

الخطة الدراسية المعتمدة

1.	School	School of Science
2.	Department	Department of Biological Sciences
3.	Program title (Arabic)	بكالوريوس في العلوم الحياتية
4.	Program title (English)	Bachelor in Biological Sciences

5. Components of Curriculum:

The curriculum for the bachelor's degree in **Biological Sciences** consists of (132) credit hours distributed as follows

Number	Type of requirement	credit hours
First	University requirement	27
Second	Faculty requirement	21
Third	Specialty requirement	84
Total		132

6. Numbering System:

A- Department number

Number	Department
1	Mathematics
2	Physics
3	Chemistry
4	Biological sciences
5	Geology



B- Course number

Domain number	Domain title	Domain number	Domain title
0	General biology	5	Botany
1	Practical biology	6	Zoology
2	Biochemistry & Clinical chemistry	7	Ecology
3	Micro techniques & histology	8	Genetics, cytology, molecular biology
4	Microbiology & immunology	9	Seminar & research

C- Course number consists of 7 digits

School		Department		Level	Serial number	
0	3	0	4	2	3	1

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First: University Requirements:



Preparation Program Requirements
(0 - 15 Credit Hours)

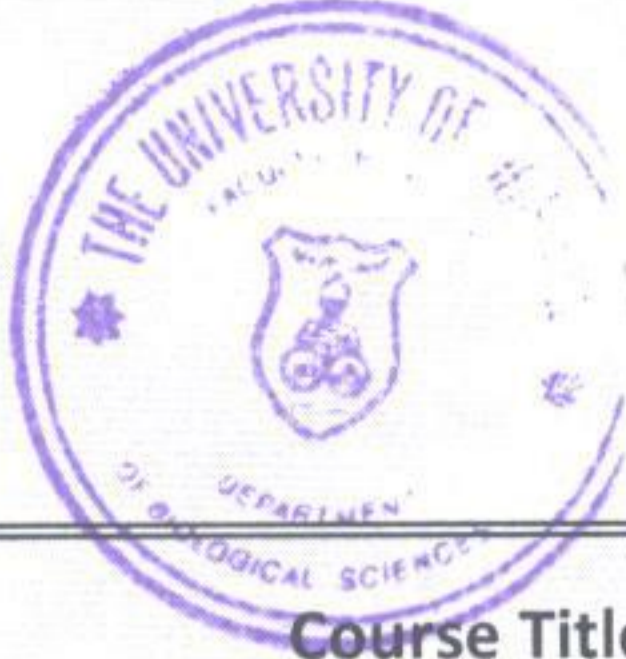
No.	Course Title	Course No.	Credit Hours	Prerequisites	Notes
1	Basics of Arabic	3201099	3		Pass/Fail
2	Arabic Languages Skills	3201100	3	3201099	Pass/Fail
3	Basics of English	3202099	3		Pass/Fail
4	English Language Skills	3202100	3	3202099	Pass/Fail
5	Basics of Computing	1932099	3		Pass/Fail

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Compulsory Requirements (18 Credit Hours)					
No.	Course Title	Course No.	Credit Hours	Prerequisites	Notes
1	Military Science	2200100	3		
2	National Culture	3400100	3		
3	Learning & Research Skills	3400101	3	3202099	
				3201099	
				1932099	
4	Communication Skills	3400102	3	3400101	
5	Introduction to Philosophy and Critical Thinking	3400103	3	3400101	
6	Human Civilization	3400104	3		
7	Campus Life and Ethics	3400105	(Zero credit; one-hour weekly meeting)		



Electives

(9 Credit Hours)

(3 Credit hours From Each Group)

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)First Group(

No.	Course Title	Course No.	Credit Hours	Prerequisites	Notes
1	Great Books	3400107	3		
2	Islam and Current Issues	0400101	3		
3	Arab-Islamic Civilization	2300101	3		
4	Jordan: History and Civilization	2300102	3		
5	Jerusalem	3400108	3		

Electives

)Second Group(

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No.	Course Title	Course No.	Credit Hours	Prerequisites	Notes
1	Legal Culture	1000102	3		
2	Environmental Culture	0300102	3		
3	Physical Fitness Culture	1100100	3		
4	Islamic Culture	0400102	3		
5	Health Culture	0720100	3		

Electives

)Third Group(

No.	Course Title	Course No.	Credit Hours	Prerequisites	Notes
1	Entrepreneurship & Creativity	3400109	3		
2	Foreign Language	2200103	3		
3	Electronic Commerce	1600100	3		
4	Social Media	1900101	3		
5	Appreciation of Arts	2000100	3		
6	Special Subject	3400106	3		

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Second: all students must do exams in Arabic, English and computer skills, students who fail in these exams should study and pass (099) course additional to curriculum.

Third: School courses: distributed as follows:

- A. Obligatory school courses: (21) credit hours**
B. Elective school courses: Nothing

A. Obligatory school courses: (21) credit hours:

Course Number	Course Title	Contact Hours		Credit Hours	Pre-requisite
		Theoretical	Practical		
0301101	Calculus (1)	3	-	3	-
0301131	Principles of statistics	3	-	3	-
0302101	General physics (1)	3	-	3	-
0303101	General chemistry (1)	3	-	3	-
0304101	General Biology (1)	3	-	3	-
0305101	General geology	3	-	3	-
1901102	Computer skills (2)- practical	3	-	3	1900100

B. Elective school courses: Nothing

Fourth: Specialty courses: (84) credit hours distributed as follows:

- B. Obligatory specialty courses: (84) credit hours**
C. Elective specialty courses: (63) credit hours

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A. Obligatory specialty courses: (84) credit hours:

Course Number	Course Title	Contact Hours		Credit Hours	Pre-requisite
		Theoretical	Practical		
0303102	General chemistry (2)	3	-	3	0303101
0333109	Practical General chemistry	-	3	1	0303102 or concurrently
0333211	Analytical chemistry	3	-	3	0333109
0303216	Practical Analytical chemistry	-	3	1	0333211
0333233	Organic chemistry for non-chemistry students	3	3	3	0303102
0303239	Practical Organic chemistry	-	4	1	0333233 or concurrently
0304102	General biology (2)	3	-	3	0304101
0304111	Practical General biology	-	3	1	0304101 or Concurrently
0334231	Cell biology	2	-	2	0304101
0334251	General botany	3	3	4	0304102
0334261	General zoology	3	3	4	0304102
0304281	Genetics	2	3	3	0304101
0334321	biochemistry	3	3	4	0333233
0334341	General microbiology	3	3	4	0333233
0344351	Plant anatomy and development	2	3	3	0334251
0344352	Plant physiology	2	3	3	0304101
0364361	Vertebrate anatomy	2	3	3	0334261
0344363	Animal physiology	3	3	4	0304102
0334382	Molecular biology	2	3	3	0304101
0304383	Biotechnology	2	3	3	0304101
0304465	Evolution	3	-	3	0304102



0334471	Ecology	2	3	3	0304102
0304491	Seminar	1	-	1	Department approval

B. Elective specialty courses: (21) credit hours:

Course Number	Course Title	Contact Hours		Credit Hours	Pre-requisite
		Theoretical	Practical		
0333323	Nuclear and radiochemistry	3	-	3	0303102
0334282	Human genetics	3	-	3	0304102
0334354	Medical mycology	2	3	3	0304102
0364362	Developmental biology	2	3	3	0304102
0344421	Metabolism	3	-	3	0334321
0334432	Histology	2	3	3	0334261
0334441	Applied microbiology	2	3	3	0334261
0304443	Immunology	2	3	3	0334341
0334445	Virology	2	-	2	0304102
0344452	Taxonomy of flowering plants	2	3	3	0334251
0334463	Endocrinology	2	3	3	0344363
0354464	Comparative Animal Physiology	3	-	3	0344363
0304466	Laboratory Animals	1	3	2	0364361
0304472	Marine Biology and Ecology	2	3	3	0334261
0304492	Research Department	-	6	2	Department Approval

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Fifth: Courses offered by other faculties and departments

Course Number	Course Title	Contact Hours		Credit Hours	Pre-requisite
		Theoretical	Practical		
0301101	Calculus (1)	3	-	3	-
0301131	Principles of statistics	3	-	3	-
0302101	General physics (1)	3	-	3	-
0303101	General chemistry (1)	3	-	3	-
0305101	General geology	3	-	3	-
1901102	Computer skills (2)- practical	3	-	3	1900100
0303102	General chemistry (2)	3	-	3	0303101
0303109	Practical General chemistry	-	3	1	0303102 or concurrently
0303211	Analytical chemistry	3	-	3	0303109
0303216	Practical Analytical chemistry	-	3	1	0303211, or concurrently
0333233	Organic chemistry for non-chemistry students	3	-	3	0303102
0303239	Practical Organic chemistry	-	4	1	0333233 or concurrently
0333323	Nuclear and radiochemistry	3	-	3	0303102

Sixth: Advisory Study Plan
First Year

First Semester			Second Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0301101	Calculus (1)	3	0303101	General chemistry (1)	3
0302101	General physics (1)	3	0304102	General biology (2)	3
0304101	General biology (1)	3		University requirement	3
	University requirement	3		University requirement	3
	University requirement	3		Faculty requirement	3
	Practical general biology	1			
Total		16	Total		15

Second Year

First Semester			Second Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0303102	General chemistry (2)	3	0333233	Organic chemistry for non-chemistry students	3
0303109	Practical general chemistry	1	0303239	Practical Organic chemistry for non-chemistry students	1
0334251	General botany	4	0334231	cytology	2
0304281	Genetics	3	0334261	General zoology	4
	University requirement	3		University requirement	3
	University requirement	3		Faculty requirement	3
Total		17	Total		16

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Third Year



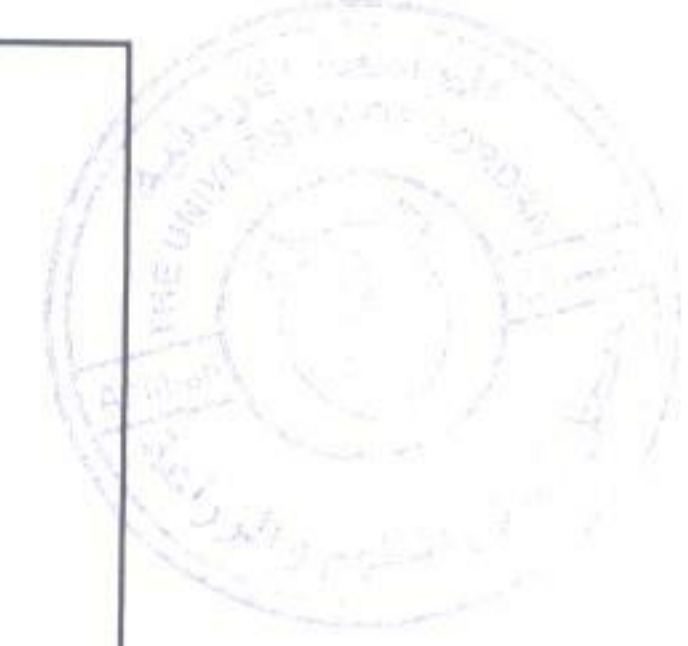
First Semester			Second Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0364361	Vertebrate anatomy	3	0334363	Animal physiology	4
0344321	Biochemistry	4	0333211	Analytical chemistry	3
0334352	Plant physiology	3	0303216	Practical Analytical chemistry	1
	University requirement	3	0334341	General microbiology	4
	Faculty requirement	3		University requirement	3
				Elective specialty requirement 3	3
Total		18	Total		16

Fourth Year

First Semester			Second Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0304491	Seminar	1	0334383	biotechnology	3
0344351	Plant anatomy	3	0334471	Ecology	3
0334382	Molecular Biology	3	0304465	evolution	3
	Elective specialty requirement	3		Elective specialty requirement	3
	Elective specialty requirement	3		Elective specialty requirement	3
	Elective specialty requirement	3		Elective specialty requirement	3
Total		18	Total		16

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**Course description for the
courses taught by
The Department of Biological
Sciences
B.Sc.**



0304101 General biology (1)

(Credit Hours:3)

Prerequisite: -

Internal structure of the cell, molecules of the cell, metabolism, respiration and photosynthesis, cell-cell signaling, cell division, Mendelian inheritance, molecular biology of the gene, DNA technology, chemical signals in plants and animals, phylogeny and systematic introduction to ecosystems.

0304102 General biology (2)

(Credit Hours: 3)

Prerequisite:0304111 or concurrently

Animal and plant tissues, Mammalian circulation, immune system, gas exchange, controlling the internal environment, nervous system and motor mechanism. Transport in plants, plant nutrition, plant reproduction and development.

Eco-distribution and adaptations of organisms, population ecology and community ecology.

0304111 Practical general biology

(Credit Hours: 1)

Prerequisite:0304101 or concurrently

Laboratory experiments in microscopy and cells, chemical aspects of cells, plant and animal tissues, animal and plant physiology. Mammalian anatomy, and systematic of major living groups.

0334231 Cell Biology

(Credit Hours: 2)

Prerequisite: 0304101

This course deals with the cell as a unit of structure of all living organisms. It includes: Cell theory. Principles and technology of microscopy, biological membranes: Ultrastructure and function and their role in controlling cellular responses to cell matrix. Intracellular compartments: Endoplasmic reticulum, golgi complex, lysosomes and peroxisoms ultrastructure and function. Energy transformers: Mitochondria and chloroplasts. The course concentrates also on the nuclear ultrastructure. Chromatin and DNA packaging. Nucleolus and ribosome's biosynthesis. Cell cycle and mechanism of cell division. Also studies cellular junctions. Adhesions and extracellular structures. Cell-to-substratum interactions. Transient differentiations associated with surface activity. Motile cell processes. Plant cell wall and plasmodesmata and bacterial cell wall. The course investigates also the structural elements of cytoskeleton, microtubules, microfilaments and intermediate filaments ultrastructure and functions. Cellular movement, motility and contractility and cell-to cell signaling. The course deals also with cellular aspects of cancer, aging and death.

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0334251 General Botany

(Credit Hours: 4)

Prerequisite: 0304102

Plants on our planet , the plant body, the plant cell, the tissues, the root, the stem the leaf, the flower, inflorescence, the fruit, seed and seedling, plant development, plant groups, plants and man (economic, medicinal, poisonous, ..) , climate and phytogeography.

0334261 General Zoology

(Credit Hours: 4)

Prerequisite: 0304102

Introduction to the living animal continuity and evolution, principles of genetics, organic evolution, reproduction and development, diversity of animal life (structural patterns, classification and phylogeny, principles of nomenclatures); invertebrate and vertebrate animals; activity of life; behavior; animal environment and its influence on its distribution and adaptations.

0304281 General genetics

(Credit Hours: 3)

Prerequisite: 0304101

Mendelian genetics; statistical and pedigree analysis; sex determination; gene linkage and recombination; extranuclear inheritance; modification in chromosome number and structure; fine structure of the gene; the molecular structure of the gene and its replication; transcription; gene action and regulation of gene expression, molecular basis of mutagenesis; population genetics, genetic engineering and laboratory work in basic genetics.

0304282 Human Genetics

(Credit Hours: 3)

Prerequisite: 0304102

DNA structure, techniques of gene analysis, chromosome structure and cell division, immunogenetics, Cancer, genes in kindreds, somatic cell hybridization, cytogenetics, multifactorial inheritance, the human gene map, heritability, population statistics, genetic testing in individuals and populations, human biochemical disorders, gene therapy, hereditary defects with altered drug responses, genetic counseling.

0344321 Biochemistry

(Credit Hours: 4)

Prerequisite: 0333233

This course deals with acids, bases and buffers. The purification and isolation of macromolecules is stressed as an introduction to the study of proteins and nucleic acids. The course deals with the structure of proteins in general and the function of enzymes. Biochemical aspects of nucleic acids including gene expression and regulation are stressed. The course culminates in an overview of carbohydrates, lipids and integrated cellular metabolism.

0334341 General Microbiology

(Credit Hours: 4)

Prerequisite: 0333233

History and scope of microbiology ; prokaryotes cell structure and function; metabolism and nutrition , microbial growth, requirements for growth , environmental factors affecting growth, effect of antimicrobial agents on growth; microbial genetics, and gene cloning , bacterial reproduction, microbial taxonomy, major groups of bacteria, microorganisms and

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environment, elements cycling ; symbiotic associations; immune response and antigen – antibody reactions in vitro.

0344351 Plant Anatomy and Development

(Credit Hours: 3)

Prerequisite: 0334251

A study of the functional aspects of the internal structure for all plants vegetative and reproductive organs and development of vascular plants

0334352 Plant Physiology

(Credit Hours: 3)

Prerequisite: 0304101

Plant water relations: absorption, transport and transpiration. Mineral nutrition, photosynthesis, phloem translocation, phytohormones. growth, dormancy ; seed germination, phytochrome and phtomorphogenesis and stress physiology

0334354 Medical Mycology

(Credit Hours: 3)

Prerequisite: 0304102

Objective study of fungi causing human external and internal diseases: Topics include introduction to fungi, classification, biology, infection modes, prevention, diseases caused by these fungi and treatment.

0364361 Vertebrate Anatomy

(Credit Hours: 3)

Prerequisite: 0304102

Using embryonic, morphological , and developmental patterns in the anatomy of vertebrates Dissecting samples of vertebrate classes in the laboratory

0364362 Developmental Biology

(Credit Hours: 3)

Prerequisite: 0304102

This course deals with the following topics: Male reproductive system, spermatogenesis, oogenesis, fertilization, assisted reproduction technology, cleavage, gastrulation, neurulation, and early human development.

In addition, the course covers development of the following: The skin and its derivatives; the central nervous system, the sense organs; the heart and major blood vessels, the excretory and the reproductive systems, the limbs, the digestive system; the respiratory system. Also a study of the fetal membranes, parturition, and twinning is covered.

0344363 Animal physiology

(Credit Hours: 4)

Prerequisite: 0304102

The physiologic concepts related to the organ systems including the nervous, muscular, endocrine, cardiovascular, excretory and respiratory system are studied. Special emphasis is given to the molecular aspects of the signal transduction mechanisms.

0334382 Molecular Biology

(Credit Hours: 3)

Prerequisite: 0304101

The lectures in this course covers the following topics; historical back ground; chemistry of nucleic acid; Watson-Crick model of DNA; physical and chemical properties of nucleic acids; an introduction to gene function (selection, transcription and translation); transcription in prokaryotic cells; regulation of transcription in prokaryotic cells;

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transcription in eukaryotic cells; regulation of transcription in eukaryotic cells; general and specific transcription factors; post transcriptional events ; translation and the genetic code; post translational events; DNA replication in prokaryotic and eukaryotic cells; Mutation and DNA repair. the laboratory covers the following topics: Isolation of nucleic acids; quantitative and qualitative measurements of nucleic acids; the use of restriction enzymes; Amplification of nucleic acids; characterization and manipulation of the recombinant plasmid pGLO containing GFP gene; bacterial transformation and gene expression and protein produced isolation ; DNA-cloning and southern blot.

0304383 Biotechnology

(Credit Hours: 3)

Prerequisite: 0304101

The course introduces both principles and application of recombinant DNA technology to microbes, animals and plants in the hop of using genetically engineered products to clear the environment and improve human health prospects. This would be achieved trough tackling the history of biotechnology, basic principles of recombinant DNA technology, common methods of applications of animals, human and medical biotechnology. Common methods of applications of plant biotechnology. Methods of applications of microbial and environmental biotechnology. Ethical issues of biotechnology and patenting. Current societal issues in biotechnology and bioethics.

0344421 Metabolism

(Credit Hours: 3)

Prerequisite: 0334321

Metabolism (anabolism and catabolism) of the main organic molecules in the living cell which includes carbohydrates, lipids proteins and nucleic acids with the emphasis on energy metabolism and the role of vitamins as cofactors for enzymes' action.

0334432 Histology

(Credit Hours: 3)

Prerequisite: 0334261

This course covers the following topics: types of tissues, characteristics, structural and functional aspects of the following tissues: epithelial, connective, cartilage, bone, blood, muscular and nervous. In addition, the course deals with study of histology of the following systems: integumentary; lymphoid, digestive, respiratory, excretory, reproductive, and endocrine.

0334441 Applied Microbiology

(Credit Hours: 3)

Prerequisite: 0334341

Food as a substrate for microorganisms, factors affecting growth in food; microorganisms important in food, principles of food preservation, food borne diseases and toxins. Industrial microbiology: primary and secondary metabolites, downstream processing, strain development, microorganisms as food, microbial transformation, water pollution and sewage treatment, microbial treatment and utilization of waste.

0344443 Immunology

(Credit Hours: 3)

Prerequisite: 0334321

This course aims to introduce the student to concepts of immunology. Including basic components of innate and acquired immunity, genetic basis of antibody diversity, mechanisms of immune response both humoral and cell mediated, role of major

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histocompatibility complex (MHC) in immune response, biology of T- and B- lymphocytes, cytokines and complement system. Moreover, the course will cast a light on special cases of immune-disfunctions such as hypersensitivity, autoimmunity and immunodeficiencies. The practical part of the course will introduce the student to basic immunological techniques. The protocols include those for the detection of antigen-antibody interactions, lymphocyte proliferation as well as flowcytometry.

0334445 Virology

(Credit Hours: 2)

Prerequisite: 0304102

Virus structure, viroids, satellites, prions, virus evolution, multiplication of viruses, virus taxonomy, viral pathogenesis, viral persistent, latency, patterns of some viral diseases of human, cell transformation by viruses, host-immune response to viral infections, interferons, antiviral agents, immunization and vaccination.

0344452 Taxonomy of Flowering Plants

(Credit Hours: 3)

Prerequisite: 0334251

Taxonomy of flowering plants, plant according to simple principles, aims to taxonomy, historical summary, phytogeography, and terminology of plant description, field and herbarium methods, nomenclature, concepts of taxa, construction and use of keys, taxonomic literature for such study of the characteristics of about 48 families of plants in Jordan.

0304463 Endocrinology

(Credit Hours: 3)

Prerequisite: 0344363

The function and organization of the major endocrine glands in mammals with emphasis on molecular endocrinology. It also includes the biosynthesis, secretion, metabolism, mechanism and physiological action of the hormones. Some endocrinological disorders resulted from hyposecretion or hypersecretion of hormones will be studied.

0354464 Comparative Animal Physiology

(Credit Hours: 3)

Prerequisite: 0344363

A comparative study of the differences and similarities in the functional processes of animals at selected levels of phylogeny with an emphasis on physiological variation and how different species use different physiological strategies to achieve the same body function. It will include also the molecular and cellular bases for physiological regulation, bioenergetics as well as the functions of the major body systems such as respiratory, excretory, gastrointestinal, cardiovascular, haemopoietic, endocrine and nervous systems.

0304465 Evolution

(Credit Hours: 3)

Prerequisite: 0304102

A review of the history of evolution and evidence for it, biogeography; natural barriers and oceanic islands; fossils and fossilization, origin of life, biogenetic law; the origin of variation and the genetic basis of evolution, natural selection, adaptation and evolution; species and speciation; rates of evolutionary changes, ecology, behavior, and evolution; human evolution; the primates and apes; family Hominidae; major functional and structural changes in relation to new habitat; origin of man; genus *Homo*, and the rise of modern man.

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د. هادي عيسى
Dr. Hadi Issa

0304466 Laboratory animals

(Credit Hours: 2)

Prerequisite: 0364361

Importance, history, definition, general environment, use and advantages of laboratory animals; animal models for research; nutrition of laboratory animals; housing and caging; reproduction and breeding; diseases and disease control; management and supply of animals; production methods; transport of laboratory animals; preparation for surgical procedures and post operative care.

0334471 Ecology

(Credit Hours: 3)

Prerequisite: 0304102

Basic concepts in ecology; organization, structure and function of ecosystem and ecosystem properties; cycling of matter and flow of energy in ecosystems and their equilibrium; factors involved in the regulation, growth, and general dynamics of populations; data needed to describe populations, population growth, population models, and regulatory mechanisms; spatial and temporal variation and properties of populations; community structure and interactions; succession patterns in aquatic and terrestrial communities; field trips to the different vegetation types in Jordan and analysis of quantitative data from the field.

0304472 Marine Biology and Ecology

(Credit Hours:3)

Prerequisite: 0334261

Physical and chemical properties of water; basic oceanography; some ecological principles; division of the marine environment; planktons; oceanic nekton; deep sea biology; shallowwater subtidal benthos; intertidal ecology; meiofauna; tropical communities; symbiotic relationships; human impact on the sea.

0304491 Seminar

(Credit Hours: 1)

Prerequisite: Department approval

Library use, reference collection, reference organization, presentation of term paper and a Short talk using the collected references

0304492 Research

(Credit Hours: 2)

Prerequisite: Department approval

The student chooses a research project in one of the fields of biological sciences which He/she must complete and write in an acceptable scientific manner during the semester (Only students with total average of B and above are allowed to register for this course).

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