Tafila Technical University

College of Science

Department of Applied Biology

Study Plan Approval Date	Applied Biology Study Plan	Study Plan Code
06/11/ 2024		SCI._BIO._0207

Tafila Technical University

College of Science

This study plan is applied to the students admitted into the Bachelor's program in Applied Biology for the academic year 2024/2025

Study Plan for B.SC. in Applied Biology

Offered Degree: B.SC. in Applied Biology

Department	Program	Official Stamp
Department of Applied Biology	B.SC. in Applied Biology	
The applied Biology study plan was approved by the **dean's council** on 06/11/ 2024 / Decision Number (281/2024)		

TTU Applied Biology Program

The Department of Applied Biology was established in 2015 within the College of Science at Tafila Technical University. Its purpose is to grant **a Bachelor's degree in Applied Biology**.

The department aims to prepare qualified human resources in various applied fields across all branches of Biology sciences at both educational and research levels. The academic curriculum consists of 134 credit hours for theoretical and practical courses, equipping students to train in the latest technical methods used in studying and analyzing Biology systems, ranging from microbes to the organs in a living organism. There's a future plan to equip the department with state-of-the-art research laboratories in addition to the educational labs, covering all branches of applied biological sciences.

Vision and Mission

Vision	**Preparing** distinguished scientific and professional competencies in the field of applied biological sciences to meet the needs of the labor market.
Mission	**Elevate** academic standards, and support and stimulate scientific research in the field of applied biological sciences within a caring, safe environment that encourages creativity, innovation, and a spirit of teamwork.

Program Objectives (POs)

PO_1	**Provide** students with basic knowledge and skills in applied biological sciences by a distinguished level of learning and teaching at the bachelor's level.
PO_2	**Qualify** applied biology students to meet the requirements of the labor market with specializations needed by governmental institutions and private sector companies.
PO_3	**Train** applied biology students on scientific research methods, critical thinking, and problem solving to provide the community with consulting and training services in various applied biology applications.
PO_4	**Prepare** distinguished graduates in applied biological sciences to complete their postgraduate studies to serve and develop society.
PO_5	**Attract** distinguished scientific and administrative competencies in applied biology.

Program Educational Outcomes (PEOs)	
PEO_1	**Demonstrate** a comprehensive understanding of fundamental biological principles and their applications in addressing real-world challenges.
PEO_2	**Applying** scientific research methodologies and analytical techniques to investigate and solve problems in applied biological sciences.
PEO_3	**Communicate** scientific concepts and findings effectively, both in written and oral formats.
PEO_4	**Exhibit** ethical behaviour and responsibility in the practice of applied biological sciences, considering the social and environmental impacts of their work.

Student Learning Outcomes (SLOs)	
SLO_1	**Identify**, **formulate**, and **solve** broadly defined technical or scientific problems by applying knowledge of mathematics, science, and technical subjects in areas related to physics.
SLO_2	**Formulate** or **design** a system, process, procedure, or program to meet desired needs.
SLO_3	**Develop** and **conduct** experiments or test hypotheses, analyse and interpret data, and use scientific judgment to draw conclusions.
SLO_4	**Communicate** effectively with a wide range of audiences.
SLO_5	**Understand** ethical and professional responsibilities and the impact of technical and scientific solutions in global, economic, environmental and societal contexts.
SLO_6	**Work** effectively in teams that set goals, plan tasks, meet deadlines, and analyse risks.

Cognitive Domains for Applied Biological Program	
Domain	**Fundamental Cognitive Domains**
1	Animal Science
2	Plant Science
3	Microbiology and Immunity
4	Biochemistry and Molecular Biology
5	Cell Biology and Genetics
6	Biotechnology
7	Advanced Topics and Training
	Supporting Cognitive Domains
	Courses support the applied biological program that are offered by other programs in the college of science or by other colleges

Numbering System for Applied Biological Sciences Program				
College NO.	Program NO.	Course Level	Domain NO.	Course order within the cognitive Domain
02	07	From 1 to 4	From 1 to 7	From 1 to 8

Credit Hours Distribution for B.SC. in Applied Biological Sciences			
Classification	**Credit Hours**		
	Obligatory	**Elective**	**Total**
University Requirements	21	6	27
College Requirements	21	0	21
Specialty Requirements	69	17	86
	111	**23**	**134**

Classification of the Requirements for the B.SC. Degree in Applied Biological Sciences According to Teaching Mode (Online – Blended – Face to Face)

Classification / Requirements	Specialty Requirements		College Requirements	Elective University Requirements	Obligatory University Requirements
	Obligatory	Elective			
Credit Hours	69	17	21	6	21
% Credit Hours	51.5 %	12.5 %	15.7 %	4.5 %	15.7 %
% (Total)	**64.1 %**		**15.7 %**	**20.2 %**	

Teaching Mode	Specialty Requirements			College Requirements			Elective University Requirements			Obligatory University Requirements		
	F-to-F	Blended	Online	F-to-F	Blended	Online	F-to-F	Blended	Online	F-to-F	Blended	Online
Credit Hours	54	12	0	3	18	0	0	0	6	0	0	21
% (Total)	40.3 %	8 %	0 %	2.2 %	13.4 %	0 %	0 %	0 %	4.5 %	0 %	0 %	15.7 %

First: Obligatory University Requirements (21 Credit Hours)

Course NO.	Course Name	Number Of Credit Hours			Pre-requisite	Teaching Mode
		Theoretical	Experimental	Total		
0501100	Communication Skills in Arabic Language	3	0	3	(1)	Online
0502100	Communication Skills in English Language	3	0	3	(2)	Online
0603099	Computer complementary course (3)	3	0	0	------	Online
0302100	Life skills	3	0	3	None	Online
0301199	Leadership and Social Responsibility	3	0	3	None	Online
0404199	Entrepreneurship and innovation	3	0	3	None	Online
0503101	National Education (4)	3	0	3	None	Online
0503112	Military Science (4)	3	0	3	None	Online

(1) "Arabic Placement Test" or Prerequisite Arabic Language 0501099.
(2) "English Placement Test" or Prerequisite English Language 0502099.
(3) " Computer skill placement test" 0602098 , If the student passes in placement test, the grade will record "pass"
(4) Obligatory course for Jordanian students and optional for non-Jordanians. Non-Jordanian students, who do not choose this course, must study another course from the elective university requirements and the grade for this course will not be included in the student's GPA, but will be counted as **pass** or **fail**.

Second: Elective University Requirements (6 Credit Hours)

The student can choose one course from each of the following **groups**:

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Mode
		Theoretical	Experimental	Total		
Humanities Group Offered by College of Arts, College of Education and College of Business						
0302099	Islamic Culture	3	0	3	None	Online
0503108	Human Rights	3	0	3	None	Online
0503110	Introduction to Domestic Violence	3	0	3	None	Online
0301102	Principles of Thinking	3	0	3	None	Online
0301105	Family Counseling	3	0	3	None	Online
0404100	Work Ethics	3	0	3	None	Online
0403099	Development and Environment	3	0	3	None	Online
Applied Sciences Group Offered by College of Engineering, College of Science and College of Information Technology and Telecommunications						
0105103	Mineral Resources in Jordan	3	0	3	None	Online
0601104	E-Learning	3	0	3	None	Online
0602100	Digital Culture	3	0	3	None	Online
0106140	Traffic Safety	3	0	3	None	Online
0105102	Sustainable Development	3	0	3	None	Online
0202111	Physics and Society (5)	3	0	3	None	Online
0212111	Radiation Sources and its Applications (5)	3	0	3	None	Online

(5) Can be chosen by all university students except students of the Applied Physics Department.

Third: Obligatory College Requirements (21 Credit Hours)

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Mode
		Theoretical	Experimental	Total		
0213105	Calculus 1	3	0	3	(5)	Blended
0213106	Calculus 2	3	0	3	0213105	Blended
0213101	General Physics 1	3	0	3	(6)	Blended
0213107	General chemistry 1	3	0	3	(7)	Blended
0213109	General Biology 1	3	0	3	None	Blended
0213115	Principles of Statistics 1	3	0	3	None	Blended
0213103	General Physics Lab. 1	0	3	1	0213101(8)	F-to F
0213108	General Chemistry Lab. 1	0	3	1	0213107(8)	F-to F
0213116	Principles of Statistics Lab. 1	0	3	1	0213115(8)	F-to F

(5) "High School Mathematics " or Prerequisite Mathematics 0213098.
(6) "High School Physics " or Prerequisite Physics 0213097.
(7) "High School Chemistry" or Prerequisite Chemistry 0213099.
(8) or concurrent

Fourth: Obligatory Specialization Requirements (69 credit hours)

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Mode
		Theoretical	Experimental	Total		
0207110	General Biology Lab. 1	0	3	1	0213109 (8)	F-to F
0207111	General Biology 2	3	0	3	0213109	Blended
0207112	General Biology Lab. 2	0	3	1	0207111(8)	F-to F
0205113	General Chemistry 2	3	0	3	0213107	Blended
0205217	Organic Chemistry /Biology	3	0	3	0205113	F-to F
0205218	Organic Chemistry lab. / Biology	0	3	1	0205217(8)	F-to F
0207213	Invertebrates	2	3	3	0207111	F-to F
0207214	Vertebrates	2	3	3	0207213	F-to F
0207241	Biochemistry	3	0	3	0205217	F-to F
0207242	Biochemistry Lab.	0	3	1	0207241(8)	F-to F
0207252	Cell Biology	3	0	3	0207111	Blended
0207231	Mycology	3	0	3	0207111	Blended
0207261	Introductory Biotechnology	3	0	3	0207252	Blended
0207352	Genetics	3	0	3	0207252	F-to F
0207353	Genetics Lab.	0	3	1	0207352 (8)	F-to F
0207332	General Microbiology	3	0	3	0207252	F-to F
0207333	General Microbiology Lab.	0	3	1	0207332 (8)	F-to F
0207321	Plant Biology	3	0	3	0207252	F-to F
0207322	Plant Biology Lab.	0	3	1	0207321(8)	F-to F
0207324	Ecology	3	0	3	0207111	F-to F
0207343	Molecular Biology	3	0	3	0207352	F-to F
0207426	Plant Physiology	3	0	3	0207321	F-to F
0207415	Animal Physiology	3	0	3	0207214	F-to F
0207416	Animal Physiology Lab.	0	3	1	0207415(8)	F-to F

0207417	Histology	2	3	3	0207241	F-to F
0207435	Immunology	3	0	3	0207241	F-to F
0207468	AI Applications in Biology	2	3	3	0207261	F-to F
0207471	Training	0	12**	3	90 credit hours passed	F-to F
0207472	Seminar	1	0	1	90 credit hours passed	F-to F

(8) or concurrent.

****** Students should complete 140 training hour during the semester.

Fifth: Elective Specialization Requirements (17 Credit Hours)

The student can choose courses from the following list:

Course NO.	Course Name	Number of Credit Hours			Pre-requisite	Teaching Mode
		Theoretical	Experimental	Total		
0205234	Analytical Chemistry 1	3	0	3	0205113	F-to F
0207323	Plant Taxonomy	3	0	3	0207321	Blended
0207334	Medical Microbiology	3	0	3	0207332	F-to F
0207362	Microbial Biotechnology	2	3	3	0207261	F-to F
0207363	Plant Biotechnology	2	0	2	0207261	F-to F
0207364	Animal Biotechnology	2	0	2	0207261	F-to F
0207365	Environmental Biotechnology	3	0	3	0207261	Blended
0207366	Bioinformatics	2	3	3	0207261	F-to F
0207467	Food Technology	3	0	3	0207261	Blended
0207469	Biotechnology Ethics	2	0	2	0207261	F-to F
0207444	Hematology	2	3	3	0207415	F-to F
0207445	Clinical Chemistry	2	3	3	0207415	F-to F
0207446	Enzyme Technology	3	0	3	0207261	Blended
0207454	Forensic Science and DNA Technology	3	0	3	0207261	Blended
0207425	Biodiversity	1	0	1	0207324	F-to F
0207418	Embryology	3	0	3	0207213	Blended
0207473	Special Topics	3	0	3	90 credit hours passed	Blended

Advisory Plan for B.SC. Degree in Applied Biological

First Academic Year - Applied Biology Program

The First Semester				The Second Semester			
Course Number	Course Name	Credit Hours	Pre-requisite	Course Number	Course Name	Credit Hours	Pre-requisite
0213109	General Biology1	3	None	0213101	General Physics 1	3	(2)
0207110	General Biology Lab.1	1	0213109(3)	0213103	General Physics Lab.1	1	0213101(3)
0213107	General Chemistry1	3	(1)	0207111	General Biology 2	3	0213109
0213108	General Chemistry Lab. 1	1	0213107	0207112	General Biology Lab.2	1	0207111(3)
0213115	Principles of Statistics1	3	None	0205113	General Chemistry 2	3	0213107
0213116	Principles of Statistics Lab.1	1	0213115		Oblig. University Requirement	3	
	Elec. University Requirement	3			Oblig. University Requirement	3	
Total		**15**		**Total**		**17**	

(1) "High School Chemistry" or Prerequisite Chemistry 0213099.
(2) "High School Physics " or Prerequisite Physics 0213097.
(3) or concurrent

Second Academic Year - Applied Biology Program

The First Semester				The Second Semester			
Course Number	Course Name	Credit Hours	Pre-requisite	Course Number	Course Name	Credit Hours	Pre-requisite
0213105	Calculus 1	3	(1)	0207214	Vertebrates	3	0207213
0205217	Organic Chemistry /Biology	3	0205113	0207241	Biochemistry	3	0205217
0205218	Organic Chemistry lab. / Bio	1	0205217(2)	0207242	Biochemistry Lab.	1	0207241(2)
0207213	Invertebrates	3	0207111	0207261	Introductory Biotechnology	3	0207252
0207252	Cell Biology	3	0207111		Elec. Specialty Requirement	3	
0207231	Mycology	3	0207111		Oblig. University Requirement	3	
Total		**16**		**Total**		**16**	

(1) "High School Mathematics " or Prerequisite Mathematics 0213098.
(2) Or concurrent

Third Academic Year - Applied Biology Program

The First Semester					The Second Semester			
Course Number	Course Name	Credit Hours	Pre-requisite		Course Number	Course Name	Credit Hours	Pre-requisite
0213106	Calculus 2	3	0213105		0207321	Plant Biology	3	0207252
0207352	Genetics	3	0207252		0207322	Plant Biology Lab.	1	0207321(1)
0207353	Genetics Lab.	1	0207352(1)		0207324	Ecology	3	0207111
0207332	General Microbiology	3	0207252		0207343	Molecular Biology	3	0207352
0207333	General Microbiology Lab.	1	0207332(1)			Elec. Specialty Requirement	2	
	Elec. Specialty Requirement	3				Elec. University Requirement	3	
	Oblig. University Requirement	3				Oblig. University Requirement	3	
Total		**17**			**Total**		**18**	

(1) Or concurrent

Fourth Academic Year - Applied Biology Program

The First Semester					The Second Semester			
Course Number	Course Name	Credit Hours	Pre-requisite		Course Number	Course Name	Credit Hours	Pre-requisite
0207426	Plant Physiology	3	0207321		0207417	Histology	3	0207241
0207415	Animal Physiology	3	0207214		0207435	Immunology	3	0207241
0207416	Animal Physiology Lab.	1	0207415(1)		0207468	Biotechnology Ethics	2	0207261
0207472	Seminar	1	90 Hours			Elec. Specialty Requirement	3	
0207471	Training	3	90 Hours			Elec. Specialty Requirement	3	
	Elec. Specialty Requirement	3				Oblig. University Requirement	3	
	Oblig. University Requirement	3						
Total		**17**			**Total**		**17**	

(1) Or concurrent

Courses that Cover Fundamental Cognitive Domains for the Applied Biological

Cognitive Domain	Course number	Course Name	Number of credit hours			Pre-requisite
			Theoretical	Experimental	Total	
(1) Animal Science	0207110	General Biology Lab. 1	0	3	1	0213109(1)
	0207111	General Biology 2	3	0	3	0213109
	0207112	General Biology Lab. 2	0	3	1	0207111(1)
	0207213	Invertebrates	2	3	3	0207111
	0207214	Vertebrates	2	3	3	0207213
	0207415	Animal Physiology	3	0	3	0207214
	0207416	Animal Physiology Lab.	0	3	1	0207415(1)
	0207417	Histology	2	3	3	0207241
	0207418	Embryology	3	0	3	0207213
(2) Plant Science	0207321	Plant Biology	3	0	3	0207252
	0207322	Plant Biology Lab.	0	3	1	0207321(1)
	0207323	Plant Taxonomy	3	0	3	0207321
	0207324	Ecology	3	0	3	0207111
	0207425	Biodiversity	1	0	1	0207324
	0207426	Plant Physiology	3	0	3	0207321
(3) Microbiology and Immunity	0207231	Mycology	3	0	3	0207111
	0207332	General Microbiology	3	0	3	0207252
	0207333	General Microbiology Lab.	0	3	1	0207332(1)
	0207334	Medical Microbiology	3	0	3	0207332
	0207435	Immunology	3	0	3	0207241
(4) Biochemistry and Molecular Biology	0207241	Biochemistry	3	0	3	0205217
	0207242	Biochemistry Lab.	0	3	1	0207241(1)
	0207343	Molecular Biology	3	0	3	0207352
	0207444	Hematology	2	3	3	0207415
	0207445	Clinical Chemistry	2	3	3	0207415
	0207446	Enzyme Technology	3	0	3	0207261
(5) Cell Biology and Genetics	0207252	Cell Biology	3	0	3	0207111
	0207352	Genetics	3	0	3	0207252
	0207353	Genetics Lab.	0	3	1	0207352(1)
	0207454	Forensic Science and DNA Technology	3	0	3	0207261
(6) Biotechnology	0207261	Introductory Biotechnology	3	0	3	0207252
	0207362	Microbial Biotechnology	2	3	3	0207261
	0207363	Plant Biotechnology	2	0	2	0207261

	0207364	Animal Biotechnology	2	0	2	0207261
	0207365	Environmental Biotechnology	3	0	3	0207261
	0207366	Bioinformatics	2	3	3	0207261
	0207467	Food Technology	3	0	3	0207261
	0207468	AI Applications in Biology	2	3	3	0207261
	0207469	Biotechnology Ethics	2	0	2	0207261
(7) Advanced Topics and Training	0207471	Training	0	12**	3	90 credit hours passed
	0207472	Seminar	1	0	1	
	0207473	Special Topics	3	0	3	

(1) or concurrent.

**** Students should complete 140 training hour during the semester.**

Supporting Courses for the Applied Biological Program that are Offered by other Programs in the College of Science

Cognitive Domain	Course Number	Course Name	Number of credit hours			Pre-requisite
			Theoretical	Experimental	Total	
Supporting Domains	0213105	Calculus 1	3	0	3	(5)
	0213106	Calculus 2	3	0	3	0213105
	0213101	General Physics 1	3	0	3	(6)
	0213107	General Chemistry 1	3	0	3	(7)
	0213115	Principles of Statistics 1	3	0	3	None
	0213103	General Physics Lab. 1	0	3	1	0213101(8)
	0213108	General Chemistry Lab. 1	0	3	1	0213107(8)
	0213116	Principles of Statistics Lab. 1	0	3	1	0213115(8)
	0205113	General Chemistry 2	3	0	3	0213107
	0205217	Organic Chemistry /Biology	3	0	3	0205113
	0205218	Organic Chemistry lab. / Biology	0	3	1	0205217(8)
	0205234	Analytical Chemistry	3	0	3	0205113
	0213097	Prerequisite Physics (9)	3	0	0	None
	0213098	Prerequisite Calculus (9)	3	0	0	None
	0213099	Prerequisite Chemistry (9)	3	0	0	None

(5) "High School Mathematics " or Prerequisite Mathematics 0213098.
(6) "High School Physics " or Prerequisite Physics 0213097.
(7) "High School Chemistry" or Prerequisite Chemistry 0213099.
(8) or concurrent. (9) This course is marked **PASS** or **FAIL**

Description of the Courses that Cover Fundamental Cognitive Domains of the Applied Biological Program

Course Name: **General Biology 1**	Course Number: **0213109**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **None**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This introductory course will cover the basic concepts in biology which includes the chemical context of life, water and the fitness of the environment, carbon and the molecular diversity of life, the structure and function of large biological molecules, cell structure and function, membrane structure and function, an introduction to metabolism, cellular respiration and fermentation, photosynthesis, the cell cycle, mitosis, meiosis and sexual life cycles, Mendel and the gene idea and finally the chromosomal basis of inheritance.	
Course name: **General Biology Lab. 1**	Course number: **0207110**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0213109**$^{(8)}$	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	During this general practical course the students will learn about lab safety, types and structure of microscopes, structure and function of cells, detection and quantifications of large bio-molecules (Carbohydrates, Lipids, Proteins and Nucleic acids), cellular respiration, photosynthesis, cell cycle and cell division, enzyme function and the effect of different parameters on the enzyme activity transport of water and solutes through the semi-permeable membranes, plant and animal tissue.	
Course name: **General Biology 2**	Course number: **0207111**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0213109**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	General biology 2 course will introduce the students into the structure, function, life cycle and classification of organisms of the three main domains of organisms including Bacteria and Archaea, Protists, Fungi, Plant Diversity and classification, Plant Form and Function, Plant Structure, Growth, and Development, Soil and Plant Nutrition, Animal Diversity and classification, Introduction to Invertebrates, Origin and Evolution of Vertebrates, Animal Form and Function.	
Course name: **General Biology Lab. 2**	Course number: **0207112**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite**: 0207111**$^{(8)}$	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this general practical course the students will be exposed to the biodiversity of organisms through prepared slides and models as well as preserved specimen covering the Domain of Archea, the domain of Bacteria and the domain of Prokarya (Protists, Fungi, Plant and Animals). Through this practical course the students will learn and got knowledge about the taxonomy, morphology and some of the structural adaptations of organisms.	
Course name: **Invertebrate**	Course number: **0207213**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite**: 0207111**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this course the students will learn about the basic concepts of invertebrate taxonomy, physiology and function; external and internal anatomy; reproduction, life cycles, feeding relationships; form and function of aquatic and terrestrial invertebrates; adaptations of all the invertebrate phyla.	

Course name: **Vertebrates**	Course number: **0207214**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207213**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course aims to introduce the students to the study of the Vertebrates. It will expose the students to the external morphology, embryological, structural, functional and evolutionary approaches. The course will integrate vertebrate anatomy with functional morphology and phylogeny. The following systems will be discussed: the integument, skeletal, digestive, muscular, circulatory, respiratory, excretory and the nervous and sense organs.	
Course name: **Biochemistry**	Course number: **0207241**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0205217**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this 3 credit hours course of biochemistry the students will learn about Water, electrolytes, acid base balance and buffers, Amino acids and peptides, Enzymes: catalysis, types, function and inhibition, Lipids: chemical nature and function, Nucleic acids structure and function: nucleotides, DNA, RNA, Carbohydrates: the structure and function of monosaccharides, disaccharides, polysaccharides and glycoproteins, Carbohydrates metabolism, Lipid metabolism, ketone bodies, Metabolism of amino acids, Purines and Pyrimidines: synthesis and degradation.	
Course name: **Biochemistry Lab.**	Course number: **0207242**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207241**$^{(8)}$	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this practical course of biochemistry the students will learn and perform some experiments about Qualitative analysis of amino acids, Determine pKa and pI of acidic, basic, and neutral amino acids, Estimate amino acids by Ninhydrin Methods, Quantify glycine by formal titration, Qualitative analysis of carbohydrates, Estimate total sugars by phenol sulfuric acid method, Estimate reducing sugars by DNS, Estimate fructose by Roe's method, Qualitative analysis of lipids, Saponification value of fats ,Iodine number of oil, Acid value of fats, Estimate protein by Biuret method, Estimate protein by Lowry method Separate amino acids by ion-exchange Chromatography, Enzymes and the effect of different parameters on enzyme activity.	
Course name: **Cell Biology**	Course number: **0207252**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207111**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the basic topics in cell and molecular biology such as: Basic properties of cells, Prokaryotic and eukaryotic cells, Viruses, Biological molecules: carbohydrates, lipids, proteins, and nucleic acids, Techniques used in cell and molecular biology, Enzymes, Metabolism, Mitochondrion structure and function, Chloroplast structure and function, Plasma membrane composition, structure, and function, The movement of substances across cell membranes, The endomembrane system, The extracellular matrix, The structure and function of the nucleus, Genes and chromosomes, DNA replication, Transcription, Translation, Cytoskeleton and cell motility, Cellular reproduction, Cell signaling and Cancer.	
Course name: **Mycology**	Course number: **0207231**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207111**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the study of the Morphology of Yeasts and Fungi, Ultrastructure and Function of Fungal Cells, Fungal Nutrition and Cellular Biosynthesis, Fungal Metabolism, Fungal Growth and Reproduction, Fungal biodiversity and taxonomy. The course also covers some of the biotechnological application of fungi, fungal pathogens of human and plants.	

Course name: **Introductory Biotechnology**	Course number: **0207261**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207252**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this introductory course the student will study about the definitions, history and categories of biotechnology. The student will be exposed to the most common biotechnological applications in biology including recombinant DNA technology, PCR, Northern and southern blot, insulin and growth hormone production through recombinant DNA technology, DNA profiling and forensic DNA technology, proteomics, fermentation technology, organic acid production, amino acid production, single cell protein, animal biotechnology, plant biotechnology and environmental biotechnology.	
Course name: **Genetics**	Course number: **0207352**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207252**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course presents basic terms and principles of genetics. The course covers the following topics: Structure and Biochemistry of DNA (DNA - the Genetic Code, Structure, Replication, and Manipulation of DNA, Transcription and Translation) Transmission Genetics (Basic and Advanced Principles of Heredity, The Chromosomal Basis of Heredity) Linkage, Mapping, and Chromosomes (Gene Linkage and Genetic Mapping, Human Karyotypes and Chromosome Behavior) Prokaryotic Genetics (The Genetics of Bacteria and Viruses, Molecular Mechanisms of Prokaryotic Gene Regulation) and some Specialized Topics (Genetic Engineering and Genomics, Mechanisms of Mutation, Cancer, The Basics of Population Genetics).	
Course name: **Genetics Lab.**	Course number: **0207353**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0207352(8)**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This practical course covers the basic topics in genetics including: The law of genetic transformation of mendilian and nonmendilian traits using hybridization in the fruit fly Drosophila. Plasmid DNA isolation and DNA quantitation: Plasmid minipreps, Restriction digestion, Preparation of competent cells, Agarose gel electrophoresis, Restriction Enzyme digestion of DNA, Purification of DNA from an agarose gel, DNA Ligation, Transformation of *E.coli* with standard plasmids, Calculation of transformation efficiency.	
Course name: **General Microbiology**	Course number: **0207332**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207252**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the basic topics in microbiology including: Overview of history of Microbiology, Microscopy, Concept of Sterilization, Stains and staining techniques, microbial cells structure and function, microbial nutrition, microbial growth, microbial metabolism, taxonomy, microbial genetics, the role of microorganisms in disease, immunity and other related applied topics. Basic concepts of Virology.	
Course name: **General Microbiology Lab.**	Course number: **0207333**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0207332(8)**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this course the students will lean and practice the following basic techniques in microbiology such as Sterilization, disinfection, safety in microbiological laboratory, Preparation of media for growth of various microorganisms, Identification and culturing of various microorganisms, Staining and enumeration of microorganisms., Growth curve, measure of bacterial population by turbidometry and studying the effect of temperature, pH, carbon and nitrogen, Assay of antibiotics production and demonstration of antibiotic resistance, Isolation and screening of industrially important microorganisms, Determination of thermal death point and thermal death time of microorganisms.	

Course name: **Plant Biology**	Course number: **0207321**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207252**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course provides an introductory coverage of angiosperm plant structure including cell types, tissues, and tissue systems, reproduction and development, plant nutrition, and growth regulation. Students are also given an overview of the major Divisions in the Plant Kingdom as well as plant ecology and geographical distributions.	
Course name: **Plant Biology Lab.**	Course number: **0207322**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0207321**$^{(8)}$	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this practical course of plant biology the students will learn about plant structure including cell types, tissues, and tissue systems, plant morphology and the major divisions in the plant kingdom through prepared slides, models and living specimen.	
Course name: **Ecology**	Course number: **0207324**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207111**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the basic concepts in ecology including: Fundamentals of Ecology, Ecosystems: Definition and, concept of ecosystems, energy flow in ecosystems, Nutritional Flux. Development and evolution of the ecosystems. Biogeochemical cycles, Food-chains, ecotone, edge effects, ecological niche, and ecosystem stability, Microorganisms and their association with man, animals and plants. Microbes as anti-microbial agents, Biomes and Habitat, Classification of biomes, major biotic elements of each biome and their characteristics. Human impact on the natural environment, Biodiversity of Jordan, Population and Community Ecology.	
Course name: **Molecular Biology**	Course number: **0207343**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207352**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course aims to introduce the students to the basic concepts of molecular biology. The first part covers the molecular nature of genes and organization of prokaryotic and eukaryotic chromosomes. The second part covers DNA replication, repair gene expression and gene regulation. Genomics, analysis of gene structure, and gene expression are covered briefly. Students are required to read selected chapters as self-studying. In the laboratory, the students learn hands-on techniques of recombinant DNA technology.	
Course name: **Plant Physiology**	Course number: **0207426**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207321**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course is designed to provide students with the basics of plant physiology. Topics to be covered include solute transport and photosynthesis, metabolism of organic and inorganic nutrients, regulation of plant growth and growth factors, as well as environmental influence on plant physiology. The physiology of fungi, nitrogen fixation nodules, as well as plant hormones and defense mechanisms in plants will also be addressed.	
Course name: **Animal Physiology**	Course number: **0207415**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207214**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	The animal physiology course provides a solid foundation in animal form and function, homeostasis, gas exchange and physiology of ventilation, circulatory system, nutrition and digestion, energetics of locomotion, muscle and movement, temperature adaptation, thermoregulation, thermal physiology, nervous systems and sensory physiology, endocrine and neuroendocrine physiology, reproductive physiology, nitrogen excretion and kidney function.	

Course name: **Animal Physiology Lab.**	Course number: **0207416**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0207415**(8)	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In the practical course of animal physiology the students will perform experiments on the Influence of pH on salivary amylase activity, Estimation of haemoglobin, RBC and WBC, Estimation of serum uric acid, study of Cardiovascular system function, Nervous System, Respiration and Metabolism, Gastrointestinal, Endocrine, Renal, Environmental and Body Temperature.	
Course name: **Histology**	Course number: **0207417**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207241**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	Cell review, Animal Tissues: Epithelial tissue, Connective tissue Cartilage, Bone, Blood, Muscular tissue, Nervous tissue, Cardiovascular, Lymphatic Organs: Tonsils, Thymus, Spleen, Lymph nodes, Respiratory system, Skin, Digestive system: Salivary Glands and Tongue Esophagus and Stomach, Small and large Intestine, Liver, Gall Bladder and Pancreas, Urinary system, Reproductive system, Endocrine system: Pituitary and Pineal Glands, Thyroid, Parathyroid and Adrenal glands.	
Course name: **Immunology**	Course number: **0207435**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207241**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	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 histo-compatibilty 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 immune-deficiencies. 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 flow cytometry.	
Course name: **AI Applications in Biology**	Course number: **0207468**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course explores the transformative role of artificial intelligence (AI) in the field of biology. Designed for students with a background in biology, computer science, or a related discipline, the course provides an interdisciplinary approach to understanding how AI techniques are applied to solve complex biological problems.	
Course name: **Training**	Course number: **0207471**	NO. of credit hours: **3** (**140** training Hrs)
Pre-requisite: **90 credit hours passed**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	The student will be trained 140 hours during summer semesters (after completing the 3 year) in the Official Medical laboratory recognized by the Department of the Biological Sciences and University of Jordan. The training will include basic concepts in clinical Chemistry, Medical Microbiology, blood endocrinology, Blood banking, Parasitology, Immunopathology. The students will be supervised by a departmental member for training purposes. The graduate mark will be pass or fail.	
Course name: **Seminar**	Course number: **0207472**	NO. of credit hours: **1** Theoretical Hrs.
Pre-requisite: **90 credit hours passed**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This is an applied research seminar in which the students will prepare a written presentation material about research articles or topic, fact sheets on a current science or technology in biology. The students will be guided by the supervisor for choosing the topic of their presentation, the scientific writing and in their presentation preparations.	

Course name: **Plant Taxonomy**	Course number: **0207323**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207321**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course provides an in-depth exploration of plant taxonomy, focusing on the principles and methodologies used in the classification and identification of plants. Emphasis is placed on understanding plant diversity through morphological, anatomical, and molecular characteristics. The course covers the history of plant classification, from early systems to modern phylogenetic approaches. Students will learn to use taxonomic keys and resources to identify plants, and will explore the significance of taxonomy in fields such as conservation, agriculture, and ecology.	
Course name: **Medical Microbiology**	Course number: **0207334**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207332**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	A medical microbiology course typically covers the study of microorganisms, including bacteria, viruses, fungi, and parasites, that are relevant to human health and disease. The course is designed to provide students with a comprehensive understanding of the principles and applications of microbiology in the context of medicine.	
Course name**:** **Microbial Biotechnology**	Course number: **0207362**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the fundamental principles and applications of microbial systems in industrial processes, environmental management, agriculture, and healthcare. Students will gain a comprehensive understanding of how microbes can be harnessed to develop innovative solutions and products, ranging from pharmaceuticals to biofuels.	
Course name: **Plant Biotechnology**	Course number: **0207363**	NO. of credit hours: **2** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	The course will concentrate on Plant tissue culture, Transformation of plants or plant cells. Stress, pathogen and herbicide tolerance. Improved nutritional content and functional foods. Phytoremediation, Forest biotechnology, Plants as green factories: production of plastics, fats/oils, fibers, proteins and biofuels, GMO-regulations.	
Course name: **Animal Biotechnology**	Course number: **0207364**	NO. of credit hours: **2** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course will Introduce the students to preservation and maintenance of animal cell lines, cryopreservation and transport of animal germ plasma (i.e. semen, ovum and embryos), Gene Transfer to Animal Cell, Animal Germ cells and development, Valuable genes for animal biology, Transgenic animals and gene knock-outs, Transgenic animals in agriculture and nutritional science, DNA vaccine, DNA Vaccine, Antibiotics as growth promotants, Molecular biological techniques for rapid diagnosis of genetic diseases and gene therapy.	
Course name**:** **Environmental Biotechnology**	Course number: **0207365**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the Fundamental Aspects of Environmental Microbiology and Environmental Significance of Bacteria, Fungi, and Algae, Bioremediation for Soil Environment, Bioremediation for Air Environment, Bioremediation for Water Environment, Bio-treatment of Metals, Overcoming Limitations of Bioremediation and Emerging Environmental Biotechnologies.	

Course name: **Bioinformatics**	Course number: **0207366**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the major bioinformatics resources (NCBI, EBI, ExPASy); Sequence and structure databases; Sequence analysis (biomolecular sequence file formats, scoring matrices, sequence alignment, phylogeny); Genomics and Proteomics (Large scale genome sequencing strategies; Comparative genomics; Understanding DNA microarrays and protein arrays); Molecular modeling and simulations (basic concepts including concept of force fields).	
Course name: **Food Technology**	Course number: **0207467**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course covers the basic knowledge about food safety and hygiene practices including (personal hygiene, food hygiene safe work practices), causes of food deterioration and spoilage, principles of food preservation and storage, reasons for cooking foods, properties of food, basic ingredients used in food preparation, methods and equipment used in the preparation and processing of food, the role of technology in the preparation of food domestically and the social implications, physical and nutritive effects of preparation and processing in domestic and industrial setting, industrial food preparation, presentation and service of food, food packaging.	
Course name: **Biotechnology Ethics**	Course number: **0207469**	NO. of credit hours: **2** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	Course will cover areas where human life and health are involved, such as artificial reproduction, research ethics, cloning, and stem cell research. This course begins with a brief overview of ethics, and them moves to develop and consider the moral values and principles relevant to medical practice and bioethics. The course aims to consider the defense of general views on the moral values involved in bioethics, as well as the complicated issues of applying this general knowledge to particular situations. The course hopes to develop moral wisdom (knowledge about ethics and the ability to think ethically) and moral virtue (a stronger commitment to act morally).	
Course name: **Hematology**	Course number: **0207444**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207415**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course provides a comprehensive examination of hematology, encompassing the study of blood and its physiological and pathological aspects. Emphasis is placed on understanding the structure and function of blood cells, the mechanisms of blood coagulation, and the interpretation of hematological tests. The course covers the etiology, diagnosis, and treatment of hematological disorders, including anemias, leukemias, and coagulopathies. Laboratory sessions complement theoretical knowledge by providing practical experience in blood cell morphology assessment, hematological testing techniques, and interpretation of diagnostic findings.	
Course name: **Clinical Chemistry**	Course number: **0207445**	NO. of credit hours: **3** (**2** Theoretical & **3** Experimental Hrs)
Pre-requisite: **0207415**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	Essentials of clinical chemistry that related to the biochemical basis of diseases and the principals of laboratory diagnosis particularly in the following conditions; inborn errors of metabolism, disorders of plasma proteins, plasma enzymes, acid-base balance, blood gases, electrolytes, carbohydrates, lipids, nitrogen metabolites, calcium and phosphate, renal and liver function tests. Also exposing the student to the routine biochemical tests used in the diagnosis of diseases.	

Course name: **Enzyme Technology**	Course number: **0207446**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this course the students will learn about enzymes as catalysts (proteins as catalysts, Enzyme characteristics and properties, Enzyme nomenclature/classification, Enzyme Purification and Assay). Enzyme kinetics (Kinetics of single substrate reactions, Enzyme inhibition, Multi-substrate reactions). Mechanism of enzyme catalysis (Reaction Mechanisms and Catalysis, Active Site studies, Specific enzymes Case examples of enzymes). Enzyme regulation (Partial Proteolysis, Phosphorylation, adenylylation, disulphide reduction, Allosteric regulation). Biotechnological applications of industrial enzymes. Enzyme preparation and use. The preparation of immobilized enzymes – rationale ,choice of matrix, methods of immobilization. Large scale enzyme production. Enzyme stabilization: use of additives. Application of enzymes in industry, analytical purpose and medical therapy.	
Course name: **Forensic Science and DNA Technology**	Course number: **0207454**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207261**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	In this applied course the students will learn about Basic DNA principles; Introductory genetic principles; Population variation and genome structure, molecular separations and detections technology, Fundamentals of DNA separations and detections, RFLP, Short Tandem Repeat (STR) markers, DNA testing, Modern DNA analysis methods, Mitochondrial DNA analysis, Advantages and limitations of DNA typing methods, DNA sample collection, storage, and characterization, DNA extractions, separations analysis; DNA quantitation for forensic analysis, PCR techniques, factors affecting genotyping results, Developing an interpretation strategy, Statistical interpretations and evaluating strength of DNA analysis, DNA databases, Forensic DNA challenges.	
Course name: **Biodiversity**	Course number: **0207425**	NO. of credit hours: **1** Theoretical Hrs.
Pre-requisite: **0207324**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course will expose the students to the historical background of DANA biosphere reserve area, the geographical and climate properties of DANA, the plant and animal biodiversity in DANA biosphere reserve. In addition, students will gain knowledge in Wildlife management and conservation. Protected Areas Network in Jordan: Goals of management, Strategies for planning. Factors influencing wildlife management such as habitats, population, behavior, food-habits, health, etc.	
Course name: **Embryology**	Course number: **0207418**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0207213**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	The course will focus on studying the developmental stages in different organisms as Amphibians, Sea Urchins, Drosophila and human. Current approaches in developmental biology including genetic molecular biology will be discussed.	
Course name: **Special Topics**	Course number: **0207473**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **90 credit hours passed**	Teaching language: **English**	Offered by: Applied Biology Program
Course Description	This course offers an in-depth examination of a specialized topic within [field/area], providing students with the opportunity to explore current trends, emerging issues, or advanced concepts not covered in standard curriculum. The course content may vary each semester to reflect timely and relevant developments in the field. Emphasis is placed on critical analysis, research, and discussion, fostering a deeper understanding and appreciation of the selected topic.	

(8) or concurrent.

Description of the Courses Offered by other Programs in the College of Science that Cover Supporting Domains of the Applied Biology Program

Course Name: **General Physics 1**	Course number: **0213101**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **High School Physics or Prerequisite Physics 0213097**	Teaching language: **English**	Offered by: Applied Physics Program
Course Description	The course covers units and measurement, scalar and vector quantities, vectors, motion in one dimension, projectiles, circular motion, laws of motion and their applications, work and energy, linear momentum, collisions, kinematics of rotational motion, center of mass, torque, angular momentum, applications of static and dynamic equilibrium.	
Course Name: **General Physics Lab. 1**	Course number: **0213103**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0213101**(8)	Teaching language: **English**	Offered by: Applied Physics Program
Course Description	This experimental course covers an introduction on measurements, accuracy and precision, collection and analysis of data, measurements and uncertainties, vectors: force table, kinematics of rectilinear motion, projectiles, newton's second law of motion with digital cart, force and displacement on a fixed pully, centripetal force/centrifugal force, coefficients kinetic and static friction, conservation of mechanical energy, conservation of momentum with digital-cart, simple pendulum, spring constant.	
Course Name: **Calculus 1**	Course number: **0213105**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **High School Mathematics or Prerequisite Mathematics 0213098**	Teaching language: **English**	Offered by: Mathematics Program
Course Description	Calculus 1 is an introductory course in differential and integral calculus, laying the foundation for further studies in mathematics, engineering, physical sciences, and economics. The course focuses on the fundamental principles of calculus and their applications to real-world problems. It is designed to develop students' analytical and problem-solving skills through a rigorous examination of limits, derivatives, integrals, and the Fundamental Theorem of Calculus.	
Course Name: **Calculus 2**	Course number: **0213106**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0213105**	Teaching language: **English**	Offered by: Mathematics Program
Course Description	Calculus 2 is a continuation of the study of calculus, building upon the foundational concepts introduced in Calculus 1. This course delves deeper into integration techniques, infinite sequences and series, and introduces parametric equations and polar coordinates. It is designed for students in mathematics, engineering, physical sciences, and economics, emphasizing both theoretical understanding and practical applications.	
Course Name: **General chemistry 1**	Course number: **0213107**	NO. of credit hours: 3 Theoretical Hrs.
Pre-requisite: **High School Chemistry or Prerequisite Chemistry 0213099**	Teaching language: **English**	Offered by: Chemistry Program
Course Description	Chemistry and measurement, stoichiometry of atoms and molecules, stoichiometry of chemical reactions, properties of solutions, atomic structure, periodic table and electronic configurations of atoms and ions, molecular structure, chemical bonding, molecular shapes, gases, thermo chemistry.	
Course Name: **General chemistry 2**	Course number: **0205113**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0213107**	Teaching language: **English**	Offered by: Chemistry Program
Course Description	Inter-molecular attractive forces, Chemical kinetics, thermochemistry and thermodynamics, electrochemistry, acids and bases, chemical equilibrium, precipitation reactions.	

Course Name: **General Chemistry Lab. 1**	Course number: **0213108**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0213107**(8)	Teaching language: **English**	Offered by: Chemistry Program
Course Description	This experimental course covers Lab. safety and basic Lab. techniques, formula of hydrate, empirical formula of a compound, limiting reactant, periodic chart and periodic law, spectroscopy and molecular geometry, properties of inorganic compounds and metathesis reactions, molecular weight of a volatile liquid, preparation of an alum, aspirin synthesis, standardization of NaOH solution and equivalent weight of an acid, bleach analysis.	
Course Name: **Principles of Statistics 1**	Course number: **0213115**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **None**	Teaching language: **English**	Offered by: Mathematics Program
Course Description	Principles of Statistics I is an introductory course aimed at providing students with a fundamental understanding of statistical concepts and techniques. This course focuses on descriptive statistics, probability theory, and basic inferential statistics. It is essential for students in various disciplines, including social sciences, business, health sciences, and natural sciences, where data analysis and interpretation are crucial.	
Course Name: **Principles of Statistics Lab. 1**	Course number: **0213116**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0213115**(8)	Teaching language: **English**	Offered by: Mathematics Program
Course Description	Principles of Statistics Lab 1 is a companion laboratory course designed to reinforce and apply the concepts learned in the Principles of Statistics 1 lecture course. Through hands-on experience with statistical software and real-world data sets, students will gain practical skills in data analysis, interpretation, and presentation. This lab is essential for students aiming to enhance their understanding of statistical methods and their applications in various disciplines.	
Course Name: **Organic Chemistry For Biology**	Course number: **0205217**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0205113**	Teaching language: **English**	Offered by: Chemistry Program
Course Description	Bonding, molecular properties and structure of organic compounds, nomenclature, preparations, physical properties, stereochemistry, reactions and reaction mechanisms of alkanes, alkenes, alkynes and aromatic compounds, nomenclature, preparations, physical properties, reactions and reaction mechanisms of alkyl halides, alcohols, phenols, ethers, sulfur compounds, aldehydes, ketones, carboxylic acids and their derivatives, amines and aryl amines.	
Course Name: **Organic Chemistry for Biology Lab.**	Course number: **0205218**	NO. of credit hours: **1** (**3** Experimental Hrs)
Pre-requisite: **0205217**(8)	Teaching language: **English**	Offered by: Chemistry Program
Course Description	The Organic Chemistry Lab course is designed to provide students with hands-on experience in the techniques and principles of organic synthesis, purification, and analysis. Through a series of laboratory experiments, students will learn to safely handle chemicals, perform reactions, and utilize various analytical instruments to characterize organic compounds.	
Course Name: **Analytical Chemistry 1**	Course number: **0205234**	NO. of credit hours: **3** Theoretical Hrs.
Pre-requisite: **0205113**	Teaching language: **English**	Offered by: Chemistry Program
Course Description	Statistical treatment of analytical data, gravimetric analysis, acid-base equilibria, acid-base titrations, complex formation titrations, precipitation reactions and titrations, introduction to electrochemistry, qualitative analysis by atomic spectroscopic methods.	

(8) or concurrent.

Cours Name: **Prerequisite Physics** *	Course number: **0213097**	NO. of credit hours: **0** (**3** Theoretical.)
Pre-requisite: **None**	Teaching language: **English**	Offered by: Basic Sciences Department
Course Description	The course covers measurement and system of units; Vectors; motion in one and two dimensions; Particle dynamics and Newton's laws of motion; Work and energy; Conservation of energy; Collisions, impulse; Conservation of linear momentum; Electric charge; Coulomb's law; Electric field; Gauss law; Electric potential: electric potential energy and electric potential of point charges; Current and resistance; Ohm's law; Kirchhoff's laws; Magnetic field: Magnetic force and concept of magnetic field.	
Cours Name: **Prerequisite Calculus** *	Course number: **0213098**	NO. of credit hours: **0** (**3** Theoretical.)
Pre-requisite: **None**	Teaching language: **English**	Offered by: Basic Sciences Department
Course Description	The course covers real numbers, Inequalities; Cartesian plane; Distance formula, Straight lines; Parabola; Graph of curves; Composition functions; Polynomials; Rational functions; Long division, Roots of polynomials; Exponents; Logarithms; Trigonometric functions, Limits, Continuity, Limits at infinity, Definition of derivative; Differentiation rules; Applications; chain rule; Implicit differentiation; Derivatives of logarithmic and trigonometric functions; Definite integration; Principles of integration; Fundamental theorem of calculus; Applications of integration; Area between two curves.	
Cours Name: **Prerequisite Chemistry** *	Course number: **0213099**	NO. of credit hours: **0** (**3** Theoretical.)
Pre-requisite: **None**	Teaching language: **English**	Offered by: Basic Sciences Department
Course Description	The course covers basic concepts in chemistry: The study of change; Mass relationships in chemical reactions, Gases, Physical periodic relationship among the elements; Chemical bonding; Physical properties of solutions; Acids, bases and their equilibria. The course emphasizes on developing the student's problem-solving skills by introducing examples on everyday examples whenever possible.	

* This course is marked **PASS** or **FAIL**