# Tikrit university
# جامعة تكريت

*First Cycle – Bachelor's Degree (B.Sc.) – Biology/general biology*

بكالوريوس – علوم حياة -فرع الاحياء عام

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# 1. Overview

This catalogue is about the courses (modules) given by the program of biology/general biology to gain the Bachelor of Science degree. The program delivers (٤٩) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج علوم الحياة – فرع الاحياء العام للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٤٩) مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

# 2. Undergraduate Courses 2025-2026

**Module 1**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1101 | Zoology | 7 | 1 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 95 | 80 |
| **Description** | | | |
| Zoology course offers an in-depth exploration of animal biology, focusing on the diversity, structure, function, and evolution of the animal kingdom. Students will study various phyla, delving into anatomy, physiology, behavior, and ecology. The course integrates lectures, laboratory work, and field studies to provide a comprehensive understanding of both invertebrate and vertebrate species. Emphasizing comparative biology, the course also examines the adaptive strategies and evolutionary relationships among animals, preparing students for advanced studies or careers in biological sciences. | | | |

**Module 2**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1102 | Analytical Chemistry | 7 | 1 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 95 | 80 |

| Description |
|---|
| Analytical Chemistry course introduces students to the principles and techniques used in the qualitative and quantitative analysis of chemical substances. Emphasizing accuracy, precision, and method validation, the course covers topics such as spectroscopy, chromatography, titration, and electrochemical methods. Through lectures, hands-on laboratory work, and data analysis, students will develop critical thinking and problem-solving skills necessary for analyzing complex chemical systems. This course is ideal for students pursuing careers in biology, biochemistry, environmental science, and related fields. |

**Module 3**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1103 | General Mathematics | 6 | 1 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 80 | 70 |
| **Description** | | | |
| General Mathematics course provides a comprehensive foundation in essential mathematical concepts, including algebra, geometry, trigonometry, and calculus. Designed for students of all disciplines, the course emphasizes problem-solving, logical reasoning, and the application of mathematical principles in real-world scenarios. Topics include functions, equations, inequalities, and introductory statistics. Through interactive lectures, practice exercises, and collaborative learning, students will develop critical analytical skills and a solid understanding of mathematical techniques, preparing them for more advanced studies or practical application in various fields. | | | |

**Module 4**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1104 | Biophysics | 6 | 1 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 95 | 55 |
| **Description** | | | |
| Biophysics course explores the physical principles underlying biological processes, bridging the gap between biology and physics. Students will study molecular structures, bioenergetics, and the mechanics of biological systems, with an emphasis on techniques like spectroscopy, microscopy, and computational modeling. Through lectures, lab work, and problem-solving sessions, the course offers a deep understanding of how physical laws govern biological phenomena, preparing students for careers or research in biophysics, biomedical engineering, or related fields. | | | |

**Module 5**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| UNI-1105 | Human Rights and Democracy | 2 | 1 |

| Class (hr/w) | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
|---|---|---|---|
| 2 | 0 | 33 | 17 |
| **Description** | | | |
| Human Rights and Democracy course examines the principles, history, and challenges of human rights and democratic governance. Students will explore key concepts such as civil liberties, political participation, and social justice, alongside case studies of democratic movements and human rights struggles worldwide. The course emphasizes critical analysis, encouraging students to engage with contemporary issues and debates. Through lectures, discussions, and research projects, students will gain a nuanced understanding of the relationship between human rights and democracy. | | | |

**Module 6**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| UNI-1106 | Arabic Language | 2 | 1 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 0 | 33 | 17 |
| **Description** | | | |
| Arabic Language course offers a comprehensive introduction to Modern Standard Arabic, focusing on reading, writing, speaking, and listening skills. Students will learn essential vocabulary, grammar, and sentence structure while exploring cultural aspects of the Arabic-speaking world. The course uses interactive activities, dialogues, and multimedia resources to build language proficiency and cultural awareness. Suitable for beginners, it prepares students for further language study or practical use in various professional contexts. | | | |

**Module 7**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1207 | General Botany | 7 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 95 | 80 |
| **Description** | | | |
| General Botany course provides a thorough introduction to the biology of plants, covering their structure, function, reproduction, and diversity. Students will explore plant anatomy, physiology, genetics, ecology, and evolution, with an emphasis on the role of plants in ecosystems and human life. The course includes lectures, laboratory work, and field studies to give students hands-on experience in plant identification and experimentation. Ideal for those pursuing careers in biology, environmental science, or agriculture, this course equips students with a solid foundation in plant science. | | | |

**Module 8**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1208 | Organic Chemistry | 7 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 95 | 80 |
| **Description** | | | |
| Organic Chemistry course delves into the structure, properties, and reactions of carbon-containing compounds. Students will explore key concepts such as functional groups, reaction mechanisms, stereochemistry, and spectroscopy. The course emphasizes problem-solving and the application of organic chemistry principles in real-world contexts, including pharmaceuticals, biochemistry, and materials science. Through lectures, laboratory experiments, and collaborative learning, students will develop a deep understanding of organic reactions and synthetic strategies, preparing them for advanced studies or careers in biology, medicine, and related fields. | | | |

**Module 9**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-1209 | Biostatistics | 6 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 80 | 70 |
| **Description** | | | |
| Biostatistics course introduces statistical methods and data analysis techniques used in biological and health sciences. Students will learn about probability, descriptive statistics, hypothesis testing, regression analysis, and experimental design. Emphasis is placed on applying statistical tools to real-world biological data, interpreting results, and making informed decisions. Through lectures, practical exercises, and data analysis projects, students will gain proficiency in biostatistical software and develop skills essential for research, public health, and clinical studies. | | | |

**Module 10**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-12010 | Safety and biosecurity | 5 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 80 | 45 |
| **Description** | | | |
| Safety and Biosecurity course focuses on principles and practices to ensure the safe handling, storage, and disposal of biological materials. Students will learn about risk assessment, safety protocols, regulatory compliance, and emergency response strategies. The course covers topics such as laboratory safety, infection control, and biohazard management, emphasizing the importance of protecting human | | | |

health and the environment. Through lectures, case studies, and practical exercises, students will develop skills to implement and manage effective safety and biosecurity measures in research and clinical settings.

**Module 11**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| UNI-12011 | Computer Science | 3 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 2 | 65 | 10 |
| **Description** | | | |
| Computer and Windows course provides a foundational understanding of computer systems and the Windows operating environment. Students will learn about basic hardware components, software installation, and system configuration. The course covers essential Windows functions, including file management, system settings, and troubleshooting common issues. Practical exercises and hands-on labs will enhance skills in navigating the Windows interface, managing applications, and optimizing system performance. Ideal for beginners, this course prepares students for everyday computer use and provides a solid basis for more advanced IT studies. | | | |

**Module 12**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| UNI-12012 | English Language | 2 | 2 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 2 | 33 | 17 |
| **Description** | | | |
| This English Language course offers a comprehensive approach to developing proficiency in reading, writing, speaking, and listening. Students will engage with a variety of texts, practice grammar and vocabulary, and improve communication skills through interactive activities and discussions. Emphasis is placed on effective language use in academic and professional contexts. The course includes practical exercises, writing assignments, and oral presentations, aiming to build confidence and fluency. Ideal for learners at all levels, this course enhances overall language competence and prepares students for diverse linguistic challenges. | | | |

**Module 13**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23013 | Biochemistry I | 3 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 2 | 63 | 12 |

| Description |
|---|
| Biochemistry I explore the fundamental principles of biochemistry, focusing on the structure and function of biomolecules such as proteins, nucleic acids, lipids, and carbohydrates. Students will study enzyme kinetics, metabolic pathways, and biochemical techniques, emphasizing the chemical processes underlying biological systems. Through lectures, laboratory experiments, and data analysis, the course provides a solid foundation in understanding how biochemical reactions drive cellular functions and physiological processes. Ideal for those pursuing careers in biochemistry, molecular biology, or related fields, it prepares students for advanced study and research. |

**Module 14**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23014 | Plant Anatomy | 5 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| Plant Anatomy course examines the internal structure and organization of plants, focusing on tissues, organs, and cellular components. Students will explore topics such as histology, xylem and phloem function, and developmental processes. The course integrates lectures with hands-on laboratory work, including microscopy and tissue staining techniques, to provide practical experience in plant dissection and analysis. Emphasis is placed on understanding how plant anatomy relates to function and adaptation. Ideal for students in botany, agriculture, or environmental science, this course offers insights into plant structure essential for research and application. | | | |

**Module 15**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23015 | Invertebrates | 5 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| Invertebrates course explores the diversity, anatomy, and physiology of non-vertebrate animals. Students will study major invertebrate phyla, including arthropods, mollusks, annelids, and cnidarians, focusing on their evolutionary relationships, ecological roles, and adaptations. The course combines lectures with practical laboratory and fieldwork, including specimen identification and dissection. Emphasis is placed on understanding the functional biology and behavior of invertebrates in various environments. Ideal for students in zoology, marine biology, or environmental science, this course provides a comprehensive foundation in the study of invertebrate organisms. | | | |

**Module 16**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23016 | Plant groups | 5 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| Plant Groups course offers an in-depth examination of major plant groups, including algae, bryophytes, ferns. Students will explore the characteristics, evolutionary history, and ecological roles of each group, focusing on their structure, reproduction, and adaptation. The course integrates lectures with practical laboratory work and field studies, providing hands-on experience in plant identification and classification. Ideal for students in botany, ecology, or environmental science, this course builds a comprehensive understanding of plant diversity and evolutionary relationships. | | | |

**Module 17**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23017 | Entomology I | 5 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| Entomology I introduce students to the study of insects, covering their anatomy, physiology, taxonomy, and behavior. The course explores major insect orders, life cycles, and ecological roles, emphasizing their impact on agriculture, health, and ecosystems. Through lectures, laboratory work, and field collection, students will gain practical skills in insect identification and specimen preservation. This foundational course provides essential knowledge for those pursuing careers in entomology, agriculture, or environmental science, equipping students with a thorough understanding of insect biology and its applications. | | | |

**Module 18**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-23018 | Microbiology I | 5 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| Microbiology I provide a comprehensive introduction to microbial life, focusing on bacteria. Students will explore microbial structure, function, metabolism, and genetics, as well as the role of microbes in health, disease, and environmental processes. The course includes lectures, laboratory work, and practical exercises, such as microscopy and culturing techniques. Emphasis is placed on | | | |

| |
|---|
| understanding microbial diversity, pathogenesis, and applications in biotechnology and medicine. Ideal for students pursuing careers in microbiology, biotechnology, or health sciences, this course lays the groundwork for advanced microbiological studies. |

**Module 19**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| UNI-23019 | Crimes of the Baath party | 2 | 3 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 0 | 33 | 17 |
| **Description** | | | |
| Crimes of the Baath Party course investigates the human rights abuses and political crimes committed by the Baathist regime, focusing on Iraq. Students will examine historical events, policies, and government actions that led to widespread repression, including systematic violence, torture, and political purges. The course includes analysis of primary sources, survivor testimonies, and international responses. Through lectures, case studies, and critical discussions, students will gain a deeper understanding of the impact of authoritarianism and the pursuit of justice in post-Baathist contexts. | | | |

**Module 20**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24120 | Biochemistry II | 4 | 4 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 78 | 22 |
| **Description** | | | |
| Biochemistry II builds on foundational knowledge from Biochemistry I, delving into advanced topics such as metabolic regulation, signaling pathways, and molecular mechanisms of diseases. Students will explore complex biochemical processes, including enzyme regulation, gene expression, and protein interactions. The course emphasizes practical applications through laboratory experiments, data analysis, and case studies. Ideal for students pursuing careers in biochemistry, molecular biology, or biomedical research, this course provides a deeper understanding of the biochemical basis of cellular function and human health. | | | |

**Module 21**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24121 | Plant Taxonomy | 6 | 4 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 71 |
| **Description** | | | |

The Plant Taxonomy course focuses on the classification, identification, and naming of plants. Students will study the principles of plant taxonomy, including the use of dichotomous keys, taxonomic hierarchies, and phylogenetic relationships. The course covers major plant families, genera, and species, emphasizing their morphological and genetic characteristics. Through lectures, laboratory work, and field studies, students will gain hands-on experience in plant identification and herbarium techniques. Ideal for students in botany, ecology, or environmental science, this course provides essential skills for understanding and cataloging plant diversity.

**Module 22**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24122 | Parasitology | 6 | 4 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 71 |
| **Description** | | | |
| The Parasitology course examines the biology, life cycles, and host-parasite interactions of various parasites, including protozoa, helminths, and ectoparasites. Students will study mechanisms of parasitism, disease transmission, and the impact of parasites on human health and ecosystems. The course includes lectures, laboratory work, and case studies, with hands-on experience in parasite identification and diagnostic techniques. Emphasis is placed on understanding the role of parasites in disease, treatment strategies, and prevention measures. Ideal for students in biology, medicine, or public health, this course provides a thorough foundation in parasitology. | | | |

**Module 23**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24123 | Entomology II | 6 | 4 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 71 |
| **Description** | | | |
| Entomology II builds on foundational entomology knowledge, exploring advanced topics such as insect physiology, behavior, ecology, and evolutionary biology. Students will delve into specialized areas including insect communication, pollination, and pest management. The course combines lectures with hands-on laboratory work and field studies, offering practical experience in advanced insect identification, collection techniques, and ecological impact assessments. Ideal for students pursuing careers in entomology, agriculture, or environmental science, this course provides a deeper understanding of insect biology and its implications for ecosystems and human activities. | | | |

**Module 24**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24124 | Microbiology II | 6 | 4 |

| Class (hr/w) | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
|---|---|---|---|
| 2 | 3 | 79 | 71 |

**Description**

Microbiology II expands on introductory concepts, focusing on advanced topics such as microbial genetics, pathogenic mechanisms, and environmental microbiology. Students will explore interactions between microbes and their hosts, including immune responses and disease processes, as well as applications in biotechnology and bioremediation. The course combines lectures with laboratory work, including advanced techniques like molecular diagnostics and microbial culturing. Emphasis is placed on current research and emerging issues in microbiology. Ideal for students pursuing careers in research, medicine, or biotechnology, this course deepens understanding of microbial systems and their impact on health and the environment.

**Module 25**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-24125 | Research Methodology | 2 | 4 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 0 | 33 | 17 |

**Description**

The Research Methodology course provides a comprehensive overview of research design, data collection, and analysis techniques. Students will learn about various research methods, including qualitative and quantitative approaches, experimental design, and statistical analysis. The course emphasizes critical evaluation of research literature, ethical considerations, and effective communication of findings. Through lectures, hands-on projects, and case studies, students will develop practical skills in designing research studies, analyzing data, and presenting results. Ideal for students pursuing careers in research, academia, or applied sciences, this course prepares them for conducting rigorous and ethical research.

**Module 26**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35026 | Cell Biology | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |

**Description**

The Cell Biology course explores the structure, function, and processes of cells, focusing on cellular components, mechanisms of cell division, and cellular communication. Students will study topics such as organelles, signal transduction, and cell metabolism, using both theoretical and practical approaches. The course includes lectures, laboratory experiments, and microscopy techniques to observe and analyze cellular activities. Emphasis is placed on understanding how cellular processes relate to overall organismal function and disease. Ideal for students in biology, medicine, or biomedical research, this

course provides a solid foundation in cellular mechanisms and their implications.

**Module 27**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35027 | Ecology | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Ecology course examines the interactions between organisms and their environments, covering topics such as ecosystems, population dynamics, and community structure. Students will explore principles of energy flow, nutrient cycling, and ecological succession. The course includes lectures, field studies, and data analysis, emphasizing hands-on experience in observing and interpreting ecological processes. Students will gain insights into the impact of human activities on ecosystems and strategies for conservation. Ideal for students in biology, environmental science, or ecology, this course provides a thorough understanding of ecological principles and their application to real-world environmental issues. | | | |

**Module 28**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35028 | Histology | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Histology course focuses on the microscopic structure of tissues and organs, emphasizing their organization, function, and pathology. Students will study the four basic tissue types—epithelial, connective, muscle, and nervous—using various staining techniques and microscopy. The course combines lectures with practical laboratory work, including tissue section preparation and slide examination. Emphasis is placed on understanding how tissue architecture relates to function and disease. Ideal for students in biology, medicine, or biomedical sciences, this course provides essential skills for analyzing and interpreting tissue samples and their clinical relevance. | | | |

**Module 29**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35029 | Mycology | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |

The Mycology course explores the biology, taxonomy, and ecology of fungi. Students will study fungal structure, reproduction, and classification, focusing on both beneficial and pathogenic species. The course includes lectures, laboratory work, and field studies, emphasizing hands-on experience in identifying fungal specimens and understanding their roles in ecosystems and human health. Topics cover fungal diseases, industrial applications, and symbiotic relationships. Ideal for students in biology, environmental science, or medicine, this course provides a comprehensive understanding of fungal diversity and their impact on the environment and society.

**Module 30**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35030 | Plant Physiology | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |

The Plant Physiology course delves into the physiological processes and functions of plants, including photosynthesis, respiration, water and nutrient uptake, and plant growth regulation. Students will explore how plants adapt to environmental changes and stressors, and examine mechanisms of signal transduction and hormone action. The course integrates lectures with laboratory experiments and field studies, providing hands-on experience in measuring physiological parameters and analyzing plant responses. Ideal for students in botany, agriculture, or environmental science, this course offers a deep understanding of plant function and its applications to agriculture and ecology.

**Module 31**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-35031 | Bio Techniques | 5 | 5 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |

The Bio Techniques course provides practical training in essential laboratory techniques used in biological research and applications. Students will learn methods such as DNA/RNA extraction, PCR, gel electrophoresis, microscopy, and spectrophotometry. The course includes hands-on laboratory sessions, where students will apply these techniques to analyze biological samples and interpret experimental data. Emphasis is placed on developing technical skills, ensuring accuracy, and understanding the theoretical principles behind each method. Ideal for students pursuing careers in research, biotechnology, or clinical labs, this course equips them with the practical skills necessary for advanced biological investigations.

**Module 32**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36138 | Genetics | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Genetics course covers the principles of heredity and gene function, including Mendelian genetics, molecular genetics, and population genetics. Students will study genetic variation, inheritance patterns, gene expression, and genetic disorders. The course integrates lectures with laboratory work, such as DNA analysis and genetic mapping, to provide hands-on experience in genetic research techniques. Emphasis is placed on understanding the role of genetics in development, evolution, and disease. Ideal for students pursuing careers in biology, medicine, or biotechnology, this course offers a comprehensive foundation in genetic principles and their applications. | | | |

**Module 33**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36139 | Pollution | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Pollution course examines the sources, effects, and mitigation strategies of environmental pollution. Students will study air, water, soil, and noise pollution, exploring their impact on ecosystems, human health, and global climate. The course includes lectures, case studies, and fieldwork to analyze pollution sources, regulatory frameworks, and remediation technologies. Emphasis is placed on understanding pollution dynamics, assessing environmental risks, and developing sustainable solutions. Ideal for students in environmental science, public health, or policy, this course provides critical insights into managing and mitigating pollution challenges. | | | |

**Module 34**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36140 | Animal Physiology | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Animal Physiology course explores the physiological processes and systems of animals, focusing on how they maintain homeostasis and respond to environmental changes. Topics include neurophysiology, cardiovascular function, respiratory systems, and metabolism. Students will study | | | |

comparative physiology across different species, examining adaptations and evolutionary mechanisms. The course combines lectures with laboratory experiments and dissections to provide hands-on experience in physiological measurements and analysis. Ideal for students in biology, veterinary science, or medicine, this course offers a comprehensive understanding of animal physiology and its applications to health and behavior.

**Module 35**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36141 | Plant diseases | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Plant Diseases course investigates the causes, symptoms, and management of diseases affecting plants. Students will study pathogens such as fungi, bacteria, viruses, and nematodes, examining their life cycles, modes of infection, and impact on plant health and agriculture. The course includes lectures, laboratory work, and field studies, emphasizing diagnostic techniques, disease management strategies, and integrated pest management. Ideal for students in plant science, agriculture, or environmental science, this course provides essential knowledge for identifying, controlling, and preventing plant diseases to ensure crop health and productivity. | | | |

**Module 36**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36142 | Embryology | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Embryology course explores the developmental processes from fertilization to birth, focusing on the formation and differentiation of tissues and organs. Students will study embryonic development stages, cell division, gene regulation, and morphological changes in various organisms. The course combines lectures with laboratory work, including dissections and microscopy, to observe developmental stages and study model organisms. Emphasis is placed on understanding normal developmental processes and the basis of congenital anomalies. Ideal for students in biology, medicine, or developmental biology, this course provides a thorough foundation in the principles of embryonic development. | | | |

**Module 37**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-36142 | Hematology | 5 | 6 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |

| | | | |
|---|---|---|---|
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Hematology course delves into the study of blood and blood-forming tissues, focusing on the physiology, pathology, and clinical aspects of hematologic disorders. Students will explore blood cell formation, function, and diseases such as anemia, leukemia, and clotting disorders. The course includes lectures, laboratory work, and clinical case studies, offering hands-on experience in blood analysis, microscopic examination, and diagnostic techniques. Ideal for students in biology, biomedical science, or clinical laboratory technology, this course provides essential knowledge for diagnosing and managing hematological conditions and understanding their impact on overall health. | | | |

**Module 38**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47050 | Molecular Biology | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Molecular Biology course examines the molecular mechanisms underlying genetic processes, including DNA replication, transcription, translation, and gene regulation. Students will study molecular techniques such as PCR, gel electrophoresis, and gene cloning, with a focus on understanding how molecular interactions drive cellular functions and genetic expression. The course combines lectures with laboratory experiments, providing practical experience in molecular techniques and data analysis. Ideal for students in genetics, biotechnology, or biomedical research, this course offers a comprehensive foundation in the molecular basis of biology and its applications to research and medicine. | | | |

**Module 39**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47051 | Endocrine glands and hormones | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Endocrine Glands and Hormones course explores the structure, function, and regulation of endocrine glands and their hormones. Students will study hormone synthesis, secretion, and action, as well as the role of various glands such as the pituitary, thyroid, adrenal, and pancreas. The course covers hormonal regulation of physiological processes and disorders associated with endocrine imbalances. Through lectures, laboratory work, and case studies, students will gain insights into endocrine physiology and its impact on health and disease. Ideal for students in biology, medicine, or health sciences, this course provides a solid understanding of endocrine system functions. | | | |

**Module 40**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47052 | Medical insects | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Medical Insects course examines the role of insects in human health, focusing on their impact as vectors of disease and their use in medical research. Students will study insect biology, behavior, and their roles in transmitting diseases such as malaria, dengue, and Lyme disease. The course includes lectures, laboratory work, and field studies, offering hands-on experience in identifying medically relevant insects and understanding their epidemiological significance. Ideal for students in entomology, public health, or medicine, this course provides a comprehensive understanding of the intersection between insects and human health. | | | |

**Module 41**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47053 | Plant metabolism | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Plant Metabolism course explores the biochemical processes essential for plant growth and development, including photosynthesis, respiration, and nutrient assimilation. Students will study the pathways and regulation of primary and secondary metabolites, and their roles in plant physiology and adaptation. The course combines lectures with laboratory work, including assays and metabolic profiling, to provide hands-on experience in analyzing plant metabolic processes. Ideal for students in plant science, agriculture, or biochemistry, this course offers a deep understanding of how metabolic processes drive plant function and productivity. | | | |

**Module 42**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47054 | Water treatment | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Water Treatment course covers the principles and practices of treating and purifying water to ensure safety and quality. Students will study various treatment methods, including physical, chemical, and biological processes, such as filtration, disinfection, and coagulation. The course includes lectures, | | | |

laboratory work, and field studies, emphasizing hands-on experience in water testing, treatment design, and system management. Ideal for students in environmental engineering, public health, or chemistry, this course provides essential knowledge for addressing water quality issues and implementing effective water treatment solutions.

**Module 43**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-47055 | Comparative anatomy | 5 | 7 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Comparative Anatomy course examines the anatomical structures and functions across different species to understand evolutionary relationships and adaptations. Students will study and compare the skeletal, muscular, and organ systems of various animals, including vertebrates and invertebrates. The course includes lectures, dissections, and comparative studies, emphasizing how anatomical variations reflect ecological roles and evolutionary processes. Ideal for students in biology, zoology, or veterinary science, this course provides insights into the diversity of anatomical solutions and their implications for understanding organismal biology and evolution. | | | |

**Module 44**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48162 | Genetic Engineering | 5 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Genetic Engineering course delves into the techniques and applications of manipulating DNA to alter genetic material in organisms. Students will learn about gene cloning, CRISPR-Cas9, recombinant DNA technology, and transgenic organism creation. The course combines theoretical lectures with hands-on laboratory work, including gene editing, vector design, and DNA sequencing. Emphasis is placed on ethical considerations, real-world applications, and advancements in biotechnology and medicine. Ideal for students in genetics, biotechnology, or molecular biology, this course provides a comprehensive understanding of the tools and techniques used in genetic modification and their impact on science and society. | | | |

**Module 45**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48163 | Immunity | 6 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |

| | | | |
|---|---|---|---|
| 2 | 3 | 79 | 71 |
| **Description** | | | |
| The Immunity course explores the principles and mechanisms of the immune system, focusing on how the body defends against pathogens. Students will study innate and adaptive immunity, including the roles of immune cells, antibodies, and cytokines. The course covers topics such as immunological memory, vaccine development, and autoimmune disorders. Through lectures, laboratory experiments, and case studies, students will gain a deep understanding of immune responses and their implications for health and disease. Ideal for students in biology, medicine, or biomedical sciences, this course provides essential knowledge for understanding immune function and its applications in healthcare. | | | |

**Module 46**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48164 | Tissue culture | 5 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Tissue Culture course provides an in-depth exploration of the techniques and principles behind the in vitro cultivation of plant and animal cells. Students will learn about the preparation of culture media, sterilization methods, and the maintenance of aseptic conditions. The course includes hands-on laboratory experience in culturing cells, regenerating plants from tissue explants, and understanding cell differentiation. Emphasis is placed on applications in research, biotechnology, and agriculture. Ideal for students in biotechnology, botany, or biomedical sciences, this course equips learners with essential skills for tissue culture and its practical uses in science and industry. | | | |

**Module 47**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48165 | Pathological analyses | 6 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 71 |
| **Description** | | | |
| The Pathological Analyses course focuses on the techniques and methodologies used to diagnose diseases through the examination of tissues, organs, and bodily fluids. Students will study histopathology, cytology, and molecular pathology, learning to identify abnormal structures and cellular changes indicative of disease. The course combines lectures with practical laboratory sessions, where students will perform tissue staining, microscopy, and other diagnostic procedures. Emphasis is placed on understanding the pathological basis of diseases and their clinical implications. Ideal for students in medicine, biomedical sciences, or pathology, this course provides essential skills for conducting accurate pathological assessments. | | | |

**Module 48**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48166 | Parasitic worms | 5 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 2 | 3 | 79 | 46 |
| **Description** | | | |
| The Parasitic Worms course explores the biology, life cycles, and impact of helminths on human and animal health. Students will study various parasitic worms, including nematodes, cestodes, and trematodes, focusing on their morphology, transmission, and pathogenicity. The course includes lectures, laboratory work, and case studies, offering hands-on experience in identifying parasitic worms and understanding their role in disease processes. Emphasis is placed on the diagnosis, treatment, and control of helminthic infections. Ideal for students in biology, medicine, or veterinary science, this course provides comprehensive knowledge of parasitic worms and their significance in public health. | | | |

**Module 49**

| Code | Course/Module Title | ECTS | Semester |
|---|---|---|---|
| Bio-48167 | Research Project | 3 | 8 |
| **Class (hr/w)** | **Lect/Lab./Prac./Tutor** | **SSWL (hr/sem)** | **USWL (hr/w)** |
| 1 | 3 | 63 | 12 |
| **Description** | | | |
| The Research Project course guides students through the process of designing and executing an independent research project. Students will select a research topic, develop a hypothesis, conduct experiments or gather data, and analyze their findings. The course emphasizes critical thinking, problem-solving, and scientific communication, with students presenting their results in a written report and oral presentation. Throughout the course, students receive mentorship and feedback from faculty, gaining practical experience in research methodologies. Ideal for students in sciences, this course provides essential skills for conducting rigorous and meaningful research in academic or professional settings. | | | |

# Contact


Program Manager:

**Ayman Adwan Abd** | Ph.D. in Biology | Assistant Prof.

Email: ayman.adwan@tu.edu.iq

Mobile no.: +964 770 848 2828

Program Coordinator:

**Bilal Ahmed Abdullah** | Ph.D. in Biology | Lecturer.

Email: bilal.a.alarabi@tu.edu.iq

Mobile no.: +964 7719982270