Academic Programs Booklet

College of Science

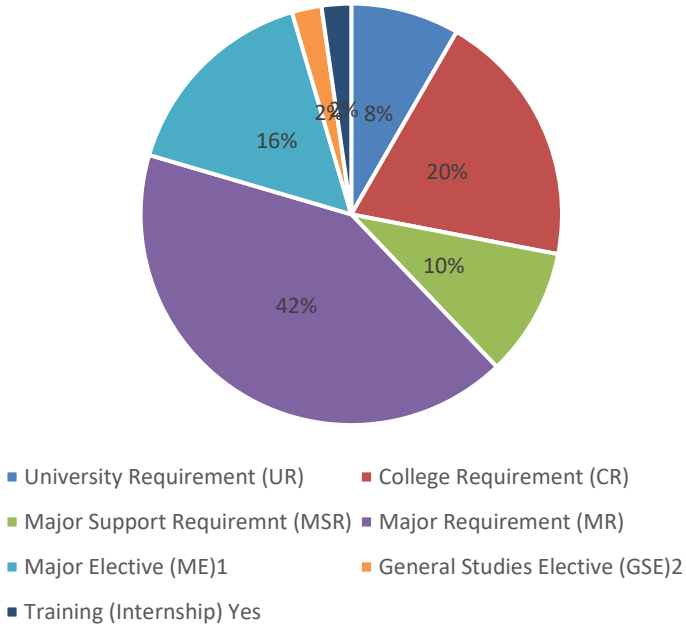
2025

Prepared By: VP For Academic Programs and Graduate Studies Office

College of Science

Bachelor of Science in Biology (2025)

Program Components



Course Type	CRD
University Requirement (UR)	**11**
College Requirement (CR)	**26**
Major Support Requirement (MSR)	**13**
Major Requirement (MR)	**55**
Major Elective (ME)[1]	**21**
General Studies Elective (GSE)[2]	**3**
Training (Internship) Yes	**3**
Total Credit (CRD)	**132**

Teaching Language: English

[1] Student must select **three** 3XX courses from Major Elective (ME) List 1, and **four** 4XX courses from Major Elective (ME) List 2.
[2] Student must select **one** General Studies Elective (GSE) from Humanities and Social Science.
Note:

- GSE Courses - Humanities and Social Science Component: Any course from the following:
  Humanities: Fine Arts, History, American Studies, Classics, Communications, English, (Foreign Language) French, Music, Philosophy, Theatre, Literature (Arabic), Religion (comparative).
  Social Science: Anthropology, Economics, Education, Geography, History, Psychology, Sociology, Women's Studies, Political Science.

Detailed Study Plan

Year 1 - Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ARAB 110	Arabic Language Skills	3	0	3	UR	-----	No
BIOLS 102	General Biology I	3	2	4	CR	-----	Yes
CHEMY 101	General Chemistry I	3	2	4	CR	-----	No
MATHS 131	Calculus I	4	0	4	CR	-----	No
ENGL 125	English for Science I (SCI)	3	0	3	CR	-----	No

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 103	General Biology II	3	2	4	MR	BIOLS 102	Yes
ITCS 106	Computer Programming I	3	2	4	CR	-----	No
HIST 122	Modern History of Bahrain and Citizenship	3	0	3	UR	-----	No
PHYCS 101	General Physics I	3	2	4	CR	-----	No
ENGL 126	English for Science II (SCI)	3	0	3	CR	ENGL 125	No

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 233	Invertebrate Zoology	2	2	3	MR	BIOLS 103	Yes
BIOLS 250	Microbiology	2	2	3	MR	BIOLS 103	Yes
CHEMY 102	General Chemistry II	3	2	4	MSR	CHEMY 101	No
ENGL 226	Scientific Report Writing	3	0	3	MSR	ENGL 126	No
ISLM 101	Islamic Culture	3	0	3	UR	-----	No

Year 2 - Semester 4

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 222	Plant Morphology	2	2	3	MR	BIOLS 103	Yes
BIOLS 234	Chordate Zoology	2	2	3	MR	BIOLS 103	Yes
CHEMY 223	Organic Chemistry for Biological Sciences	2	2	3	MSR	CHEMY 102	No
STAT 272	Introduction to Biostatistics	2	2	3	MSR	-----	No
GSE XXX	Humanities / Social Science	X	X	3	GSE	-----	No

Year 3 - Semester 5

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 300	Cell Biology	2	2	3	MR	BIOLS 103	Yes
BIOLS 340	General Ecology	2	2	3	MR	BIOLS 103	Yes
BIOLS 360	Principles of Genetics	2	2	3	MR	BIOLS 250	Yes
HRLC 107	Human Rights	2	0	2	UR	-----	No
BIOLS 3XX	Major Elective 1	X	X	3	ME	As per ME list 1	Yes
BIOLS 3XX	Major Elective 2	X	X	3	ME	As per ME list 1	Yes

Year 3 - Semester 6

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 315	Biochemistry	2	2	3	MR	BIOLS 102 & CHEMY 223	Yes
BIOLS 320	Plant Physiology	2	2	3	MR	BIOLS 300	Yes
BIOLS 372	Human Physiology	2	2	3	MR	BIOLS 300	Yes
BIOLS 380	Marine Biology	2	2	3	MR	BIOLS 340	Yes
BIOLS 390	Research Methods	2	2	3	MR	ENGL 226 & STAT 272	Yes

Training Requirement

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 397	Internship	0	6	3	MR	Completion of 75 Credits	Yes

Year 4 - Semester 7

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 391	Practical Skills in Biology	0	6	3	MR	BIOLS 390	Yes
BIOLS 404	Biotechnology	2	2	3	MR	BIOLS 250 & BIOLS 360	Yes
BIOLS 465	Gene Technology	2	2	3	MR	BIOLS 360	Yes
BIOLS 3XX	Major Elective 3	X	X	3	ME	As per ME list 1	Yes
BIOLS 4XX	Major Elective 4	X	X	3	ME	As per ME list 2	Yes

Year 4 - Semester 8

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 451	Immunology	2	2	3	MR	BIOLS 250	Yes
BIOLS 499	Senior Research Project	0	6	3	MR	Department Approval	Yes
BIOLS 4XX	Major Elective 5	X	X	3	ME	As per ME list 2	Yes
BIOLS 4XX	Major Elective 6	X	X	3	ME	As per ME list 2	Yes
BIOLS 4XX	Major Elective 7	X	X	3	ME	As per ME list 2	Yes

Major Elective Courses List 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 321	Plant Anatomy	2	2	3	ME	BIOLS 103	Yes
BIOLS 322	Economic Botany	3	0	3	ME	BIOLS 222	Yes
BIOLS 325	Phycology	2	2	3	ME	BIOLS 222	Yes
BIOLS 330	Parasitology	2	2	3	ME	BIOLS 233	Yes
BIOLS 335	Animal Behavior	3	0	3	ME	BIOLS 234	Yes
BIOLS 341	Principles of Environmental Science	2	2	3	ME	BIOLS 103	Yes
BIOLS 352	Applied Microbiology	2	2	3	ME	BIOLS 250	Yes
BIOLS 353	Virology	2	2	3	ME	BIOLS 250	Yes
BIOLS 354	Mycology	2	2	3	ME	BIOLS 222	Yes
BIOLS 371	Principles of Nutrition	2	2	3	ME	BIOLS 102	Yes
BIOLS 383	Oceanography	2	2	3	ME	BIOLS 380	Yes
BIOLS 385	Marine Pollution	2	2	3	ME	BIOLS 250 & BIOLS 340	Yes

Major Elective Courses List 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 409	Biotechnology and Development	3	0	3	ME	BIOLS 404	Yes
BIOLS 425	Terrestrial Plant Ecology	2	2	3	ME	BIOLS 340	Yes
BIOLS 429	Marine and Fresh water Botany	2	2	3	ME	BIOLS 320	Yes
BIOLS 433	Entomology	2	2	3	ME	BIOLS 233	Yes
BIOLS 438	Endocrinology	2	2	3	ME	BIOLS 372	Yes
BIOLS 441	Environmental Impact Assessment	2	2	3	ME	BIOLS 340	Yes
BIOLS 442	Conservation Biology	2	2	3	ME	BIOLS 340	Yes
BIOLS 443	Ecotoxicology	2	2	3	ME	BIOLS 340	Yes
BIOLS 452	Biology of Prokaryotes	2	2	3	ME	BIOLS 250	Yes

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
BIOLS 464	Molecular Biology of Oncogenes	3	0	3	ME	BIOLS 360	Yes
BIOLS 466	Molecular Mechanisms of Bacterial Pathogenesis	2	2	3	ME	BIOLS 250 & BIOLS 360	Yes
BIOLS 468	Animal Tissue Culture	2	2	3	ME	BIOLS 300	Yes
BIOLS 471	Nutrition Through Human Life Cycle	3	0	3	ME	BIOLS 371	Yes
BIOLS 472	Human Nutrition and Metabolism	3	0	3	ME	BIOLS 315 & BIOLS 372	Yes
BIOLS 481	Fish and Fisheries	2	2	3	ME	BIOLS 234	Yes
BIOLS 490	Bioinformatics	2	2	3	ME	BIOLS 465	Yes

General Studies Elective Courses List

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
ARAB 141	Modern Arabic Lit.	3	0	3	GSE	-----	No
ARAB 242	Arabic Poetry In The Renaissance Period	3	0	3	GSE	-----	No
ART 133	Fundamentals of Music and Its Appreciation	3	0	3	GSE	-----	No
ART 141	Drawing and Painting	2	1	3	GSE	-----	No
ART 221	Traditional Music of Bahrain and Its Application	3	0	3	GSE	-----	No
CHL 101	Introduction to Chinese Language	3	0	3	GSE	-----	No
CHL 102	Basic Chinese Language	3	0	3	GSE	CHL 101	No
EDAR 126	Playing on Piano and Org 1	3	0	3	GSE	-----	No
EDPS 144	Psychology of Learning and Memory	3	0	3	GSE	-----	No
EDTC 100	Teaching and Learning Technology	3	0	3	GSE	-----	No
ENGL 130	Introduction to Literature	3	0	3	GSE	-----	No
FREN 101	French I	3	0	3	GSE	-----	No
FREN 142	French II	3	0	3	GSE	FREN 141	No
GERM 101	Introduction to German	3	0	3	GSE	-----	No
HISTO 212	Contemporary History of The Arab World	3	0	3	GSE	-----	No
HISTO 281	Landmarks of Islamic Civilisation	3	0	3	GSE	-----	No
ISLM 114	Quranic Sciences	3	0	3	GSE	-----	No
ISLM 136	Biography of The Prophet	3	0	3	GSE	-----	No
ISLM 141	Introduction to Shari'A	3	0	3	GSE	-----	No
ISLM 252	Islamic Doctrine	3	0	3	GSE	-----	No
JAPN 101	Japanese Level I	3	0	3	GSE	-----	No
JAPN 102	Japanese Level II	3	0	3	GSE	JAPN 101	No
KL 101	Korean Language I	3	0	3	GSE	-----	No
KL 102	Korean Language II	3	0	3	GSE	KL 101	No

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
LAW 101	Introduction to Legal Studies	3	0	3	GSE	-----	No
LAW 102	History of Law	3	0	3	GSE	-----	No
LAW 106	Constitutional Law I	3	0	3	GSE	-----	No
PHEDE 214	Principles of Educational Statistics	3	0	3	GSE	-----	No
PSYC 103	Introduction to Psychology	3	0	3	GSE	-----	No
PSYC 120	Psychology of Marriage	3	0	3	GSE	-----	No
PSYC 211	Educational Psychology	3	0	3	GSE	-----	No
PSYC 281	Thinking Skills	3	0	3	GSE	-----	No
SOCIO 161	Introduction to Sociology	3	0	3	GSE	-----	No
SOCIO 181	Introduction to Anthropology	3	0	3	GSE	-----	No
SOCIO 191	Citizenship, Identity and Globalization	3	0	3	GSE	-----	No
SOCIO 224	Sociology of Health	3	0	3	GSE	-----	No
SOCIO 226	Sociology of Arabian Gulf	3	0	3	GSE	-----	No
TL 101	Turkish Language	3	0	3	GSE	-----	No
SPAN 101	Spanish I	3	0	3	GSE	-----	No
GSE XXX	Other electives	X	X	3	GSE	Department Approval	No

Course Description

Course Code: BIOLS 103 **Course Title:** General Biology II
Classification of organisms; plant structure and function; animal structure and function; evolutionary theory; ecology and modern biological problems.

Course Code: BIOLS 222 **Course Title:** Plant Morphology
General features, structures, and reproduction of algae and plants. Morphology of leaves, stems, roots, rhizoids, flowers, seeds, and fruits. Phyllotaxis and inflorescence, morphological adaptation for plant defense, and evolution of plant morphology.

Course Code: BIOLS 233 **Course Title:** Invertebrate Zoology
Classification, biology, diversity, structural features and phylogeny of major lower and higher taxonomic groups of invertebrates.

Course Code: BIOLS 234 **Course Title:** Chordate Zoology
Classification and biology of chordates: protochordates, hemichordates, urochordates, cephalochordates and vertebrates.

Course Code: BIOLS 250 **Course Title:** Microbiology
Microbial world and its development; scope of microbiology; microbial taxonomy and nomenclature; morphology and fine structure; microbial growth and metabolism; control of microorganisms; microorganisms and diseases; exploitation of microorganisms by man.

Course Code: BIOLS 300 **Course Title:** Cell Biology
Structural and chemical basis of cell functions, including energy and matter conversion; transport across cell membranes, excitability, contractility, internal membrane of cytoskeleton.

Course Code: BIOLS 315 **Course Title:** Biochemistry
Principles of biological chemistry; the chemistry of water, acids and bases, and buffer control of pH. Protein structure and function; principles of enzymology, and carbohydrate, lipid, structure and function. Basic intermediate metabolism including protein, carbohydrate and lipid synthesis and breakdown; Krebs cycle and oxidative phosphorylation.

Course Code: BIOLS 320 **Course Title:** Plant Physiology
Water relations; uptake and accumulation of solutes; mineral nutrition; photosynthesis; respiration; nitrogen metabolism; growth and growth hormones; environmental stress.

Course Code: BIOLS 321 **Course Title:** Plant Anatomy
The internal structure of seed plants; description and recognition of cell and tissue types; tissue systems and their interrelations in vegetative and reproductive structures. Developmental changes of the plant body from the embryo to mature plant and from meristems to mature tissues.

Course Code: BIOLS 322 **Course Title:** Economic Botany
Algae, bacteria and fungi and their uses as food, in diseases, destructive distillation and fermentation; agar and algin production. Fibre plants and fibre industry; starch and sugar industry; vegetable fats and oils; spices and medicinal plants.

Course Code: BIOLS 325 **Course Title:** Phycology
The taxonomy, morphology, reproduction, ecology and evolution of various algal groups with special emphasis placed on the algae of Bahrain.

Course Code: BIOLS 330 **Course Title:** Parasitology
History of parasitology; parasites and human populations; evolution of parasitism; general characteristics of parasites; the biology, epidemiology and control of selected parasites.

Course Code: BIOLS 335 **Course Title:** Animal Behavior
Animal behavior related to maintenance, feeding, defensive, habitat selection, communication, sociobiology, reproductive, development, learning parental care, role of hormones, the animal's genotype, and the animal's environment in the development of behavior and eventually relating some of these to human behavior.

Course Code: BIOLS 340 **Course Title:** General Ecology
The study of the interrelationships and interactions of organisms and their environments. Topics include population dynamics, interspecific relationships, community structure and function, nutrient cycling, energy flow in ecosystems and ecological implications of climate change.

Course Code: BIOLS 341 **Course Title:** Principles of Environmental Science
Key concepts and principles of environmental science, including environmental systems, species population, human population, biomass and biodiversity, environmental resources and conservation, environmental health, pollution, and environmental sustainability.

Course Code: BIOLS 352 **Course Title:** Applied Microbiology
Foods as substrates for microorganisms; microorganisms important in food and fermentation industries; contamination, spoilage and preservation of foods. Single cell protein production; secondary metabolite production; antibiotics, a1cohols, amino acids, enzymes, microbial toxins. New approaches to improve novel metabolite production through modern microbial biotechnology techniques.

Course Code: BIOLS 353 **Course Title:** Virology
Human, bacterial and animal virus structures; biochemistry; replication; gene regulation; virus host interaction.

Course Code: BIOLS 354 **Course Title:** Mycology
DNA and RNA; replication; translation and its code; regulation of gene expression; Mendelian vs. non-mendelian inheritance; mapping the eucaryotic chromosome; sex determination and differentiation; genes and environment; mutation and mutagenesis; immunogenetics; an introduction to population genetics.

Course Code: BIOLS 360 **Course Title:** Principles of Genetics
DNA and RNA; replication; translation and its code; regulation of gene expression; Mendelian vs. non-mendelian inheritance; mapping the eucaryotic chromosome; sex determination and differentiation; genes and environment; mutation and mutagenesis; immunogenetics; an introduction to population genetics.

Course Code: BIOLS 371 **Course Title:** Principles of Nutrition
The essential nutrients (carbohydrates, lipids, proteins, vitamins, minerals, and water); their food sources, physiological functions, digestion, absorption, transport, requirements, and the effects of deficiency or excess on health. Current dietary guidelines, principles of diet planning, energy balance, weight control, and factors that affect the food choices of individuals are emphasized.

Course Code: BIOLS 372 **Course Title:** Human Physiology
Anatomy and physiology of Man with special emphasis on the integumentary, skeletal, muscular, digestive, respiratory, excretory, reproductive, circulatory, endocrine and nervous systems. In each case the contribution of the system to general homeostasis will be discussed.

Course Code: BIOLS 380 **Course Title:** Marine Biology
Basic principles of marine biology; evolution of the sea basins; marine biota's and their ecology; seawater chemistry and marine pollution. Field and laboratory work is an integral part of the course.

Course Code: BIOLS 383 **Course Title:** Oceanography
Emphasizes its multi-disciplinary nature which includes sea water temperature and salinity; water masses and circulation; tides; major and minor components of sea water; organisms in the ocean, planktonic and benthic; the nekton. Practical classes are an essential part of the course.

Course Code: BIOLS 385 **Course Title:** Marine Pollution
Definition of pollution; types of marine pollution with emphasis on oil, sewage, thermal pollution and land reclamation; ecological and economic effect. Monitoring, analysis and control of pollution would be discussed in particular to the Arabian Gulf region.

Course Code: BIOLS 390 **Course Title:** Research Methods
Research methodologies (quantitative, qualitative, and mixed methods), experimental designs (controlled experiments, comparative studies, field investigations), literature reviews and hypothesis formulation, sampling techniques (random, systematic, targeted), data collection protocols (field measurements, laboratory analysis, observational records), and research ethics compliance.

Course Code: BIOLS 391 **Course Title:** Practical Skills in Biology
Provides extensive training in microbiology techniques, molecular methods, biochemical analysis of biological samples, chromatographic separation methods, histological procedures, and environmental sampling protocols. Through hands-on training with laboratory instruments, this course builds the technical foundation and analytical skills essential for advanced biological research.

Course Code: BIOLS 397 **Course Title:** Internship
The Internship course is designed to provide an opportunity to gain work experience related to the student's specified field of science, in a supervised workplace environment for a period of 8 consecutive weeks. The student shall submit a report upon completion.

Course Code: BIOLS 404 **Course Title:** Biotechnology
Basic principles of biotechnology; microbial screening and strain improvement; biological regulation; transport phenomena and bioreactor design. Microbial biomass and protein source, anaerobic digestion, industrial alcohol production and purification of fine enzymes. Production of antibiotics; genetic engineering and its applications; plant and animal cell culture techniques.

Course Code: BIOLS 409 **Course Title:** Biotechnology and Development
Promises of biotechnology for developing countries; agriculture horticulture forestry; Importance of plant genetic resources; food and nutrition; medicine and public health; production of pharmaceuticals, Energy production; pollution control.

Course Code: BIOLS 425 **Course Title:** Terrestrial Plant Ecology
Species, ecotypes; population structure and dynamics; species interactions; community structure and dynamics; environmental factors; biotopes.

Course Code: BIOLS 429 **Course Title:** Marine and Fresh water Botany
The biology and diversity of algal protists; the evolution and phylogeny of protests; distribution and ecology of aquatic plants; aquatic environments and global ecology; the commercial utilization of marine algal ecology.

Course Code: BIOLS 433 **Course Title:** Entomology
Morphology, physiology and control (physical, biological and chemical) of common insects.

Course Code: BIOLS 438 **Course Title:** Endocrinology
The structure of hormones; mechanism of their action; control of growth, maturation, reproduction, behaviour and chemical homeostasis. Discussion covers hormones of the pancreatic islets; parathyroid glands, hypothalamus and pituitary glands, thyroid gland, adrenal gland and reproductive glands. Emphasis on the endocrine control of metabolism. Reference to major endocrine diseases will be made where necessary.

Course Code: BIOLS 441 **Course Title:** Environmental Impact Assessment
Key principles of Environmental Impact Assessment (EIA) process; impact prediction and evaluation, mitigation, monitoring, effectiveness, and strategic environmental assessment.

Course Code: BIOLS 442 **Course Title:** Conservation Biology
Principles of conservation; including biological biodiversity and its value, the threats to biological diversity, conservation at the population and species levels, protecting and managing habitats and ecosystems, and sustainable development.

Course Code: BIOLS 443 **Course Title:** Ecotoxicology
Fundamentals of toxicology, ecological interactions, including the sources, fate, and effects of pollutants in the environment. Bioaccumulation, biomagnification, and ecotoxicological testing methods. Risk assessment, regulatory frameworks, and the impact of pollutants on various ecosystems.

Course Code: BIOLS 451 **Course Title:** Immunology
Production and function of immunoglobulin, characteristics of immunogens; prevention of infectious disease; hypersensitivity and allergy; cell-mediated immunity; transplantation and autoimmune diseases.

Course Code: BIOLS 452 **Course Title:** Biology of Prokaryotes
Diversity among prokaryotes; heterogeneity of form and function, cyanobacteria; eubacteria; archaebacteria; actinomycetes.

Course Code: BIOLS 464 **Course Title:** Molecular Biology of Oncogenes
Oncogenes; anti-oncogenes; genetic structure of oncogenes; regulation and biochemical properties of their encoded proteins.

Course Code: BIOLS 465 **Course Title:** Gene Technology
Perpetuation of DNA; fine structure of the gene; mapping bacterial and viral chromosomes; transposition. Gene cloning: isolation and characterization of DNA and the gene, development of cloning vectors, in vitro mutagenesis; introduction of different vectors to prokaryotes and eucaryotes.

Course Code: BIOLS 466 **Course Title:** Molecular Mechanisms of Bacterial Pathogenesis
The course illustrates the genetics of bacterial pathogens with emphasis on gene regulation and molecular diagnostic techniques. Development of laboratory techniques in diagnostic microbiology (such as identification of bacterial strains by molecular methods, the use of microbial bioinformatics tools in genome comparisons and analysis).

Course Code: BIOLS 468 **Course Title:** Animal Tissue Culture
Intensive lectures and laboratory works designed to provide the students with the knowledge related to the in-vitro techniques used for the propagation and maintenance of animal cells, tissue and hybridoma cultures.

Course Code: BIOLS 471 **Course Title:** Nutrition Through Human Life Cycle
Covers the basic nutrient needs and health concerns of individuals for each of the major stages of the human life cycle (infancy, childhood, adolescence, adulthood and elderly people) and the special nutritional requirements during pregnancy and lactation.

Course Code: BIOLS 472 **Course Title:** Human Nutrition and Metabolism
Investigates the biochemical and physiological foundations of human dietary needs. Uses a comprehensive approach to nutritional digestion and metabolism of nutrients (carbohydrates, proteins, lipids, vitamins, and minerals). Throughout the semester, metabolic and chronic disorders associated with diet are reviewed.

Course Code: BIOLS 481 **Course Title:** Fish and Fisheries
Forms and structures. Feeding; respiration; hydromineral balance and growth; reproductive biology. Behaviour of fishes; fish parasites; evolution and classification; ecology and zoo geography. History of fisheries; fish farming and Arabian Gulf fish and fisheries.

Course Code: BIOLS 490 **Course Title:** Bioinformatics
Definition and scope of Bioinformatics, historical developments and significance, DNA, RNA, Protein and their structures, overview of biological databases, Retrieving and searching sequence data, sequence alignment, introduction to protein structure, methods of protein structure prediction, structural databases, methods of predicting gene and annotation, Introduction to metabolic pathways and signaling pathways, tools for pathways

analysis, construction of biological networks, Evolutionary relationship between species genome-wide comparisons. Construction of phylogenetic trees. Bioinformatics in pharmaceutical research.

Course Code: BIOLS 499 **Course Title:** Senior Research Project
Oral and written presentation and defense of practical project carried out by the student under supervision.

Major Support Requirements Courses Descriptions

Course Code: CHEMY 102 **Course Title:** General Chemistry II

Molecular orbitals of homonuclear diatomic molecules; thermochemistry: calorimetry, enthalpy, thermochemical equations, heats of formation; chemical kinetics: rate and concentration, concentration and time, activation energy, rate and temperature, catalysis; chemical equilibria: gaseous and aqueous equilibria, the equilibrium constant and the factors affecting an equilibrium system, solubility equilibrium; acids and bases: pH of acidic and basic solutions, hydrolysis of salts; acid-base neutralization: buffers, acid-base titration curves, indicators; entropy and Gibb's energy; introduction to electrochemistry: balancing redox equations, galvanic cells, standard cell potentials; organic Chemistry: IUPAC nomenclature of aliphatic and aromatic hydrocarbons, common functional groups. Related practical work.

Course Code: CHEMY 223 **Course Title:** Organic Chemistry for Biological Sciences

Topics in organic chemistry those are essential for biology majors. Structure and chemical bonding, introduction to organic compounds, alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, phenols, aldehydes, ketones, nucleophilic addition reactions, carboxylic acids, amines, carbohydrates, lipids, amino acids, peptides, and proteins. Related practical work.

Course Code: STAT 272 **Course Title:** Introduction to Biostatistics

Descriptive statistics, some basic probability concept, discrete and continuous probability distribution, estimation, hypothesis testing: one and two sample interference, analysis of variance, Inference of categorical data, simple linear and multiple regression and correlation, logistic regression, use statistical packages.

Course Code: ENGL 226 **Course Title:** Scientific Report Writing

This course aims to enable students in the College of Science to write professional and academic reports (between 2000-3000 words) related to their areas of specialization and intended work. It also deals with vocabulary and language structures essential for producing a full-length formal research report.

University Requirements Courses Descriptions

Course Code: ARAB 110 **Course Title:** Arabic Language Skills
This course focuses on basic Arabic skills including form, function, and meaning. It also helps the student to appreciate and understand structures and approach them from a critical point of view, through various genres in literature.

Course Code: HIST 122 **Course Title:** Modern History of Bahrain and Citizenship
Spatial identity of Bahrain: Brief history of Bahrain until the 18th century; the historical roots of the formation of the national identity of Bahrain since the 18th century; the modern state and evolution of constitutional life in Bahrain; the Arabic and Islamic dimensions of the identity of Bahrain; the core values of Bahrain's society and citizenship rights (legal, political, civil and economic); duties; responsibilities and community participation; economic change and development in Bahrain; Bahrain's Gulf, Arab and international relations.

Course Code: HRLC 107 **Course Title:** Human Rights
This course deals with the principles of human rights in terms of the definition of human rights, scope, sources with a focus on the International Bill of Human Rights; The Charter of the United Nations; Universal Declaration of Human Rights; The International Covenant on Economics, Social and Culture rights; Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment; Mechanics and the Constitutional Protection of Rights and Public Freedoms in Kingdom of Bahrain.

Course Code: ISLM 101 **Course Title:** Islamic Culture
An introduction to the general outline and principles of Islamic culture, its general characteristics, its relationships with other cultures, general principles of Islam in beliefs, worship, legislation and ethics.

College Requirement Courses Descriptions

Course Code: CHEMY 101 **Course Title:** General Chemistry I
Atomic structure; formulas and names of chemical molecules; Avogadro's number and the mole; stoichiometry of chemical reactions; acid-base and redox reactions, solutions, concentration units, and colligative properties; gases and gas laws; electronic structure and the electron configuration; periodic properties and chemical bonding: ionic and covalent; Lewis structures and formal charge; molecular geometry and hybridization. Related practical work.

Course Code: BIOLS 102 **Course Title:** General Biology I
Properties of life; atoms, molecules and chemical bonds; biomolecules; cell structure and function; bioenergetics (intermediary metabolism); cell reproduction; Mendelian genetics; structure of DNA; RNA and protein synthesis; molecular genetics.

Course Code: PHYCS 101 **Course Title:** General Physics I
Units and measurements; brief review of vectors; Newton's laws of motion; projectile motion; work and energy; impulse and momentum; rotational dynamics; equilibrium of a rigid body; periodic motion.

Course Code: MATHS 131 **Course Title:** Calculus I
Limits, Derivatives of Algebraic and Transcendental Functions, Related Rates, the Mean Value Theorem, Graphing Techniques, Optimization, Integrals, and the Fundamental Theorem of Calculus.

Course Code: ITCS 106 **Course Title:** Computer Programming I
This course introduces problem solving and fundamental programming concepts and techniques implemented by a high-level programming language. Topics include primitive and compound data types, syntax, semantics, expressions, assignment, input, output, conditional and iterative control structures, and functions.

Course Code: ENGL 125 **Course Title:** English for Science I (SCI)
This is the first of two integrated language courses designed specifically for science majors. Special attention is given to scientific vocabulary and the unique features of technical writing. The course includes an extensive reading programme via a self-access lab.

Course Code: ENGL 126 **Course Title:** English for Science II (SCI)
English for Science is the second of two integrated language courses designed specifically for science majors. Special attention is given to scientific vocabulary and the unique features of technical writing.