organisms	Understand the of side effects pesticides (e.g., .(on bees or soil	laboratory experiment	Written midterm exam
9	2	Design of an Integrated Pest Management (IPM) program for a medicinal plant	Application of integrated pest management principles using selected pesticides.	Practical lecture	Submit a report of the results
10	2	Statistical analysis of pesticide trial data	Learn to use statistical software (such asSPSS) to analyze the results of experiments.	Computer + Practical Applications	Statistical application test
11	2	Manufacture of natural pesticide from plant extracts	Preparation of environmentall y friendly pesticides from medicinal and aromatic plants .	laboratory experiment	Final product evaluation + preparation quality
12	2	Testing the toxicity of pesticides on model organisms such as) worms)	Evaluation of the relative toxicity of pesticides using living organisms.	sensitive laboratory experiment	Scientific Report + Experimental Ethics
13	2	Using modern technologies in spraying	Learn about advanced technology in pesticide	Tutorial video simulation +	Short quiz + discussion participation

		pesticides such as) drones)	application.		
14	2	Submitting student projects solutions to) field problems)	Apply acquired knowledge to life -solve real pesticide problems.	Presentations Group + Discussion	Project Evaluation Content +) Presentation + Creativity)
15	2	General review and final evaluation	A comprehensive assessment of students' understanding practical of aspects and their readiness for field .application	Workshop + Oral Questions	Practical test + student participation assessment

25. Course Evaluation

1- Written semester exams (theoretical part) 60%
2- Written midterm exams (practical part) 10%
3- Daily written tests 10%
4- Student reports 10%
5- Student attendance 10%

26. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Plant Protection and Pesticide Science - " Dr. Ahmed Fouad or a Western writer like George W. Ware .
Main references (sources)	Journal of Pesticide Science
Recommended books and references (scientific journals, reports...)	Food and Agriculture OrganizationFAO - .Reports on pesticides and their safe uses
Electronic References, Websites	https://www.youtube.com /