Course Description

Level 1 (first and second semester)

Statistic &Experiment Design	احصاء وتخطيط تجارب
Soil Science	اساسيات تربة
Horticulture Principles	اساسيات بستنة
Agronomy Principles	اساسيات محاصيل
Plant Protection	وقاية نبات
Nursery & Forestry	مشاتل وغابات
Plant Environment	بيئة نبات
Fruit Production	انتاج فاكهة
Plant Physiology	فسلجة نبات
Vegetation Production	انتاج خضر
General Insects	حشرات عامة
Agri.Machine&Equipment	ساحبات وآلات زراعية
Tissue culture	زراعة انسجة

Level 2 (First + Second Semester)

Medicinal Plants Production	انتاج النباتات الطبية
Secondary Compounds Chemistry	كيمياء المركبات الثانوية
Farm management	إدارة المزارع
Drying &Reserving Plants	حفظ وتجفيف النباتات
Medicinal Plants Diseases	امراض النباتات الطبية
Medicinal Plants Environment & Classification	بيئة وتصنيف النباتات الطبية
Organic Chemistry	كيمياء عضوية
Aromatic & Floriculture Medicinal Plants	نباتات الزينة العطرية
Drugs Processing	تصنيع الأدوية
Nurseries & Propagation	مشاتل وإكثار
Medicinal Plants Pesticides	حشرات النباتات الطبية
Plants Nutrition	تغذية نبات
Project	مشروع

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type	Jabari A √			optional □	
The material	Gardening Basics	Level	the first				
Course code	PPT101	the chapter	the first				

Planned teaching hours	15	My watch	30	My working hours	Units	3

Introduction to Horticulture and its Importance Classification and classification of horticultural plants. Environmental factors affecting the growth of horticultural plants.Sexual and asexual reproduction techniques.Horticultural service practices (irrigation, fertilization, (...pruning, weeding.Methods of cultivation in greenhouses and open spaces. Principles of garden and orchard design .Medicinal, aromatic and ornamental plants.Post-harvest operations and horticultural marketing.Modern trends in gardening (such as vertical farming, (smart farming, soilless farming	Course :description
Fundamentals of Horticulture course aims to provide students with the basic knowledge and skills to understand horticulture as a core component of agricultural production and to introduce them to the importance of horticultural plants in food security and the agricultural economy. It also aims to develop students' ability to distinguish different horticultural species, understand their environmental requirements, and apply their basic agricultural processes. This provides a preliminary basis for ,advanced specialized subjects in the fields of fruits, vegetables . ornamental plants, and medicinal and aromatic plants	The purpose of teaching the :curriculum
1- Knows horticultural crops 2- .Divide the types of garden plants 3- .Classify fruit trees according to their production 4- .Distinguish between types of ornamental plants 5- .Write all the scientific names of plants	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		

2	1	**Introduction to Horticulture**: ,Definition of horticulture, its history and its importance in agriculture and the economy.	1
2	1	**Horticultural plants classification**: fruits, vegetables, ornamental plants, medicinal and aromatic plants.	2
2	1	**Horticultural environment**: environmental factors affecting plant growth (light, temperature, water, soil).	3
2	1	**Plant tissues and their parts related to horticulture**: internal structure and its relationship to horticultural functions.	4
2	1	**Sexual propagation of plants**: ,seeds, collection, storage germination, genetic characteristics.	5
2	1	**Asexual propagation of plants**: ,cuttings, layering, grafting tissue culture.	6
2	1	**Basic agricultural techniques**: ,land preparation, planting dates plant density.	7
2	1	**Irrigation and fertilization in horticultural plants**: irrigation systems, water sources, types of fertilizers, and methods of application.	8
2	1	**Complementary agricultural operations**: ,pruning, thinning weeding, mulching, and strengthening.	9
2	1	**Protected agriculture and modern horticulture**: ,greenhouses soilless agriculture, vertical farming.	10
2	1	**Ornamental plants and garden design**: types, uses, basics of garden and landscape design.	11
2	1	**Medicinal and aromatic plants**: types, benefits, cultivation and production methods.	12
2	1	**Harvesting and handling of horticultural crops**: maturity indicators, harvesting methods, storage, packaging.	13

2+2	1+1	**Horticultural Products Marketing**: Marketing Chain, Added Value, Display and Promotion Methods.	15-14

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The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type		Jabari A √			optional □
The material	Field Crops Basics	Level		First			
Course code	PPT102	the chapter		the first			

Planned teaching hours	15	My watch	30	My working hours	Units	3

Course :description	This course focuses on introducing students to the basics of field crop production, including the study of the main types of field crops (cereals, legumes, oil crops, and fodder crops), with an emphasis on suitable environmental conditions, growth requirements, and modern agricultural methods. ,It also covers basic concepts related to crop division, crop rotation, land preparation planting dates, and irrigation, fertilization, and harvesting practices. The course aims to provide students with the theoretical and practical knowledge that will ena ble them to understand sound field production and achieve agricultural sustainability.
The purpose of teaching the :curriculum	Learn the basic concepts in field crop science. Classification of field crops according to their uses and growing seasons. Explain the environmental factors affecting crop production. Identify sound agricultural practices for producing high-quality crops. Distinguish between summer and winter crops and their most important requirements. Apply basic skills in field agriculture through practical activities.
Education :outcomes	1- Know the field crop 2- .Divide crops according to families 3- .Crops are divided according to their life cycle 4- .Distinguish between types of crop seeds in the laboratory 5- .Write the scientific names of crops

Number of teaching hours		Curriculum details	week
practical	theoretical		
2	1	Identify field crops and classify field crops.	1
2	1	,Soil service operations - tillage, its importance, when to perform it judging good tillage.	2
2	1	Smoothing, its importance, benefits of leveling, adjustment and field division.	3

2	1	Crop cultivation methods, factors affecting each method, crop ,service operations, patching and weeding, thinning, fertilization irrigation, pest control.	4
2	1	Sunflower cultivation.	5
2	1	Cotton cultivation.	6
2	1	Yellow corn cultivation.	7
2	1	Rice cultivation.	8
2	1	Sesame cultivation.	9
2	1	Soybean cultivation.	10
2	1	- Wheat cultivation - origin - suitable environmental conditions planting date.	11
2	1	Barley cultivation - transformation processes for the grain industry within a sustainable environment.	12
2	1	,irrigation ,Sugar beet cultivation - planting date, fertilization maturity, harvesting date, conversion processes, and factors affecting sucrose content.	13
2	1	**Growing lentils, chickpeas and broad beans - Suitable - environmental factors - Planting date - Weeding - Weeding Fertilization - Maturity - Harvesting – Harvesting**	14
2	1	**Expanding unused agricultural areas to eliminate desertification and increase production**	15

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the first	semester	2024-2025	The year Academic	Plant production techniques	Department Scientific	Al-Hawija Technical	The
optional □	Jabari A √		Course type	medicinal plants			Branch
First			Level	Soil basics			The material
the first			the chapter	TIH103			Course code
2	Units	hours of theory + 15 hours of 15 practical		30	Planned teaching hours		

To learn about soil science, its branches, importance and the purpose of soil analysis. To know the processes and factors of soil formation, the morphological properties of soil, as well as to know the physical and chemical properties of soil in addition to the role of these properties and their effect on plant growth, as well as to know the apparent density, porosity, color and temperature of soil and the factors affecting them, the importance of added and existing organic matter in soil, estimating the percentages of gypsum and lime in soil, and knowing .saline soils and the salts available in them. Minerals available in soil	Course :description
It provides students with basic scientific knowledge about soil as a major component of the ecosystem and a vital medium for agricultural production . It also provides students with a comprehensive scientific understanding of soil components, their properties, and their various interactions, enabling them to understand the role of soil in supporting plant and environmental life, and to apply this knowledge in agricultural, environmental, and .engineering fields	The purpose of teaching the :curriculum
1- .Know soil science, its branches and importance 2- .Distinguish between soil formation processes and factors 3- .Know the relationship between physical and chemical soil properties and plant growth 4- Distinguish between different types of soil based on their physical and chemical .properties Conducts standard tests to analyze soil -5pH .salinity, and organic content , 5- .Estimating the soil content of lime and gypsum in the laboratory 6- The student knows the soil horizons, the characteristics of each horizon, and the .methods of diagnosing them	Education :outcomes

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
1	1	Learn about soil science, its branches, its importance, and the observe soil softness + purpose of soil analysis	1

1	1	**Some morphological characteristics of soil Watch the + softness of the soil.**	2
1	1	**Physical properties of soil and their relationship to plant growth + collecting soil samples.**	3
1	1	**Physical soil properties and their relationship to plant growth + Preparing samples and estimating the humidity percentage.**	4
1	1	**The effect of soil type on desertification and sustainable environment + estimation of apparent and true density and .porosity**	5
1	1	**soil water .Soil texture assessment +**	6
1	1	**soil temperature Preparing the saturated dough and soil + .suspension and determining the saturation percentage**	7
1	1	**Organocolloids .Qualitative detection of ions +**	8
1	1	**clay minerals .Estimation of positive ions +**	9
1	1	**exchange capacitance .Estimation of negative ions +**	10
1	1	**Electrical conductivity of soilEc. Estimation of organic matter + .in soil**	11
1	1	**soil salinity .Estimation of total carbonates in soil +**	12
1	1	**Nutrients and their importance to plants Estimation of + .gypsum in soil**	13
1+1	1+1	**The role of microorganisms in promoting sustainable agricultural environments Estimation of cation exchange + .capacity and exchangeable sodium ratio in soil**	15-14

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type	Jabari A				optional √
The material	Fruit production	Level	the first				
Course code	PPT106	the chapter	the first				

Planned teaching hours	15	My watch	30	My working hours	Units	3

Course :description	The "Fruit Production" course aims to provide students with the scientific knowledge and practical skills related to the production of various fruit crops, from orchard establishment to harvesting and post-harvest operations. The course covers the environmental and climatic ,foundations suitable for fruit cultivation, variety selection, propagation methods, pruning .irrigation, fertilization, and pest and disease control
The purpose of teaching the :curriculum	The course also covers the basic groups of fruit crops (deciduous fruits, evergreen fruitsand tropical and subtropical plants), with an emphasis on their economic importance and modern production methods to achieve the highest production efficiency and marketing quality.
Education :outcomes	Explain the basic principles of fruit crop production and identify their economic and environmental importance. Distinguishing the climatic and educational conditions suitable for different types of fruit trees. Identify and use appropriate methods for propagating fruit trees(seed and vegetative). Carrying out pruning and training operations according to the requirements of each type of fruit. Planning and establishing an orchard based on the requirements of the varieties to be grown. Applying irrigation and fertilization programs according to the plant growth stages and soil type.

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
2	1	Geographical distribution of fruits in Iraq and the world - the .most important problems of fruit production in Iraq	1
2	1	- Citrus fruits (native habitat - nutritional value - reproduction - most important varieties - most important citrus divisions .(suitable environment	3+2

2	1	**- Palm trees (native habitat - nutritional value - reproduction (most important varieties - suitable environment**	**4**
2	1	**Olives (original country - nutritional value - reproduction - most (important varieties - suitable environment**	**5**
2	1	**- Banana, jujube and loquat (native habitat - nutritional value .(reproduction - most important varieties - suitable environment**	**6**
2+2+2	1+1+1	**Grapes (native country - nutritional value - reproduction - most important varieties - suitable environment) Apples, pears and quince (native country - nutritional value - reproduction - most .(important varieties - suitable environment**	**9+8+7**
2	1	**Figs (native habitat - nutritional value - reproduction - most (important varieties - suitable environment**	**10**
2	1	**- Peach , apricot and pear (original habitat - nutritional value (reproduction - most important varieties - suitable environment**	**11**
2	1	**- pomegranate and persimmon (Native habitat - nutritional value .(reproduction - most important varieties - suitable environment**	**12**
2	1	**,Pistachios, walnuts and pecans: origin, nutritional value .reproduction, most important varieties, suitable environment**	**13**
2+2	1+1	**Modern trends in fruit production - the importance of hormones .and their areas of use**	**15+14**

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The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type		Jabari A √			optional □
The material	Plant physiology	Level		the first			
Course code	PPT107	the chapter		the second			

Planned teaching hours	My watch	My working hours	Units	
15	15	15	My working hours	2

The Plant Physiology course studies the biological and functional processes occurring within plants, which form the basis for understanding their growth, development, and response to the environment. The course aims to provide students with in-depth knowledge of the mechanisms regulating water and salt absorption, photosynthesis, cellular respiration, transport in plants, water relations, hormonal balance, and environmental control of physiological processes. The course focuses on interpreting physiological phenomena at the cellular, tissue, and whole-plant levels, clarifying the relationship between structure and function, and integrating modern concepts in plant physiology with agricultural applications and environmental technologies.	Course description:
Plant Physiology curriculum aims to provide students with a comprehensive scientific understanding of the biological and functional processes occurring within plants, with a focus on the physiological mechanisms that control plant growth, development, and response to different environments. The curriculum also seeks to develop skills in analyzing plant physiological phenomena and linking them to agricultural and environmental applications, thus qualifying students to apply physiological concepts in the fields of scientific research and sustainable agricultural production.	The purpose of teaching the curriculum:
1- Know all the functions of plant organs 2- Divide the parts of the plant according to their function . 3- Divide the function of each organ in the plant . 4- Distinguish between the function of each organ . 5- Know the role of each member .	Education outcomes:

week	Curriculum details	Number of teaching hours

practical	theoretical		
1	1	Introduction to Plant Physiology Definition and Importance of Plant Physiological Study Basic Concepts and Scientific Terms	1
1	1	Water relations in plants Water absorption Water movement within the plant Evaporation and processes related to water relations	2
1	1	Absorption and transport of mineral elements, absorption mechanisms, the importance of nutrients and the effect of their deficiency on plants	3
1	1	Photosynthesis: Basic Stages, Influencing Factors, and Chemical Pathways of Carbon Fixation	4
1	1	Transport of materials within the plant Transport mechanisms in wood and phloem tissues	5
1	1	Plant hormones, their types, their role in regulating vital processes and physiological effects	6
1	1	Plant movements, types of movements, tropism, flow, rhythmic movements and their causes	7
1	1	,Physiology of growth, stages of growth, hormonal dynamics and regulatory factors	8
1	1	Plant response to light Effect of light on growth Photomorphogenesis and the biological clock	9
1	1	,The impact of environmental stresses: temperature, drought .and salinity, and their effects on physiological processes	10
1	1	Secondary metabolism: types of secondary compounds, their functions, and biological importance	11
1	1	Mechanisms of plant resistance to stresses, physiological responses, adaptations and defense strategies	12
1	1	Applications of plant physiology in agricultural production: crop .improvement, fertilization, and resource management	13
1+1	1+1	Comprehensive review and applied assessment, discussion of key concepts, case studies and applied questions	15-14

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the first	semester	2025-2024	The year Academic	Plant production techniques	Department Scientific	Al-Hawija Technical	The
Optional √	Jabari A		Course type	medicinal plants			Branch
the first			Level	plant protection			The material
the first			the chapter	PPT103			Course code
2	Units	My working hours	15	My watch	15	Planned teaching hours	

Damages insects And its benefits and factors success insects And its spread in nature And reproduction and growth - Ways proliferation insects And types .Nutrition In insects and environments Which Live it Insects . And the shape External For the insect And parts abdomen Mouth . Pests. Animal not Insectarianism Rank Dream - Rank Rodents - Order Birds importance Economic For diseases Vegetarianism and losses resulting About her , male . Examples They don't matter diseases in Iraq And the world	Course :description
Introducing the student to the economic importance of insects .and plant diseases and the damage they cause	The purpose of teaching the :curriculum
1- Understand Damages that Caused by insects and diseases Vegetarianism -2 Knows pests Animal Other Insects . 3- List the ways. transmission And spread diseases Vegetarianism	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		
1	1	.The harms and benefits of insects	1
1	1	.Factors for the success and spread of insects in nature	2
1	1	Reproduction and growth - methods of insect .reproduction	3
1	1	.Types of nutrition in insects	4
1	1	.Environments in which insects live	5

1	1	.Non-insect animal pests - order Acaridae	6
1	1	.Non-insect animal pests - order Rodentia	7
1	1	.Non-insect animal pests - order of birds and rodents	8
1	1	The economic importance of plant diseases and the losses resulting from them. Give examples of the most .important diseases in Iraq and the world	9
1	1	Some definitions in plant pathology and its role in the .upcoming topics	10
1	1	The manner or method by which the pathogen enters .plant tissue	11
1	1	.Methods of transmission and spread of plant diseases	12
1	1	.Factors that predispose to plant diseases	13
1	1	Fungi - characteristics of fungi, methods of feeding fungi, methods of reproduction of fungi, classification of .fungi	14
1	1	Nematodes as plant pathogens - nematode body .structure, type of damage they cause	15

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the first	semester	2024-2025	The year Academic	Plant production techniques	Department Scientific	Al-Hawija Technical	The
optional √	Jabari A		Course type	medicinal plants			Branch
the first			Level	plant environment			The material
the first			the chapter	PPT105			Course code
2	Units	My working hours	15	My watch	15	Planned teaching hours	

The Plant Ecology course examines the various environmental factors that influence plant growth, development, and production. The course focuses on the interaction between plants ,and their environment, including physical factors such as light, temperature, and humidity chemical factors such as nutrient availability and soil composition, and biological factors.	Course :description
The course aims to understand how plants adapt to their different environments and the ,impact of environmental changes on plant physiological processes such as photosynthesis respiration, and growth. The course also explores the impact of pollution and climate change on plants and how they can adapt to them.	The purpose of teaching the :curriculum
Explain the different environmental factors that affect plant growth, such as light, temperature .and humidity .Analysis of the effect of soil properties (physical and chemical) on plant health and productivity Explain the physiological and structural adaptation mechanisms of plants to diverse .environmental conditions .Assessing the impact of pollution and climate change on plants and their natural environments Applying methods of measuring and monitoring environmental factors in fields and .laboratories to study their effect on plant growth Explain the interactive relationship between plants and the environment and its impact on .agricultural production and sustainability Use acquired knowledge to analyze environmental problems related to plants and propose .sustainable solutions	Education :outcomes

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
1	1	Definition of ecology, its historical development and its divisions.	1

1	1	Energy (radiation): visible radiation, infrared radiation ultraviolet .radiation	2
1	1	.Light quality (light intensity), photoperiod length	3
1	1	The importance of light for plants in the process of .photosynthesis and the effect of light on plants	4
1	1	.Temperature (heat flow, changes in temperature)	5
1	1	.Thermal inversion, the preferred temperature of the plant	6
1	1	.Maximum, minimum and optimum temperature	7
1	1	.Heat and its actual value for the plant	8
1	1	,Atmospheric pressure (factors affecting atmospheric pressure .(distribution of atmospheric pressure	9
1	1	Wind (wind movement, types of wind, air masses, effect of wind .(on plants	10
1	1	.The effect of wind on plants	11
1	1	Water (the amount of water on the Earth's surface and its cycle .(in nature	12
1	1	.Air humidity, evaporation, clouds, fog and frost	14+13
1	1	.Dew, rain and rainfall distribution	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2025-2024	semester	the second
Branch	medicinal plants	Course type	Jabari A √			optional □	
The material	Agricultural tractors and equipment	Level	the first				
Course code	PPT110	the chapter	the second				

Planned teaching hours		My watch		My working hours		Units	
15		30					3

knowledge importance mechanization agricultural And types Tow trucks And safety General, Study Parts Home For the tug and Devices transfer movement And study system fuel And cooling And oiling And purification air And the exhaust and electrical The device hydraulic And the structure The tug And guidance and the positions and malfunctions And maintenance Types Plows And importance practical Plowing Recipes Plowing good study Plows Al-Mathariyah The tipper and plows The disc The tipper And the excavator and equipment Smoothing and settlement and planning Split Channels Its use - its parts - its maintenance and methods Plowing With it study Agriculture mechanism - machine prose fertilizer and seeds And the seed Fertilized And a machine agriculture potatoes And a machine to cut Feed The harvester The vehicle	Course :description
Recognition on Tow trucks agricultural and training On it How to Use it in field And procedure Maintenance On it	The purpose of teaching the :curriculum
1- Understanding Tow trucks agricultural And training on Use it And procedure Operations Maintenance 2- Understanding parts The tug Home And importance How to a job All part. 3- Understanding a job Systems The tractor And specify Malfunctions .	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		
2	1	knowledge importance mechanization Agricultural - Types Tow Trucks - Safety Public	1
2	1	study Parts Home For the tug And a job all Part - Devices transfer movement Its parts And its function	2

2	1	- (study Systems Tow trucks (system) Fuel System Cooling Types - Parts Importance Benefits - Malfunctions And maintenance	3
2	1	study system Lubrication - System purification Air - System exhaust And a silencer Sound - its parts And its function Its malfunctions	4
2	1	study The system Electrical - Parts - Useful all part And his job And its maintenance	5
2	1	knowledge Devices and means to exploit ability in The tug The device Hydraulic column Tractor - column Management Rear early Management PTO	6
2	1	- study structure The Puller - Parts Benefits - System Guidance Parking - Device The path in The tug	7
2	1	- knowledge Types Plows - Importance practical Tillage Characteristics Plowing good	8
2	1	- study Plows Al-Mathariyah tipper - plows The disc Dump truck its use - its parts - its maintenance and methods Plowing With it	9
2	1	study Plows Excavator - Plows Rotary - Plough under Soil - its uses - its parts	10
2	1	knowledge equipment Smoothing Soil - Uses - Parts - Machines - settlement and planning Split Channels - their importance their use	11
2	1	- study Agriculture mechanism - machine prose fertilizer Seeds their parts - their types - their classification	12
2	1	study The seed Fertilized in Lines - their parts - their calibration Field - Calibration Laboratory	13
2	1	- study machines Agriculture in Lines - Agriculture Potatoes Types – Standardization	14
2	1	machines to cut Feed - Types - Parts The harvester Vehicle - Its Operation - Groups Home For the harvester	15

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Course description and type

the second	semester	2024-2025	The year Academic	Plant production techniques	Department Scientific	Al-Hawija Technical	The
optional ☐		Jabari A √	Course type	medicinal plants			Branch
		the first	Level	Nurseries and forests			The material
		the second	the chapter	PPT104			Course code
2	Units	My working hours	15	My watch	15	Planned teaching hours	

The importance of the role of nurseries in agriculture and plant production , types of nurseries and their classifications (governmental, private, commercial, research) environmental and administrative factors that affect the success of the nursery ,. Study of the different methods of plant propagation (sexual and asexual) , and ,practical training on propagation techniques such as cuttings, layering, grafting tissue culture, and seed cultivation , as well as acquiring skills in preparing .agricultural environments, soil sterilization, and plant care	Course :description
The student learns the foundations and principles of forest tree production, its benefits, and its various classifications.	The purpose of teaching the :curriculum
1. Introducing scientific concepts and principles of plant propagation and nursery management. 2. Implementing practical activities in educational fields or nurseries. 3. Training students on preparing agricultural environments, planting seeds, making cuttings, grafting, and layering. 4. .Monitor the growth of seedlings and evaluate their health	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		
1	1	Definition of nursery, its types and economic importance - site selection and preparation	1
1	1	Nursery planning - Nursery accessories - Media and mixtures used in propagation	2
1	1	- Features of the new medium - the most important media used in propagation the proportion of propagation mixtures	3
1	1	Plant propagation - sexual reproduction (propagation by seeds) - purposes of - sexual reproduction and the most important factors affecting it - dormancy seed storage	4
1	1	Vegetative propagation - its purposes - methods of propagation by cuttings	5
1	1	Rooting on cuttings - Using growth regulators in propagation by cuttings	6

1	1	**- Propagation by grafting - Definition of grafting - Purposes of grafting Factors affecting the success of grafting - Methods of grafting**	7
1	1	**Compounding - Definition of compounding - Its most important purposes - The most important methods of compounding**	8
1	1	**Using rootstocks in plant propagation - Introduction to rootstocks - The effect of rootstock on scion - The effect of scion on rootstock**	9
1	1	**Asexual reproduction (bulbs - tubers - offshoots - support plants... etc.)**	10
1	1	**Propagation using plant tissue - Definition of plant tissue culture - Scientific and practical applications of tissue culture The most important agricultural media - preparing plant tissue laboratories**	11
1	1	**Stages of propagation of medicinal plants using tissue culture - establishing - tissue culture - propagating the plant part - rooting the resulting branches transferring and acclimatizing plants**	12
1	1	**- The most important service operations in the nursery (irrigation - fertilization (thinning - pruning - harvesting**	13
1	1	**Annual calendar of nursery work (main work carried out each month)**	14
1	1	**Showing scientific films**	15

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The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type	Jabari A √			optional □	
The material	Statistics and planning of agricultural experiments	Level	the first				
Course code	TIH101	the chapter	the second				

Planned teaching hours	15	My watch	30	My working hours	Units	3

Course :description	This course aims to provide students with the theoretical foundations and practical skills in agricultural biostatistics, with an emphasis on how to design and analyze agricultural ,experiments scientifically. The course covers basic statistical concepts, types of experiments and methods for analyzing data using appropriate statistical techniques, including experimental design, data collection, hypothesis testing, and analysis of results, using statistical software (such asSPSS ,R , orExcel .(
The purpose of teaching the :curriculum	Understand basic statistical concepts related to populations, samples, and agricultural .variables Gaining the ability to plan and design agricultural experiments of various types .according to scientific conditions Analyze data using appropriate statistical methods such as analysis of variance and .hypothesis testing .Ability to interpret statistical results and draw accurate and realistic conclusions Employing statistical software in analysis and presenting results in an understandable .scientific format
Education :outcomes	Explains the basic concepts in agricultural statistics and experimental design . Identify different types of experimental designs and the criteria for selecting them . Distinguish between different experimental designs in terms of construction and use . Analyzes agricultural experiment data using appropriate statistical methods . Uses computer programs(Excel/SPSS/R) to analyze statistical data.

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
2	1	The concept of statistics and planning agricultural experiments, some commonly used statistical terms	1

		community, clan, sample, variable characteristic, variable) .(value, distribution	
2+2	1+1	,Statistical measures: Centering measures (arithmetic mean (median, mode, weighted arithmetic mean	3+2
2+2	1+1	,Measures of dispersion and variation (range, variance .(standard deviation, standard error, coefficient of variation	5+4
2	1	.Types of agricultural experiments	6
2	1	Sources of errors and differences in agricultural experiments (types of errors in agricultural experiments) Sources of .variation in agricultural experiments	7
2	1	Fundamentals of agricultural experiment design and types of designs used in agricultural experiments	8
2+2	1+1	Completely randomized design (its conditions, planning, and .(statistical analysis	10+9
2+2	1+1	Randomized Complete Block Design Its conditions, planning) .(and statistical analysis	12+11
2+2	1+1	.Latin square design (conditions, layout and statistical analysis)	14+13
2	1	Split panel design (conditions, planning and statistical .(analysis	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type	Jabari A √	optional □			
The material	Urban production	Level	the first				
Course code	PPT108	the chapter	the second				

Planned teaching hours		My watch		My working hours		Units	
	30		30		30		4

Course :description	, importance production Winter and summer vegetable crops , Importance Economic Diagnosis seeds ,problems production crops , to divide crops Plowing And types Plows Ways Agriculture . Importance Summer vegetable crops such as plants belonging to the legume family (watercress, cucumber, zucchini, etc.), circumstances Environmental suitability , an ,appointment Agriculture , amount seeds , Fertilization , Irrigation , stages Growth description Vegetarianism, importance Winter vegetable crops such as legumes and daffodils And legumes circumstances Environmental suitability, an appointment Agriculture , amount seeds , Fertilization , Irrigation , stages Growth, description Vegetarian
The purpose of teaching the :curriculum	Teaching and training students theoretically and practically on how to prepare the appropriate bed for planting crops , planting crops according to the method of planting each one , and performing all the crop service operations required to achieve the highest production.
Education :outcomes	Knows the production of vegetables .Divide crops according to families .Crops are divided according to their life cycle .Distinguish between types of crop seeds in the laboratory .Write the scientific names of crops

Number of teaching hours		Curriculum details	week
practical	theoretical		
2	2	the importance of studying ,Scientific classification of vegetable crops scientific classification The difference between successive cropping in open fields and greenhouses	1
2	2	shapes and functions of the root ,Morphological description of vegetable crops parts of the leaf, their shapes and ,modifications of aerial stems , and stem .functions, components of the flower and inflorescences, and types of fruits	2
2	2	Agricultural rotations, the importance of agricultural rotations, their types ,and benefits, the principles followed in designing agricultural rotations vegetable plant seeds distinguishing between	3

2	2	**Cucurbitaceae family , characteristics of the Cucurbitaceae family and its ,botanical description of the Cucurbitaceae family ,most important genera economic importance and planting date of cucumber, melon and squash cuttings**	4
2	2	**Squash and zucchini crop, economic importance, habitat, planting date and .suitable environmental conditions**	5
2	2	**The legume family, characteristics of the legume family and its most botanical description of the legume family ,important genera Broad beans, peas, lentils, beans, and fenugreek crops**	6
2	2	**characteristics of the cruciferous family and its , The cruciferous family ,botanical description of the cruciferous family ,most important genera radish crop, economic and nutritional importance, and its planting date**	7
2	2	**The Apiaceae family, characteristics of the Apiaceae family and its most the most ,botanical description of the Apiaceae family ,important genera important crops of the Apiaceae family**	8
2	2	**Carrot, celery and parsley crops, economic importance, planting date and .suitable environmental conditions, planting method**	9
2	2	**Chenopodiaceae family , characteristics of the Chenopodiaceae family and its botanical description of the family, methods of ,most important genera growing beets, chard and spinach crops**	10
2	2	**Compositae family , characteristics of the Compositae family and its most botanical description of the Compositae family, cultivation ,important genera of artichoke and marigold crops**	11
2	2	**economic importance of lettuce crop, lettuce crop service , Lettuce crop operations The Narcissus family, characteristics of the Ramarassus family and its most botanical description of the family ,important genera**	12
2	2	**The Narcissus family, the most important genera of the Narcissus family botanical description of the family, economic ,and their characteristics and nutritional importance, onion crop and its economic and nutritional importance**	13
2	2	**the economic and nutritional importance of garlic and its planting date , crop**	14
2	2	**what is a nursery and ,Methods of planting and producing vegetable seedlings the most important types of methods and places for producing seedlings, to learn the process of acclimatization or hardening seedlings**	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2025-2024	semester	the second
Branch	medicinal plants	Course type		Jabari A		optional √	
The material	General insects	Level		the first			
Course code	PPT109	the chapter		the second			
Planned teaching hours	15	My watch	15	My working hours	Units	2	

Course description:	,Providing the student with basic and comprehensive knowledge about the structure classification, behavior, and importance of insects, in order to understand their role in ecosystems and their applications in agricultural, medical, and environmental fields.
The purpose of teaching the curriculum:	Understand the general characteristics of insects as arthropods and distinguish them .from other organisms Learn about the external and internal structure of the insect, and understand the .functions of each part of the body Study of the diversity of insects, their different forms, and methods of classifying them .into orders and families Learn about the role of insects in the environment as pollinators, decomposers, and food .sources, and their role in ecological balance Understand the life cycle of insects and the types of metamorphosis, and be able to .distinguish between them
Education outcomes:	.Explains the general characteristics of insects and their position within arthropods .Distinguish between the external and internal structures of insects and their various functions Explains the stages of the insect life cycle and the types of metamorphosis .(complete/incomplete) .Describes the scientific classification of insects into orders and examples of them Explains the importance of insects from an environmental, economic, agricultural, and medical .perspective

Number of teaching hours		Curriculum details	week
practical	theoretical		
1	1	A historical overview of the development of agricultural pest .control and international bodies involved in pest control	1
1	1	.Methods of pest control (natural and applied)	2
1	1	.Mechanical control, biological control	3
1	1	.Chemical control, modern trends in pest control	4

1	1	.Pests of protected agriculture	5
1	1	.Cotton pests, wheat pests	6
1	1	.Corn pests, cruciferous pests	7
1	1	.Stored goods pests	8
1	1	.Onion and garlic pests, clover and clover pests	9
1	1	.Cucurbit pests, pests of the Solanaceae family	10
1	1	.Stone fruit pests	11
1	1	.Apple pests, grape pests	12
1	1	.Citrus pests, fig pests	13
1	1	.Pomegranate pests, olive pests	14
1	1	.Pests of palm trees and ornamental plants	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type	Jabari A √	optional □			
The material	Plant environment and classification	Level	Second				
Course code	PPT203	the chapter	the first				

Planned teaching hours	15	My watch	30	My working hours	Units	3

This course focuses on integrating the basic concepts of plant ecology and plant taxonomy, to form a comprehensive knowledge base that enables students to understand the interaction between plants and the environmental factors surrounding them, in addition to enabling them to identify and classify plants in a scientifically accurate manner based on approved taxonomic standards.	Course :description
This curriculum aims to provide students with a comprehensive understanding of the ecological relationships that connect plants to their natural environment, deepen their awareness of the impact of environmental factors on the distribution and diversity of plants, and enable them to master the scientific principles and methods for classifying flowering and non-flowering plants. The curriculum also seeks to develop students' skills in identifying plant species using taxonomic keys and approved scientific nomenclature, and to prepare them to ,conduct field observations and collect plant samples systematically .serving environmental studies, agricultural applications, and biodiversity	The purpose of teaching the :curriculum
.Knows how to divide plants .Divide and classify plants according to external appearance .Divide plants according to the growing season .Distinguish between plant types in terms of shape and structure .Write the internationally approved scientific names	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		
2	1	Introduction to plant ecology and basic definitions: the concept of the environment, components of the ecosystem, the relationship of the plant to the environment.	1

2	1	**,Non-living (abiotic) environmental factors: light, heat, water wind, soil, and their effect on plant growth and distribution.**	2
2	1	**,Biotic environmental factors: microorganisms, animals humans, and interactions between plants and biotic components.**	3
2	1	**Plant adaptations in different environments: adaptation to drought, salinity, shade, low and high temperatures.**	4
2	1	**Plant communities: composition, dominant species, structural characteristics, local and global examples.**	5
2	1	**,Ecological gradients and plant succession: pioneer species ecological succession, stages of stability and change in plant communities.**	6
2	1	**Plant ecosystems (desert, forest, humid, grassy): their components and characteristics.**	7
2	1	**- ,Introduction to plant taxonomy: definition, importance differences between traditional and modern classification.**	8
2	1	**- ,Foundations of plant classification: morphological anatomical, reproductive, chemical and molecular characteristics.**	9
2	1	**- International Code of Nomenclature(ICN): ,rules of naming writing scientific names, adaptations and modifications.**	10
2	1	**keys types, methods of using them, training on dichotomous : keys.**	11
2	1	**classification Field training in identifying selected plant families : (such as Solanaceae, Fabaceae, and Poaceae).**	12
2	1	**- ,Non-flowering plants: classification of ferns, mosses, algae and environmentally related plant fungi.**	13
2+2	1+1	**- ,Preparation of plant samples: methods of collection, drying documentation, field and laboratory classification.**	15-14

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second	
Branch	medicinal plants	Course type		Jabari A √		optional □		
The material	farm management	Level		Second				
Course code	TIH203	the chapter		the second				
Planned teaching hours		My watch	15	My working hours	15	Units	2	

The Farm Management course focuses on providing students with the basic concepts and scientific methods for organizing and operating agricultural .resources efficiently to achieve sustainable agricultural production goals ,The course covers the principles of agricultural management, planning organization, and control, decision-making, and analysis of problems related to the management of human, financial, and material resources on the farm. The course covers strategies for improving productivity, time management, marketing agricultural products, risk assessment, and the use of modern technologies in agricultural management. It also focuses on enhancing practical skills in managing daily farm operations, taking into account economic and environmental aspects.	Course :description
Farm Management curriculum aims to equip students with the knowledge and skills necessary to plan, organize, and manage diverse agricultural resources effectively and sustainably, while developing their ability to make sound administrative and economic decisions that increase productivity and improve the quality of agricultural .products, while taking into account environmental and social aspects The curriculum also seeks to enhance students' understanding of the importance of modern management and advanced technologies in .achieving efficiency and profitability in agricultural operations	The purpose of teaching the :curriculum
1Knows how to manage the farm 2 .Divide the types of farms and how to manage each type 3 .Divide the job of each employee on the farm 4 .Distinguish between types of farms 5 .Knows how to calculate farm results mathematically	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		
1	1	Introduction to Farm Management: Definition, Importance, and the Role of Management in Improving Agricultural Production Efficiency	1
1	1	Types of farms and their classifications according to ownership, size, and nature of production	2
1	1	Components of the farm and factors affecting its organizational and economic structure	3
1	1	Planning in farm management and its types: annual, seasonal and strategic planning	4
1	1	Decision-making in farm management: its steps, tools, and criteria for comparing alternatives	5
1	1	Analysis of fixed and variable agricultural costs and calculation of unit production cost	6
1	1	Preparing farm budgets and using them in planning and control	7
1	1	Farm records, their types, and their importance in monitoring performance and making decisions	8
1	1	Financial Management on the Farm: Agricultural Financing Sources and Cash Flow Management	9
1	1	,Human resource management on the farm: organizing work distributing tasks, and motivating workers	10
1	1	Agricultural Marketing: Marketing Fundamentals, Product Management, and Value Chains	11
1	1	Agricultural risk analysis and management methods under changing environmental and economic conditions	12
1	1	The role of modern technology and geographic information systems in developing farm management	13
1+1	1+1	A comprehensive review of practical applications for planning .and managing an integrated agricultural project	15-14

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first	
Branch	medicinal plants		Course type		Jabari A √		optional □	
The material	Production of medicinal plants		Level		the second			
Course code	TIH201		the chapter		the first			

Planned teaching hours	My watch	15	My working hours	30	Units	3

Medicinal Plant Production course focuses on studying the scientific and ,practical foundations for producing plants for medicinal and aromatic uses beginning with an introduction to medicinal plants and their economic and pharmaceutical importance, and extending to the agricultural practices related to their cultivation, care, harvesting, and processing. The course aims to enable students to understand the environmental and physiological requirements of medicinal plants, select suitable species for cultivation within local environments, and learn about modern techniques for propagation, production, and quality improvement of active ingredients.	Course :description
Medicinal Plant Production curriculum aims to provide students with ,theoretical knowledge and practical skills related to the cultivation care, and harvesting of medicinal and aromatic plants, with a focus on the environmental and agricultural factors affecting the quality and quantity of active ingredients. It also aims to enable students to select suitable species for cultivation, apply modern propagation and production techniques, and understand post-harvest, storage, and use requirements. This will enhance their ability to develop sustainable agricultural projects in the medicinal plant sector that serve the . pharmaceutical, food, and aromatic sectors	The purpose of teaching the :curriculum
1 .Knows all types of medicinal plants 2 .Divide the parts of the plant according to their active ingredient content 3 .Divide the types of active ingredients in the plant 4 .Distinguish between the function of each active compound 5 .Know the role of each compound in the plant from a medical perspective	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		

2	1	**Introduction to medicinal and aromatic plants, their historical .and economic importance, and their uses in various industries**	1
2	1	**Classification of medicinal plants according to their active chemical content such as volatile oils, alkaloids, and glycosides**	2
2	1	**Environmental factors affecting the growth and production of .medicinal plants, such as light, temperature, humidity, and soil**	3
2	1	**Selecting and preparing suitable land for growing medicinal plants, taking into account the crop rotation and crop .requirements**	4
2	1	**Methods of sexual propagation by seeds and asexual propagation by cuttings, layering, division, and tissue culture of medicinal plants**	5
2	1	**,Basic agricultural practices such as planting, irrigation .fertilization, and proper service schedules**	6
2	1	**Integrated pest and disease management in medicinal plants using preventive and organic methods**	7
2	1	**Harvesting in medicinal plants: determining the appropriate timing, methods, and its impact on the quality of active ingredients**	8
2	1	**,Post-harvest operations such as drying, sorting, cleaning storage and packaging in a manner that maintains the .effectiveness of the compounds**	9
2	1	**Methods of extracting oils and active compounds from medicinal plants and using appropriate equipment**	10
2	1	**Factors affecting the quality and percentage of active .ingredients, such as plant age and agricultural techniques**	11
2	1	**Quality standards and commercial classification of medicinal plants and local and international marketing requirements**	12
2	1	**Organic and sustainable cultivation of medicinal plants and their impact on human health and the environment**	13
2+2	1+1	**Study of some applied models of important medicinal crops .such as mint, chamomile, fennel and castor oil**	15-14

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type	Jabari A √	optional □			
The material	medicinal plant diseases	Level	the second				
Course code	PPT202	the chapter	the first				

Planned teaching hours	15	My watch	30	My working hours	Units	3

,This course aims to introduce students to the diseases affecting medicinal and aromatic plants which affect their growth, production, and the quality of their active ingredients. The course ,covers various types of pathogens (fungal, bacterial, viral, and nematode), their symptoms transmission methods, and diagnostic methods, in addition to biological, chemical, and environmental prevention and control methods. The course also includes applied studies and real-life cases.	Course :description
This course aims to provide students with the scientific knowledge and practical skills ,necessary to understand and diagnose diseases affecting medicinal and aromatic plants identify various pathogens, their modes of transmission, and their impact on the quality and production of active compounds. It also aims to provide students with the ability to apply appropriate prevention and control strategies in accordance with sustainable agricultural practices.	The purpose of teaching the :curriculum
Explains the basic concepts in medicinal plant pathology . Distinguish between types of plant pathogens (fungal, bacterial, viral, nematode...) . Explains the effect of diseases on the growth of medicinal plants and the quality of active ingredients. Learn about the methods of transmission and spread of diseases in agricultural fields .	Education :outcomes

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
2	1	,Classification of plant diseases according to the pathogen symptoms and agent.	1
2	1	Oomycetes, their characteristics, the most important diseases they cause, late blight on potatoes, seedling death, downy mildew on onions, cucurbits and grapes.	2
2	1	Zaikot fungi, their classification, most important characteristics and the diseases they cause.	3

2	1	Sac fungi, their most important characteristics, the diseases they ,cause and their resistance, powdery mildew diseases on cucurbits grasses, grapes and roses.	4
2	1	Imperfect fungi, diseases caused by them, date palm pollen blackening disease, apple stem black spot, ascochyta spot of broad beans.	5
2	1	Basidiomycetes, their characteristics, the most important diseases they cause, rust and smut fungi.	6
2	1	Plant pathogenic bacteria, their characteristics, the most important diseases they cause, and sources of infection with pathogenic bacteria.	7
2	1	Viruses that cause plant diseases, methods of transmission and spread of viral diseases, the most important diseases caused by viruses.	8
2+2	1+1	Non-parasitic diseases, their causes, symptoms, and deficiency of elementsNpk, Cu, Mg, Br, Fe, Zn, Mn, S	10+9
2	1	Plant diseases resulting from irregular irrigation, high ground water level, blossom end rot on leaves and tomato fruits, gummosis of stone fruit trees.	11
2	1	,Methods of controlling plant diseases: agricultural, biological chemical. Bacterial pesticides, antibiotics, mycotoxins produced by some fungi that infect grains, fruits, and food.	12
2	1	Mycoplasmas as plant pathogens, their characteristics, the most important diseases they cause, their symptoms, their life cycle, and methods of combating them.	13
2	1	,Plant viruses, their forms, the chemical composition of the virus general symptoms of viral diseases, factors affecting the external manifestations of infection with viruses.	14
2	1	Life cycle of nematodes, parasitism, changes caused by nematodes in plant tissue, resistance to nematodes, and the most important diseases they cause.	15

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The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type		Jabari A √			optional □
The material	Organic Chemistry	Level		the second			
Course code	PPT204	the chapter		the first			
Planned teaching hours	15	My watch	15	My working hours	Units	2	

The student will be able to distinguish between organic and inorganic compounds and the difference between them . He will also learn the properties of carbon and its ability to form ,long chains and cyclic compounds, as well as the cyclic and molecular formulas of methane ,benzene, and other alkenes and alkanes. He will also learn the specifications of alcohols .aldehydes, and other compounds	Course :description
Enable students to understand the structure, properties, reactions, and applications of organic compounds (i.e., those containing the element carbon), which is essential in many scientific and applied fields . They can also identify the types of chemical bonds in organic compounds (such as covalent bonds) and be able to classify compounds according to .functional groups (such as alcohols, ketones, carboxylic acids, amines...)	The purpose of teaching the :curriculum
1 ,Distinguish between types of organic compounds (such as alkanes, alkenes, alkynes, alcohols .(...acids 2 .Apply separation and purification methods (such as distillation, extraction, crystallization...) 3 .Predict the physical and chemical properties of organic compounds based on their structure 4 . Explains the mechanisms of various organic reactions 5 .Distinguish organic compounds using qualitative analysis techniques	Education :outcomes

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
1	1	,Introduction: Definition of organic chemistry, classification functional groups in organic compounds + safety precautions in the practical laboratory, tools, and equipment used in the organic chemistry laboratory	1
1	1	Aromatic compounds - definition, history of discovery, reasons ,for naming them aromatic compounds, benzene compounds their composition, properties, methods of preparation in the factory, in the laboratory + physical constants and	2

		,spectroscopic measurements of organic compounds measuring the melting point	
1	1	**Benzene derivatives, nomenclature, chemical substitution reactions, mechanism of substitution reactions, classification of substituent groups in terms of activation and deactivation of the benzene ring, examples + boiling point measurement**	3
1	1	**,Aryl halides, nomenclature, chemical and physical properties preparation methods + density measurement**	4
1	1	**,chemical and physical properties ,Phenols, nomenclature preparation methods + refractive index measurement**	5
1	1	**,Aromatic carboxylic acids, nomenclature, preparation chemical and physical properties**	6
1	1	**Aromatic aldehydes, nomenclature, preparation, chemical and physical properties**	7
1	1	**Aromatic ketones, nomenclature, preparation, chemical and physical properties**	8
1	1	**Aromatic amines, nomenclature, preparation, chemical and physical properties**	9
1	1	**Aromatic esters, nomenclature, preparation, chemical and physical properties**	10
1	1	**Azo compounds, nomenclature, preparation, chemical and physical properties**	11
1+1	1+1	**,Polycyclic aromatic cyclic compounds, nomenclature preparation, chemical and physical properties**	13+12
1	1	**Preparation methods**	14
1	1	**General review**	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the first
Branch	medicinal plants	Course type		Jabari A √		optional □	
The material	Preserving and drying plants	Level		the second			
Course code	PPT201	the chapter		the first			

Planned teaching hours	15	My watch	30	My working hours	Units	2

This course covers the scientific and practical foundations of techniques used in preserving plants and their products after harvest, with a focus on drying methods as one of the most important tools used to reduce waste and maintain quality. The course aims to introduce students to the principles of physiological and microbial postharvest loss, understand the impact of environmental and biochemical factors on plant material, and study various drying, storage, and packaging techniques and their impact on preserving the nutritional, medicinal, and aesthetic value of plants.	Course :description
The curriculum aims to provide students with the scientific knowledge and practical skills necessary to understand the physiological and ,chemical changes that occur in plants and their products after harvest enabling them to select and apply the most appropriate preservation and drying techniques that ensure minimizing waste, maintaining quality, and extending shelf life. It also aims to prepare students to evaluate the environmental and technical conditions affecting drying processes and to use sanitary and technical standards in packaging and storage, thus contributing to improving the marketing and utilization value of plant products for nutritional, medicinal, or industrial purposes.	The purpose of teaching the :curriculum
1 .Know the shelf life of each type of fruit 2 .Divide the types of fruits according to their transportability and tolerance 3.It is divided into the types of stores in which the fruits are stored 4.Distinguish between types of fruit preservation .5Know the role of preservation and its purpose	Education :outcomes

Number of teaching hours		Curriculum details	week
practical	theoretical		

2	1	**,Introduction to the importance of preserving and drying plants types of post-harvest losses, and their impact on quality and .agricultural economy**	1
2	1	**Physiological and chemical factors affecting post-harvest plant damage such as respiration, enzymes, and decomposition**	2
2	1	**Environmental conditions affecting the stability of harvested .plants, such as temperature, humidity, light, and ventilation**	3
2	1	**Introduction to traditional and modern preservation techniques such as refrigeration, thermal and chemical treatments**	4
2	1	**Principles and basics of drying as one of the most important methods of preservation and its role in reducing water activity**	5
2	1	**Traditional drying methods such as sun drying and shade air drying**	6
2	1	**Modern drying methods such as heat drying, hot air drying, and electric dryers**	7
2	1	**Freeze drying, its principles and uses in preserving active and sensitive compounds**	8
2	1	**Microwave drying and vacuum drying and their effect on product quality**	9
2	1	**,Preparing plants before drying, including washing, sorting .cutting, and auxiliary treatments**	10
2	1	**The effect of drying method, temperature and duration on the chemical and sensory properties of the plant**	11
2	1	**Packaging of dried plants and its effect on maintaining quality during storage and transportation**	12
2	1	**Principles of good storage of dried plant materials and optimal environmental conditions to minimize spoilage**	13
2+2	1+1	**Health and quality standards for dried plants and local and international standard specifications**	15-14

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The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type	Jabari A √	optional □			
The material	Nurseries and plant propagation	Level	Second				
Course code	PPT207	the chapter	the second				

Planned teaching hours	30	My watch	15	My working hours	Units	3

Course :description	Introducing scientific concepts and principles of plant propagation and nursery management. . Implementing practical activities in fields or educational nurseries Training students on preparing growing environments, planting seeds, making cuttings, grafting, layering, monitoring seedling growth, and evaluating their health.
The purpose of teaching the :curriculum	Introducing the student to the most important foundations and principles of establishing nurseries and how to propagate plants .sexually and vegetatively in nurseries
Education :outcomes	Plant Ecology Recognition ,Introducing basic concepts about environmental factors (such as light (heat, water, soil, gases. .Explain how these factors affect the physiological processes of plants

Number of teaching hours		Curriculum details	week
practical	theoretical		
2	1	Definition of nursery, its types and economic importance - site selection and preparation	1
2	1	Nursery planning - Nursery accessories - Media and mixtures used in propagation	2
2	1	Features of the new medium - the most important media used in propagation the proportion of propagation mixtures -	3
2	1	Plant propagation - sexual reproduction (propagation by seeds) - purposes - of sexual reproduction and the most important factors affecting it dormancy - seed storage	4
2	1	Vegetative propagation - its purposes - methods of propagation by cuttings	5
2	1	Rooting on cuttings - Using growth regulators in propagation by cuttings	6
2	1	- Propagation by grafting - Definition of grafting - Purposes of grafting Factors affecting the success of grafting - Methods of grafting	7

2	1	**- Compounding - Definition of compounding - Its most important purposes The most important methods of compounding**	8
2	1	**Using rootstocks in plant propagation - Introduction to rootstocks - The effect of rootstock on scion - The effect of scion on rootstock**	9
2	1	**Asexual reproduction (bulbs - tubers - offshoots - support plants... etc.)**	10
2	1	**Propagation using plant tissue - Definition of plant tissue culture - Scientific and practical applications of tissue culture The most important agricultural media - preparing plant tissue laboratories**	11
2	1	**Stages of propagation of medicinal plants using tissue culture - establishing - tissue culture - propagating the plant part - rooting the resulting branches transferring and acclimatizing plants**	12
2	1	**The most important service operations in the nursery (irrigation - fertilization (thinning - pruning - harvesting -**	13
2	1	**Annual calendar of nursery work (main work carried out each month)**	14
2	1	**Showing scientific films**	15

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Course description and type

the chapter	semester	2024-2025	The year Academic	Plant production techniques	Department Scientific	Al-Hawija Technical	The
√ Optional	Jabari A		Course type	medicinal plants			Branch
Second			Level	Plant nutrition			The material
the second			the chapter	PPT209			Course code
3	Units	My working hours	30	My watch	15	Planned teaching hours	

The student learns about plant nutrition and the ways in which nutrients are transferred from the soil to the plant, in addition to knowing the concept of a nutrient, its functions and ,classifications according to the function it performs, the types of fertilizers available diagnosing element deficiencies in the plant and methods of treating them, knowing the ,characteristics of fertilizers and methods of adding them, whether by spraying or to the soil .and differentiating between the conditions of hydroponic and sand farms	Course :description
Providing students with a comprehensive scientific understanding of plant nutritional needs and the factors affecting nutrient absorption, in order to improve agricultural productivity and sustainable resource use . Explaining the vital functions of each element, fertilizers (organic and mineral), their types, and their role in meeting plant The effect of environmental, physical and chemical factors in the soil on . needs absorption , the mechanism of element transfer, whether by mass flow or .diffusion	The purpose of teaching the :curriculum
1 .Know the basic nutrients and classify them into major and minor 2 .Distinguishes through the outward signs the deficiency of elements 3 .Identify the symptoms and link them to the factors responsible for them 4 .Determine the effect of environmental conditions on absorption efficiency 5 .Apply soil, plant and nutrient solution analysis 6 Employs integrated nutrient management principles to reduce pollution and improve .productivity 7 Distinguish between types of fertilizers and choose the appropriate one according to the type .of soil and crop 8 .Knows the methods of manufacturing fertilizers and the organic materials used in fertilizers 9 .Know the types of element absorption, whether active or passive absorption	Education :outcomes

Number of teaching hours	Curriculum components (theoretical + practical)	week

practical	theoretical		
2	1	Definition and classification of essential nutrients and their importance to plants (macro and microelements) + methods of taking and obtaining plant samples	1
2	1	Nutrient availability and factors affecting it + estimation of .moisture in the plant	2
2	1	The mechanism of nutrient absorption and the ways in which plants move nutrition into the soil Types of nutrient absorption + plant analysis and digestion method	3
2	1	Symptoms of nutrient deficiency + plant digestion using dry and wet methods	4
2	1	Nitrogen, its importance to plants, its sources, forms and transformations in the soil + its laboratory estimation	5
2	1	The plant's content of major and minor elements, and what are ?the beneficial and rare elements	6
2	1	,Phosphorus, its importance to plants, its sources and forms factors affecting its availability, and its fixation in the soil Mechanism of holding soluble phosphorus in soil + laboratory phosphorus estimation	7
2	1	+ Sulfur, its importance to plants, and its cycle in nature laboratory sulfur estimation	8
2	1	Potassium, its importance to plants, its sources and forms, its fixation in the soil + its laboratory estimation	9
2	1	Relationship of nutrients to plant environment, components and plant growth + qualitative detection of elements in soil and plant	10
2	1	The chemical composition of the solid medium in the soil and its relationship to nutrients + preparation of nutrient solutions	11
2	1	The chemical composition of the plant cell, the most important acids in the plant + learning about hydroponic farms and their conditions	12
2	1	Soil solution, its importance in plant nutrition and the factors .that control the degree of hardness of adsorbed cations	14+13
2	1	Soil fertility, internal and external factors that determine soil .fertility and its effect on plant nutrition	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type	Jabari A √			optional □	
The material	Chemistry of secondary compounds	Level	the second				
Course code	TIH202	the chapter	the second				

Planned teaching hours	15	My watch	15	My working hours	Units	2

Course :description	This course examines secondary chemical compounds produced by organisms, especially plants, which are not essential for basic growth and reproduction but play vital roles in environmental defense and communication. The course covers the classification of secondary compounds, their chemical structures, mechanisms of biosynthesis, and their biological and pharmaceutical applications.
The purpose of teaching the :curriculum	The "Chemistry of Secondary Compounds" course aims to provide students with an in-depth understanding of the various types of secondary compounds produced by living organisms, with a focus on their biological origins, chemical structures, and biological and pharmaceutical significance. The course also seeks to develop students' abilities to analyze and interpret the biosynthetic mechanisms of these compounds, identify their role in environmental interactions and chemical defenses, and enhance practical skills in extracting and analyzing them using modern techniques.
Education :outcomes	Clarifying the relationship between the chemical structure of secondary compounds and their biological and pharmaceutical functions. .Identify and classify secondary metabolites by type, biological source, and function Comparison of secondary compounds in terms of effectiveness and biological activity . .Propose biosynthetic mechanisms for specific secondary compounds based on their structures Evaluation of the potential use of secondary compounds in pharmaceutical or agricultural applications.

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
1	1	,Introduction, definition of organic secondary compounds classification of natural products, methods of obtaining organic secondary compounds, separation and purification	1

1	1	**,Separation of secondary compounds, chromatography column chromatography, thin layer chromatography, paper chromatography, liquid - gas chromatography**	2
1	1	**Methods for identifying the structural composition of secondary compounds, both physical and chemical**	3
1	1	**Physical analysis methods: A. Electronic dishes B. Infrared dishes(IR)** **) C. Nuclear magnetic resonanceNMR plate D. Mass plates (**	4
1	1	**- Identify the five types of organic secondary compounds** **- glycosides - phenols** **.Alkaloids - isoprenoids (terpenes) - quinones**	5
1+1	1+1	**Glycosides - Chemical and physical properties - Types of glycosides - Examples of glycosides - Their uses**	7+6
1+1	1+1	**Phenols - Chemical and Physical Properties - Types of Phenols, Examples, Uses**	9+8
1+1	1+1	**,Covalent bonds, chemical and physical properties, types examples, uses**	11+10
1+1	1+1	**Turbines, their classification, existence, importance, and uses**	13+12
1+1	1+1	**Alkaloids, their classification, existence, importance, and uses**	15+14

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type	Jabari A √			optional □	
The material	pharmaceutical manufacturing	Level	the second				
Course code	PPT206	the chapter	the second				

Planned teaching hours	15	My watch	30	My working hours	Units	3

Course :description	knowledge In extracting and converting raw materials available in medicinal plants into safe and effective pharmaceutical products for consumption. In addition to identifying the active - ingredient in these plants and in which part of the plants it is present (roots - stems - leaves flowers) and what is the medical purpose of its use and to treat which disease, as well as testing them in terms of solubility, stability and the doses to be given. It is also determined .whether it is in the form of tablets or capsules and the places where it is stored
The purpose of teaching the :curriculum	Providing students and stakeholders in the fields of agriculture (medicinal plants and plant production), pharmacy, and biomedical sciences with the basic knowledge and skills to understand how to transform medicinal plants into effective and safe pharmaceutical preparations, using scientific methods and modern technologies. This curriculum aims to link the therapeutic heritage derived from nature with contemporary pharmaceutical applications. It also teaches students about various extraction methods such as maceration, boiling, distillation, and solvent extraction. Students also identify methods for classifying medicinal plants according to their active components (alkaloids, volatile .(.oils, flavonoids, tannins, etc
Education :outcomes	1 .Distinguish between types of medicinal plants and their pharmaceutical properties 2 .Know the active ingredients contained in medicinal plants and their therapeutic importance 3 He has the ability to perform techniques for extracting active ingredients from plants .(.distillation, soaking, solvent extraction, etc) 4 .Prepare simple herbal preparations (cream, syrup, capsules) 5 .Knows the methods of preserving and storing plant products

Number of teaching hours		Curriculum components (theoretical + practical)	week
practical	theoretical		
2	1	The concept of pharmaceutical manufacturing - development - stages - types of pharmacies among ancient Arabs	1

		importance and specifications of the formula - practical .formulation - packaging - field trials	
2	1	- Meaning of particle size - Definition of particle size .Distribution and analysis	2
2	1	- Volume reduction - Energy required for volume reduction .Volume reduction methods - Cutting - Pressing - Compression .And crushing	3
2	1	.First: Palm tree methods - Mechanics of palm tree methods Second: Mixing, definition and topic, mixing devices and .methods of operation Third: Types of mixtures, mixing liquids, mixing powder .(ground)	4
2	1	Evaporation, factors affecting evaporation, improving evaporation efficiency, filtration, properties and affecting .factors	5
2	1	Extraction, extraction theory, extraction methods, recirculating .extraction, multi-stage extraction, continuous extraction	6
2	1	.Drying of dilute solutions, suspensions and solids	7
2	1	First: Pharmaceutical dosage form - compressed pills - pill .compression processes .Second: Preparing materials for grains - dry and wet extraction	8
2	1	- First: The basic contents of the tablets - diluents .disintegrating materials - gripping materials - slip-aid materials .Second: Grain packaging - grain calibration - quality control	9
2	1	- Capsules - Capsule production materials - Filling equipment .Processes and filling	10
2+2	1+1	- First: Emulsions and their composition - Selection of oil face Selection of auxiliary factors - Qualitative examination for .control Second: Semi-solid doses - rules for the formation of semi- .solids - ointments and creams	12+11
2+2	1+1	Pastes - gelatins - creams and medications for topical use on .the skin	14+13
2	1	Science films	15

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Course description and type

The	Al-Hawija Technical	Department Scientific	Plant production techniques	The year Academic	2024-2025	semester	the second
Branch	medicinal plants	Course type		Jabari A √			optional □
The material	Graduation project	Level		the second			
Course code	PPT210	the chapter		the second			
Planned teaching hours		My watch	45	My working hours		Units	3

Course :description	Introducing and training students in the processes of preparing the land and planting aromatic and medicinal ornamental plants and available vegetable .crops
The purpose of teaching the :curriculum	of medicinal plants in open and Production of midwives and cultivation . protected fields Preparing and preparing the land according to the method of planting the . different types of available plants Performing all service operations, including pest and weed control, for . the nursery and field ,Introducing the student to how to conduct scientific research, take data . and write reports and research
Education :outcomes	Identify a research or applied problem in the field of medicinal plants or vegetable crops using a precise scientific approach. Understanding the environmental, biological and chemical foundations that govern the production and quality of medicinal and vegetable plants. Analyze agricultural or chemical data related to plants using appropriate statistical and scientific methodologies. Propose innovative scientific or agricultural solutions to improve productivity, quality or pest control. Design an experiment or applied study based on previous knowledge, identifying the variables and influencing factors.

Number of teaching hours	Curriculum components (practical)	week
practical		

3	Selection of medicinal plants available in the area and methods . of collecting seeds	1
3+3	,Preparing the land for planting , plowing, smoothing amending, dividing and preparing the rows, whether in plastic or glass greenhouses, and preparing it well for the purpose of . planting plants	2+3
3+3	Search naming Develop a research plan, choose a research ,location, purchase research supplies, draw a research plan and determine the number of transactions and the number of . replications	4+5
3	Planting seeds or seedlings of vegetable crops, medicinal .plants and ornamental plants in the designated place	6
3	Follow-up of agricultural field work in plant care, including .irrigation, fertilization, and weed control	7
3+3	Understanding statistical processes and planning experiments and how to take data Conducting the research in the ,designated place, laboratory, or in greenhouses and shade with daily follow-up of the research. For the success of the . research plan	8+9
3	.Follow-up service of cultivated plants	10
3+3	Continue to collect and analyze data statistically, conduct service operations, write research, take pictures of each observation to strengthen the research	11+12
3+3	Harvesting and picking mature plants, collecting seeds and parts containing medicinal substances used in the .pharmaceutical industry in special bags and marking them Writing reports to research the project with scientific directions .to reach scientific research	13+14
3	Discussing students' research	15