Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Al-Nahrain University

Faculty/Institute: Collage of Biotechnology

Scientific Department: Medical and Molecular Biotechnology

Academic or Professional Program Name: Bachelors

Final Certificate Name: Bachelors of Medical and Molecular Biotechnology

Academic System: Semester system

Description Preparation Date: 23/4/2024

File Completion Date: 23/4/2024

Signature: Shahlaa

Head of Department Name:

Prof. Shahlaa Mahdi Salih

Date: 23/4/2024

Signature: Allami

Scientific Associate Name:

Prof. Risala Rzuki Hussain

Date: 23/4/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 23.4.2024

Signature: Ebrahim A. Ahmed

Dr. Ebrahim Abdulla Ahmed

Approval of the Dean

Prof. Dr. Mohsen Hashim Risan

1. Program Vision

Graduating students equipped with excellent theoretical knowledge, practical skills and attaining new heights in molecular and medical biotechnology research, to become a pioneering tool in applied scientific research for diagnosis and therapy on a global level and employing it to serve society.

2. Program Mission

To provide students with an education that incorporates academic study with intense practical education in a research-producing environment and creativity and to contribute to enhancing scientific research and community partnership through optimal investment of human and technical resources and building an effective partnership.

3. Program Objectives

1. To give students the essential theoretical background, analytical abilities, and foundational research knowledge skills in various disciplines of molecular and medical biotechnology that will enable them to seek higher education at reputable institutions nationally as well as internationally.
2. Providing technicians capable of applying knowledge and skills to solve theoretical and practical problems and creating a strong and reliable infrastructure to implement advanced applications in the field of molecular and medical biotechnology and genetic sequencing as a diagnostic and therapeutic tool for genetic and immunological diseases and malignant tumors.
3. Encourage the concept of teamwork and communication skills and promoting entrepreneurship among graduate's students in medical biotechnology.
4. Enhancing students' scientific and practical skills and contributing to enhancing scientific research and community partnership through optimal investment of human and technical resources and building an effective partnership.
5. To encourage students to start their own businesses in fields related to medical biotechnology.
6. Exhibit a high level of experience and professionalism in the ethical consequences of the medical sector and in accordance with the values of the profession in society.
7. Aligning academic outputs with the needs of the labor market and keeping pace with its developments to promote academic programs.
8. To plan and participate in events, conferences, symposiums, workshops, and interactions with scholars and academic institutions both locally and globally.

4. Program Accreditation

NO

5. Other external influences

Ministry of Higher Education and Scientific Research

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	**8**		**16%**	
College Requirements	**8**		**16%**	
Department Requirements	**34**		**68%**	
Summer Training	**YES**			
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Credit Hours		Course Code	Course Name	Year/Level
practical	theoretical			
2	2	MBt11-GB	General Biology-I	First stage/first semester
2	2	MBt11-AC	Analytical Chemistry	
2	2	MBt11-PB	Principles ofBiotechnology- |	
2	2	MBt11-Bp	Biophysics	
-	2	MBt12-BS	Biostatistics	
-	2	MBt 11-CS	Computer Science	
-	2	UN11-Eng	English	

2	2	**MBt12-GB**	General Biology-II	First stage/Sec.semester
2	2	**MBt12-PB**	Principles of Biotechnology	
2	2	**MBt12-OC**	Organic Chemistry	
2	2	**MBt12-PG**	Principles of Genetics	
-	2	**MBt12-BRM**	Biosafety and Risk management	
-	2	**UN12-HR-D**	Human rights and Democracy	
-	2	**UN12-Ab**	Arabic	
2	2	**BTM21-His**	**Histology**	Second stage/first semester
2	2	**BTM21-BicI**	**Biochemistry I**	
2	2	**BTM22-Em**	**Embryology**	
2	2	**BTM21-GMic**	**General Microbiology**	
2	2	**BTM21- EvBt**	**Environmental Biotechnology**	
-	2	**BTM21-BiSa**	**Biosafety and Risk Management**	
-	2	**UN21-HR**	**Human Rights**	
-	1	**UN21-EnI**	**English Language I**	
-	-	-	**Physical Education**	
2	**2**	**BTM22– APhy**	**Animal Physiology**	Second stage/Sec. semester
2	**2**	**BTM22– BicII**	**Biochemistry II**	
2	**2**	**BTM22– MeMi**	**Medical Microbiology**	
2	**2**	**BTM22– MiGe**	**Microbial Genetics**	
2	**2**	**BTM22– MiPhy**	**Microbial Physiology**	
2	**2**	**BTM22– Myc**	**Mycology**	
-	**2**	**UN22– Dem**	**Democracy**	
-	**1**	**UN22-EnII**	**English Language II**	
-	**-**	**-**	**Physical Education**	
2	**2**	**BTM31-Im**	**Immunology**	Third stage/first semester
2	**2**	**BTM31-MoBI**	**Molecular Biology- I**	
-	**2**	**BTM31-GeEnI**	**Genetic Engineering- I**	
2	**2**	**BTM31-InMi**	**Industrial Microbiology**	

2	2	BTM31-ATC	Animal Tissue Culture	
-	2	BTM31-MoTech	Molecular Technologies	
-	2	BTM31-ExDe	Experimental Design and Academic Writing	
-	1	UN31-EnI	English Language I	
-	-	-	Physical Education	
2	2	BTM32-HuCy	Human Cytogenetic	Third stage/Sec.semester
2	2	BTM32-Vi	Virology and Vaccines	
-	2	BTM32-GeEnII	Genetic Engineering II	
-	2	BTM32-NaBt	Nanobiotechnology	
2	2	BTM32-AnVa	Antibiotics	
2	2	BTM32-MoBII	Molecular Biology-II	
-	2	BTM32-MoDia	Molecular Diagnostics	
-	1	UN31-EnII	English Language II	
-	-	-	Physical Education	
2	2	BMT41-Ez	Enzymology	fourth stage/first semester
2	2	BTM41-To	Toxicology	
2	2	BTM41-DnaTy	Forensic Science and DNA Typing	
-	2	BTM42-PrGe	Genomics and Proteomics	
2	-	BTM41-RePro	Graduation Research Project I	
-	1	UN41-EnI	English Language I	
-	2	BTM41I-E	Elective I	
-	-	-	Physical Education	
2	2	BTM42-MoGe	Molecular Genetics	fourth stage/Sec.semester
-	2	BTM42-MeBt	Medical Biotechnology	
2	2	BTM41-Binfo	Bioinformatics	
-	2	BTM42-PhBt	Pharmaceutical Biotechnology	
2	-	BTM42-ReProII	Graduation Research Project II	
-	1	UN42-EnII	English Language II	
-	2	BTM42E-II	Elective II	
-	-	-	Physical Education	

8. Expected learning outcomes of the program

Knowledge	
Enabling students to obtain knowledge and understanding of the intellectual framework in	Clarification and explanation of study materials by academic staff through available modern capabilities Providing students with knowledge through classroom and

the department Enabling students to obtain knowledge and understanding of the various standards in the department	extracurricular vocabulary assignments Asking students to visit the library to obtain academic knowledge related to academic vocabulary
Skills	
. Deep understanding of basic concepts in life sciences and biotechnology. 2. The ability to use and apply different techniques and methods used in biological research, such as molecular, cellular and genetic techniques. 3. Develop basic laboratory skills, including the correct preparation, analysis, and interpretation of biological data. 4. Understand professional ethics and social responsibilities related to working in the field of biotechnology. 5. Developing the ability to think critically and analytically and evaluate vital research and results. 6. Develop scientific communication skills, including scientific writing, reports, and presentations.	1 - Providing advanced study programs and research projects that aim to deal with microorganisms in the medical and immunological fields. 2 - Familiarity with the vocabulary of the specialty is able to work in medical laboratories and conduct laboratory analyzes and molecular examinations while meeting quality standards and raising professional skills related to this specialty to contribute to building a society and strengthening scientific ties with Arab and international universities and research centers. 3 - Teaching skills and techniques for early detection of the genes responsible for many hereditary diseases by following modern techniques of genetic and immunological engineering and tissue culture of animal cells, thus making the specialty capable of providing society with knowledge and distinguished cadres with scientific specialization in the field of molecular and medical life technologies. 4- Interpreting biological phenomena using scientific concepts and appropriate techniques. 5-. Application of advanced biotechnology in research and industrial laboratories. 6. Analyze vital data using approved statistical software and tools.
Ethics	

. Quality: Achieving high standards in understanding biological concepts and applying biotechnology effectively. 2. Sustainability: The ability to use acquired knowledge and skills permanently and effectively in various life and professional contexts. 3. Innovation: The ability to think creatively and provide new and innovative solutions to vital challenges. 4. Responsibility: Dealing ethically and responsibly in using and applying biotechnology to solve problems and achieve scientific and social development.	. Deep understanding of biological concepts and advanced technologies used in research and industrial applications. 2. Develop laboratory work skills including preparation, analysis, and correct interpretation of biological data. 3. The ability to use software and statistical tools specialized in analyzing vital data. 4. Develop effective communication skills, whether in scientific writing, reports, or presentations. 5. Commitment to professional ethics and social responsibility in the field of biotechnology.

9. Teaching and Learning Strategies

Using modern methods to deliver information in a scientific and understandable way, such as using the interactive whiteboard with students, modern presentation methods, and progressive video to facilitate the delivery of information to students.

10. Evaluation methods

Conducting daily exams and interactive participation within the classroom, in addition to preparing scientific reports and holding discussion circles to present

modern scientific topics in the scientific specialization, in addition to conducting quarterly and final exams for practical and theoretical subjects.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Biotechnology	Molecular Biology			3	
Assistant Professor	Biotechnology	Molecular Biology			2	
Lecturer	Biotechnology	Molecular Biology			6	
Assistant Lecturer	Biotechnology	Molecular Biology			5	
Professor	Biotechnology	Microbiology			1	
Assistant Professor	Biotechnology	Microbiology			3	
Lecturer	Biotechnology	Microbiology			6	
Assistant Lecturer	Biotechnology	Microbiology			5	
Professor	Biotechnology	Immunology			1	
Assistant Professor	Biotechnology	Immunology			1	
Lecturer	Biotechnology	Immunology			1	
Assistant Lecturer	Biotechnology	Immunology			2	
Professor	Biotechnology	Enzymology			3	

Lecturer	Biotechnology	Enzymology			**1**	
Assistant Lecturer	Biotechnology	Enzymology			**1**	
Professor	Biotechnology	Animal tissue culture			**1**	
Assistant Professor	Biotechnology	Animal tissue culture			**1**	
Assistant Lecturer	Biotechnology	Animal tissue culture			**1**	
Professor	Biotechnology	Cytogenetic			**1**	
Assistant Professor	Biotechnology	Cytogenetic			**1**	

Professional Development
Mentoring new faculty members
Professional development of faculty members
Continuous review of modern literature and sources. − Use the virtual library to obtain some recent books in electronic format. − Participation in seminars, conferences and workshops.

12. Acceptance Criterion

Graduates of preparatory school / biological scientific branch / central admission

13. The most important sources of information about the program

− University requirements − Local scientific trends − International scientific requirements − Coverage of locally specialized staff

14. Program Development Plan
The proposed development plans for an academic program in biotechnology vary according to market needs and modern scientific and technological developments. Among the proposed plans are: 1. Updating the curriculum to include recent developments in the fields of biotechnology. 2. Introducing new courses covering emerging topics such as genomics, gene editing, and personalized medicine. 3. Developing specialized educational programs in advanced biotechnology such as genetic engineering and complex biological systems. 4. Promote practical training and laboratory experiments to enhance students' skills in the practical application of biotechnologies. 5. Providing hands-on training opportunities and collaborating with industry and research institutions to enhance students' understanding of real-world applications of biotechnology.

Program Skills Outline															
Required program Learning outcomes															
Ethics				Skills				Knowledge				Basic or optional	Course Name	Course Code	Year/Level
C4	C3	C2	C1	B4	B3	B2	B1	A4	A3	A2	A1				
√	√	√	√	√	√	√	√	√	√	√	√	Basic	General Biology-I	MBt11-GB	First stage/first semester
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Analytical Chemistry	MBt11-AC	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles ofBiotechnology- |	MBt11-PB	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Biophysics	MBt11-Bp	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Biostatistics	MBt12-BS	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Computer Science	MBt 11-CS	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	English	UN11-Eng	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	General Biology-II	MBt12-GB	First stage/Sec.semester
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Principles of	MBt12-PB	

													Biotechnology		
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	Organic Chemistry	**MBt12-OC**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	Principles of Genetics	**MBt12-PG**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	Biosafety and Risk management	**MBt12-BRM**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	Human rights and Democracy	**UN12-HR-D**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	Arabic	**UN12-Ab**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Histology**	**BTM21-His**	Second stage/first semester
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Biochemistry I**	**BTM21-BicI**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Embryology**	**BTM22-Em**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**General Microbiology**	**BTM21-GMic**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Environmental**	**BTM21-**	

												Biotechnology	**EvBt**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Biosafety and Risk Management**	**BTM21-BiSa**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Human Rights**	**UN21-HR**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**English Language I**	**UN21-EnI**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Animal Physiology**	**– APhy BTM22**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Biochemistry II**	**– BicII BTM22**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Medical Microbiology**	**– MeMi BTM22**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Microbial Genetics**	**– MiGe BTM22**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Microbial Physiology**	**– MiPhy BTM22**
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Mycology**	**– Myc BTM22**

Second stage/Sec. semester

√	√	√	√	√	√	√	√	√	√	√	√	Basic	Democracy	UN22– Dem	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	English Language II	UN22-EnII	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Physical Education	-	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Immunology	BTM31-Im	Third stage/first semester
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Molecular Biology- I	-MoBI BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Genetic Engineering- I	-GeEnI BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Industrial Microbiology	-InMi BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Animal Tissue Culture	-ATC BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Molecular Technologies	-MoTech BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Experimental Design and Academic Writing	-ExDe BTM31	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	English Language I	UN31-EnI	

√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Human Cytogenetic**	**BTM32-HuCy**	Third stage/Sec.semester
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Virology and Vaccines**	**BTM32-Vi**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Genetic Engineering II**	**-GeEnII BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Nanobiotechnology**	**-NaBt BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Antibiotics**	**-AnVa BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Biology-II**	**-MoBII BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Diagnostics**	**-MoDia BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**English Language II**	**UN31-EnII**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Enzymology**	**BMT41-Ez**	fourth stage/first semester
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Toxicology**	**BTM41-To**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Forensic Science and DNA Typing**	**-DnaTy BTM41**	

√	√	√	√	√	√	√	√	√	√	√	√	Basic	Genomics and Proteomics	-PrGe BTM42	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Graduation Research Project I	-RePro BTM41	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	English Language I	UN41-EnI	
√	√	√	√	√	√	√	√	√	√	√	√	optional	Elective I	BTM41I-E	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Physical Education	-	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Molecular Genetics	BTM42-MoGe	fourth stage/Sec.semester
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Medical Biotechnology	-MeBt BTM42	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Bioinformatics	-Binfo BTM41	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Pharmaceutical Biotechnology	-PhBt BTM42	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Graduation Research Project II	-ReProII BTM42	

√	√	√	√	√	√	√	√	√	√	√	√	Basic	English Language II	UN42-EnII	
√	√	√	√	√	√	√	√	√	√	√	√	optional	Elective II	BTM42E-II	
√	√	√	√	√	√	√	√	√	√	√	√	Basic	Physical Education	-	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Organic Chemistry
2. Course Code: MBt12-OC
3. Semester / Year:2\2
4. Description Preparation Date: 28 / 1 / 2024
5. Available Attendance Forms: attendance
6. Number of Credit Hours (Total) / Number of Units (Total):2\8
7. Course administrator's name (mention all, if more than one name)
Name: Alabbas Abdulkareem Majeed Email: albas.abdulkareem@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	**The main goal of studying organic chemistry i to understand the yield and reactions of orgar compounds, which mainly consist of carbon, such as nitrogen and other elements. Among main options:** **1. Understanding the organic composition of t compound: studying the military structure of t compound and the arrangement of the atoms and bonds in its molecules.** **2. Identifying the physical and chemical crops newspapers: analyzing the harvest of the distinctive newspapers of organic compounds such as solubility, melting, electrical conductivity, and commercial reactions.** **3. Understanding Interactive Registratio Examining how membership eleme malfunction, and expectations regarding composition of products.**

9. Teaching and Learning Strategies

Strategy	1. Textbooks 2. Laboratories 3. Illustrations and diagrams 4. Online resources 5. Discussion and effective exchange of knowledge

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**Introduction and General principles about organic chemistry**	**Introduction and Gen principles about orgar chemistry**	Blackboard and data show	Daily exams homework
2	2	**Hybridization in organic compounds**	**Hybridization in organic compounds**	Blackboard and show	Daily exams homework
3	2	**Alkanes**	**structure and nomenclature**	Blackboard and data show	Daily exams homework
4	2	**Alkanes**	**synthesis and reaction**	Blackboard and data show	Daily exams homework
5	2	**Alkenes**	**structure and nomenclature**	Blackboard and data show	Daily exams homework
6	2	**Alkenes**	**synthesis and reaction**	Blackboard and data show	Daily exams homework
7	2	**Mid-term Exam**	**Mid-term Exam**	Blackboard and data show	
8	2	**Alkynes**	**structure, nomenclatu and reaction.**	Blackboard and data show	Daily exams homework
9	2	**Alkyl halides:**	**structure, nomenclatu and reaction**	Blackboard and data show	Daily exams homework
10	2	**Amines**	**nomenclature**	Blackboard and data show	Daily exams homework
11	2	**Ethers**	**structure and nomenclature,**	Blackboard and data show	Daily exams homework
12	2	**Ethers**	**synthesis and reaction**	Blackboard and data show	Daily exams homework
13	2	**Alcohols**	**structure, physical and chemical properties, nomenclature**	Blackboard and data show	Daily exams homework
14	2	**Alcohols**	**Reaction and prepara**	Blackboard and data show	Daily exams homework
15	2	**Preparatory week before the final Exam**	**Preparatory week bef the final Exam**	Blackboard and data show	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Organic Chemistry, 6th Edition 6th Edition by Robert T. Morrison , Robert N. Boyd
Main references (sources)	Organic Chemistry (7th Edition)7th Edition by Paula Yurkanis Bruice
Recommended books and references (scientific journals, reports…)	https://www.chemicalprocessing.com/
Electronic References, Websites	

Course Description Form

1. Course Name:

Biostatistics

2. Course Code:

PBt2-Bst

3. Semester / Year:

Semester 2, Year 1

4. Description Preparation Date:

28\4\2024

5. Available Attendance Forms:

Attendance

6. Number of Credit Hours (Total) / Number of Units (Total):

2hour \2 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Zaid Nsaif Abbas Email: zaid.altameemi@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The Statistics module aims to provide undergraduate students with a solid foundation in statistical concepts, methods, and applications. Through this module, students will develop a comprehensive understanding of the principles and techniques used in statistical analysis, data interpretation, and inference. The module will cover various statistical topics, including descriptive statistics, probability theory, hypothesis testing, regression analysis, and data visualization. Aims of Study Statistics for Undergraduate Students: 1. Understanding Statistical Concepts: The module aims to familiarize students with fundamental statistical concepts, such as population, sample, variables, measures of central tendency, and measures of dispersion. Students will learn how to describe, summarize, and analyze data using appropriate statistical techniques. 2. Data Analysis and Interpretation: The module aims to equip students with the necessary skills to collect, organize, and analyze data effectively. Students will learn how to apply statistical methods to explore relationships, patterns, and trends within datasets. They will also gain proficiency in interpreting and drawing meaningful conclusions from statistical analyses. 3. Statistical Inference: The module aims to introduce students to the principles of statistical inference, including hypothesis testing and confidence interval estimation. Students will learn how to formulate research hypotheses, select appropriate statistical tests, and make valid inferences about populations based on sample data. 4. Statistical Software and Tools: The module aims to familiarize students with commonly used statistical software and tools. Students will gain hands-on experience in using statistical software packages to perform data analysis, conduct statistical tests, and generate graphical representations of data. 5. Critical Thinking and Problem-Solving: The module aim to enhance students' critical thinking and problem-solving skills through the application of statistical methods. Students will develop the ability to identify real-world problems that can be addressed using statistical analysis and propose appropriate solutions based on data-driven evidence.

	6. **Communication of Statistical Findings:** The module aims to improve students' ability to communicate statistical findings effectively. Students will learn how to present statistical results in a clear and concise manner, using appropriate visualizations and written explanations. They will also develop skills in critically evaluating and interpreting statistical information presented by others.

9. Teaching and Learning Strategies

Strategy	1. **Lectures:** Traditional classroom lectures will be used to present key concepts, theories, and statistical methods. Lectures will provide a structured overview of the topics and allow for explanations and demonstrations by the teacher. 2. **Practical Sessions:** Practical sessions will be conducted with statistical software to provide hands-on experience in data analysis and interpretation. Students will have the opportunity to apply statistical techniques to real-world datasets, perform calculations, and interpret the results. 3. **Case Studies:** Case studies involving real research scenarios and datasets will be discussed to illustrate the application of statistical methods in the field of biostatistics. Students will analyze the data, identify appropriate statistical tests, and interpret the findings. 4. **Group Discussions:** Group discussions will be encouraged to promote active learning and critical thinking. Students can share their understanding of statistical concepts, discuss complex problems, and explore different perspectives on statistical analyses. 5. **Practical Assignments:** Assignments will be given to students to solve statistical problems and conduct data analyses independently. These assignments will reinforce the learning outcomes and provide opportunities for students to practice their skills. 6. **Online Resources:** Online resources such as video tutorials, interactive quizzes, and reading materials will be provided to supplement classroom learning. These resources can be accessed at any time, allowing students to review concepts and practice statistical techniques at their own pace. 7. **Formative Feedback:** Regular formative assessments, such as quizzes or in-class exercises, will be conducted to monitor students' progress and provide feedback on their understanding of statistical concepts. This will help identify areas that require further clarification or reinforcement. 8. **Individual Consultations:** Individual consultations with the instructor will be available to add specific questions or concerns regarding statistical concepts, calculations, or data ana techniques. This personalized support can assist students in overcoming challenges and clari their understanding.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Biostatistics	Introduction to Biostatistics	Presentation and whiteboard	Oral Discussion and Quiz
2	2	Description and Presentation of Numerical Data	Description and Presentation of Numerical Data	Presentation and whiteboard	Oral Discussion and Quiz
3	2	Description and Presentation of Numerical Data (tutorial)	Description and Presentation of Numerical Data (tutorial)	Presentation and whiteboard	Oral Discussion and Quiz

4	2	Description and Presentation of Categorical Data	Description and Presentation of Categorical Data	Presentation and whiteboard	Oral Discussion and Quiz
5	2	Description and Presentation of Categorical Data (tutorial)	Description and Presentation of Categorical Data (tutorial)	Presentation and whiteboard	Oral Discussion and Quiz
6	2	Probability	Probability	Presentation and whiteboard	Oral Discussion and Quiz
7	2	Estimation	Estimation		
8	2	Mid Exam	Mid Exam	Presentation and whiteboard	Oral Discussion and Quiz
9	2	Hypothesis Testing	Hypothesis Testing	Presentation and whiteboard	Oral Discussion and Quiz
10	2	Sampling Techniques	Sampling Techniques	Presentation and whiteboard	Oral Discussion and Quiz
11	2	Inferential Statistics	Inferential Statistics	Presentation and whiteboard	Oral Discussion and Quiz
12	2	T-test and Chi-Square Distribution	T-test and Chi-Square Distribution	Presentation and whiteboard	Oral Discussion and Quiz
13	2	Analysis of Variance (ANOVA)	Analysis of Variance (ANOVA)	Presentation and whiteboard	Oral Discussion and Quiz
14	2	Correlation and Linear Regression	Correlation and Linear Regression	Presentation and whiteboard	Oral Discussion and Quiz
15	2	Exam	Exam		

11.Course Evaluation

Presentations, daily oral discussions, reports .... etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Triola, M. M., Triola, M. F., & Roy, J. (2018). Biostatistics for the biological and health sciences (Second edition). Pearson.
Recommended books and references (scientific journals, reports...)	White S.E.(Ed.), [publicationyear2] *Basic & Clinical Biostatistics, 5e*. McGraw-Hill Education.
Electronic References, Websites	https://accessmedicine.mhmedical.com/content.aspx?bookid=2724&sectionid=226990388

Course Description Form

1. Course Name:
Biosafety and Risk Assessment
2. Course Code:
3. Semester / Year:
2023/2024
4. Description Preparation Date:
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours Theory / Number of units = 3
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ali Z. Al-Saffar Email: ali.saffar@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	**1. Understand the fundamental principles of bio-safety and risk assessment in various laboratory and research settings.** **2. Gain knowledge of the potential hazards associated with biological agents and genetically modified organisms (GMOs).** **3. Learn about the legal and regulatory frameworks governing bio-safety and risk assessment.** **4. Explore different levels of bio-safety containment an their corresponding practices and requirements.**

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Principles of Biological Safety; and Biosa Course Resources			
2	2	Laboratory-acquired Infections; Routes exposure			
3	2	Good Laboratory Practices (BSL1 and requirements)			
4	2	Risk Groups (1-4) and Biological Safety Le (BSL1-4)			
5	2	Biological Safety Cabinets (BSC-I, II, III)			
6	2	Regulations, Standards, and Guidel Applicable to Biological Safety			
7	2	Mid-Course Exam			
8	2	Risk Assessment, Biosafety Prog Management			
9	2	Controls in Biological safety:			
10	2	I: Facility Design and Containment Equipm			
11	2	II Personal Protective Equipment (PPE)			
12	2	Decontamination, Spills, and W Management			
13	2	Biosecurity and Select Agents			
14	2	Biosafety Level 3 and 4 Containments			
15	2	Human Gene Transfer and Animal Biosafety			

11. Course Evaluation

Exam I	25 %
Attendance	5 %
Contribution	5 %
Drop Quizzes	5 %
Final Exam	60 %
TOTAL	100 %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Biosafety in Microbiological and Biomedi Laboratories (BMBL) 5th edition.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Biosecurity: Understanding, Assessing, and Preventin the Threat. Editor(s): Ryan Burnette. 2013. Edition, Leboffe and Pierce.
Electronic References, Websites	

Course Description Form

1. Course Name:
Microbial Genetics
2. Course Code:
BTM22-MeMi
3. Semester / Year:
2nd Semester / 2nd year
4. Description Preparation Date:
1 / 9 / 2023
5. Available Attendance Forms:
Attending
6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours / 45 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Ali Mhawesh Email: ahmed.ali@nahrainuniv.edu.iq Name: Dhafar N. Al-ugaili Email: dhafar.alugaili@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	• Understanding and appreciation of the field of microorganism science and its genetics. • Understand and appreciate the scope, versatility and utility of many microbial genetic techniques. • Understand and appreciate the possibility of using modern applications of PCR technology to facilitate microbial genetic techniques.

9. Teaching and Learning Strategies

Strategy	The graduate must be able to know and understand all of the following: 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects Education methods 1- Lectures 2- Power point system 3- 3- Homework and seminar system Learning methods 1- Weekly rapid exams 2- Discussion, immediate questions and answers 3- The international network for information on the subject of specialization

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T+2L	Understanding the elementary theoretical principles and foundations related to subject	Introduction	Lectures and seminars	Oral and written exams Seminars

2	2T+2L	=	Why study Prokaryotic genetics?	=	=
3	2T+2L	=	DNA as the genetic material	=	=
4	2T+2L	=	Genetic exchange in bacteria	=	=
5	2T+2L	=	Bacterial transformation	=	=
6	2T+2L	=	Bacterial conjugation	=	=
7	2T+2L	=	Transduction	=	=
8	2T+2L	=	Transposable genetic elements	=	=
9	2T+2L	=	Midterm exam	=	=
10	2T+2L	=	Mutations as the raw material of genetic variation	=	=
11	2T+2L	=	Genetic repair system in prokaryote (DNA damage and mutation)	=	=
12	2T+2L	=	Protoplast formation in microorganisms	=	=
13	2T+2L	=	Operons	=	=
14	2T+2L	=	Regulation of gene expression	=	=
15	2T+2L	=	Genetically modified organisms (GMOs)	=	=

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Genetics. Bengamin A. pierce. Sixth edition. W.H. freeman
Main references (sources)	Molecular Genetics of Bacteria, Snyder, L. and Champness, W. 2007. 3rd edition, American Society for Microbiology, Washington, D. C.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	NATIONAL CENTER FOR BIOTECHNOLOGY INFORMATION (NCBI): http://www.ncbi.nlm.nih.gov/.

Course Description Form

1. Course Name: Molecular Biology II
I
2. Course Code: BTM31-MOB1
3. Semester / Year:
2nd semester / 3rd year
4. Description Preparation Date:
24/4/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30Hours / 2units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Dr. Hameed M. Jasim Email: Hameed.jasim@nahrainuniv.edu.iq Dr: Dr. Risala R. Allami Email: risala.allami@nahrainuniv.edu.iq ririallami@yahoo.com
8. Course Objectives

Course Objectives	1- To provide students with knowledge and information as well as practical experience about Molecular Biology. 2- Studying the composition, structure and interactions of cellular molecules – such as nucleic acids and proteins 3- Carrying out the biological processes essential for the cell's functions and maintenance. 1.

9. Teaching and Learning Strategies

Strategy	A grounding of molecular biology is provided through a combination of recorded lectures(screencasts) and demonstrations. These will cover various aspects of basic molecular biologyincluding nucleic acids and proteins; gene expression; DNA analysis; gene cloning; molecularevolution; typing and diagnostics. A summative assessment will be carried out via a timed Quiz style test on Moodle at the end of the module. This assessment does not count toward thegrade.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	Regulation of transcription in prokaryotes General features of genes that are regulated, molecules involved in		Power point and white board	Quizzes, Assignments and written exam

		regulation			
2	2 theoretical	Regulation of gene expression in prokaryotes • Operon • lac Operon • Activation of the lac operon by cyclic AMP and the CAP protein		″	″
3	2 theoretical	Eukaryotic transcription • The Structure of Eukaryotic mRNAs • Production of Mature mRNA in Eukaryotes • Regulation of gene expression in eukaryotes • Control of Transcription by Activators and Repressors		″	″
4	2 theoretical	Controls of Gene Expression in Eukaryotes • Methylation of DNA • RNA Interference (RNAi) Micro RNA (miRNA		″	″
5	2 theoretical	Mutations		″	″
6	2 theoretical	Transposon • Types and structure of transposons • The transposition machinery		″	″
7	2 theoretical	Recombination: homologous recombination, Site specific recombination, Illegitimate recombination		″	″
8	2 theoretical	Mid exam			
9	2 theoretical	Genomics and Proteomics		″	″
10	2 theoretical	Epigenetics		″	″
11	2 theoretical	Metagenomics		″	″
12	2 theoretical	Bacteriophages and eukaryotic viruses: Introduction to viruses, Bacteriophages		″	″
13	2 theoretical	Bioinformatics Algorithms: Introduction to bioinformatics		″	″
14	2 theoretical	Cancer Molecular basis of cancer		″	″
15		Final Exam			

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final exams ....etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1- **Molecular Biology: Principles of Genome Function** Nancy L Craig ,Orna Cohen-Fix, Rachel Green, Carol W Greider, Gisela Storz, Cynthia Wolberger. Oxford University Press 2018. 2-**Molecular Biology of the Cell**. 8th edition Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2020. 3- Practical Handbook Of Biochemistry And Molecular Biology/ Gerald D Fasman
Main references (sources)	1- **Molecular Biology: Principles of Genome Function** Nancy L Craig ,Orna Cohen-Fix, Rachel Green, Carol W Greider, Gisela Storz, Cynthia Wolberger. Oxford University Press 2018. 2-**Molecular Biology of the Cell**. 8th edition Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2020. 3- Practical Handbook Of Biochemistry And Molecular Biology/ Gerald D Fasman
Recommended books and references (scientific journals, reports...)	**Textbook, laboratory manuals, lecture materials, scen and cases, videos, power point presentation**
Electronic References, Websites	https://www.sciencedirect.com/book/9780323990455/principles-of-molecular

Course Description Form

1. Course Name: Medical microbiology
2. Course Code: BTM22-MeMi
3. Semester / Year: Semester 2, Year 2
4. Description Preparation Date: 15\1\2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total): 4/3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Bushra hindi Saleh Em Bushra.aftan@nahrainuniv.edu.iq Name: Aya raad salh mahdi Email: aya.raad@nahrainuniv.edu. Name: Noor dheyaa hameed Em noor.dheyaa@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	The outcomes of this course is to provide students with the knowledge and information as well as practical experience about principles of Medical microbiology , who bacteria caused diseases, most important family of bacteria, then study most important gram positive & negative bacterial *spp* that causes important diseases ,virulence factors of these bacteria, classification and role of virulence factors in mechanism of pathogeneses of bacteria that caused the disease, predisposing factor, Lab diagnosis and treatment.

9. Teaching and Learning Strategies

Strategy	Effective teaching and learning strategies involve use new methods in learning by The numbe teaching units are three units which consists of approximately 14-15 week time tabled study a two hours lecturing with a two-hour practical laboratory every week. The teaching meth involve interactive/active learning lectures, videos, Data show, tutorial sessions, guided inq ,feedback, reflection ,demonstrations and pe practical learning in laboratory, and homew

	assignment 15 hours will be independent or self-directed study.. These strategies aim to eng students actively, reinforce theoretical concepts, develop critical thinking skills, and ensure a learning environment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	4	Learning the student principle of medical microbiology	Introduction into medical microbiology ,classification of bacteria	Data show + Blackboard +practical	Daily exams and home work
	4	Learning the student about pathogeneses of gram positive Staph *spp* and who to diagnosis it	Family micrococcaceae, Staphylococcus virulence factors ,pathogenesis of m important disease caused by importa spp, diagnosis	Data show + Blackboard+ practical	Daily exams and home work
	4	Learning the student about main spp of streptococcus bacteria, ,pathogensis of bacteria and method of diagnosis	Streptococcus. classification of bacteria ,pathogenesis ,most important diseases caused by main groups	Data show + Blackboard+p ractical	Daily exams and home work
	4	Learning the student about Gram negative bacteria in Enterobacteriacae family,pathogenesis, method of diagnosis of bacteria	Family enterobacteriac ae. most important spp. serotype, E.coli important diseases caused by each species, mechanism of diarreha caused by each spp	Data show + Blackboard+p ractical	Daily exams and home work
	4	Mid exam	Mid exam	Written	Mid exams
	4	Learning the student about main salmonella spp,pathogenesis and diagnosis	Salmonella, classification ,virulence factors, typhoid fever ,stages of	Data show + Blackboard +practical	Daily exams and home work

			pathogenesis of disease		
	4	Learning the student about main proteus spp,pathogensis of bacteria and diagnosis	Proteus, virulence factors, most important characters, ,most important disease caused by it	Data show + Blackboard +practical	Daily exams and home work
	4	Learning the student about Tuberculosis disease	Tuberculosis ,causes, risk factor ,mechanism of disease.Tuberclin skin test ,Vaccination	Data show + Blackboard+ practical	Daily exams and home work
	4	Learning the student about bacteria caused malta fever	Brucella spp, disease caused by it	Data show + Blackboard+practical	Daily exams and home work
	4	Mid exam	Mid exam	written	Mid exam
	4	Learning the student about Pseudomonas bacteria and diagnosis	Pseudomonas, Characters of bacteria, virulence factors and pathogenesis,disease caused by bacteria	Data show + Blackboard+practical	Daily exams and home work
	4	Learning the student about gram positive bacilli ,spore foming clostridia	Clostridia, virulence factors, ,most important disease, gas gangrene,causative agent and pathogensis,	Data show + Blackboard+practical	Daily exams and home work
	4	Learning the student about gram positive bacilli ,non spore foming	Coryne bacteria, virulence factors,most important disease.	Data show + Blackboard+practical	Daily exams and home work
	4	Learning the student about gram positive bacilli ,non spore foming	Listeria, virulence factors,most important disease,Listeriosis in adult	Data show + Blackboard+ practical	Daily exams and home work

	4	revision	revision	oral	Daily exams and home work

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Garrity,G.(2001),Berges Manual of systematic Bacteriology . 2nd(ed.)spr verla.New York.465-471
Main references (sources)	1- Murray,p.R;Rosenthal,K.S.and Pfaller,M.A.(2020).Medical Microbiology. E-Book.9th(ed.).ElsevierHealth science.Houston 2- Warren,L.and Ernest,J.(2000).Medical microbiology and immunology.Hall international.6th(ed,).Lange Medical Books/McGraw-Hill.Medical publishing.New York.
Recommended books and references (scientific journals, reports…)	http://www.sciencedirect.com/ book-medical microbiology
Electronic References, Websites	http://www.amazon.com/medical -microbiology

Course Description Form

1. Course Name: General Microbiology

2. Course Code: BTM21−GMic

3. Semester / Year: Semester 1, Year 2

4. Description Preparation Date: 28\1\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 4\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr.Bushra hindi Saleh Email: Bushra.aftan@nahrainuniv.edu.iq
Name: Dr. Mayaada S Mahdi Email: mayyadah.mahdi@nahrainuniv.edu.iq
Name: Rana Adnan Mohsin Email: rana.rana@nahrainuniv.edu.iq
Name: Mustafa sami mohammed Email: Mustafa.alsalmani@nahrainuni.edu.iq
Name: Noor Ali Oohayyed Email : noorali.oohayid@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The outcomes of this course provide students with the knowledge and information about the principles of microbiology ,Classification of M.O , study prokaryotic structure and function, differences between prokaryotic and Eukaryotic ,study the most important process occurs inside cell like respiration ,nutrition and metabolism. learning students methods of sterilization and preparation of culture media ,also study the role of antiseptic and detergent in control the growth of M.O.

9. Teaching and Learning Strategies

Strategy	The number of teaching units are three units which consists of approximately 14-15 week timetabled study c a two hours lecturing with a three-hour practical laboratory every week. The teaching methods invo interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homework assignment hours will be independent or self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Introduction to general Microbiology, classification of M.O theories of discovery of Microbiology.	study of the biology of microscopic organisms - viruses, bacteria, algae, fungi, slime molds, and protozoa.	Whit board and power point	Quizzes and homewor Seminar ,written exam
2	2	Definition of cell, cell theories ,study the structure of prokaryotic cells and role of each organelles	Study the observed of bacteria and other microorganisms using a single-lens microscope	Whit board and power point	Quizzes and homewor Seminar ,written exams
3	2	Introducing to the Classification of Microorganisms	study the microorganism that exist as unicellular, multicellular, or cell clusters	Whit board and power point	Quizzes and homewor Seminar ,written exams
4	2	Introducing to Bacterial classification ,observation ,culture on different types of media.	Study the Bacterial classification ,observation ,culture on different types of media.	Whit board and power point	Daily exams and homework
5	2	Mid exam	Mid exam		
6	2	Introducing to Eukaryotic cell structure, organelles main functions, composition of nucleus, mitochondria, chloroplast, lysosome.	Study the Eukaryotic cell structure, organelles main functions, composition of nucleus, mitochondria, chloroplast	Whit board and power point	Daily exams and homework
7	2	Introducing to Bacterial nutrition,Micronutrient,Macronutrient,classification of microorganism according to their nutrition. Types of Transport system,comparision between transport system of M.O	Study the Bacterial nutrition,Micronutrient,Macronutrient,classification of microorganism according to their nutrition. Types of Transport system, comparision between transport system of M.O	Whit board and power point	Daily exams and homework
8	2	Introducing to Bacterial growth curve ,characters of each stage , Generation time ,factors influence on bacterial growth curve.	Study the Bacterial growth curve ,characters of each stage , Generation time ,factors influence on bacterial growth curve.	Whit board and power point	Daily exams and homework
9	2	Introducing to Classification of M.O according to temperature (psychrophile ,mesophile,thermophile,hyper thermophile), PH (acidophile,,alkalophile,Neutrophile) osmotic pressure (osmotolerent,Halophile)	Study the Classification of M.O according to temperature (psychrophile ,mesophile,thermophile,hyper thermophile), PH (acidophile,,alkalophile,Neutrophile) osmotic pressure (osmotolerent,Halophile)	Whit board and power point	Daily exams and homework
10	2	Mid exam	Mid exam		
11	2	Introducing to Respirations ,aerobic respiration ,Krebs cycle	Study the Respirations ,aerobic respiration	Whit board and power point	Daily exams and homework

			,Krebs cycle		
12	2	Introducing to Anaerobic respiration and fermentation	Study the Anaerobic respiration and fermentation	Whit board and power point	Daily exams and homework
13	2	Introducing to Energy and metabolism,anabolism and catabolism	Study the Energy metabolism,anabolism catabolism	Whit board and power point	Daily exams and homework
14	2	Introducing to Antiseptic and detergents, their types and mode of actions	Study the Antiseptic and detergents, their types and mode of actions	Whit board and power point	Daily exams and homework
15	2	Introducing to Viru Classification of v according nucleocapsid. Ty of nucleic acid. Replicatior viruses, **Pox virus,Retro virus**	Study the Viruses, Classification of virus according nucleocapsid. Types of nucleic acid. Replication of viruses, **Pox virus,Retro virus**	Whit board and power point	Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Ogunseilan,O.(2005).Microbial Diversity,form and function in prokaryotic.1st(ed.).Blackwell. USA
Main references (sources)	2-James,C.and Natalie.(2014).Microbiology.A laboratory manual. 10_{th} (ed.).Pearson.Boston. 3 - Schaechingter,M.;Ingraham,J. L .and Neidhardt ,F.C. .(2006) ,F.C.(2006).Microbe.1st(ed.).ASMpress. Washington.chapter 6,82-111. 4-Garrity,G.(2001).Berges Manual of Systematic Bacteriology.2nd(ed).spr.verla,Newyork.465-471.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Microbial physiology

2. Course Code: BTM22-Miphy

3. Semester / Year: Semester 2, Year 2

4. Description Preparation Date: 28\1\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 4\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Mayaada S. Mahdi Email: **mayyadah.mahdi@nahrainuniv.edu.iq**
Name: Rana Adnan Mohsin Email: rana.rana@nahrainuniv.edu.iq
Name: Aya Read Salih Email: aya.read@nahrainuniv.edu,.iq

8. Course Objectives

Course Objectives	The outcomes of this course provide students with knowledge and information about how microbial cell structures, growth and metabolism function in living organisms. It covers the study of viruses, bacteria, fungi and parasites. ... Microbial physiology is important in the field of metabolic engineering and also functional genomics..

9. Teaching and Learning Strategies

Strategy	The number of teaching units are three units which consists of approximately 14-15 week timetabled st over a two hours lecturing with a three-hour practical laboratory every week. The teaching meth involve interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homew assignment 15 hours will be independent or self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introducing to the microbial physiology	Study the microbial physiology	White board and power points	Quizzes and homework Seminar or written exams

2	2	Introducing to the Microbial Cell Structure and Function	Study the microbial structure and function	White board and power points	Quizzes and homework Seminar or written exams
3	2	Introducing to the Microbial metabolism, growth and biokinetics	Study the Microbial metabolism, growth and biokinetics	White board and power points	Quizzes and homework Seminar or written exams
4	2	Introducing to the **Diversity of Physiological Adaptations in Microbes**	Study the **Diversity of Physiological**	White board and power points	Quizzes and homework Seminar or written exams
5	2	Mid exam	Mid exam		
6	2	Introducing to the Microbial Stress Response	Study the Microbial Stress Response	White board and power points	Quizzes and homework Seminar or written exams
7	2	Introducing to the Micro Growth and and multiplicatio	Studying the growth of microorganisms	White board and power points	Quizzes and homework Seminar or written exams
8	2	Introducing to the Transport across the cell membrane	Study the types of Transport across the cell membrane	White board and power points	Quizzes and homework Seminar or written exams
9	2	Introducing to the Biofilm	Study the steps of biofilm	White board and power points	Quizzes and homework Seminar or written exams
10	2	Mid exam	Mid exam		
11	2	Introducing to the Cell to cell communication	Study the role of quorum sensing	White board and power points	Quizzes and homework Seminar or written exams
12	2	Introducing to the Sporulation	Study the phenomena of Sporulation	White board and power points	Quizzes and homework Seminar or written exams
13	2	Introducing to the Microbial interaction and types	Study the types of Micro interactions	White board and power points	Quizzes and homework Seminar or written exams
14	2	Introducing to the Environmental factors affecting growth	Study the Environmental fac that affecting growth	White board and power points	Quizzes and homework Seminar or written exams
15	2	Introducing to the Metab Engineering	Study the Metabolic Engineering	White board and power points	Quizzes and homework Seminar or written exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Prescott's Microbiology 10th. Joanne Willey
Main references (sources)	2. Essential Microbiology Stuart Hogg The University of Glamorgan, UK
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: **Animal physiology**
2. Course Code: BTM22-Aphy
3. Semester / Year:2 year 2
4. Description Preparation Date: 23-4-2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total):2\3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Prof. Dr. Zina F. AL-Obaidi\ Email: zena.alobaeady@nahrainuniv.edu.iq Name:Mohand Hasan Hussein\ Email: mhbio8080@gmail.com
8. Course Objectives

Course Objectives	Lectures and laboratories are concerned with mechanisms by which animals function. The prevai theme is the biology of the whole animal. Regula and integrative mechanisms in animal organ systems examined • **An introduction to the fundame understanding of animal structure function. Emphasis placed on the pract aspects of anatomy and physiology different species. Discussion will incl tissues, organs, and body systems wh make up the living organism.**

9. Teaching and Learning Strategies

Strategy	1-The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercis while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,

	interactive tutorials and by considering type of 2-simple experiments involving some sampling activities th are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1. Most anim physiologically adapt developing means for protecti body temperature regulation predation. 2. The HPA syst releasescortisol, corticotroph releasing hormone and ot hormones for relieving a perso emotional or physical str according to the Centers Disease Control and Prevent Summarize what is meant by basic electric circuit. 3. Physiological activ refers to the normal function an organism. It may refer specific organs or the organism a whole. Describe electri power, charge, and current. 4.Define Osmoregulation 5.Identify the Thermoregulat in heat and cold 6.Discuss the operations sinusoid and phasors in electric circuit. 7.Discuss physical things nee for human survival and pro functioning of the human body 8.learn about all of the ma systems of the body, and h they work together to keep body functioning at its best. 9.Identify introduction to discipline of anatomy physiology.	1-Introduction 2- General physiolog 3- Osmoregulation 4- Circulatory systen 5- Exchange/Respira 6- Thermoregulation 7- Mid-term Exam 1 8- The Digestive syst physiology 9- The Urinary syste physiology 10- Muscle system physiology 11- Human Reproductive physiology 12- Human Reproductive Hormones 13- Mid-term Exam	Black boa +power poi	Daily exam and Hom work

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Environmental Biotechnology

2. Course Code: BTM21-EvBt

3. Semester / Year: Semester 1, Year 2

4. Description Preparation Date: 28\1\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 4\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: **Dr. Mayaada S Mahdi** Email: **mayyadah.mahdi@nahrainuniv.edu.iq**

Name: **Dr. Farah T.O.Al-Jumaili** Email: **farah.aljumaili@nahrainuniv.edu.iq**

Name: **Hiba k. Ibrahim** Email: **heba.ibrahim@ced.nahrainuniv.edu.iq**

Name: **Saja ali** Email: **saja.ali@nahrainuniv.edu.iq**

8. Course Objectives

Course Objectives	The outcomes of this course provide students with knowledge and information as well as practical experience to promote education and research in biotechnology and provide academic and professional excellence for immediate productivity in industrial, governmental, or clinical settings for an ultimate benefit of society and environment.

9. Teaching and Learning Strategies

Strategy	The number of teaching units are three units which consists of approximately 14-15 week timetabled st over a two hours lecturing with a three-hour practical laboratory every week. The teaching meth involve interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homew assignment 15 hours will be independent or self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introducing to the environmental biotechnology	Study the environmental biotechnology	Whit board and power point	Quizzes and homewor Seminar ,written exams
2	2	Introduction to Fundamental aspects of environmental microbiology,	Study the Introduction Fundamental aspects environmental	Whit board and power point	Quizzes and homewor Seminar ,written exams

		environmental significance of fungi, bacteria, and algae	microbiology, environmental significa of fungi, bacteria, a algae		
3	2	Introduction to Microbial metabolism, growth and biokinetics	Study the Microbial metabolism, growth and biokinetics	Whit board and power point	Quizzes and homewor Seminar ,written exams
4	2	Introduction to Microorganism in the environment, the nitrogen cycle	Study the Microorganism in the environment, the nitrogen cycle	Whit board and power point	Quizzes and homewor Seminar ,written exams
5	2	Mid exam	Mid exam		
6	2	Introduction to Environmental health	Study the Environmental health	Whit board and power point	Quizzes and homewor Seminar ,written exams
7	2	Introduction to Benef effects of microorganisms in environment	Study the Beneficial effects of microorganisms in the environment	Whit board and power point	Quizzes and homewor Seminar ,written exams
8	2	Introduction to Sources of environmental contamination	Study the Sources of environmental contamination	Whit board and power point	Quizzes and homewor Seminar ,written exams
9	2	Introduction to Types of pollutions, Air Pollution	Study the Types of pollutions, Air Pollution	Whit board and power point	Quizzes and homewor Seminar ,written exams
10	2	Mid exam	Mid exam		
11	2	Introduction to Water Pollution	Study the Water Pollution	Whit board and power point	Quizzes and homewor Seminar ,written exams
12	2	Introduction to Some ways of Biotechnology Makes the World More Sustainable	Study the ways of Biotechnology Makes the World More Sustainable	Whit board and power point	Quizzes and homewor Seminar ,written exams
13	2	Introduction to metabolic genetic engineering techniques	Explaining the role of ger engineering techniques regulating metabolism, w reflects the role of biology in environment	Whit board and power point	Quizzes and homewor Seminar ,written exams
14	2	Introduction to Ten ways to save our environment	Study the Ten ways to save environment	Whit board and power point	Quizzes and homewor Seminar ,written exams
15	2	Introduction Biodegradation principles	Study the Biodegradation principles	Whit board and power point	Quizzes and homewor Seminar ,written exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. **Microorganisms in environmental biotechnology application,chapter 3,** ***Awanish Kumar1*; Dharm Pal2,*** Raipur-492010, Chhattisgarh, India

Main references (sources)	1. Biodegradation: Involved Microorganisms and Genetically Engineered Microorganisms, Nezha Tahri Joutey. 2. Prescott's Microbiology 10th. Joanne Willey
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:

Biochemistry I

2. Course Code:

BTM21-BicI

3. Semester / Year:

1st semester / 2nd year

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

4 Hours / 3 units

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Mustafa Kahtan Sameen Al-Bayaty
Email: Mustafa.kahtan@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The objectives of this course involve providing the essentials for understanding all living processes. This module aims to teach core concepts in biochemistry including topics on structure of proteins, carbohydrates, lipids, enzymes, and nucleic acids. The module will also provide a background to fundamental aspects of chemistry. This module provides the core knowledge and skills to enhance performance in the area of biological chemistry. Understand how the chemical properties of molecules determine the ways in which they interact and react with each other. Understand different types of chemical reactions and how they are used by living organisms. Use a variety of models to understand and explain chemical and biochemical phenomena, being aware of their strengths and weaknesses.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by practical experiments at the laboratory involving the different aspects of biochemistry.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to carbohydrates	Chemistry of carbohydrates 1	Power point presentation and white board	Daily exams and homework
2	2	Introduction to carbohydrates	Chemistry of carbohydrates 2	Power point presentation and white board	Daily exams and homework
3	2	Introduction to lipids	Chemistry of lipids 1	Power point presentation and white board	Daily exams and homework
4	2	Introduction to lipids	Chemistry of lipids 2	Power point presentation and white board	Daily exams and homework

5	2	Introduction to amino acids and proteins	Chemistry of amino acids and proteins 1	Power point presentation and white board	Daily exams and homework
6	2	Introduction to amino acids and proteins	Chemistry of amino acids and proteins 2	Power point presentation and white board	Daily exams and homework
7	2	Mid-term Exam	Mid-term Exam	Power point presentation and white board	Daily exams and homework
8	2	Introduction to enzymes	Chemistry of Enzymes 1	Power point presentation and white board	Daily exams and homework
9	2	Introduction to enzymes	Chemistry of Enzymes 2	Power point presentation and white board	Daily exams and homework
10	2	Introduction to DNA	Chemistry of nucleic acids: DNA	Power point presentation and white board	Daily exams and homework
11	2	Introduction to RNA	Chemistry of nucleic acids: RNA	Power point presentation and white board	Daily exams and homework
12	2	Introduction to DNA replication	Nucleic acids: Replication	Power point presentation and white board	Daily exams and homework
13	2	Introduction to RNA synthesis	Nucleic acids: Transcription	Power point presentation and white board	Daily exams and homework
14	2	Introduction to protein synthesis	Nucleic acids: Translation	Power point presentation and white board	Daily exams and homework
15	2	Final exam	Final exam	Power point presentation and white board	Daily exams and homework

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final exams .... etc

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Essentials of biochemistry by Pankaja Naik, Mathews biochemistry
Main references (sources)	Lippincott Illustrated Reviews: Biochemistry Harper's Illusterated Biochemistry
Recommended books and references (scientific journals, reports...)	Lehninger Principles of Biochemistry
Electronic References, Websites	

Course Description Form

1. Course Name: **Histology**

2. Course Code: BTM21−His

3. Semester / Year:1 Second year

4. Description Preparation Date: 23−4−2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total):2\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Assistant Prof. Dr. Zina F. AL-Obaidi\ Ema
zena.alobaeady@nahrainuniv.edu.iq
Name:Mohand Hasan Hussein\ Email: mhbio8080@gmail.com

8. Course Objectives

Course Objectives	• To acquire a basic background in histol and to understand the properties of cells their interactions with one another components of tissues and organs. • understand how structure and funct correlate at the microscopic level. • • To be able to describe the nor structure and function of various cell typ tissues, and organs, and to differentiate t histological structures from each ot through examination.

9. Teaching and Learning Strategies

Strategy	: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,

	interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. Examine the Tissues under microscope

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 2	1-Describe the method of tissue preparation for histological examination. 2.Outline the principles of histochemistry and immunohistochemistry . 3. Describe the function the different types of microscopy utilized in histology. Explain the structure and function of epithelial tissu Distinguish between tight junctions, anchoring junctions, and gap junctio Distinguish between simp epithelia and stratified epithelia, as well as betwe squamous, cuboidal, and columnar epithelia Describe the structure and function of endocrine and exocrine glands and their respective secretions	1-Introduction of histology 2- Epithelial tissu 3- Transitional epithelial 4- simple epithel tissue+ Stratified epithelial tissue 5- Pseudostratifie epithelial tissue 6- Mid-term Exa 7- Connective tis 8- muscular tissu 9- nervous tissue 10-stomach histology 11- eye histology 12- - Mid-term Exam	Black board + And power point	Daily exa and Home work

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: **Embryology**
2. Course Code: BTM22-Em
3. Semester / Year:1 second year
4. Description Preparation Date: 23-4-2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total):2\3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Prof. Dr. Zina F. AL-Obaidi\ Ema zena.alobaeady@nahrainuniv.edu.iq Name: Murtadha A. Alshami\ Email: Murtadha.adil@nahrianuni.edu.iq
8. Course Objectives

Course Objectives	develop understanding of histogenesis a organogenesis of particular tissues a organs. Students acquire knowledge critical periods, critical factors and differ congenital and developmental anomal that arise at different periods of intrauter life Knowledge on the technical aspects ICSI, IVF, semen processing and analys vitrification etc. Hands-on training handling gametes, semen analysis, loadi embryo transfer catheters, vitrification et

9. Teaching and Learning Strategies

Strateg	provide an easily accessible and detailed content in the field of basic and advan ART laboratory techniques as well as provide critical basic science and backgro information. This course will provide a common knowledge set appropriate for broad range of health care professionals involved in the treatment of the infe couple that proceeds to ART, provide training in the assessment of parameters gametes and embryos, laboratory technologies, and laboratory management well as assisting embryologists in identifying strategies for improving the laboratory.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
11	2	The student w be able determine t abnormalities the hum system a organs under microscope, b will recogn the developmenta stages of t face, jaw a neck, as well the senso organs, analy their correspondenc to the time development andstandard embryonic structures.	1-: Introduction Embryology 2- Spermatogenesi oogenesis 3- Cell division 4- neuralation 5- emb development fi week 6- Mid-term Ex 7-Cleaveage 8- Fertilization 9- assist reproductive techniques 10- I development 11- Egg layers 12- Em implantation 13- Mid-te Exam	Black board+ +power point	Daily exa and Home wo

11. Course Evaluation

. Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular boo	

if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Genetic Engineering II
2. Course Code:
3. Semester / Year:
2nd semester / 3rd year
4. Description Preparation Date:
15/9/2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Yaseen Ismael Imran Email: yaseen.ismael@nahrainuniv.edu.iq Dr: Hanaa Jasib Salim

8. Course Objectives	
Course Objectives	1. Understand the basic principles of Genetic Engineering. 2. Understand the tremendous applications of Genetic Engineering in Medicine, Pharmacy, Agriculture, Forensic DNA and Archelogy.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is encouraging students to interact positively with others, think critically, to solve problems related Genetic Engineering and its applications and think independently and access relevant literature and review information.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theoretical	Introduction and common properties for cloning experiments of eukaryotes. Cloning in yeast, Transformation of yeast,		Power point and white board	Quizzes, Assignments and written exam

		Cloning vectors for yeast: YEp, YRp&YIp.			
2	2 theoretical	Artificial Chromosomes: BAC & YAC. The structure & use of YAC.			
3	2 theoretical	Cloning in molds and other yeast			
4	2 theoretical	Cloning in plants Cloning vector derived from (Ti) plasmid & development.			
5	2 theoretical	The Ri plasmid Cloning genes in plant by direct gene transfer, transfer into organelles.			
6	2 theoretical	Plant viruses as Cloning vectors. Introduction of foreign DNA into plant cells, Expression of foreign DNA in the plant cells.			
7	2 theoretical	Mid Exam			
8	2 theoretical	Cloning in animals Introducing of DNA into mammalian cells.			
9	2 theoretical	Cloning vector for mammalian cells Direct gene transfer			
10	2 theoretical	Expression of genes cloned in *E.*			

		coli.& mammalian cell Expression Vectors.			
11	2 theoretical	Probes: Labeling, problem, cDNA probes.			
12	2 theoretical	Application of genetic engineering Medical Application: Diagnosis of genetic diseases, Gene therapy.			
13	2 theoretical	Industrial Application: Production of Insulin, Somatotropin, Interferons, Vaccins, Single Cell protein, Degradation of toxic compounds.			
14	2 theoretical	Agriculture Application: Resistance to Viruses, Resistance to pesticide, Resistance to Fungi.			
15		Final Exam			

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final exams .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Gene cloning and DNA analysis
Main references (sources)	Gene cloning and DNA analysis
Recommended books and references (scientific journals, reports...)	Gene cloning and DNA analysis
Electronic References, Websites	https://www.livescience.com/26579-immune-system.html

Course Description Form

1. Course Name:	
Immunology	
2. Course Code:	
BTM31-Im	
3. Semester / Year:	
1st semester / 3rd year	
4. Description Preparation Date:	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Hours / 45 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Shahlaa M.Salih Email: shahlaa.mahdi@nahrainuniv.edu.iq Dr, Rawaa Alchalabi rawaa.alchalabi@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	1. Describe how the immune system is able to discriminate self vs. non-self. 2. Explain how the innate and adaptive immune systems work together to generate an effective 3. immune response against a specific pathogen. 4. Explain how the immune system is able to respond to so many diverse antigens. 5. Distinguish between humoral and cell-mediated (cellular) immunity and the location of the 6. pathogens they target (extracellular, intracellular). 7. Explain what happens when there are defects in the immune system (i.e., autoimmune diseases, allergy, organ/tissue rejection).
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is encouraging students to interact positively with others, think critically, solve immunology-related problems and to solve problems related to Immunology and think independently and access relevant literature and review information.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory + 2 lab	**Introduction of immunology**		Power point and white board	Quizess , **Assignments and writeen exam**
2	2 theory + 2 lab	**Fundamental of blood cell biology**			
3	2 theory + 2 lab	**Lymphoid and lymphoid tissue**			
4	2 theory + 2 lab	**Inflammatory response**			
5	2 theory + 2 lab	**Complement system**			
6	2 theory + 2 lab	**Innate immunity**			
7		**Mid-term Exam**			
8	2 theory + 2 lab	**Antigen and immunogens**			
9	2 theory + 2 lab	**Antigen presentation and MHC complex**			
10	2 theory + 2 lab	**Antibodies**			
11	2 theory + 2 lab	**Immune response**			

12	2 theory + 2 lab	**Cytokines**			
13	2 theory + 2 lab	**Autoimmune diseases& Immunological tolerance**			
14	2 theory + 2 lab	**Hypersensitivity**			
15		Final exam			

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final exams .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Immunology by Ivan M .Roitt (Editor), J. Brostoff and D. Male Paperback.
Main references (sources)	Kuby Immunology by Richa A.Goldsby,Thomas J. Kindt and Barbara Osborne Paperback
Recommended books and references (scientific journals, reports...)	Molecular Immunology by Abul K. Abb Andrew H. Lichtman, Jordan S. Pol Paperback -
Electronic References, Websites	https://www.livescience.com/2657 immune-system.html

Course Description Form

1. Course Name: Virology and Vaccines

2. Course Code: BTM32-Vi

3. Semester / Year: Second semester/ Third Class

4. Description Preparation Date: 24-4-2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total) : 2/1

7. Course administrator's name (mention all, if more than one name)
   1. Assistant professor : Rawaa Nazar AlChalabi (Ema rawaa.alchalabi@nahrainuniv.edu.iq)
   2. Instructor :Lamiaa Finjan Nas E.mail:lamiaa.fingan@ced.nahrainuniv.edu.iq)

8. Course Objectives The main goal of the lesson is to understand the structure of viruses and how to divide them into groups based on their characteristics, life cycle, and the basic part of each type in how it causes disease. In the laboratory, how to deal with viruses by applying laboratory safety procedures and how to isolate their genetic material, and then understanding the meaning of the vaccine, types, manufacturing standards, manufacturing stages, and the positive and negative effects of

each type.

9. Teaching and Learning Strategies

Strategy	Pre-lab planning, demonstrations, guided inquiry, collaborative learning, feedback, reflection, theory-application integration, and a strong focus on safety are all components of effective teaching and learning methodologies. These techniques seek to foster critical thinking abilities, actively involve students, uphold theoretical ideas, and guarantee a secure learning environment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		inition of Virology, iruses and general aracteristics of virus	Introduction about virus	White Board Power-point	Quiz+Homew
	2	Virus eplication	eplication cycle	White Board Power-point	Quiz+Homew
	2	assification and ENETICAS F VIRUSES	Viral Genome	White Board Power-point	Quiz+Homew
	2	Viruses athogencity	Virulence parameters	White Board Power-point	Quiz+Homew
	2	unctions of nvelope and onsequences Properties for Enveloped viruses	Envelop	White Board Power-point	Quiz+Homew
	2	ost defense nechanism	Host Defens	White Board Power-point	Quiz+Homew
	2	NA Viruses nilies &RNA uses families	DNA Viruses familie	White Board Power-point	Quiz+Homew
	2	d term exam	1st exam	White Board Power-point	Quiz+Homew
		Vaccines	Vaccines	White Board Power-point	Quiz+Homew
		Types of Vaccines	Types	White Board Power-point	Quiz+Homew

		Steps of Vaccines production	anufacturing criteria	White Board Power-point	Quiz+Homew
		Attenuated, led Vaccines and chanisms of actions	ode of action	White Board Power-point	Quiz+Homew
		Corona virus ,whole virus, protein subunit, viral vector and nucleic acid of the virus	Corona vaccines	White Board Power-point	Quiz+Homew
		econd mid exam	2nd Exam	White Board Power-point	Quiz+Homew
		al exam	Final Exam	White Board Power-point	Quiz+Homew

Course Evaluation Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	.11
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	

12. Learning and Teaching Resources

Required textbo (curricular books any)	• Basic Virology (Third Edition)2008; Edwa Wanger, Martinez Hewlett, David Bloc (Blackwell Publishing) • Diagnostic Virology Protocol (Seco Edition)John Stephenson, Alan Wames(Hum press) • Virus and Human Cancer(Second Editi)2023;(Springer)
Main referen (sources)	
Recommended books and references (scientific journals, reports…)	

Electronic References, Websites	www. Khanacademy.orq

Course Description Form

1. Course Name: Industrial Microbiology

2. Course Code: BTM31-INMi

3. Semester / Year: Semester1, Year 3

4. Description Preparation Date: 23\4\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 4\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Nedhaal Suhail Zbar Email: nedhaal.suhail@nahrainuniv.edu.iq

8. Course Objectives

Course Objecti	Industrial Microbiology is aimed to bring to your understanding of industrial microbiology as the study of large scale profit motivated production of microorganisms or their products for direct use or as inputs in the manufacture of other goods

9. Teaching and Learning Strategies

Strategy	**1.** Think of the future when teaching 2. Use engaging visuals and animations 3. Connect dots through stories 4. Use modern-day tools 5. Make learning multi-way 6. Amaze them with e-experiments!

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Definition and use of the term 'fermentation'	Definition and use of the term 'fermentation'	Blackboard	Daily exams and homework
2	2	Industrial Microbiology Vs Biotechnology	Industrial Microbiology Vs Biotechnology	Blackboard	Daily exams and homework
3	2	History(An Art from the Past, a Skill for the Future)	History(An Art from the Past, a Skill for the Future)	Blackboard	Daily exams and homework
4	2	Multidisciplinary nature	Multidisciplinary nature	Blackboard	Daily exams and homework
5	2	A Typical Bioprocess: introduction, advantages and limitations.	A Typical Bioprocess: introduction, advantages and limitations.	Blackboard	Daily exams and homework
6	2	Types of fermentations: Aseptic and non-aseptic fermentations	Types of fermentations: Aseptic and non-aseptic fermentations	Blackboard	Daily exams and homework
7	2	Mid-term Exam	Mid-term Exam	Blackboard	Daily exams and homework
8	2	Fermentation types according to the organization of the biological system :Suspended and support culture	Fermentation types according to the organization of the biological system :Suspended and support culture	Blackboard	Daily exams and homework
9	2	Upstream processing (USP) and downstream processing (DSP), unit downstream processing	Upstream processing (USP) and downstream processing (DSP), unit downstream processing	Blackboard	Daily exams and homework
10	2	Industrial Microbiology Vs Biotechnology	Industrial Microbiology Vs Biotechnology	Blackboard	Daily exams and homework
11	2	Industrial fermentation products and their producer microorganisms(List)	Industrial fermentation products and their producer microorganisms(List)	Blackboard	Daily exams and homework
12	2	Obsolescence of procedures and methods	Obsolescence of procedures and methods	Blackboard	Daily exams and homework
13	2	Patents and Intellectual Property Rights	Patents and Intellectual Property Rights	Blackboard	Daily exams and homework
14	2	Use of mutants / Genetically Modified Microorganisms (GMM) as against Wild type isolates for production.	Use of mutants / Genetically Modified Microorganisms (GMM) as against Wild type isolates for production.	Blackboard	Daily exams and homework
15	2	Culture Collections industrially impor microorganism	revision	Blackboard	Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education
Main references (sources)	1. Modern Industrial Microbiology and Biotechnology (2007) by Nduka Okafor. Published by Science Publishers, Enfield, NH, USA 2. Practical Fermentation Technology Edited by Brian McNeil and Linda M. Harvey 2008 John Wiley & Sons, Ltd. ISBN: 978-0-470-01434-9 3. Industrial Microbiology: An Introduction (2001); Michael J. Waites, Neil L. Morgan, John S. Rockey& Gary Higton
Recommended books and references (scientific journals, reports…)	www.google.com
Electronic References, Websites	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education

Course Description Form

1. Course Name:

Principles of Cytogenetics

2. Course Code:

3. Semester / Year:

2023/2024

4. Description Preparation Date:

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

30 Hours Theory + 30 Hours Practical = 60/ Number of units = 3

7. Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Ali Z. Al-Saffar

Email: ali.saffar@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	**This course is intended to give the students an understandi of the principles of cytogenetics by studying the nature of chromosomal abnormalities within a conceptual framework.**

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction: What are Chromosome			
2	2	Chromosomes and Cell Cycle			
3	2	Variation in Chromosomal Struct Part I			
4	2	Variation in Chromosomal Struct Part II			
5	2	Variation in Chromosome Number I I			

6	2	Variation in Chromosome Number I II			
7	2	Mid – Course Exam			
8	2	Y and X Chromosomes, X-Inactivati			
9	2	Sex Related Disorders			
10	2	Introduction to Cancer Cytogenetics			
11	2	The biology of cancer cells			
12	2	Cancer Gene Expression Chromosomes			
13	2	Techniques used in Cytogenetics			
14	2	Role of Cytogenetics in Dise Diagnosis			
15	2	Seminar Discussion			

11. Course Evaluation

Exam I	15 %
Attendance	2.5 %
Contribution	2.5 %
Drop Quizzes	5 %
Med Lab	15 %
Final Lab	10 %
Final Exam	50 %
TOTAL	100 %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Cancer Cytogenetics, Chromosomal and Molecu Genetic Aberrations of Tumor Cells, Sverre Heim
Main references (sources)	
Recommended books and references (scientific journals, reports…)	The Principles of Clinical Cytogenetics, Steven L. Gersen Martha B. Keagle Editors
Electronic References, Websites	

Course Description Form

1. Course Name:
Animal Tissue Culture
2. Course Code:
BTM31-ATC
3. Semester / Year:
1st semester - 3rd Year
4. Description Preparation Date:
17/9/2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total):
2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Moyassar Basil Hadi Email: moyassar.basil@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	The course aims that students acquire the practical skills needed to isolate mammalian cells for in vitro studies, perpetuate animal cells in the laboratory, manipulate animal cells in the laboratory, and apply molecular techniques in laboratory situations needed. The main objectives of the course could be summarized as below: 1- Develop the student's skills in isolating animal cells from tissues and transplanting them into culture dishes. 2- Develop the student's skills to understand and distinguish the ideal applications of cells in therapeutic and medical applications. 3- Developing the skills of successful cell growth in the laboratory. 4- Develop the skills of preserving cells under laboratory conditions. 5- Develop students' skills to modify animal cells in the laboratory according to the conditions of the experiment.
9. Teaching and Learning Strategies	
Strategy	Learning and strategies with high impact teaching focus on planning, teaching and assessment to equip students to excel their role in state associations after graduation. These include: • Planning for lecture • Lecture structure

	• Explicit teaching and inquiry • Questioning generation • Feedback from students • Effective assessment for the students • Greater understanding of planning expectations • Assessment skills that will change teaching style

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	Stem cells characteristics	Introduction to animal tissue culture	Whiteboard and PPT	Quiz & Home Work
2nd	2	Isolation of cells from animal / mice	Primary cell culture	Whiteboard and PPT	Quiz & Home Work
3rd	2	Types of cell lines	Cell Lines	Whiteboard and PPT	Quiz & Home Work
4th	2	Types of culture media	Animal cell culture media	Whiteboard and PPT	Quiz & Home Work
5th	2	Cell Behavior in 2D- and 3D-culture	Types of cell culture	Whiteboard and PPT	Quiz & Home Work
6th	2	Therapeutic and Industrial uses of ATC	Applications of animal tissue culture	Whiteboard and PPT	Quiz & Home Work
7th	2	Written Exam	Midterm Exam	Whiteboard and PPT	Quiz & Home Work
8th	2	Cell behavior in culture	Biology of Cells in Culture	Whiteboard and PPT	Quiz & Home Work
9th	2	How to manipulate cells in culture	Factors affecting cell behavior in vitro	Whiteboard and PPT	Quiz & Home Work

10th	2	The difference between two-dimensional and three-dimensional cultivation environment	Culture Environment	Whiteboard and PPT	Quiz & Home Work
11th	2	Medical uses of 3D Culture	Applications of 3D tissue culture	Whiteboard and PPT	Quiz & Home Work
12th	2	Types and uses of 3D culture scaffolds	Scaffolds of 3D tissue culture	Whiteboard and PPT	Quiz & Home Work
13th	2	Use of microfluidic system as a tissue culture system	Microfluidic culture system	Whiteboard and PPT	Quiz & Home Work
14th	2	Review and answer students' questions	Review and answer students' questions	Whiteboard and PPT	Quiz & Home Work
15th	2	Answering students questions	Preparatory week before the final Exam	Whiteboard and PPT	Quiz & Home Work

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as:

- Midterm Written Exam (30%).
- Weekly Quizzes (5%).
- Home Works and Assignments (5%).
- Final Exam (60%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, Sixth Edition.

Main references (sources)	Basics of animal cell culture: Foundation for modern science
Recommended books and references (scientific journals, reports...)	Animal Cell Culture and Technology
Electronic References, Websites	An Introductory Undergraduate Course Covering Animal Cell Culture Techniques. https://iubmb.onlinelibrary.wiley.com/doi/epdf/10.1002/bmb.2004.494032050381

Course Description Form

1. Course Name: Molecular Biology
2. Course Code: BTM31-MoB1
3. Semester / Year: Semester 1, Year 3
4. Description Preparation Date: 25\4\2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total): 2\1 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Hameed M. Jasim Hameed.jasim@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The outcomes of this course is to provide students with knowledge and information as well as practical experience about

9. Teaching and Learning Strategies

Strategy	Foundations of molecular biology are provided through a combination recorded lectures (screen recordings) and demonstrations. These will co various aspects of basic molecular biology including nucleic acids a proteins; gene expression; DNA analysis. gene cloning; Molecu evolution. Writing and diagnosis. Evaluation is through a timed test on Moodle system at the end of the unit. This evaluation is not counted tow the grade.

10. Course Structure

Week	Hours	Unit or subject name	Required Learning Outcomes	Learning method	Evaluation method
	2 Theoretical	Macromolecules Large macromolecular assemblies	1- Describe the basic structure and biochemistry of nucleic acids and proteins and distinguish between them. 2- Identify the principles of DNA replication, transcription, and translation		
		Properties of nucleic acids. Nucleic acid structure. Chemical and physical properties of nucleic acids.			
		Spectroscopic and thermal properties			

		of nucleic acids. DNA supercoiling.	and explain how they relate to each other. 3- Describe the basic principles of DNA preparation methods, such as DNA extraction, cloning, transformation, and polymerase chain reaction, and analyze their applications. 4- Describe the basic principles of DNA analysis methods, such as hybridization, restriction analyses, and DNA sequencing, and analyze their applications. 5- Describe and discuss applications of molecular biology, including the use of bioinformatics and genomics.	Whiteboard and PowerPoint	Quiz, short exams and Mid-term exam
		Prokaryotic and eukaryotic chromosome structure. Prokaryotic chromosome structure. Chromatin structure.			
		Eukaryotic chromosome structure. Genome complexity. The flow of genetic information.			
		DNA replication: an overview. Bacterial DNA replication. The cell cycle. Eukaryotic DNA replication.			
		Gene anatomy. Promoters, Terminators, Enhancers, se strand.			
		Exam			
		Split Genes			
		Transcription in prokaryotes. Basic principles of transcription. *Escherichia coli* RNA polymerase. The *E. coli* _70 promoter. Transcription, initiation, elongation and termination.			
		Transcription in eukaryotes. The three RNA polymerases: characterization and function. RNA Pol I genes: the ribosomal repeat RNA Pol III			

		genes: 5S and tRNA transcription. RNA Pol II genes: promoters and enhancers. General transcription factors and RNA Pol II initiation.			
		RNA processing. rRNA processing and ribosomes. tRNA processing and other small RNAs. mRNA processing, hnRNAs and snRNAs. Alternative mRNA processing.			
		Gene Expression. Translation of prokaryotic.			
		Eukaryotic genes. The genetic code tRNA structure and function			
		Exam			

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricu books, if any)	Molecular Biology , Molecular genetics of bacteria
Main references (sources)	Fundamental Bacterial Genetics
Recommended books and references (scientific journals, reports...)	Molecular Biotechnology
Electronic References, Websites	References available on the Internet

Course Description Form

1. Course Name :Molecular technology

2. Course Code: BTM31-motech

3. Semester / Year:1st semester, third stage

4. Description Preparation Date:

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total) : 2

7. Course administrator's name (mention all, if more than one name)

Name: Dr. sahar M. Hussein
Email: sahar.hussain@nahrainuniv.edu.iq
Dr. Zaid nsaiff

8. Course Objectives

Course Objectives	**1: To prepare competent graduates for care in molecular and genetic related fields clinical applications** **2: To provide a scientific foundation expertise in the field of genetics and prot modelling.** **3: Interpreting the detailed procedure of DI RNA, protein extraction and Amplificat technique.**

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Ho	Required Learning	Unit or subject	Learning	Evaluation

	urs	Outcomes	name	method	method
1	2	Introduction for molecular technology	What is DNA ,RN Protein	Videos white board	Daily exa and homewo
2	2	Principle in DNA extraction	Methods of extraction	Videos white board	Daily exa and homewo
3	2	Calculate purity and concentration of nucl acid	Equation fo calculation	Videos white board	Daily exa and homewo
4	2	Gel electrophoresis	Method an parameter for gel electropho ses	Videos white board	Daily exa and homewo
5	2	Mid exam	Mid exam	Videos white board	Daily exa and homewo
6	2	Polymerase chain reaction principle and application	Medical application and diagnosis	Videos white board	Daily exa and homewo
7	2	Restriction enzymes and RFLP technology	Applicatior and diagnosis	Videos white board	Daily exa and homewo
8	2	Cloning vectors	Genetic recombina n	Videos white board	Daily exa and homewo
9	2	Southern plot and northern plot	Plotting application	Videos white board	Daily exa and homewo
10	2	Mid exam	Med exam	Videos white board	Daily exa and homewo
11	2	Scientific travail	Scientific travail	Videos white board	Daily exa and homewo
12	2	seminar 1	Group 1	Videos white board	Daily exa and homewo
13	2	Seminar 2	Group 2	Videos white	Daily exa and homewo

				board	
14	2	Revision	Revision	Videos white board	Daily exa and homewo
15	2	Revision	Revision	Videos white board	Daily exa and homewo

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text books Book of Molecular biology of gene 2013 Biology 304 –Spring 2016 Secti 1001
Main references (sources)	-1 Text books الشبكة الدولية للمعلومات في موضوع المقرر
Recommended books and references (scientific journals, reports…)	Text books المجلات العلمية الرسائل والاطاريح
Electronic References, Websites	الشبكة الدولية للمعلومات في موضوع المقرر

Course Description Form

1. Course Name: Molecular diagnostic

2. Course Code: BTM32-MoDia

3. Semester / Year: Semester 2, Year 3

4. Description Preparation Date: 28\1\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 2 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Sahar M. Hussein Email: sahar.hussain@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The Molecular Diagnostics course will introduce the fundamentals of molecular diagnostic testing in the medical laboratory, including basic DNA and RNA structure, PCR, RT-PCR, Southern blotting, and electrophoresis. This course will cover the application of molecular diagnostic techniques in the identification and diagnosis of genetic diseases and diseases caused by microorganisms.

9. Teaching and Learning Strategies

Strategy	Effective teaching and learning strategies involve actually examples , collaborative learning, feedback, reflection, the application integration, and a strong emphasis on safety, final grade will be a combination of homework, exams, participation in laboratory exercises.. These strategies aim to engage students actively, reinforce theoretical concepts, dev critical thinking skills, and ensure a safe learning environment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introducing of molecular diagnosis , Fundamentals of genetics.	What is DNA,RNA, replication, tools	Blackboard	Daily exams and homework

2	2	Primer design	Properties of primer desigr	Blackboard	Daily exams and homework
3	2	Calculating primer melting and annealing temperature	Equations for calculating	Blackboard	Daily exams and homework
4	2	Introducing to PCR	Definition and steps	Blackboard	Daily exams and homework
5	2	Mid exam	Mid exam	Blackboard	Daily exams and homework
6	2	Calculating and prepare suitable PCR program	Optimization of PCR	Blackboard	Daily exams and homework
7	2	Introducing student to RT-PCR	Definition and steps	Blackboard	Daily exams and homework
8	2	Steps, calculation , and type of RT-PCR	One step or two step	Blackboard	Daily exams and homework
9	2	Introducing the student to sequencing	Definition and steps	Blackboard	Daily exams and homework
10	2	Mid exam	Mid exam	Blackboard	Daily exams and homework
11	2	Sequencing device	How the sequencing device give me the results	Blackboard	Daily exams and homework
12	2	Sample management	Type of samples and type of testing for diagnosis	Blackboard	Daily exams and homework
13	2	Flowcytometry	Introduction and applicatic	Blackboard	Daily exams and homework
14	2	scientific travel	Increase vision and participation	Blackboard	Daily exams and homework
15	2	revision	revision	Blackboard	Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Diagnostic Genetic Testing (2022) ISBN 978-3-030-85509-3 ISBN 978-3-030-85510-9 (eBook) https://doi.org/10.1007/978-3-030-85510-9	(available as e-book)
Population Genetics and Belonging (2015) ISBN 978-3-319-15810-5 ISBN 978-3-319-15811-2 (eBook) DOI 10.1007/978-3-319-15811-2	(available as e-book)

Course Description Form

1. Course Name:
English Language II
2. Course Code:
UN31-EnII
3. Semester / Year:
2nd Semester - 3rd Year
4. Description Preparation Date:
28/1/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total):
2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Moyassar Basil Hadi Email: moyassar.basil@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	The course aims to enable students to develop the English language skills of third-year students, and these skills are represented in the four sections of the English language (speaking, writing, listening and reading). The course also aims to develop students' skills to work as a team at times, to develop a culture of communication and discussion with others, and collective participation to accomplish a specific task and to work as individuals at other times to strengthen their self-confidence and self-reliance in accomplishing tasks. One of the course objectives is also to learn the rules of tenses in the English language, which helps in strengthening the students' ability to speak, describe and write, and link the sequence of events with the tasks taking place in successive periods of time, whether long or short. The main objectives of the course could be summarized as below: 1- Develop the learner's skills to understand and distinguish the correct words and exits of the English language letters. 2- Develop writing skills and avoid quoting using different writing methods such as paraphrasing the text using the passive tenses in different forms and circumstances. 3- Develop listening skills by focusing on the pronunciation of words and distinguishing some of them with the tone and tone of voice because of their importance. 4- Develop reading skills through fast reading to understand the general content of the texts and focus on important events such as years, numbers and parentheses that refer to events that may be important in the texts.

9. Teaching and Learning Strategies

Strategy	Learning and strategies with high impact teaching focus on planning, teaching and assessment to equip students to excel their role in state associations after graduation. These include: • Planning for lecture • Lecture structure • Explicit teaching and inquiry • Questioning generation • Feedback from students • Effective assessment for the students • Greater understanding of planning expectations • Assessment skills that will change teaching style

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	Structure and uses of Perfect tense	Perfect Tenses	Whiteboard and PPT	Quiz & Home Work
2nd	2	Differences and uses of Adj &Adv	Adjectives and adverbs	Whiteboard and PPT	Quiz & Home Work
3rd	2	Structure and uses of verbs	Verb forms	Whiteboard and PPT	Quiz & Home Work
4th	2	Understanding of vocabulary from text meaning	General grammar and vocabulary development	Whiteboard and PPT	Quiz & Home Work
5th	2	Types and uses of If conditional	If - conditional	Whiteboard and PPT	Quiz & Home Work

6th	2	Avoid plagiarism using adverbs and adjectives	Use of adverbs and adjectives in conversation	Whiteboard and PPT	Quiz & Home Work
7th	2	Written Exam	Midterm Exam	Whiteboard and PPT	Quiz & Home Work
8th	2	Differences and uses of articles	The Articles (the, a, an)	Whiteboard and PPT	Quiz & Home Work
9th	2	How to manipulate cells in culture	Adverbs sites in the sentence	Whiteboard and PPT	Quiz & Home Work
10th	2	The difference between two-dimensional and three-dimensional cultivation environment	Facts and probability	Whiteboard and PPT	Quiz & Home Work
11th	2	Uses of perfect tense	Obligation by perfect tense	Whiteboard and PPT	Quiz & Home Work
12th	2	Uses of past tense	Expressing ideas in the past tense	Whiteboard and PPT	Quiz & Home Work
13th	2	Uses of Care and mind	Care and mind	Whiteboard and PPT	Quiz & Home Work
14th	2	Review and answer students' questions	Review and answer students' questions	Whiteboard and PPT	Quiz & Home Work
15th	2	Answering students questions	Preparatory week before the final Exam	Whiteboard and PPT	Quiz & Home Work

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as:

- Midterm Written Exam (30%).
- Weekly Quizzes (5%).
- Home Works and Assignments (5%).
- Final Exam (60%)

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Headway Intermediate Student's Book. Fourth edition, Liz and John Soars Headway Workbook with Key. Fourth edition, Liz and John Soars
Main references (sources)	Headway Intermediate Fourth edition, Liz and John Soars
Recommended books and references (scientific journals, reports...)	Headway Intermediate
Electronic References, Websites	Tenses and auxiliary verbs https://www.scribbr.com/verbs/auxiliary-verb

Course Description Form

1. Course Name:	
Antibiotics	
2. Course Code:	
BTM32-AnVa	
3. Semester / Year:	
2nd Semester / 3rd year	
4. Description Preparation Date:	
1 / 9 / 2023	
5. Available Attendance Forms:	
Attending	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 Hours / 45 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Ali Mhawesh Email: ahmed.ali@nahrainuniv.edu.iq Name: Dhafar N. Al-ugaili Email: dhafar.alugaili@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	This course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment. This course mainly concentrates on resistance in bacteria
9. Teaching and Learning Strategies	
Strategy	The graduate must be able to know and understand all of the following: 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects Education methods 1- Lectures 2- Power point system 3- 3- Homework and seminar system Learning methods 1- Weekly rapid exams 2- Discussion, immediate questions and answers 3- The international network for information on the subject of specialization

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T+2L	Understanding the elementary theoretical principles and foundations related to subject	Chemotherapeutic agents and antimicrobials	Lectures and seminars	Oral and written exams Seminars
2	2T+2L	=	Antibiotics Discovery and	=	=

			Development		
3	2T+2L	=	The Effect of Antibiotics against cell wall	=	=
4	2T+2L	=	Factors Affecting Choice of Antimicrobial Agent	=	=
5	2T+2L	=	Antibiotic Resistance	=	=
6	2T+2L	=	Intrinsic and Acquired Resistance	=	=
7	2T+2L	=	Molecular Methods for Detection of Antimicrobial Resistance genes	=	=
8	2T+2L	=	Midterm exam	=	=
9	2T+2L	=	Antibiotics for Gram positive bacteria	=	=
10	2T+2L	=	Antibiotics for Gram negative bacteria	=	=
11	2T+2L	=	Antibiotics for an aerobic infections	=	=
12	2T+2L	=	Herbal antibiotics	=	=
13	2T+2L	=	Final Topics antibiotics (general concepts)	=	=
14	2T+2L	=	2nd Midterm exam	=	=
15	2T+2L	=	Seminar presentation	=	=

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Ahmad, M. and Khan, A.U. (2019) 'Global economic impact of antibiotic resistance: A review.' Journal of Global Antimicrobial Resistance, 19 pp. 313-316Molecular Genetics of Bacteria, Snyder, L. and Champness, W. 2007. 3rd edition, American Society for Microbiology, Washington, D. C.
Main references (sources)	Centers for Disease Control and Prevention. (2019) US antibiotic use rates by state.
Recommended books and references (scientific journals, reports...)	NHS. (2019) Antibiotic resistance.
Electronic References, Websites	https://www.cdc.gov/antibiotic-use/community/images/materials/Antibiotic-Prescriptions-Map https://www.nhs.uk/conditions/antibiotics/antibiotic-antimicrobial-resistance/

Course Description Form

1. Course Name: Toxicology

2. Course Code: BTM41-To

3. Semester / Year: First Semester \ Fourth year

4. Description Preparation Date:27\4\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total) 6

7. Course administrator's name (mention all, if more than one name)

Name: Dr.ruqaia mohammed, Noor Ali, Shahad Basil, Muhanad Najem
Email: Ruqaia.alezzy@nahrainuniv.edu.iq
n.a.o.89.8.14@gmail.com
shahadalazawihz@gmail.com
muhanadnajim@yahoo.com

8. Course Objectives

Course Objectives	– **Aimed to learn about toxicology science and its mechanism body and how our body eliminate toxin.** – **Studying the different type of toxicological agent.....**

9. Teaching and Learning Strategies

Strateg	Effective teaching and learning strategies involve pre-lab preparation, demonstratio guided inquiry, collaborative learning, feedback, reflection, theory-applicat integration, and a strong emphasis on safety. These strategies aim to engage students activ reinforce theoretical concepts, develop critical thinking skills, and ensure a safe learn environment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	2	Introducing student to st introduction toxicology	Introduction toxicology	Data show, Blackboard	Daily exams and homework
	2	Introducing student chemical toxin	Chemical to part I	Data show, Blackboard	Daily exams and homework
	2	Introducing	Chemical to	Data show,	Daily exams

		student chemical toxin	part II	Blackboard	and homework
	2	Introducing student bacterial toxin	bacterial to part I	Data show, Blackboard	Daily exams and homework
	2	Introducing student to ot type bacte toxin(II)	Bacterial to part II	Data show, Blackboard	Daily exams and homework
	2	Exam			
	2	Introducing student to fun toxin(I)	Fungal to part I	Data show, Blackboard	Daily exams and homework
	2	Introducing student to ot type of fun toxin(II)	Fungal to part II	Data show, Blackboard	Daily exams and homework
	2	Introducing students to fo toxin	Food toxin	Data show, Blackboard	Daily exams and homework
	2	Introducing students mushroom toxi	mushroom toxin	Data show, Blackboard	Daily exams and homework
	2	Introducing students immuno toxin	immuno tox	Data show, Blackboard	Daily exams and homework
	2	Introducing students how body elimina toxin	how our bo eliminates toxin	Data show, Blackboard	Daily exams and homework
	2	Exam		Data show, Blackboard	Daily exams and homework
	2	Revision		Data show, Blackboard	Daily exams and homework
	2	Seminar	Seminar	Data show, Blackboard	

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
12. Learning and Teaching Resources	
Required textbooks (curricu books, if any)	A text book of modern toxicology, 4 th edition ISBN: 978-46206-5 Internet source
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic Referenc Websites	**Textbook, laboratory manuals, lecture materi scenarios and cases, videos, power point presentation**

Course Description Form

1. Course Name: Pharmaceutical Biotechnology

2. Course Code: PTM,42-PhBT

3. Semester / Year: Semester 2, Year 4

4. Description Preparation Date: 24\4\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 2 theoretical only \2unit

7. Course administrator's name (Prof .Dr Zahraa Kamel Zedan /Asst.Prof.Dr.Yaseen Ismaiel Omran)

Name: Dr. Zahraa Kamel Zedan Email: Zahraa.kamel@nahrainuniv.edu.iq

Name: Dr. Yaseen Ismaiel Omran Email: Yassen.ismaiel@nahrainuniv.edu.iq

8. Course Objectives

Course Objecti	The main objectives are to introduce the subject of biopharmaceutical technology by knowing the foundations of this science and the most important practical applications of this science by knowing the most important pharmaceutical materials produced through genetic engineering technology and the methods of producing and marketing them in detail so that the student gains practical and theoretical experience in the medical field.

9. Teaching and Learning Strategies

Strategy	Effective teaching and learning strategies involve pre-lab preparation, demonstrations, guided inquiry, collaborative lea feedback, reflection, theory-application integration, and a strong emphasis on safety. These strategies aim to engage stu actively, reinforce theoretical concepts, develop critical thinking skills, and ensure a safe learning environment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Introduction to PTMs operations on cell level	PTMs operations on cell level with details	Blackboard Monitor	Daily exams and homework
2	2	Introducing the student Recombinant DNA technology in production of pharmaceutical products	Recombinant DNA technology in production of pharmaceutical products	Blackboard Monitor	Daily exams and homework
3	2	Introducing the student to Types of pharmaceutical products produced by recombinant DNA technology	Types of pharmaceutical products produced by recombinant DNA technology	Blackboard Monitor	Daily exams and homework
4	2	Introducing the student to Human protein replacements	preparation of Human protein replacements via biotechnology techniques	Blackboard Monitor	Daily exams and homework
5	2	Mid exam	Mid exam	Blackboard Monitor	Daily exams and homework
6	2	Introducing the student to Insulin production via rDNA technology	Production of Insulin production via rDNA technology	Blackboard Monitor	Daily exams and homework
7	2	Introducing the student to Cloning in eukaryotes vs prokaryotes	Cloning in eukaryotes vs prokaryotes	Blackboard Monitor	Daily exams and homework
8	2	Introducing the student to Growth hormone production via rDNA technology	Growth hormone production via rDNA technology	Blackboard Monitor	Daily exams and homework
9	2	Introducing the student to preparation of paracetamol	preparation of paracetamol(acetamino phen)	Blackboard	Daily exams and homework
10	2	Introducing the student to Medicinal enzymes production via rDNA technology	Medicinal enzymes production via rDNA technology	Blackboard Monitor	Daily exams and homework
11	2	Introducing the student to Phage therapy	synthesis of cinnamic acid	Blackboard Monitor	Daily exams and homework
12	2	Introducing the student to Preparation of cinnamic	Importance of Phage therapy	Blackboard Monitor	Daily exams and homework
13	2	Introducing the student to preparation of DNA vaccines	DNA vaccines	Blackboard Monitor	Daily exams and homework
14	2	Introducing the student to Vaccines production via rDNA technology	Vaccines production via rDNA technology technique in detail	Blackboard Monitor	Daily exams and homework
15	2	Mid exam	Mid exam	Blackboard Monitor	Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Handbook of pharmaceutical biotechnology 2010
Main references (sources)	Liu, Shuying; Wang, Shixia; Lu, Shan (April 27, 2016). "DNA immunization as a technology platform for monoclonal antibody induction". Emerging Microbes & Infections. 5 (4): e33. doi:10.1038/emi.2016.27. PMC 4855071. PMID 27048742. • ^Jump up to:a b c "DNA vaccines". World Health Organization. • ^Jump up to:a b Kishwar Hayat Khan (March 1, 2013). "DNA vaccines: roles against diseases". Germs. 3 (1): 26–35. doi:10.11599/germs.2013.1034. PMC 3882840. PMID 24432284
Recommended books and references (scientific journals, reports…)	• Jump up to:a b c d e f g h i j k l m n Alarcon JB, Waine GW, McManus DP (1999). "DNA Vaccines: Technology and Application as Anti-parasite and Anti-microbial Agents". Advances in Parasitology Volume 42. Advances in Parasitology. Vol. 42. pp. 343–410. doi:10.1016/S0065-308X(08)60152-9. ISBN 9780120317424. PMID 10050276. • ^ Jump up to:a b c d e f g h i j k l m n o p q r s t u v Robinson HL, Pertmer TM (2000). DNA vaccines for viral infections: basic studies and applications. Advances in Virus Research. Vol. 55. pp. 1–74. doi:10.1016/S0065-3527(00)55001-5. ISBN 9780120398553. PMID 11050940.

Electronic References, Websites	• doi:10.1016/S0065-3527(00)55001-5. ISBN 9780120398553. PM 11050940.

Course Description Form

1. Course Name:
Antibiotics Resistance and Infection Control
2. Course Code:
BTM41E-I
3. Semester / Year:
1st Semester / 4th year
4. Description Preparation Date:
1 / 9 / 2023
5. Available Attendance Forms:
Attending
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 30 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dhafar N. Al-ugaili Email: dhafar.alugaili@nahrainuniv.edu.iq
8. Course Objectives

Course Objectives	This course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment. This course mainly concentrates on resistance in bacteria.

9. Teaching and Learning Strategies

Strategy	The graduate must be able to know and understand all of the following: 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects Education methods 1- Lectures 2- Power point system 3- 3- Homework and seminar system Learning methods 1- Weekly rapid exams 2- Discussion, immediate questions and answers 3- The international network for information on the subject of specialization

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Understanding the elementary theoretical principles and foundations related to subject	Introduction: -An overview of antimicrobial chemotherapy -Main groups of antimicrobial agents	Lectures and seminars	Oral and written exams Seminars
2	2	=	Antimicrobial drug resistance - development of resistance -biochemical basis of drug resistance - molecular basis of drug resistance	=	=
3	2	=	Strategies used to resist the effects of antibiotics I. -Restrict access of the antibiotic defense	=	=
4	2	=	Strategies used to resist the effects of antibiotics II. -Active drug efflux	=	=
5	2	=	Strategies used to resist the effects of antibiotics III. -Drug inactivation.	=	=
6	2	=	Strategies used to resist the effects of antibiotics. -Modified target sites	=	=
7	2	=	Strategies to overcome antibiotic resistance	=	=
8	2	=	Midterm exam	=	=
9	2	=	Resistance in clinical environments: the transmission of drug resistance genes and drug resistant pathogens in the environment and clinical settings.	=	=
10	2	=	Multidrug resistant bacteria: MRSA/ VRSA	=	=
11	2	=	Drug resistance in cancer	=	=
12	2	=	Antimicrobial resistant in sexually transmitted pathogens	=	=
13	2	=	Bacteriocins as alternative medicine	=	=
14	2	=	Therapeutics: Host-targeted therapeutics	=	=
15	2	=	2nd midterm exam	=	=

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ahmad, M. and Khan, A.U. (2019) 'Global economic impact of antibiotic resistance: A review.' Journal of Global Antimicrobial Resistance, 19 pp. 313-316Molecular Genetics of Bacteria, Snyder, L. and Champness, W. 2007. 3rd edition, American Society for Microbiology, Washington, D. C.
Main references (sources)	Centers for Disease Control and Prevention. (2019) US antibiotic use rates by state.
Recommended books and references	NHS. (2019) Antibiotic resistance.

(scientific journals, reports…)	
Electronic References, Websites	https://www.cdc.gov/antibiotic-use/community/images/materials/Antibiotic-Prescriptions-Map https://www.nhs.uk/conditions/antibiotics/antibiotic-antimicrobial-resistance/

Course Description Form

1. Course Name: Bioseparation
2. Course code: MBt32-BT
3. Semester / Year: Semester 2, Year 4
4. Description Preparation Date: 25\4\2024
5. Available Attendance Forms: Attendance
6. Number of Credit Hours (Total) / Number of Units (Total): 2\2 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Nedhaal Suhail Zbar Email: Nedhaal.suhail@nahrainuniv.edu.iq
8. Course Objectives

Course Objecti	Fundamental scientific principles underlying the recovery, purification and formulation of biologics (biotherapuetics), especially proteins, are examined. Emphasis is placed on delineating the key chemical and physical properties of biomolecules that impact downstream processing and formulation development. Laboratories in the analytical and small-scale purification facility provide students with 'hands-on' exposure to key scientific principles and small scale unit operations. This is a half-semester course

9. Teaching and Learning Strategies

Strategy	A student successfully at the end of course should be able to: 1. Describe the chemical and physical properties of biomacromolecules and how those properties influence the design of assays, downstream processes and product formulation. 2. Explain the basic principles underlying common biopharmaceutical analytical, recovery, separation and purification methods such as spectroscopy, flocculation, precipitation, electrophoresis, membrane filtration, centrifugation, and chromatography.

	3. Understand the development of simple analytical models describing the above processes and utilize the models in the analysis of experimental data and process measurements.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	• be able to describe various unit operations used for separation and purification of products from biotechnology processes • based on the characteristics of a target product select the appropriate unit operation • be able to analyse product recovery and purity • be able to design a downstream processing scheme for a product from a specific bio-based raw material •	Properties of proteins and enzymes, macromolecules essential to all life.	Blackboard	Daily exams and homework
2	2		Study structures of protein	Blackboard	Daily exams and homework
3	2		Study methods of enzyme inhibition	Blackboard	Daily exams and homework
4	2		Complet the lesson of enzyme inhibition	Blackboard	Daily exams and homework
5	2		Mid exam		
6	2		Study and illustrate key catalytic strategies.	Blackboard	Daily exams and homework
7	2		lock & key model ○ induced fit model , transition state model	Blackboard	Daily exams and homework
8	2		Noncompetitive ○Substrate	Blackboard	Daily exams and homework
9	2		Hoe to inhibit enzymes	Blackboard	Daily exams and homework
10	2		Classification of enzymes	Blackboard	Daily exams and homework
11	2		Each student most know modules of enzymes and its pathway	Blackboard	Daily exams and homework
12	2		Activstor of enzymes	Blackboard	Daily exams and homework

11. Course Evaluation

Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lenhoff, A.M. (2003). A natural interaction: chemical engineering and molecular biophysics. AIChE J. 49, 806-812. 2. Lightfoot, E.N. and Moscariello, J.S. (2004). Bioseparations. Biotechnology and Bioengineering 87, 260. 3. Bonnerjea, J., Oh, S., Hoare, M., and Dunnill, P. (1986). Protein purification: the right step at the right time. Bio/technology 4, 95
Main references (sources)	file:///C:/Users/hp/Downloads/illustrating-bioseparations-with-the-production-purification-and-separation-of-colorful-proteins.pdf

Course Description Form

1. Course Name:	
Stem Cells and Gene Therapy	
2. Course Code:	
3. Semester / Year:	
2nd Semester - 4th Year	
4. Description Preparation Date:	
28/1/2024	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Moyassar Basil Hadi Email: moyassar.basil@nahrainuniv.edu.iq	
8. Course Objectives	
Course Objectives	The course aims to:

	• enable students to acquire the practical skills necessary to isolate stem cells and grow them in the laboratory for the purposes of therapeutic applications and laboratory studies, the maintenance of stem cells in the laboratory, and the manipulation of stem cells in the laboratory and their differentiation into different forms of cells as needed. The main objects could be listed below: 1- Developing the student's skills in isolating stem cells from different tissues such as bone marrow and developing them in culture dishes 2- Develop the student's skills to understand and distinguish the ideal applications of stem cells in therapeutic and medical applications. 3- Developing the skills of successful stem cell growth in the laboratory. 4- Developing the skills of preserving stem cells under laboratory conditions. 5- Develop students' skills to modify stem cells in the laboratory according to the conditions of the experiment.
9. Teaching and Learning Strategies	
Strategy	Learning and strategies with high impact teaching focus on planning, teaching and assessment to equip students to excel their role in state associations after graduation. These include: • Planning for lecture • Lecture structure • Explicit teaching and inquiry • Questioning generation • Feedback from students • Effective assessment for the students • Greater understanding of planning expectations

	• Assessment skills that will change teaching style

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	Stem cells characteristics	Stem Cell types and Features	Whiteboard and PPT	Quiz & Home Wor
2nd	2	Stem cells differentiation	Stem Cell Potency	Whiteboard and PPT	Quiz & Home Wor
3rd	2	Secretions of stem cells	Secretions of stem cells	Whiteboard and PPT	Quiz & Home Wor
4th	2	Therapeutic applications of stem cells	Mode of action of stem cells	Whiteboard and PPT	Quiz & Home Wor
5th	2	Applications of stem cells	Benefits of stem cells in therapeutic applications	Whiteboard and PPT	Quiz & Home Wor
6th	2	Manipulation of stem cells	Epigenetic changes of stem cells	Whiteboard and PPT	Quiz & Home Wor
7th	2	Written Exam	Midterm Exam	Whiteboard and PPT	Quiz & Home Wor
8th	2	Types of germ stem cells	Germ stem cells	Whiteboard and PPT	Quiz & Home Wor
9th	2	Generation of iPSCs in the lab	Reprogramming somatic cells into stem cells	Whiteboard and PPT	Quiz & Home Wor
10th	2	Apply stem cells for skin biograft	Bioengineering using stem cells	Whiteboard and PPT	Quiz & Home Wor
11th	2	Development of cancers from stem cells	Cancer stem cells	Whiteboard and PPT	Quiz & Home Wor
12th	2	Types of gene therapy	Introduction to gene therapy	Whiteboard and PPT	Quiz & Home Wor
13th	2	Hurdles and obstacles of gene therapy	Ethics of gene therapy	Whiteboard and PPT	Quiz & Home Wor
14th	2	Applications of gene therapy	Gene therapy in the treatment of diseases	Whiteboard and PPT	Quiz & Home Wor
15th	2	Answering students questions	Review and answer students' questions	Whiteboard and PPT	Quiz & Home Wor

11. Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as: • Midterm Written Exam (30%). • Weekly Quizzes (5%). • Home Works and Assignments (5%). • Final Exam (60%)

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Essentials of Stem Cell Biology.
Main references (sources)	Stem Cell Research - Bibliography https://philpapers.org/browse/stem-cell-research
Recommended books and references (scientific journals, reports...)	Stem Cells in Cell Therapy and Regenerative Medicine.
Electronic References, Websites	An Introduction to Stem Cell Biology https://www.law.berkeley.edu/files/stem_cell_day1_part2_shelanski.pdf

Course Description Form

1. Course Name:

Genomic and Proteomics

2. Course Code:

BTM42-PrGe

3. Semester / Year:

Semester 2, Year 4

4. Description Preparation Date:

28\4\2024

5. Available Attendance Forms:

Attendance

6. Number of Credit Hours (Total) / Number of Units (Total):

2hour \2 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Asmaa Ali Hussein Email: asmaa.ali@nahrainuniv.edu.iq
Name: Dr. Zaid Nsaif Abbas Email: zaid.altameemi@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The Genomics and Proteomics module aims to provide students with a comprehensive understanding of the principles, techniques, and applications of genomics and proteomics in modern biological research. This module will delve into the study of genomes and proteomes, exploring their structures, functions, and interactions. Through a combination of theoretical knowledge and practical exercises, students will gain insights into the vast amount of genetic and protein information encoded within living organisms and how this knowledge can be harnessed to advance various areas of biological science, including medicine, biotechnology, and personalized healthcare.

9. Teaching and Learning Strategies

Strategy	1. **Lectures:** Engage students through interactive lectures that provide theoretical knowledge, foundational concepts, and recent research advancements in genomics and proteomics. Use multimedia aids such as visuals, videos, and case studies to enhance understanding and promote critical thinking. 2. **Group Discussions:** Organize group discussions to facilitate active learning and exchange of ideas. Assign topics or case studies on genomics and proteomics for students to analyze, discuss, and present their findings. 3. **Case Studies:** Introduce real-life case studies and scenarios highlighting the application of genomics and proteomics in different fields. Challenge students to apply their knowledge and problem-solving skills to analyze complex genomic and proteomic data and propose solutions. 4. **Bioinformatics Workshops:** Conduct workshops to familiarize students with bioinformatics tools and resources used in genomic and proteomic data analysis. Provide hands-on training in using software for sequence analysis, genome assembly, gene prediction, and functional annotation. 5. **Guest Speakers:** Invite experts from academia, research institutions, or industry to deliver guest lectures or seminars on specialized topics within genomics and proteomics. Expose students to diverse perspectives and cutting-edge research in the field.

6. **Self-directed Learning:** Encourage students to study independently and research. Provide recommended reading materials, research papers, and online resources for further exploration of topics related to genomics and proteomics. Assign projects or assignments that require students to delve deeper into specific areas of interest.
7. **Assessment Methods:** Utilize a variety of assessment methods, including examinations, quizzes, laboratory reports, group projects, and presentations, to assess students' understanding of key concepts, practical skills, and critical thinking abilities related to genomics and proteomics.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Genomics	Introduction to Genomics	Presentation and whiteboard	Oral Discussion and Quiz
2	2	DNA Sequencing Techniques	DNA Sequencing Techniques	Presentation and whiteboard	Oral Discussion and Quiz
3	2	Genome annotation and gene prediction	Genome annotation and gene prediction	Presentation and whiteboard	Oral Discussion and Quiz
4	2	Genomic Variation and SNP Analysis	Genomic Variation and SNP Analysis	Presentation and whiteboard	Oral Discussion and Quiz
5	2	Metagenomics	Metagenomics	Presentation and whiteboard	Oral Discussion and Quiz
6	2	Epigenetics and Transcriptomics	Epigenetics and Transcriptomics	Presentation and whiteboard	Oral Discussion and Quiz
7	2	Mid Exam	Mid Exam		
8	2	Introduction and Scope of Proteomics	Introduction and Scope of Proteomics	Presentation and whiteboard	Oral Discussion and Quiz
9	2	Steps in Proteomic Analysis	Steps in Proteomic Analysis	Presentation and whiteboard	Oral Discussion and Quiz
10	2	Protein Purification	Protein Purification	Presentation and whiteboard	Oral Discussion and Quiz
11	2	Strategies for protein identification	Strategies for protein identification	Presentation and whiteboard	Oral Discussion and Quiz
12	2	Protein Modifications and Proteomics	Protein Modifications and Proteomics	Presentation and whiteboard	Oral Discussion and Quiz
13	2	Protein Engineering	Protein Engineering	Presentation and whiteboard	Oral Discussion and Quiz
14	2	Irrational design of protein engineering	Irrational design of protein engineering	Presentation and whiteboard	Oral Discussion and Quiz
15	2	Exam	Exam		

11.Course Evaluation

Presentations, daily oral discussions, reports .... etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Introduction to Proteomics: Principles and Applications Nawin C. Mishra, Günter Blobel (Foreword by) ISBN: 978-0-471-75402-2 May 2010

	Lesk Arthur M. 2017. *Introduction to Genomics* Third ed. Oxford United Kingdom: Oxford University Press.
Recommended books and references (scientific journals, reports...)	Genomics, Proteomics & Bioinformatics Journal https://academic.oup.com/gpb
Electronic References, Websites	https://pubmed.ncbi.nlm.nih.gov/

Course Description Form

1. Course Name: Medical biotechnology

2. Course Code: BTM42-MeBt

3. Semester / Year: Semester 2, Year 4

4. Description Preparation Date: 28\1\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 2\2 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Mayaada S Mahdi Email: mayyadah.mahdi@nahrainuniv.edu.iq
Name: Dr: Yaseen Ismael Mamoori Email: yaseen.ismael@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The outcomes of this course provide students with knowledge and information as well as practical experience about how to use of living cells and cell materials to research and produce pharmaceutical and diagnostic products that help treat and prevent human diseases. Also knowledge to use a multidisciplinary approach to solving complex problems in the biotechnological field.

9. Teaching and Learning Strategies

Strategy	The number of teaching units are three units which consists of approximately 14-15 week timetabled st over a two hours lecturing with a three-hour practical laboratory every week. The teaching meth involve interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homew assignment 15 hours will be independent or self-directed study.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introducing to medical biotechnology	Study biotechnology and medicine	White board and power points	Quizzes and homework Seminar or written exams
2	2	Introducing to biotechnology and Healthcare	Study how biotechnology made a huge impact	White board and power points	Quizzes and homework Seminar or

			healthcare such as diagnos and biopharmaceuticals		written exams
3	2	Introducing to Detecting and Diagnosing Human Disease Conditions	Study the identification of disease and test therapies before clinical trial in human	White board and power points	Quizzes and homework Seminar or written exams
4	2	Introducing to Medical Products and Applications of Biotechnology	Study the use of uses living cells and cell materials to research and then produce pharmaceutical and diagnosing products	White board and power points	Quizzes and homework Seminar or written exams
5	2	Mid exam	Mid exam		
6	2	Introducing to Gene therapy	Study treating disease by inserting functional genes to replace defective ones.	White board and power points	Quizzes and homework Seminar or written exams
7	2	Introducing to The Applica of Antisense Technology Medicine	Study the Antisense technology as a formidable tool for investigating physiologic and pathologic processes	White board and power points	Quizzes and homework Seminar or written exams
8	2	Introducing to The importance of Triplex Technology to Medicine	Study the Triplex technology	White board and power points	Quizzes and homework Seminar or written exams
9	2	Introducing to Applications of Nanotechnology in Medicine	Study the applications of nanoparticles	White board and power points	Quizzes and homework Seminar or written exams
10	2	Mid exam	Mid exam		
11	2	Introducing to Regenerative medical biotechnologies	Study the applications of regenerative medicine	White board and power points	Quizzes and homework Seminar or written exams
12	2	Introducing to Functional biomaterials in medicine	Study the applications of biomaterials in medicine	White board and power points	Quizzes and homework Seminar or written exams
13	2	Introducing to The genetic basis of Disease	Study the basis of gen disease	White board and power points	Quizzes and homework Seminar or written exams
14	2	Introducing to RNA-based therapeutics	Study the applications of RNA-based therapeutics	White board and power points	Quizzes and homework Seminar or written exams
15	2	revision	revision	White board and power points	Quizzes and homework Seminar or written exams

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Medical biotechnology Bernard R. Glick, 2014
Main references (sources)	2. Medical biotechnology, book, Oxford , university press. 3. Prescott's Microbiology 10th. Joanne Willey
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Bioinformatics

2. Course Code: BTM41-Binfo

3. Semester / Year: Semester 1, Year 4

4. Description Preparation Date:

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Sahar M.Hussein Email: sahar.hussain@nahrainuniv.edu.iq

Name: Dr. Zaid Nsaif Email: zaidirq2@gmail.com

8. Course Objectives

Course Objectives	1. The fundamental objectives are to identify genes and proteins, determine their functions, establish evolutionary relationships and predict their conformation. 2. The major scope and application of bioinformatics are: Cell organizations and function. Analysis of drug targets. Examine the characteristics of various diseases. Integration and development of various tools for the management of biological databases. 3. Management and analysis of a wide set of biological data. 4. It is specially used in human genome sequencing where large sets of data are being handled. 5. Bioinformatics plays a major role in the research and development of the biomedical field. 6. Bioinformatics uses computational coding for several applications that involve finding gene and protein functions and sequences, developing evolutionary relationships, and analyzing the three-dimensional shapes of proteins. 7. Research works based on genetic disease and microbial disease entirely depend on bioinformatics, where the derived information can be vital to produce personalised medicines. 8. Bioinformatics is largely used in gene therapy. 9. Bioinformatics is a field that is a very important part of research and development. 10. Bioinformatics finds its application in the areas of 3D image processing, 3D modeling of living cells, image analyzing, drug development

9. Teaching and Learning Strategies

Strategy	In bioinformatics use the genome browser as a reference tool in ma

	different disciplinary fields. It can be used in bioinformatics, clini genetics, genomic research, pharmaceutical development, and ma others. Scientists can navigate the entire human genome, as well as oth species, base pair by base pair.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction in bioinformatics	What Is Bioinformatics? Goal , Scope, Applications , Limitations	Blackboard	Daily exams and homework
2	2	Introduction to Biological Databases What Is a Database?	What is data base	Blackboard	Daily exams and homework
3	2	Types of Databases and Biological Databases	Explain database	Blackboard	Daily exams and homework
4	2	SEQUENCE ALIGNMENT: Pairwise Sequence Alignment Evolutionary Basis	Programes in sequencing analysis	Blackboard	Daily exams and homework
5	2	Methods of : Sequence Homology versus Sequence Similarity Sequence Similarity versus Sequence Identity	Programs used in this technology	Blackboard	Daily exams and homework
6	2	Mid exam	Mid exam	Blackboard	Daily exams and homework
7	2	Scoring Matrices Statistical Significance Sequence Alignme	Equations and programs	Blackboard	Daily exams and homework
8	2	Database Similarity Searching Unique Requirements of Database Searching Heuristic Database Searching	Type of database that used	Blackboard	Daily exams and homework

9	2	Basic Local Alignment Search Tool (BLAST)	Programed on line or off line	Blackboard	Daily exams and homework
10	2	FASTA Comparison of FASTA and BLAST	FASTA and PLAST	Blackboard	Daily exams and homework
11	2	Mid exam	Mid exam	Blackboard	Daily exams and homework
12	2	Multiple Sequence Alignment MEGA, BioEdid	Programs used on line or off line	Blackboard	Daily exams and homework
13	2	Protein Motifs and Domain Prediction Identification of Motifs and Domains in Multiple Sequence Alignment	Prediction of second structure of nucleic acid	Blackboard	Daily exams and homework
14	2	Protein Family Databases	Drown protein structure	Blackboard	Daily exams and homework
15	2	Phylogenetics Basics Molecular Evolution Molecular Phylogenet	Application and programs used for phylogenetic tree	Blackboard	Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1) Essential bioinformatics by Jin Xiong
Main references (sources)	Bioinformatics and Functional Genomics **by Jonathan Pevsner**
Recommended books and references (scientific journals, reports…)	NCBI
Electronic References, Websites	**EMB**

Course Description Form

1. Course Name: Enzymology

2. Course Code:

3. Semester / Year: Semester 1, Year 4

4. Description Preparation Date: 1\4\2024

5. Available Attendance Forms: Attendance

6. Number of Credit Hours (Total) / Number of Units (Total): 6\3 unit

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Asmaa Ali Hussein Email: asmaa.ali@nahrainuniv.edu.iq

Name: Dr. maha Hameed Email: Maha.albahrani @nahrainuniv.edu.iq

Name: Mays T. Abdullah Email:

8. Course Objectives

Course Objectives	1. This course deals with the basic concept of enzymology. 2. The outcomes of this course provide students with knowledge and information as well as practical experience about enzymes / definition 3. To understand differences between enzymatic and non enzymatic reactions 4. To understand structure and function of enzymes. 5- Students learn about the importance of enzymatic reactions in clinical and industrial fields

9. Teaching and Learning Strategies

Strategy	Effective teaching and learning strategies involve pre-lab preparation, demonstrations, guided inquiry, collaborative learn feedback, reflection, theory-application integration, and a strong emphasis on safety. These strategies aim to engage stud actively, reinforce theoretical concepts, develop critical thinking skills, and ensure a safe learning environment.

10. Course Structure

Week	Hour	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

	s				
1	2	Introduction, History & Course purpose	Explanation on enzymes and biochemical reactions	PowerPoint, white board	Daily exams and homework
2	2	Introducing the student to Enzyme nomenclature	Enzyme nomenclature classifications	Whiteboard Presentation	Daily exams and homework
3	2	Introducing the student to Enzymatic and non enzymatic reactions	Enzymatic and non enzymatic reactions differences	Whiteboard Presentation	Daily exams and homework
4	2	Introducing the student to Enzyme structure	Enzyme structure and active site	Whiteboard	Daily exams and homework
5	2	Mid exam	Mid exam		
6	2	Introducing the student to Isoenzymes	Isoenzymes and their importance in disease diagnosis	Presentation	Daily exams and homework
7	2	Introducing the student to Activation energy of enzyme	Activation energy of enzyme	Whiteboard Power Point	Daily exams and homework
8	2	Introducing the student to Factors affecting enzyme activity	Factors affecting enzyme activity and optimization of enzymes	Whiteboard	Daily exams and homework
9	2	Introducing the student to Purification of enzymes	Purification Steps of enzymes	Whiteboard Power point	Daily exams and homework
10	2	Mid exam	Mid exam	Whiteboard	Daily exams and homework
11	2	Introducing the student to Enzyme kinetics	Km, Vmaz and relation with substrate concentrations	Whiteboard Power point	Daily exams and homework
12	2	Introducing the student to Types of microbial enzymes	Types and importance of microbial enzymes	Whiteboard	Daily exams and homework
13	2	Introducing the student to Medical applications of enzymes	Medical applications of enzymes	Whiteboard	Daily exams and homework
14	2	Introducing the student to industrial applications of enzymes	Industrial applications of enzymes	Whiteboard	Daily exams and homework
15	2	revision	revision		Daily exams and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Enzyme Technology , Published by N.K. Muraleedharan for Asiatech Publishers Inc.,2006

Main references (sources)	No single textbook is used for the lecture material. But useful reference text is Structure and Mechanism in Protein Science: A Guide to Enzyme Catalysis and Protein Folding, 2nd edition (1999), Alan Fersht, W.H. Freeman and Co. New York, NY 1999.
Recommended books and references (scientific journals, reports…)	Enzyme Technology , Published by N.K. Muraleedharan for Asiatech Publishers Inc.,2006
Electronic References, Websites	https://www.brenda-enzymes.org/

Course Description Form

1. Course Name: English language II

2. Course Code:UN42-ENII

3. Semester / Year: 2/4

4. Description Preparation Date: 24/4/2024

5. Available Attendance Forms: attendance

6. Number of Credit Hours (Total) / Number of Units (Total) 1/1 (1)

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Lamiaa Fingan Nashi Al-Maliki
Email:lamiaa.fimgan.@ced.nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	1) Grammar has a core place in language teaching and learning. 2) A wide variety of practice tasks in all the four skills are essential to language learning. 3 Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational, or idiomatic.i

9. Teaching and Learning Strategies

Strategy	Learning student all the materials in New headway Plus as Upper-Intermdiate Stu book and practice with Intreactive Practice CD-ROM.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Quiz and Homework	Getting on together	Whiteboard and PowerPoint	Daily exam homework
2	1	Quiz and Homework	Going to extremes	Whiteboard and PowerPoint	Daily exam and homework
3	1	Quiz and Homework	Things ain't what t used to be	Whiteboard and	Daily exam and

4 5 6 7	1 1 1 1	Quiz and Homework Quiz and Homework Quiz and Homework Quiz and Homework	Risking life and limb In your dreams It's never too late Mid exam	PowerPoint Whiteboard and PowerPoint Whiteboard and PowerPoint	homework Daily exam and homework Daily exam and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	New headway Plus Upper-Intermediate students Book
Main references (sources)	New headway Plus Upper-Intermediate stude Book with Interactive Practice CD-ROM
Recommended books and references (scientific journals, reports…)	General Recommendations Highly recommended materials c range of skills and language: •Using English for Academic Purposes: A Guide for Internati Students, http://www.uefap.co.uk, by Andy Gillett: a comp course on Accuracy, Listening, Reading, Speaking, Vocabular Writing. • Hong Kong Polytechnic University's Centre for Indepen Language Learning, http://www2.elc.polyu.edu.hk/CILL, a v range of tasks across the different skills; select EAP to start v (for a complete list of all exercises, go http://elc.polyu.edu.hk/cill/exercises/). Writing Highly recommended for all aspects of acade assignment writing: • Learning Lab at the Learning Skills Unit, RMIT Universit Melbourne, http://www.dlsweb.rmit.edu.au/lsu/index.htm, on- tutorials and printable summaries; excellent detailed material practice activities for: o summarising, plagiarism, referencin quotation—see under Study Skills and Writing Skills. o spec Assessment Tasks including reports, case studies & litera reviews. • Hong Kong University's English Centre contains very us material particularly for writing: o Academic Gram http://ec.hku.hk/acadgrammar, detailed guidance and exercise writing academic essays. o Plagiarism and How to Avoid It, http://ec.hku.hk/plagiar the title speaks for itself!
Electronic References, Websites	Headway Learning Resources English File Learning Resources Solutions Learning Resources Oxford Advanced Learner's Dictionary