وزارة التعليم العالي والبحث العلمي

جـــهاز الإشـــراف والتقـويم العلـمي

دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد للعام الدراسي

2025-2024

الجامعة : النهرين

الكلية /المعهد : التقنيات الاحيائية

القسم العلمي : التقنيات الحيوية الجزيئية والطبية

تاريخ ملء الملف :

لتوقيع : التوقيع :

اسم رئيس القسم: أ.د شهلاء مهدي صالح اسم المعاون العلمي :أ.د رسالة رزوقي حسين

التاريخ : التاريخ :

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: أ.م.د ابراهيم عبد الله احمد

التاريخ 1 / 11 / 2024

التوقيع

مصادقة السيد العميد

ا.د.محسن هاشم رسن

Al- Nahrain University
College of Biotechnology

First Cycle – Bachelor's degree (B.Sc.) – Molecular and Medical Biotechnology

بكالوريوس في التقنيات الأحيائية - التقنيات الحيوية الجزيئية والطبية

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1. Vision and Mission

Vision

The biotechnology academic staff of the Molecular and Medical Biotechnology Department/College of Biotechnology at Al-Nahrain University believes that students come to understand the discipline of Molecular and Medical Biotechnology through a combination of course work, laboratory experiences, research, and fieldwork. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by biotechnologists to make observations, develop insights and create theories about the molecular approaches in medicine and their physiological and molecular levels in addition to sustainable participant in the maintaining the human requirements for studying biological problems. It implies that the essential biological properties can be reduced to the study of two classes of biomolecules, namely nucleic acids and proteins. Small class sizes within the Molecular and Medical Biotechnology program structures, functions, and internal controls within individual cells, all of which can be used to efficiently target new drugs, diagnose disease, and better understand cell physiology.

الرؤية

يرى أعضاء هيئة التدريس في قسم التقنيات الحيوية والجزيئية / كلية التقنيات الاحيائية في جامعة النهرين أن الطلاب سيصلون إلى فهم تخصص التقنيات الحيوية والجزيئية من خلال ربط مجموعة من المواد الفصلية والتجارب المختبرية والبحوث والعمل الميداني. للجمع بين الأساليب التعليمية الطلاب إلى فهم متوازن للطرق العلمية التي يستخدمها علماء التقنيات الاحيائية لإجراء الملاحظات وتطوير الرؤى وفهم الأساسيات حول التقنيات الحيوية والجزيئية ومستوياتها الخلوية الفسلجية, فضلا عن إمكابية ختزال الخصائص البيولوجية الأساسية في دراسة فئتين من الجزيئات الحيوية، هما الأحماض النووية والبروتينات. وتعزز أحجام الفصول الصغيرة داخل الهيكل الوظيفي وضوابط برامج التقنيات الحيوية الجزيئية والطبية داخل خلايا الكائن الحي، والتي يمكن استخدامها لاستهداف الأدوية الجديدة بكفاءة وتشخيص الأمراض وفهم فسيولوجيا الخلية بشكل أفضل.

Mission

The Molecular and Medical Biotechnology has enormous potential for developing new solutions to improve human health. Through the understanding of the molecular and cellular mechanisms of diseases, biotechnology plays an essential role in developing drugs, vaccines, therapies, and diagnostic tests. Programme in Medical Biotechnology and Molecular Medicine is committed to form professionals, provided with a strong technical and theoretical background. The expected evolution of their careers will be to develop scientific methodologies and coordinate research projects in the fields of applied biotechnology and translational medicine. The Programme will provide students with a strong educational background on the genetic and molecular bases of diseases and the pathophysiological mechanisms that occur in humans in pathological states, in order to develop diagnostic and therapeutic strategies based on biotechnology. This knowledge will be integrated with a specific formation in the fields of informatics, biophysics, nanotechnology and pharmacology. The Programme is organized in common and curricular learning activities focused on neuroscience, oncology, molecular diagnostics and immunobiotechnology. As a part of

the common course, the students will learn about economic management of a scientific project, with emphasis on the construction of a business plan and cost analysis.

الرسالة

تهدف التقنيات الحيوية الجزيئية والطبية الى امكانية تطوير حلول جديدة لتحسين صحة الإنسان من خلال فهم الآليات الجزيئية والخلوية للأمراض، وفهم الدورًا الأساسيً في تطوير الأدوية واللقاحات والعلاجات والاختبارات التشخيصية. يلتزم برنامج التقنيات الحيوية الجزيئية والطبية بتكوين مهنيين يتمتعون بخلفية تقنية ونظرية قوية. وسيكون التطور المتوقع لمهتهم هو تطوير المنهجيات العلمية وتنسيق المشاريع البحثية في مجالات التقنيات الحيوية الجزيئية والطبية. وسيزود برنامج القسم الطلاب بخلفية تعليمية قوية حول الأسس الجينية والجزيئية للأمراض والآليات الفسلجية للأمراض التي تحدث عند البشر، من أجل تطوير استراتيجيات تشخيصية وعلاجية تعتمد على التقنيات الحيوية الجزيئية والطبية, ودمج هذه المعرفة مع تشكيل محدد في مجالات المعلوماتية والفيزياء الحيوية وتقنيات النانو ووالهندسة الوراثية من خلال تنظيم البرامج في الأنشطة التعليمية المشتركة ومنهجية تركز على الأسس الجزيئية للأمراض والتقنيات الحيوية المناعية كجزء من مهام القسم.

2. Program Specification

Programme code:	BSc-MMEB	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

The Molecular and Medical Biotechnology (MMEB) Program is a guide to assist undergraduate students and early-career scientists in their search for the next step in their education. The Program features detailed profiles of leading institutions in Molecular and biomedical education. Students may compare programs and identify subjects that match their interests in Molecular and Medical Biotechnology to provide students with an opportunity to learn advanced practical biomedical sciences skills necessary to support their activity in a working laboratory or research setting. Students will further augment their theoretical knowledge in biomedical sciences with practical skills in molecular biology, cell biology, animal tissue culture, Human Molecular Genetics, Genetic Engineering, Molecular Techniques, Medical Virology, Nanobiotechnology, Bioseparation Techniques, Enzymology, Microbial Toxins and Human Cytogenetics. These courses will allow students to further enhance their learning by the application of the theoretical concepts and skills in a simulated research laboratory setting. In some disciplines, students need to demonstrate competency before they can progress further in their studies. Competency involves the application skills and knowledge to a particular standard performance. Students need to pass all competency assessments in all courses and reach a total passing of 50% to be awarded a passing grade. Competency Assessment Items are identified in the course specification.

2- مواصفات البرنامج

يعد برنامج التقنيات الحيوية الجزيئية والطبية (MMEB) دليلًا لمساعدة الطلاب الجامعيين والباحثين في بداية حياتهم المهنية في بحثهم عن الخطوة التالية في تعليمهم. يتميز البرنامج بلمسات مفصلة عن التوجهات الرائدة في التعليم الجزيئي والطب الحيوي. ويمكن للطلاب مقارنة البرامج وتحديد الموضوعات التي تتناسب مع اهتماماتهم في التقنيات الحيوية الجزيئية والطبية لتزويدهم بفرصة لتعلم مهارات العلوم الحيوية العملية المتقدمة اللازمة لدعم نشاطاتهم في المختبر أو أي بيئة بحثية. سيقوم الطلاب بزيادة معرفتهم النظرية في العلوم الطبية الحيوية من خلال المهارات العملية في علم الحياة الجزيئي، و علم الحياة الخلية، وزراعة الأنسجة الحيوانية، وعلم الوراثة الجزيئية البشرية ، والهندسة الوراثية ، والتقنيات الجزيئية ، والفيروسات الطبية ، والتقنيات الحيوية النانوية، وتقنيات الفصل الحيوي، وعلم الإنزيمات، والسموم الميكروبية، وعلم الوراثة الخلوية البشرية وغيرها من المواد الدراسية التي تسمح بتعزيز التعلم من خلال تطبيق المفاهيم والمهارات النظرية في المختبرات الطبية. ويحتاج الطلاب إلى إظهار كفاءة مهارات التطبيق قبل أن يتمكنوا من التقدم أكثر في دراساتهم في هذه التخصصات. كما يحتاج الطلاب أن يجتازوا جميع تقييمات الكفاءة في جميع مراحل الدراسة للوصول إلى إجمالي النجاح بنسبة 50٪ ليتم منحهم درجة البكلوريوس في التقنيات الحيوية الجزيئية والطبية.

Program Goals

1- To provide a comprehensive education in Molecular and Medical Biotechnology that emphasizes scientific thinking and problem-solving across a range of disciplines within science.

2- To prepare students for a variety of post-baccalaureate pathways, including graduate studies, apprenticeship programs, or entry-level jobs in any field of biotechnology.

3- To provide extensive hands-on training in laboratory skills, and field techniques.

4- To provide comprehensive training in written and oral communication of scientific information.

5- To enrich students with alternative education opportunities in the field of Molecular and Medical Biotechnology through undergraduate research, internships, and study abroad.

3- اهداف البرنامج

1- لتوفير تعليم شامل في التقنيات الحيوية الجزيئية والطبية يشدد على التفكير العلمي وحل المشكلات عبر مجموعة من التخصصات داخل العلم

2- لإعداد الطلاب لمجموعة متنوعة من مسارات ما بعد البكالوريا ، بما في ذلك الدراسات العليا أو برامج التدريب المهني أو وظائف مستوى الدخول في أي مجال من مجالات علم التقنيات الاحيائية

3- .3لتوفير تدريب عملي مكثف في التكنولوجيا الإلكترونية ، والتحليل الإحصائي ، والمهارات المعملية ، والتقنيات الميدانية

لتوفير تدريب شامل في الاتصال الكتابي والشفوي للمعلومات العلمية

4- لإثراء الطلاب بفرص التعليم البديل في مجال التقنيات الحيوية الجزيئية والطبية من خلال البحث الجامعي ، والتدريب الداخلي ، والدراسة في الخارج<

3. Student Learning Outcomes

- Comprehensive understanding of the principles and practices of Molecular and Medical Biotechnology which will make them able to work in the areas of research and development.

- To empower the graduates with the ability to think and solve problems in the field of Molecular and Medical Biotechnology.
- Well trained students to be able to work in medical laboratories.
- Molecular and Medical Biotechnology students will have the updated current scientific knowledge, well versed with computer programs and web information which will enable them to take online projects in the field of bioinformatics.
- Molecular and Medical Biotechnology students will be well trained in scientific communication skills so that they can effectively communicate with biotech and other interdisciplinary professionals.
- Students with updated knowledge of various disciplines of Molecular and Medical Biotechnology will make good trainers for teaching biotechnology, molecular biology, cell biology, genetics etc at B.Sc level education system.

4. مخرجات تعلم الطالب

- فهم شامل لمبادئ وأساسيات التتقنيات الحيوية الجزيئية والطبية التي ستجعل الطلاب قادرين على العمل في مجالات البحث والتطوير الطبي.
- تمكين الخريجين من القدرة على التفكير وحل المشكلات في مجال التتقنيات الحيوية الجزيئية والطبية.
- تدريب الطلاب تدريباً جيداً ليكونوا قادرين على العمل في المختبرات والمؤسسات الطبية.
- سيتمتع الطلاب بالمعرفة العلمية في مجال الأختصاص، والدراية جيدة بالمعلوماتية الحيوية التي ستمكنهم من تنفيذ بحوث وبرامج التتقنيات الحيوية الجزيئية والطبية.
- تدريب طلاب التتقنيات الحيوية الجزيئية والطبية جيدًا على مهارات الاتصال العلمي حتى يتمكنوا من التواصل بشكل فعال مع المتخصصين في مجال التتقنيات الحيوية وغيرهم من الباحثين متعددي التخصصات.
- سيكون للطلاب الذين لديهم المعارف الحديثة في تخصصات التتقنيات الحيوية الجزيئية والطبية الامكانية تهيئة جيل جديد من طلاب التتقنيات الحيوية والبيولوجي الجزيئي ملمين بعلوم الخلية وعلم الوراثة وما إلى ذلك في نظام التعليم على مستوى البكالوريوس.

Learning outcomes

Outcome 1

To provide education that leads to comprehensive understanding of the principles and practices of biotechnology and to ensure students are able to effectively communicate with biotech and other interdisciplinary professionals.

الحصيلة 1

لتوفير التعليم الذي يؤدي إلى فهم شامل لمبادئ وأساسيات التتقنيات الحيوية الجزيئية والطبية, ولضمان قدرة الطلاب على التواصل بشكل فعال مع الباحثين في مجال الأحنصاص وغيرهم من الباحثين متعددي التخصصات العلمية.

Outcome 2

To understand the chemistry of life and structure and functions of Biomolecules, and be able to describe how microorganisms are used as model systems to study basic biology, genetics, and metabolism.

الحصيلة 2

فهم كيمياء الحياة وتركيب ووظائف الجزيئات الحيوية والقدرة على وصف كيفية استخدام الكائنات الحية الدقيقة كنظم نموذجية لدراسة علم الأحياء وعلم الوراثة ومسارات الأيض.

Outcome 3

Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.

الحصيلة 3

سيتمكن الخريجون من إجراء التجارب المعملية والدراسات الميدانية ، باستخدام المعدات العلمية وتكنولوجيا الكمبيوتر مع مراعاة بروتوكولات السلامة المناسبة.

Outcome 4

Graduates will be able to demonstrate a balanced understanding of how scientific knowledge in the field of plant biotechnology has evolved, including its evolution and foundational laws.

الحصيلة رقم 4

سيتمكن الخريجون من إظهار مفهوم متوازن لكيفية تطور المعرفة العلمية في مجال التقنيات الاحيائية النباتية، بما في ذلك تطور هذا العلم والقوانين التأسيسية له.

Outcome 5

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

الحصيلة رقم 5

سيتمكن الخريجون من إظهار المهارات الكمية العلمية ، مثل القدرة على إجراء تحليل بسيط للبيانات.

Outcome 6

Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

الحصيلة رقم 6

سيتمكن الخريجون من استخدام التفكير النقدي ومهارات حل المشكلات لتطوير مشروع بحثي و / أو ورقة.

5. Academic Staff

No.	Name	Academic Title	Degree	Specialty
1	Hameed Majeed Jasim	Professor	PhD	Molecular Biology
2	Shahlaa Mahdi Salih	Professor	PhD	Immunology
3	Salwa Jaber Alawadi	Professor	PhD	Molecular Genetics
4	Asmaa Ali Hussein	Professor	PhD	Enzymology
5	Ali Zaid Al-Saffar	Professor	PhD	Cytogenetics
6	Zahraa Kamel Zedan	Professor	PhD	Stem cells technology
7	Risala Rzuki Hussain	Professor	PhD	Genetic Engineering and Biotechnology

8	Maha Hameed Abdullah	Professor	PhD	Enzymology
9	Bushra Hindi Saleh	Professor	PhD	Medical Microbiology
10	Ruqaia Mohammed Alezzy	Professor	PhD	Cytogenetics
11	Rawaa Nazar Mohammed Ali	Assistant Professor	PhD	Immunology
12	Dhafar Najim Abdualmeer	Assistant Professor	PhD	Medical Microbiology
13	Zena Fawzi Hussien	Assistant Professor	PhD	Embryo Genetics
14	Sahar Medhat Hussein	Assistant Professor	PhD	Molecular Genetics
15	Moyassar Basil Hadi	Assistant Professor	PhD	Stem cell& Animal Tissue culture
16	Yaseen Ismael Imran	Assistant Professor	PhD	Molecular Biology and Genetic Engineering
17	Hanaa Chassb Salim	Lecturer	PhD	Genetic engineering and molecular biology
18	Lamiaa Fingan Nashi	Lecturer	PhD	Vaccine technology
19	Zaid Nsaif Abbas	Lecturer	PhD	Molecular Genetics
20	Farah Turki Oraibi	Assistant Professor	PhD	Toxicityand Cytogenetics
21	Mustafa Kahtan Sameen	Lecturer	PhD	Biochemistry
22	Heba Khaleel Ibrahim	Assistant Professor	MSc	Microbiology
23	Manhal Farooq Ahmed	Assistant Professor	MSc	Parasitolog&Immunology
24	Tamara Husham Zedan	Lecturer	MSc	Molecular biology
25	Mays Talip Abdullah	Lecturer	MSc	Enzymology
26	Reem Naeem Ibrahim	Lecturer	MSc	Microbiology
27	Mohammed Hussein Wali	Lecturer	MSc	Molecular biology
28	Mohanad Hasan Hussein	Assistant Professor	MSc	Microbiology
29	Hadeel Mohamed Khalaf	Assistant Professor	MSc	Molecular biology
30	Mustafa sami mohammed	Lecturer	MSc	Molecular biology
31	Ayah Muhammed Maki	Lecturer	MSc	Immunology
32	Noor Ali Oohayyid	Lecturer	MSc	Biotechnology
33	Ahmed Yaseen Khalaf	Assistant Lecturer	MSc	Biotechnology
34	Ola Imad Khudhair	Assistant Lecturer	MSc	Molecular biology
35	Saja Ali Shareef	Lecturer	PhD	Molecular biology
36	Shahad Basil Ismail	Assistant Lecturer	MSc	Genetic engineering
37	Alabbas Abdulkareem Majeed	Lecturer	PhD	Biochemistry
38	Murtadha Adil Hussien	Lecturer	PhD	Animal tissue culture
39	Yasameen Hasan Jumaah	Assistant Lecturer	MSc	Molecular biology

6. الكادر التدريسي

ت	اسم التدريسي	اللقب العلمي	الشهادة	الاختصاص الدقيق
1	حميد مجيد جاسم	استاذ	دكتوراه	بايولوجي جزيئي
2	شهلاء مهدي صالح	استاذ	دكتوراه	منـــاعة
3	سلوى جابر العوادي	استاذ	دكتوراه	وراثة جزيئية
4	اسماء علي حسين	استاذ	دكتوراه	انزيمات
5	علي زيد فاضل	استاذ	دكتوراه	وراثة خلوية
6	زهراء كامل زيدان	استاذ	دكتوراه	تقنيات خلايا جذعية
7	رسالة رزوقي حسين	استاذ	دكتوراه	تقنيات حيوية وهندسة وراثية
8	مها حميد عبدالله	استاذ	دكتوراه	انزيمات
9	بشرى هندي صالح	استاذ	دكتوراه	احياء مجهرية طبية
10	رقية محمد ابراهيم	استاذ	دكتوراه	وراثة خلوية
11	رواء نزار محمد علي	استاذ مساعد	دكتوراه	مناعة
12	ظفر نجم عبد الامير	استاذ مساعد	دكتوراه	احياء مجهرية طبية
13	زينة فوزي حسين	استاذ مساعد	دكتوراه	وراثةو أجنــة
14	سحر مدحت حسين	استاذ مساعد	دكتوراه	وراثة جزيئية
15	ميسر باسل هادي	استاذ مساعد	دكتوراه	خلايا جذعية,, وزراعة انسجة حيوانية
16	ياسين اسماعيل عمران	استاذ مساعد	دكتوراه	بايولوجي جزيئي وهندسة وراثية
17	هناء جاسب سالم	مدرس	دكتوراه	هندسة وراثية و بايولوجي جزيئي
18	لمياء فنجان ناشي	مدرس	دكتوراه	تكنولوجيا اللقاح
19	زيد نصيف عباس	مدرس	دكتوراه	وراثة جزيئية
20	فرح تركي عريبي	استاذ مساعد	دكتوراه	سمية ووراثة خلوية
21	مصطفى قحطان سمين	مدرس	دكتوراه	كيمياء حياتية
22	هبة خليل ابراهيم	استاذ مساعد	ماجستير	احياء مجهرية
23	منهل فاروق احمد	استاذ مساعد	ماجستير	طفيليات ومناعة
24	تمارا هشام زيدان	مدرس	ماجستير	بايولوجي جزيئي
25	ميس طالب عبدالله	مدرس	ماجستير	انزيمات
26	ريم نعيم ابراهيم	مدرس	ماجستير	احياء مجهرية
27	محمد حسين والي	مدرس	ماجستير	بايولوجي جزيئي
28	مهند حسن حسين	استاذ مساعد	ماجستير	أحياء مجهرية
29	هديل محمد خلف	استاذ مساعد	ماجستير	بايولوجي جزيئي
30	مصطفى سامي محمد	مدرس	ماجستير	أحياء مجهرية
31	اية محمد مكي	مدرس مساعد	ماجستير	مناعة
32	نور علي اوحيد	مدرس	ماجستير	تقنيات أحيائية
33	احمد ياسين خلف	مدرس مساعد	ماجستير	تقنيات أحيائية
34	علا عماد خضير	مدرس مساعد	ماجستير	بايولوجي جزيئي
35	سجى علي شريف	مدرس	دكتوراة	بايةلوجي جزيئي
36	شهد باسل اسماعيل	مدرس مساعد	ماجستير	هندسة وراثية

37	العباس عبد الكريم مجيد	مدرس	دكتوراة	كيمياء حياتية
38	مرتضى عادل حسين	مدرس	دكتوراة	زراعة انسجة حيوانية
39	ياسمين حسن جمعة	مدرس مساعد	ماجستير	بايولوجي جزيئي

4. Credits, Grading and GPA

Credits

Al- Nahrain University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs. student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

5. Curiculum/Modules

First Level – First Semester **المستوى الاول - الفصل الاول**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MBt-11-Gb-I	General Biology-I	79	71	6.00	C	
MBt-11-PBI	Principle of Biotechnology -I	79	71	6.00	C	
MBt-11-AC	Analytical Chemistry	79	71	6.00	S	
Mbt-11-Bp	Biophysics	79	46	5.00	S	
URCOM	Computer Science-I	63	12	3.00	B	
URENG1	New Head Way plus	33	17	2.00	B	

First Level – Second Semester **المستوى الاول - الفصل الثاني**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MBt-12-GBII	General Biology-II	79	71	8.00	C	General Biology
Mbt-12-PBII	Principle of Biotechnology -II	79	71	8.00	C	Principle of Biotechnology –I
MBt-12-OC	Organic Chemistry	79	71	6.00	S	analytical chemistry
MBt-12-Bs	Biostatistics	79	71	6.00	S	

URARA	Arabic Language-I	33	17	2.00	B	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Principle of Biotechnology- 1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt-11-PBI				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department	**Department of molecular and medical biotechnology**		**College**	**College of Biotechnology**	
Module Leader	**Farah T.Orabi**		**e-mail**	**Biotech.farah@yahoo.com**	
Module Leader's Acad. Title	**Assist,Prof.**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor			**e-mail**		
Peer Reviewer Name	**Name**		**e-mail**	**E-mail**	
Scientific Committee Approval Date	**1/10/2024**		**Version Number**	**1.0**	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Noneم	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• To understand biotechnology science and their application. • To understand medical biotechnology as a modern field in biotechnology • This course deals with the basic application of biotechnology in medicine . • Introduce the application of biotechnology in food industry • Understand nanotechnology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Study biotechnology (definition- fields- application) 2. Study the cancer and its treatment (immunotherapy) 3. Study stem cell-monoclonal antibody and their uses in medical treatment 4. Introduce the application of biotechnology in treatment of different diseases 5. Study vaccine and edible vaccine and their application in treatment disease by using genetically modified plants 6. Study the modern routs in drug delivery 7. Understand the gene therapy technique and take an example (recombinant insulin) 8. Study the modern CRISPER technique 9. Study the application of biotechnology in industry 10. Introducing the nanotechnology as a new field in medical application .
Indicative Contents المحتويات الإرشادية تضم الكلمات المفتاحية المهمة	Indicative content includes the following. Medical Biotechnology – stem cell-Embryonic stem cells Adult stem cell-prenatal stem cell- Benign (noncancerous) - malignant (cancerous)-Carcinoma-lymphoma – leukemia-

للمحاضرات	Chemotherapy- Precision Medicine monoclonal antibodies-checkpoint inhibitors-vaccines-cytokines-CAR-T cell therapy Edible vaccine – transgenic plant Drug delivery- microneedle patches-Controlled-release formulations-Dexedrine-liposome Gene therapy- plasmid –vector-Human gene editing technology-Patient-derived cellular gene therapy products CRISPER –insulin Biotechnology in food –nanotechnology

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 12	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Biotechnology
Week 2	Relation of biotechnology with other science
Week 3	Biotechnology Examples in Everyday Life
Week 4	Application of Biotechnology
Week 5	Application of Biotechnology in agriculture
Week 6	Application of Biotechnology in environment
Week 7	Application of Biotechnology in industry
Week 8	Mid-term Exam
Week 9	Application of Biotechnology in healthcare
Week 10	What is immunotherapy
Week 11	Drug delivery

Week 12	**Edible vaccine**
Week 13	**Gene therapy**
Week 14	**Biotechnology and cell biology**
Week 15	**Seminars**
Week 16	**final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Glossary of medical terms
Week 2	Laboratory apparatuses
Week 3	Chromosome structure
Week 4	Mitosis And Meiosis
Week 5	Bacterial growth and culturing
Week 6	Subculturing
Week 7	Bacterial culture (gram stain)
Week 8	DNA structure
Week 9	DNA Extraction
Week 10	Purification
Week 11	DNA concentration
Week 12	PCR
Week 13	ELISA principle and types
Week 14	Genetic engineering techniques
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to biotechnology	yes
Recommended Texts	. Medical Biotechnology: Advancement and Ethics	yes
Websites	https://www.wgu.edu/blog/medical-biotechnology-advancements-ethics1811.html	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**General Biology-I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt-11-GB**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**1**		**Semester of Delivery**	**1**	
Administering Department	**Molecular and Medical Biotechnology**		**College**	**Biotechnology**	
Module Leader	Dr. Risala R. Allami Dr. dhafar.alugail		**e-mail**	risala.allami@nahrainuniv.edu.iq dhafar.alugaili@nahrainuniv.edu.iq	
Module Leader's Acad. Title	prof Assistant Professor		**Module Leader's Qualification**	PhD	
Module Tutor	Dr. Risala R. Allami		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Lamiaa Fingan		**e-mail**	E-mail	
Scientific Committee Approval Date	1/ 10/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	None
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to advance the student's knowledge of plant biology, its parts, reproduction and usefulness.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) To introduce basic biological principles through an integrated approach. 2) To investigate the cellular processes of living organisms with an emphasis on biological chemistry applications. 3) To investigate the unifying themes and key concepts of different organisms. 4) To acquaint the student with the anatomy, function, genetics and evolution of different types of organisms. 5) The student will demonstrate factual knowledge of contemporary natural science. 6) The student will apply contemporary scientific models to describe the natural world. 7) To understand and apply the scientific method. 8) Demonstrate basic problem-solving processes, including observation, inference, measurement, prediction, use of numbers, classifying and use of space and time relationships in life sciences. 9) Demonstrate integrated process skills, including identification and control of variables, interpretation of data, formulation and testing of hypotheses, and experimentation in the life sciences.
Indicative Contents المحتويات الإرشادية	**1. Introduction to Biology** • Definition, scope, and importance of biology. • Levels of biological organization: molecules, cells, tissues, organs, organisms, populations, ecosystems. • Scientific methods, observation, experimentation, and hypothesis testing.

	2. Chemistry of Life • Chemical elements essential for life (C, H, O, N, P, S). • Water and its biological properties. • Organic compounds: carbohydrates, lipids, proteins, nucleic acids. • Enzymes: structure, function, and factors affecting activity. **3. Cell Biology** • Cell theory and types of cells (prokaryotic vs. eukaryotic). • Cell structure and organelles. • Cell membranes and transport mechanisms. • Introduction to cell division: mitosis and meiosis. **4. Genetics and Molecular Biology** • DNA and RNA: structure and function. • Basic concepts of heredity: Mendelian genetics. • Genes, chromosomes, and genetic variation. • Introduction to molecular genetics and biotechnology. **5. Plant Biology (Botany)** • Plant cell structure and differences from animal cells. • Photosynthesis: light and dark reactions. • Plant tissues: meristematic and permanent tissues. • Plant reproduction: sexual and asexual methods. **6. Animal Biology (Zoology)** • Overview of animal cell structure. • Animal tissues: epithelial, connective, muscle, nervous. • Digestive, respiratory, circulatory, excretory, and reproductive systems. • Homeostasis and regulation.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Teaching Methods** 1. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 2. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 3. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Review of animal biology
Week 2	Cellular history
Week 3	The cell (the cell theory, cellular evolution)

Week 4	Prokaryotic and Eukaryotic cells (structure and function)
Week 5	Viruses , bacteria and Archaea
Week 6	Membranes and transport(membrane structure and function, passive transport processes and active transport processes)
Week 7	Cellular respiration (Aerobic, Anaerobic, Glycolysis, TCA, Fermentation)
Week 8	Midterm exam
Week 9	Sexual reproduction (spermatogenesis and Oogenesis)
Week 10	DNA (Genetic material, DNA structure)
Week 11	Gene function (genetic code)
Week 12	Transcription
Week 13	Translation
Week 14	Mutations
Week 15	Repair of mutations

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Laboratory Equipment and tools
Week 3	Light Microscope
Week 4	Taxonomy Phylogenetic Systematics
Week 5	Prokaryotes
Week 6	Protists
Week 7	Fungi
Week 8	Midterm Exam

Week 9	Animal Diversity I
Week 10	Animal Diversity II
Week 11	Vertebrate Anatomy (Frog Dissection)
Week 12	Mice Dissection
Week 13	Animal Behavior
Week 14	Reports Presentations I
Week 15	Reports Presentations II

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Gene Cloning and Manipulation Second Edition Christopher Howe University of Cambridge	نعم
Recommended Texts	Dominic W.S. Wong The ABCs of Gene Cloning Second Edition Springer	نعم
Websites	https://www.ncbi.nlm.nih.gov/	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

معلومات المادة الدراسية **Biophysics**					
Module Title	**Biophysics**			**Module Delivery**	
Module Type	Support			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt11-Bp				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level			**Semester of Delivery**		
Administering Department	**Department of molecular and medical biotechnology**		**College**	College of Biotechnology	
Module Leader	Dr. Mohammed Tariq		**e-mail**	Mohammed.albaidhani@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	Biophysics is an interdisciplinary subject and one of the forefront of modern science, emerging as a major field in research laboratories, medical laboratories,

أهداف المادة الدراسية	industry and academia. The key to the most important progress has been to understand the fundamentals of modern and classical physics in order to develop powerful tools that can be used to address many open questions related to our understanding of human life and disease. In this semester we will cover a wide range of basic and advanced physical concepts and biological applications. We will study the basics of physics that are directly related to biological studies and research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain models of biological systems and models dealing with statistical mechanics and transport phenomena. 2. Solve qualitative and quantitative problems, using appropriate statistical mechanics and computing techniques. 3. Perform experiments which involve making correct and appropriate use of a range of scientific equipment, keeping an accurate record of experimental work and analysing results and reaching non-trivial conclusions from them. 4. Communicate at an advanced level the results of both theoretical and experimental work in various forms including written reports, oral presentations and poster presentations. 5. Collaborate effectively with team members for scientific investigations and for the process of learning.
Indicative Contents المحتويات الإرشادية تضم الكلمات المفتاحية المهمة للمحاضرات	Lectures will discuss the scope of modern biophysics, introducing students to the basics of classical and modern physics. Physical concepts related to biophysics will then be discussed in detail. Where students will learn about the nature of light, sound, heat, and other physics concepts, and the laws related to them. Thus, the student will have sufficient tools to understand modern biological technologies, which use physical concepts as the basis for their work.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Discussing the topics of the textbook and supporting references • Theoretical lectures including problem solving and discussion of homework • Asking students a set of thinking questions during the lectures for specific topics. • Giving students homework that requires finding self-solutions.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 11	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Biophysics

Week 2	Liquid and Gas, The mechanics of Fluid
Week 3	Density Pressure in fluid
Week 4	Buoyancy Surface tension
Week 5	Fluid flow Bernoulli's equation
Week 6	Application of Bernoulli's equation Viscosity
Week 7	Applications about Physics concepts
Week 8	Temperature and expansion
Week 9	Temperature thermal equilibrium Thermometers
Week 10	The Celsius and Fahrenheit scale
Week 11	Thermal expansion
Week 12	Thermal stresses
Week 13	Thermal properties of matter
Week 14	Equation of states
Week 15	Ideal gases P-V diagram
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Instructions to students, Basic personal needs and other requirements. Writing the account of an experiment, Introduction to graphical representation of experimental data, Errors, their determination and minimization, least square fitting. Units.

Week 2	Lab 2: Forces and Equilibrium
Week 3	Lab 3: Spiral Spring and Hooks Law
Week 4	Lab 4: Spiral Spring: Determination of force constant and effective mass of a spring.
Week 5	Lab 5: Spiral Spring: To deduce the acceleration of free fall from a combination of the static and dynamic experiments.
Week 6	Lab 6: Simple Pendulum and determination of gravitational acceleration (g).
Week 7	Lab 7: The Cantilever experiment
Week 8	Lab 8: The bifilar suspension: Variation of the period of oscilation with the distance between the vertical suspension threads.
Week 9	Lab 9: The bifilar suspension: Variation of Oscillation with length of the suspension threads.
Week 10	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Fundamentals of Physics (3rd edition) College physics (2nd edition)	
Recommended Texts	Physics for biologist (by: George Duncan)	
Websites		

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Science**			**Module Delivery**	
Module Type	**Basic**			■ **Theory** ☐ **Lecture** ■ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt11-CS**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	**1**		**Semester of Delivery**	**1**	
Administering Department	**Molecular &Medical Biotechnology**		**College**	**Biotechnology**	
Module Leader	Noor Salameh Shehdh		**e-mail**	Noor.salama@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PhD	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	None
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	It includes studying the basic concepts of computers, their types, and the application of software programs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course aims to introduce students to the general concept of computers, their components, and types. It focuses on teaching students about various input and output devices, types of memory, and familiarizing them with different operating system software and application software. The course also covers an introduction to Microsoft Office and its components, along with studying the types of application software. The course is designed to teach students how to use application software and apply it to computers, including word processing software like **Microsoft Word**. Additionally, it introduces students to presentation software such as **Microsoft PowerPoint**, its applications, and usage on computers. Furthermore, the course aims to provide foundational knowledge of the **Internet** and how to work with internet technologies
Indicative Contents المحتويات الإرشادية	يجب ان يتم التعامل مع كافة الحتويات العلمية بطريقة النقاش وايجاد الحلول ومن ثم تنفيذها بطرق برمجية مما يساعد المجتمع في التطور نحو بناء انظمة الكترونية في كافة المجالات

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Teaching using mini lessons, where the scientific method is divided into main ideas and then taught to the student in the form of consecutive lectures, and each lecture deals with only one idea 2. The tribal evaluation - through the scientific discussion with the students and knowing the extent of the student's understanding of the subject that we will begin to study. 3. Formative evaluation - through daily and sudden exams, and thus knowing the extent to which the student understands the scientific material during the lectures. 4. Final evaluation - through the monthly or final exams, through which the student is evaluated and the extent to which the student understands the scientific material.
Student Workload (SWL)	

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 10	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to computer
Week 2	Computer components
Week 3	Operating system and Graphical User Interface GUI
Week 4	Word processing

Week 5	Word processing
Week 6	Word processing
Week 7	First exam
Week 8	Spread sheet
Week 9	Spread sheet
Week 10	Presentation software
Week 11	Presentation software
Week 12	Introduction to internet and web browsers
Week 13	Communications and Emails
Week 14	Computer troubleshooting
Week 15	Second exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to computer: Concepts of hardware and software with their components; concept of computing, data and information; applications off information electronics and communication technology (IECT); connecting input, input/output devices, and the rates to CPU
Week 2	Computer components: Computer portions, hardware parts, I/O units, memory types, basic CPU components, computer ports, personal computer, personal computer (features and types).
Week 3	Operating system and Graphical User Interface GUI: operating system; basics of common operating system; the user interface, using mouse techniques, use of common icons, status bar, using menu and menu-selection, concept of folders and directories, opening and closing of different windows; creating shortcuts
Week 4	Word processing: Word processing basics; opening and closing of documents; text creation and manipulation; formatting of text, table handling, spell check. Language setting and thesaurus; printing of word document.
Week 5	Word processing: Inserting and formatting images within the document; Using shapes and backgrounds.
Week 6	Word processing: Adjusting margins, orientation, and paper size; Preparing the document for printing; Inserting hyperlinks; Saving documents in different formats, such as PDF.
Week 7	First exam

Week 8	Spread sheet: basics of spreadsheets; manipulation of cells, formulas and functions; editing of spread sheet, printing of spreadsheets
Week 9	Spread sheet: Using PivotTables and Pivot Charts; Adjusting margins, orientation, and paper size for printing; Securing data with a password; Handling files in different formats (e.g., CSV, PDF).
Week 10	Presentation software: basics of presentation software; creating presentation; preparation and presentation office slides; slide show, taking printouts of presentation/handouts.
Week 11	Presentation software: Customizing slide backgrounds; Adding motion effects to elements within the slide; Applying transitions between slides; Inserting audio or video files into the presentation; Using comments or footnotes; Setting up and running the presentation; Enhancing appearance using themes and templates; Securing the presentation with a password; Preparing and printing slides or notes; Saving and sharing the presentation in various formats (e.g., PDF).
Week 12	Introduction to internet and web browsers: computer network basic; LAN, WAN, concept of Internet and its applications; connecting to Internet; world wide web, web browsing software's. search engines; understanding URL, domain name, IP address
Week 13	Communications and Emails: basics of electronic mail; getting an email account; sending and receiving emails; accessing sent emails; using emails; document collaboration
Week 14	Computer troubleshooting identifying and solving common hardware and software problems that computer users encounter. basic troubleshooting techniques and tools for diagnosing and resolving issues
Week 15	Second exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Lectures prepared by the instructor.	
Recommended Texts	• Graham Brown, David Watson, " Cambridge IGCSE information and Communication Technology", 3rd Edition (2020). • Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action Complete" 16th Edition (2020). • Ahmed Banafa, " Introduction to Artificial Intelligence (AI)", 1st Edition (2024). • الخضر علي الخضر بحاث،" اساسيات الحاسوب" 2016 الدكتور عادل عبدالنور، " مدخل الى عالم الذكاء الاصطناعي" 2005	

Websites	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**New headway plus**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**URENG1**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		**Theory**	**Semester of Delivery**		**1**
Administering Department		**Molecular and Medical Biotechnology Department**	**College**	**Biotechnology**	
Module Leader	Dr. Lamiaa Fingan Nashi Al-Maliki		**e-mail**	lamiaafingan@yahoo.com	
Module Leader's Acad. Title		Lecturer Doctor	**Module Leader's Qualification**		PhD
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1\10/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	None
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. **---Learn skills of speaking** 2. **---Learn skills of reading and writing** 3. **---Grammar** 4. **---Learn skills of listening**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The graduate should be able to know and understand all of the following: 1- The foundations of standard and general conversation in English. 2- The foundations of scientific and academic writing in the English language. 3- Strengthening English listening skills. 4- Understanding and realizing how to read texts in the English language and distinguishing the important substantive texts in a particular article and giving them more attention than other sub-texts to shorten the time of correct general understanding of the content to be read. 5- Develop the learner's skills to understand and distinguish the correct words and exits of the English language letters. 6- Develop writing skills and avoid quoting using different writing methods such as paraphrasing the text using the passive tenses in different forms and circumstances. 7- 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. 8- 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.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Texts, reading, whiteboard, plasma screen

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 11	LO #1, 2, 10 and 1
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Onsite Assignments	1	10% (10)	10	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Hello! P.6 Grammar: am/are/is, my/your I'm Pablo. My name's Nawaf What's your name? p6 This;s ... This is Ben. Nice to meet you. p7 Vocabulary: How are you? How are you? Fine, thanks. Very well, thank you. p8 What's this in English? It's a photograph. a computer, a camera, a bag plO Numbers 1-10and plurals three houses fffl students pll Speaking: Introductions p6-? Good morning! Practising conversations p9 Skill work: Good morning! Goodbye! What a lovely day! See you later! A cup of tea, please. Have a nice day. Good night! p

Week 2	Unit 2 Your World P12 Grammar: he/she/they, his/her He's from the United States. Her name's Karima. p13 They're on holiday. p16 Questions What's his name? Where's she from? p13 Vocabulary: Countries France, China, Spain pl2 Adjectives awful, really good, fantastic, beautiful pl6 Reading and speaking: Where are they from? Two people on holiday in New York pl6 Nouns centre, hospital, building, park pl6. Everyday English : Numbers 11-30 fifteen twenty-one p
Week 3	Unit 3 All about you P.18 Grammar: am/are/is We're all students. p20 Negatives She isn't a nurse. p1S I'm not from Scotland. p20 They aren't from Ireland. p20 Questions What's his address? How old is he? Is he married? p19 Short answers Yes, he is. / No, he isn't. p20 Vocabulary : Jobs a police officer, a nurse pl8 Personal information surname, first name, address, phone number, married pl9 Reading and listening: Hello! We're on a mountain! An interview with students on a charity walk p22 Roleplay Interview on a mountain p22 Everyday English: Social Expressions (1) I'm sorry. That's OK. Excuse me! I don't understand. I don't know. p23
Week 4	Unit 4 : Family and Friends P24 Grammar: Possessive adjectives my, your, our, their p24 Possessive 's Fatima's husband Adel's offic p24 has/have I have a small hotel. She has a job. We have three sons. p27 Adjective + noun a small hotel a big house a good job p27 Vocabulary : The family mother, son, wife, ... p25 Describing a friend very beautiful, really funny, a lot offriends, her favourite team p28 Reading and writing: My best friend A description of a friend p28 Listening: Who are they? Listen and identify the people p25, p29 Everyday English: The alphabet a, b, c ... How do you spell ... ? p30

	On the phone Good morning. Laxcon International. The Manager, please. Sam Benting speaking. p31 Saying email addresses pam@hotmail.com p3l
Week 5	Unit5 : The way I live P32 Grammar : Present Simple I/you/we/they I like ice-cream. I don't like tennis. Do you like f ootball? p33 Where do you work? Do you live in Dundee? p34 In Portugal they speak Portuguese. p36 a and an a waiter, an engineer, an Italian restaurant p34 Adjective + noun a German car Spanish oranges p37 Vocabulary : Sports/ Food/ Drinks tennis, swimming burgers, oranges tea, coffee, juice p32 Adjectives exciting, delicious, great p33 Verbs live, work, come, play, speak, want p34 Languages and nationalities German, Japanese p36 Listening Where is Colin? Who is he with? p35 Listening and speaking At a dinner Two people meet and talk p38 Roleplay At a dinner Everyday English: How much is it? Numbers1-100 30, 40, 50 ... p39 Prices 75p £20 £50 $100 How much is .. .? p39
Week 6	Unit 6: Every day p42 Present Simple he/ she He gets up at 6.00. He has lunch in his office. p42 She lives in a small house. p44 Questions and negatives What time does he have breakfast? He doesn 't live in London. p43 Adverbs of frequency He always works late. He never goes out. p42 Vocabulary: The time It's nine o'clock. It's ten fifteen. What time is it? p40 Verbs and nouns have breakfast leave school get home p41 Verbs cook, listen, play p44 Nouns eggs, toast, beach p44 Words that go together get up early, watch TV p46 Speaking Lifestyle questionnaire Do you get up early? Do you go shopping at the weekend? p46 Everyday English: Days of the week Monday, Tuesday ... today, tomorrow Prepositions of time on Sunday at nine o'clock in the morning p4?
Week 7	1st Mid term Exam

Week 8	Unit 7 My favorite P 48 Grammar: Question words who, where, why, how p4S Pronouns Subject/Object/Possessive lime/my we/us/our they/them/ their p49 this and that I like this coat. Who's that? pSO Vocabulary : Adjectives lovely, terrible p52 comfortable, friendly p53 Opposite adjectives new/old, big/small p52 Places railway station, chemist p55 Reading and writing: A postcard from San Francisco A holiday postcard p53 Roleplay Conversations in town p55 Everyday English : Can I. .. ? Can I have a return ticket? Can I tryon this jumper, please? p54
Week 9	Unit 8 Where I live P56 Grammar : There is/ore ... There's an old sofa. Are there any armchairs? There are some books. p57 Prepositions in, on, under, next to pS8 Vocabulary: Rooms and furniture living room, bedroom cooker, sofa pS6 In and out of town mountain, beach, ferry, fishing, sailing p6G post office, hospital, castle p63 Reading and vocabulary Vancouver - the best city in the world What to do and where to go p60 listening and writing My horne town Steve talks about living in Vancouver Write about a town you know p62 Directions Turn right. Go straight on. Is there a ... near here? p63
Week 10	Unit 9 Time past 64 Grammar: was/were born When were you born? I was born in 1996. p65 Past Simple - irregular verbs went, came, saw She went shopping. p68 Vocabulary : Saying years 2010, 1996 p64 People and jobs politician surgeon writer p66 Irregular verbs had, made, bought p68 have, do, go have lunch, do homework, go shopping p70 Listening and speaking: Magalie Dromard Magalie talks about her family Talk about your family p6S Reading and speaking :Two Saudi boys find an antique vase Telling a story from pictures p68 Everyday English: When's your date of birth? Months January, February. .. p71 Ordinal numbers first, fifth, tenth .. . p71 Saying dates the sixth ofApril p71
Week 11	Unit 10 We Had agreat time P 72 Grammar: Past Simple - regular and irregular played, got, watched, did p72 Questions What did you do? Did you go out? p73 Negatives They didn't go to work. p73 ago I went to Rome ten years ago. p78 Vocabulary: Weekend activities go to the mall, have a meal, see yourfriends p75. Time expressions at 8 o'clock, on Monday, last night p7S Sports and leisure tennis, skiing, windsurfing p76

	ploy or go? play tennis, go skiing p76 Seasons winter, summer p77. Speaking Did you have a good weekend? A questionnaire. p74 Listening and speaking Jack and Millie Parker's holiday A couple talk about their holidays p77 Asking about holidays p77 Speaking and writing My last holiday W hat is your favourite kind of holiday? Where did you go on your last holiday? p78 Everyday English: Making conversation - showing interest Really? Oh! Good! Mmm! p75 Going sightseeing Can I have a map ofthe town? We want to go on a bus tour. How much is it to get in? p79
Week 12	Unit11 Can Ido that? p80 Grammar : can/can't He can speak French. I can't draw. Can she run fast? p80 Adverbs I can cook a little bit. I can't cook at all. really well, fluently p82 Requests and offers Can you tell me the time? Can I help you? p83 Vocabulary: Verbs draw, run, drive, use a computer pSG Verb + noun listen to the radio chat to friends p84 Adjective + noun fast car, busy city, dangerous sport p86 Opposite adjectives dangerous/safe, old/modern, old/young p86. Reading and listening The Internet What can you do on the Internet? p84 Five people talk about what they do on the Internet p8S. Everyday problems I can't get on the Intern et! I'm lost! This machine doesn't work! Tu rn everything off... p87
Week 13	Unit 12 Please and thank you p88. Grammar : I'd like ... J'd like some chicken. How much would you like? p8S some and any J'd like some cheese. Do you have any Emmental? I don't have any apple juice. p89 like and would like I like cola. I like going to the mall. l'd like to go out. p91 Vocabulary: Shopping bread, milk, fruit, stamps, shampoo, cheese, chicken, conditioner pS8 Food cereal, salad, pasta, fish p92 In arestaurant menu, starter, dessert soup, salmon, mixed salad p94 Roleplay Ordering a meal Are you ready to order? p94. listeni ng Conversations with Adam p89 Good luck! What people would like to do after an exam p90 Reading and speaking You are what you eat People from different parts of the world describe what they eat p92 Discussion - what is a good diet? p92. Everyday English: Roleplay Making offers to guests Would you like a cold drink? What would you like? Would you like to watch the football? p9G Signs all around Where can you see these signs? Way in No entry Push Queue here p9S
Week 14	Unit 13 Here and now p96 Grammar : Present Continuous He's wearing a T-s hirt. What's he doing? p97 Present Simple and Present Continuous He lives in London. They're not staying in a hotel. p99 Vocabulary: Colours blue, red, green p96 Clothes jacket, trousers, shoes and socks p96 Opposite verbs buy/sell!' love/hate, openklose plO2. Reading and listening This week is different Colin, a millionaire, gives money to homeless teenagers plOG Conversations with Colin plOl.

	Everyday English: What's the matter? I'm tired/thirsty/bored. She has a headache/a cold. Why don't you ... ? That's a good idea. plO3.
Week 15	Unit 14 Its time to go! P104 Grammar Future plans They're going on holiday. Which countries are you going to visit? I'm leaving on Tuesday. Revision Question words - when, where, who, how p106 Tenses - present, past, and future tenses plIO Vocabulary: Transport travel by bus, coach, motorbike, plane plO4 Revision Words that go together pay bills, menu/waiter plO7 Which word is different? train bus bridge p107 Pronu nciation Two and three syllables - married vegetable Words that rhyme - some!come plO7. Reading and speaking: Life's big events Three people talk about their past, present, and future pl08 A mini autobiography I was born in .. . I grew up in .. . I'm studying .. . I want to be a .. . I'm going to ... pl09. Everyday English: Social expressions (2) Good luck in the exam! Don't worry! It doesn't matter! That's so kind ofyou! Thanks for everything! It was a pleasure. pIll

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**--New –Headway Plus Beginner student's book John and Liz Soars ISBN 978-0-19-471375-7** **--- New Headway Plus Beginner workbook with key John and Liz Soars ISBN 978-0-19-47-1376-4** **---Internet**	NO
Recommended Texts		
Websites	**--- English language Youtube**	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	الديمقراطية وحقوق الانسان		**Module Delivery**
Module Type	**Basic**		• ☒ **Theory** • ☒ **Lecture** • ☐**Lab** • ☐ **Tutorial** • ☐ **Practical** • ☒**Seminar**
Module Code	**URDEM**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level		**Semester of Delivery**	1
Administering Department	Department of molecular and medical biotechnology	**College**	College of Biotechnology
Module Leader	مروة غازي	**e-mail**	marwa.k.86@nahrainuniv.edu.iq
	Lecture Assist.	**Module Leader's Qualification**	M.Sc
Module Tutor	None	**e-mail**	E-mail
Peer Reviewer Name	Osama kareem rasheed	**e-mail**	Usama.kareem1103a@comc.uobaghdad.edu.iq
Scientific Committee Approval Date	1.10.2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**			
Module Aims **أهداف المادة الدراسية**	هدف دراسة مادة حقوق الإنسان والديمقراطية يتمثل في تعزيز الفهم والوعي بقضايا حقوق الإنسان والمبادئ الأساسية للديمقراطية. هناك بعض الأهداف الرئيسية لدراسة هذه المادة:		

	1. فهم حقوق الإنسان: يهدف دراسة حقوق الإنسان إلى تعريفك بالمفاهيم الأساسية لحقوق الإنسان وقيمتها الأساسية في المجتمع. ستتعلم عن التاريخ والتطور القانوني لحقوق الإنسان والمعاهدات والاتفاقيات الدولية المتعلقة بهذا الموضوع. 2 .التوعية بالمبادئ الأساسية للديمقراطية: ستتعرف على مفهوم الديمقراطية وقيمها الأساسية، بما في ذلك حكم القانون، وحقوق المواطنة، والمشاركة السياسية. ستتعلم أيضًا عن أنظمة الحكم المختلفة وكيفية تطبيق مبادئ الديمقراطية في المجتمعات المختلفة. 3 .التعرف على التحديات الحالية: ستتعلم عن التحديات والقضايا الحالية في مجال حقوق الإنسان والديمقراطية. ستدرس القضايا المتعلقة بالتمييز والعدالة الاجتماعية وحقوق المرأة وحقوق الأقليات وحقوق الطفل وحقوق اللاجئين، وكيفية التعامل مع هذه التحديات في إطار الديمقراطية. 4 .تطبيق المفاهيم على الواقع: ستتعلم كيفية تطبيق المفاهيم والمبادئ التي تم دراستها في حقوق الإنسان والديمقراطية على الواقع العملي. ستدرس الأدوار المختلفة للمنظمات الحقوقية والمؤسسات الديمقراطية وكيفية العمل من أجل تعزيز حقوق الإنسان وتعزيز الديمقراطية في المجتمعات. 5 .تنمية المهارات النقدية والتحليلية: ستتعلم كيفية تحليل القضايا المتعلقة بحقوق الإنسان والديمقراطية وتقييم السياق القانوني والأخلاقي والسياسي الذي يحيط بها. ستتدرب على صياغة حجج قوية وتوجيه النقد البناء للسياسات والممارسات غير العادلة. عن طريق دراسة مادة حقوق الإنسان والديمقراطية، ستكتسب المعرفة والفهم اللازمين للمساهمة في تعزيز حقوق الإنسان والديمقراطية في المجتمع والعمل على خلق تغيير إيجابي
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	تعمل جامعة النهرين من خلال تدريس مادة حقوق الانسان والديمقراطية لتعزيز التثقيف والتوعية وتدريب الطلبة على اهمية المشاركة الفاعلة في جوانب الحياة العامة كتعزيز احترام مبادئ حقوق الانسان العامة والمشاركة الفاعلة في الحياة السياسية والثقافية وتكريس القيم والمعتقدات والمواقف التي تشجع جميع الطلبة على دعم الحقوق الخاصة بهم وحقوق غيرهم، كما أنه يتيح فهماً للمسؤولية المشتركة لهذه الشريحة عن جعل حقوق الانسان أمراً واقعاً يعايشونه ويتسلحون بالمعارف والمهارات والمواقف التي تمكنهم من إدراك هذه الحقوق والالتزام بها
Indicative Contents **المحتويات الإرشادية**	• معرفة مفهوم الحق ومفهوم الانسان من الناحية اللغوية والاصطلاحية ومعرفة مفهوم حقوق الانسان ودراسة الشخصية القانونية للإنسان وماهي مميزات الشخصية الطبيعية • معرفة التطور التاريخي لفكرة حقوق الانسان في العصور القديمة والعصور الوسطى وفكرة حقوق الانسان في الشرائع السماوية • دراسة مصادر حقوق الانسان المحلية والدولية • دراسة ضمانات حقوق الانسان ومعرفة ماهي الضمانات الدستورية والقضائية وضمانات حقوق الانسان في الإسلام • معرفة دور المنظمات في حقوق الانسان على الصعيد الإقليمي والدولي • دراسة ما مدى تأثير العولمة على حقوق الانسان • دراسة مفهوم الديمقراطية ومعرفة تطوره وتعريفه وابعاده • دراسة الديمقراطية التمثيلية ومعرفة النظام التمثيلي وطبيعته القانونية • معرفة مفهوم الانتخاب وتكييفه القانوني • معرفة كيفية تنظيم الانتخاب وتحديد الدوائر الانتخابية والقوائم الانتخابية والمرشحون والحملة الانتخابية والتصويت • دراسة نظم الانتخابات ومعرفة ماهو الانتخاب المباشر والانتخاب الغير مباشر والانتخاب الفردي والانتخاب بالقائمة • معرفة مميزات وعيوب الديمقراطية
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Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1. POWERPOINT 2. كتابة التقارير 3. التعلم عبر الانترنيت 4. زيارات ميدانية

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**		**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**		**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	6, 11	1-10
	Assignments	1	10% (10)	10	1-9
	Onsite Assignments	1	10% (10)	8	1-7
	Report		10	6	1-10
Summative assessment	**Midterm Exam**	1 hr	20% (20)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**مفهوم حقوق الانسان**
Week 2	**حقوق الانسان في الحضارات القديمة**
Week 3	**حقوق الانسان في الشرائع والأديان السماوية**
Week 4	**مصادر حقوق الانسان**
Week 5	**ضمانات حقوق الانسان ووسائل حمايتها**
Week 6	**دور المنظمات في حماية حقوق الانسان**
Week 7	**العولمة و حقوق الانسان**
Week 8	**مفهوم الديمقراطية**
Week 9	**الديمقراطية التمثيلية (النيابية)**

Week 10	**مفهوم الانتخاب وتكيفه القانوني**
Week 11	**تنظيم عملية الانتخاب**
Week 12	**نظم الانتخاب**
Week 13	**تكوين هيئة الناخبين**
Week 14	**مقومات ومعوقات الحكم الرشيد (الحكم الصالح)**
Week 15	**مساوئ ومحاسن الديمقراطية**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ماهر صالح علاوي الجبوري، حقوق الانسان والطفل والديمقراطية, المكتبة القانونية،2009	نعم
Recommended Texts	د. حميد حنون خالد,حقوق الانسان,مكتبة السنهوري,٢٠١٥	لا
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** – Excellent	**امتياز**	90 - 100	Outstanding Performance
	B - Very Good	**جيد جدا**	80 - 89	Above average with some errors
	C – Good	**جيد**	70 - 79	Sound work with notable errors
	D - Satisfactory	**متوسط**	60 - 69	Fair but with major shortcomings
	E – Sufficient	**مقبول**	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	**راسب (قيد المعالجة)**	(45-49)	More work required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Analytical Chemistry**		**Module Delivery**
Module Type	**Support**		• ☒ **Theory** • ☐ **Lecture** • ☒ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	MBt-11-AC		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level		**Semester of Delivery**	1
Administering Department	**Molecular and Medical Biotechnology**	**College**	**Biotechnology**
Module Leader	Alabass abdulkareem	**e-mail**	Albbas.abdulkareem@nahrainuniv.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	Albbas.abdulkareem@nahrainuniv.edu.iq
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. The aims of an Analytical Chemistry module for first-year university students typically include providing foundational knowledge and skills in the field of analytical chemistry. Here are six main aims for such a module:

	2. **Introduction to Analytical Techniques:** To introduce students to a wide range of analytical techniques commonly used in chemical analysis, including spectroscopy, chromatography, titration, and electrochemical methods. 3. **Measurement and Quantification:** To teach students the principles of accurate measurement and quantification, including units of measurement, error analysis, and statistical methods used in analytical chemistry. 4. **Sample Preparation:** To instruct students on proper sample preparation techniques, including sample collection, extraction, and handling, to ensure reliable and reproducible results. 5. **Instrumentation:** To familiarize students with laboratory instrumentation and analytical equipment, including how to operate and maintain them, interpret data, and troubleshoot common issues. 6. **Chemical Analysis:** To enable students to perform chemical analyses, including the selection of appropriate methods and techniques, calibration, data analysis, and reporting of results. 7. **Quality Assurance and Good Laboratory Practices:** To emphasize the importance of quality assurance, safety, and good laboratory practices in analytical chemistry, including the documentation of procedures, adherence to safety protocols, and compliance with ethical guidelines. 8. These aims are designed to provide students with a solid foundation in analytical chemistry, equipping them with the knowledge and skills needed to conduct accurate and reliable chemical analyses in various scientific and industrial settings.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Module learning outcomes for a first-year university Analytical Chemistry course typically encompass a range of knowledge and skills students are expected to gain during the course. Here are six main aims or learning outcomes for such a module: 2. Fundamental Principles: Understand and apply fundamental principles of analytical chemistry, including concepts related to chemical equilibria, chemical reactions, and the behavior of analytes in various matrices. 3. Analytical Techniques: Gain proficiency in a variety of analytical techniques such as spectroscopy, chromatography, titration, and electrochemical methods, and demonstrate the ability to select and apply appropriate techniques for specific analytical problems. 4. Measurement and Quantification: Develop the skills necessary for accurate measurement and quantification, including proficiency in units of measurement, error analysis, and statistical methods relevant to analytical chemistry. 5. Sample Preparation: Learn and apply proper sample preparation techniques, including sample collection, extraction, and handling, to ensure the reliability and reproducibility of analytical results. 6. Instrumentation and Data Analysis: Become proficient in the operation and maintenance of analytical instruments, as well as the interpretation of data generated by these instruments. Analyze experimental data, draw meaningful conclusions, and report findings effectively. 7. Safety and Ethics: Understand and practice laboratory safety protocols and ethical considerations in analytical chemistry, including the responsible use of chemicals, proper disposal of waste, and adherence to ethical guidelines for research and data reporting.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Teaching Analytical Chemistry to first-year university students involves a combination of theoretical concepts and practical laboratory experiences. Here are the main theoretical and practical indicative contents for such a course: **Theoretical Contents:** 1. **Introduction to Analytical Chemistry:** • Definition and scope of analytical chemistry • Importance of analytical chemistry in various fields • Analytical chemistry as a quantitative science

	2. **Measurement and Units:** • Fundamental concepts of measurement • Units and dimensions • Accuracy and precision in measurements 3. **Chemical Equilibria:** • Concepts of chemical equilibrium • Equilibrium constants and expressions • Applications in analytical chemistry 4. **Chemical Reactions:** • Reaction stoichiometry • Reaction kinetics • Applications of chemical reactions in analysis 5. **Instrumentation:** • Introduction to analytical instruments • Spectroscopy (UV-Vis, IR, NMR, etc.) • Chromatography (HPLC, GC, etc.) • Electrochemical methods (potentiometry, voltammetry, etc.) 6. **Sampling and Sample Preparation:** • Importance of representative sampling • Sample collection and preservation • Sample extraction and pre-treatment techniques **Practical Contents:** 1. **Laboratory Safety:** • Introduction to laboratory safety rules and practices • Handling of chemicals and safety equipment 2. **Basic Laboratory Skills:** • Proper use of laboratory glassware and equipment • Pipetting and titration techniques • Weighing and measurement techniques 3. **Instrumentation Techniques:** • Hands-on experience with analytical instruments (e.g., spectrophotometers) • Calibration and maintenance of instruments 4. **Sample Preparation:** • Sample collection, preservation, and handling • Sample extraction and pre-treatment procedures 5. **Analytical Techniques:** • Conducting chemical analyses using various techniques • Data acquisition and analysis • Troubleshooting instrument issues

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Type something like: 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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**		**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	

Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**		**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 13	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 11	LO # 3, 4, 6 and 10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Analytical Chemistry
Week 2	Fundamental Units of Measure
Week 3	Units for Expressing Concentration
Week 4	the Chemical Composition of Aqueous Solutions
Week 5	Concentration units, stoichiometry, and chemical equilibrium.
Week 6	Titrations in Analytical Chemistry
Week 7	Types of titration
Week 8	Midterm exam
Week 9	Spectroscopic Methods of Analysis
Week 10	ultraviolet/Visible Photo meters and Spectro photo meters
Week 11	Infrared Spectro photo meters

Week 12	Molecular Photoluminescence Spectroscopy
Week 13	2nd midterm exam
Week 14	Chromatography fundamentals
Week 15	Introduction to gas chromatography (GC) and high-performance liquid chromatography (HPLC).

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Analytical Chemistry and Laboratory Safety
Week 2	Basic Laboratory Techniques
Week 3	Preparation of Standard Solutions from Solid Materials
Week 4	Preparation of Standard Solutions from Liquid Materials
Week 5	Preparation of Serial Dilutions
Week 6	Acid-Base Titration to Determine the Concentration of an Unknown Acid Solution
Week 7	Acid-Base Titration to Determine the Concentration of an Unknown base Solution
Week 8	Determination of Calcium Carbonate Content in a Sample Using Back Titration
Week 9	1 Midterm exam
Week 10	Preparation of an Acidic Buffer Solution
Week 11	Preparation of an Basic Buffer Solution
Week 12	Determination of Absorbance Using UV-Vis Spectroscopy
Week 13	Determination of Absorbance of Potassium Permanganate ($KMnO_4$) Using UV-Vis Spectroscopy
Week 14	Thin Layer Chromatography (TLC)

Week 15	2 Midterm exam

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Analytical Chemistry 9th edition by Skooge	Yes
Recommended Texts	Modern analytical chemistry / David Harvey. — 1st ed.	No
Websites		

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	**امتياز**	90 - 100	Outstanding Performance
	B - Very Good	**جيد جدا**	80 - 89	Above average with some errors
	C – Good	**جيد**	70 - 79	Sound work with notable errors
	D – Satisfactory	**متوسط**	60 - 69	Fair but with major shortcomings
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	General Biology 11			**Module Delivery**	
Module Type	Core			☒ **Thery** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt12-GB				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level			**Semester of Delivery**	2	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**College of Biotechnology**	
Module Leader	**Dr.Risala allami , Dr Farah Dr.Lamiaa fangan**		**e-mail**	**risala.allami@ nahrainuniv.edu.iq** **lamiaafingan@!yahoo.com**	
Module Leader's Acad. Title	**Prof .Dr.** **Assist prof** **Lecturer**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	**Name (if available)**		**e-mail**	**E-mail**	
Peer Reviewer Name	**Name**		**e-mail**	**E-mail**	
Scientific Committee Approval Date	**1\10\2024**		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Biology-I		1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to advance the student's knowledge of animal and plant cell biology taxonomy of organism characterization , structure and classification.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) To introduce basic biological principles through an integrated approach. 2) To investigate the cellular processes of living organisms with an emphasis on biological chemistry applications. 3) To investigate the unifying themes and key concepts of different organisms. 4) To acquaint the student with the anatomy, function, genetics and evolution of different types of organisms. 5) The student will demonstrate factual knowledge of contemporary natural science. 6) The student will apply contemporary scientific models to describe the natural world. 7) To understand and apply the scientific method. 8) Demonstrate basic problem-solving processes, including observation, inference, measurement, prediction, use of numbers, classifying and use of space and time relationships in life sciences. 9) Demonstrate integrated process skills, including identification and control of variables, interpretation of data, formulation and testing of hypotheses, and experimentation in the life sciences..
Indicative Contents المحتويات الإرشادية تضم الكلمات المفتاحية المهمة للمحاضرات	الكتب المقررة المطلوبة: Text books المراجع الرئيسية (المصادر): Text books و الشبكة الدولية للمعلومات في موضوع المقرر الكتب والمراجع التي يوصى بها (المجلات العلمية, التقارير,...): Text books, المجلات العلمية و الرسائل والاطاريح المراجع الالكترونية, مواقع الانترنت: الشبكة الدولية للمعلومات في موضوع المقرر

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-اسلوب المحاضرات 2-نظام الـ power point 3-نظام الـواجبات البيتية والحلقات الدراسية طرائق التعلم: 1- الامتحانات السريعة اسبوعيا 2- المناقشة والاسئلة والاجوبة الفورية 3-الشبكة الدولية للمعلومات في موضوع الاختصاص طرائق التقييم 1- الامتحانات الاسبوعية والفصلية 2- تقييم اداء الطلبة من خلال الحلقات الدراسية 3- درجات محددة بواجبات بيتية

	4- انظمة الجودة القياسية (Quality standards) 5- امتحانات يومية باسئلة بيتية حلها ذاتيا درجات مشاركة لاسئلة منافسة تتعلق بالمادة الدراسية

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Classification of Living Organisms
Week 2	Basic Characteristics, Identification and Classification of Viruses
Week 3	Basic Characteristics, Identification and Classification of Prokaryotes
Week 4	Eukaryotic Organisms
Week 5	The Protists
Week 6	Basic Characteristics, Identification and Classification of Fungi
Week 7	overview of the plant kingdom , Kingdom Plantae, the plant body, plant cell division in general
Week 8	**1st Midterm exam**
Week 9	OVERVIEW OF THE ANIMAL KINGDOM, Diversity of Animal Life The Simplest Animals , Flatworms, Nematodes, and Arthropods
Week 10	Vertebrates I: Fishes and Amphibians. Vertebrates II: Reptiles, Birds and Mammals
Week 11	Heredity (Genes and Chromosomes)
Week 12	Heredity (the basic concepts and features of heredity)
Week 13	Human biology
Week 14	Cancer biology
Week 15	**2nd Midterm exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	**Glossary of medical terms**

Week 2	**Biosafety**
Week 3	**Sterilization**
Week 4	**Classification of kingdom**
Week 5	**Animal cell**
Week 6	**Plant cell**
Week 7	**Bacteria**
Week 8	**Fungi**
Week 9	**Mid exam**
Week 10	**DNA extraction**
Week 11	**Culture media preparation**
Week 12	**Antibiotic sensitivity test**
Week 13	**Blood group**
Week 14	**Plant slid preparation**
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	GENERAL BIOLOGY II Course Team: Abiodun E. Adams (Course Developer/Writer) - NOUN Professor Mohammed Bello Abdullahi (Course Reviewer) - Federal University, Kashere – Gombe	Yes
Recommended Texts	.Medical Biotechnology: Advancement and EthicsDominic W.S. Wong The ABCs of Gene Cloning Second Edition Springer	Yes
Websites	https://www.wgu.edu/blog/medical-biotechnology-advancements-ethics1811.html	

	https://www.ncbi.nlm.nih.gov/

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –**Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C –Good	جيد	70 - 79	Sound work with notable errors
	D –Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E –Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Principle of Biotechnology-II**			**Module Delivery**	
Module Type	Core			☒ **Theory** **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt12-PB				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level			**Semester of Delivery**	2	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**College of Biotechnology**	
Module Leader	**Asmaa Ali Hussein +Maha Hameed**		**e-mail**	**asmaa.ali@nahrainuniv.edu.iq** **Dr.mahahameed@gmail.com**	
Module Leader's Acad. Title	**Professor**		**Module Leader's Qualification**	**Ph.D.**	
Module Tutor	**Name (if available)**		**e-mail**	**E-mail**	
Peer Reviewer Name	**Name**		**e-mail**	**E-mail**	
Scientific Committee Approval Date	**1\10\2024**		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Principle of Biotechnology-I	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**The outcomes of this course provide students with knowledge and information** Students taking this introductory course begin understanding the role of biotechnology plays in the fields of human, animal genetics, environment and industry. **Biotechnology course will enable students to learn about the sciences behind biotechnology, scientific concepts and knowledge about the field of biotechnology and deeper understanding of the biological concepts used. Furthermore, students will**

	explore and evaluate career opportunities in the field of biotechnology through extensive readings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**The knowledge, skills and information to be developed by the student are:** **1. Be able to define the term "biotechnology" and appreciate its scope** **2. Have an information on biotechnology and its resultant industries, and a broad knowledge of which are represented nationally and locally** **3. Be familiar with the key events in the development of biotechnology** **4. Be able to state the broad categories of biotechnological processes based on the products formed and/or the process or substrates used, and have detailed knowledge of examples of each of these** **5. Have an understanding of the multidisciplinary nature of biotechnology and the associated role that has been played by enabling technologies in the development of biotechnology**
Indicative Contents المحتويات الإرشادية تضم الكلمات المفتاحية المهمة للمحاضرات	**Indicative content includes the following.** - **Growth phases and growth culture of bacteria** - **Medical Biotechnology** - **DNA structure and Biotechnology** - **Protein, enzyme and biotechnology** - **Industrial biotechnology** - **Bioremediation and biotechnology**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Type something like: 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.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)		**Unstructured SWL (h/w)**	

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 6and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction on biotechnology and applications
Week 2	Industrial biotechnology
Week 3	DNA structure
Week 4	Molecular biotechnology
Week 5	Protein structure
Week 6	Enzyme and Their applications in biotechnology
Week 7	Bioremediations
Week 8	Mid-term Exam
Week 9	Culture technique
Week 10	Growth culture
Week 11	bioreactor design
Week 12	Fermentation
Week 13	Single Cell Protein
Week 14	Mid-term Second Exam
Week 15	Seminars
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Laboratory apparatus**
Week 2	**Isolation of bacteria from different sources**
Week 3	**Culturing of bacteria on different media**
Week 4	**Growth phases of bacteria**
Week 5	**Preparation of solvents and solutions used in biotechnology experiments**
Week 6	**Quantification of proteins**
Week 7	**Determination of enzyme activity in bacterial isolate**
Week 8	**Determination of enzyme activity in serum samples**
Week 9	**Mid term exam**
Week 10	**DNA extraction in ten easy steps from plant samples**
Week 11	**DNA extraction using kit**
Week 12	PCR
Week 13	**Exam**
Week 14	**Report**
Week 15	**Report**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to biotechnology	yes
Recommended Texts	. Medical Biotechnology: Advancement and Ethics	yes
Websites	https://www.wgu.edu/blog/medical-biotechnology-advancements-ethics1811.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group	**A –** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry**			**Module Delivery**	
Module Type	**Supportive**			☒ **Theory** **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt12-OC				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**College of Biotechnology**	
Module Leader	**Alabbas+alaa**		**e-mail**	**Alshamaryabass1@gmail.com**	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	**Ph.D**	
Module Tutor	**Name (if available)**		**e-mail**	**E-mail**	
Peer Reviewer Name	**Name**		**e-mail**	**E-mail**	
Scientific Committee Approval Date	**1\10\2024**		**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Analytical chemistry	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module is intended to introduce the structure and bonding of simple organic molecules. The properties, preparation, reactivity and reaction mechanisms will be explored for a number of functional groups.t covers the common organic molecules (alkenes, alcohols, amines, carbonyls etc.) and emphasizes their recognition, naming, reactions and relevance to everyday life and health.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**On completion of this module students should be able to:** **1.Understand the structures of organic molecules and recognize and name examples of them.** **2.Predict the properties and reactions of a molecule from its structure.**

	3.Discuss the reactions of common organic compounds. **4.Design the synthesis of a simple molecule from available starting materials.** **5.Understand the molecular basis of life.** **6.Safely perform a simple chemical synthesis in the laboratory.**
Indicative Contents المحتويات الإرشادية تضم الكلمات المفتاحية المهمة للمحاضرات	**Fundamental organic chemistry covers a wide range of topics that are essential for understanding the principles and reactions of organic compounds. Here's an indicative list of contents typically covered in a fundamental organic chemistry course:** 1. **Introduction to Organic Chemistry:** Definition of organic chemistry, historical perspective, and importance in everyday life. 2. **Structure and Bonding:** Covalent bonding, Lewis structures, VSEPR theory, molecular geometry, hybridization, polarity, and resonance. 3. **Functional Groups:** Introduction to functional groups, classification, and properties of various functional groups such as alkanes, alkenes, alkynes, alcohols, ethers, halides and amines. 4. **Nomenclature:** IUPAC rules for naming organic compounds, including alkanes, alkenes, alkynes, cyclic compounds, and compounds with functional groups. 5. **Isomerism:** Structural isomerism, geometric isomerism (cis-trans isomerism), and optical isomerism (enantiomerism). 6. **Acids and Bases in Organic Chemistry:** Bronsted-Lowry and Lewis acid-base theories, pKa values, and the concept of nucleophiles and electrophiles
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to learning and teaching fundamental organic chemistry, it's essential to employ strategies that cater to the complexity and depth of the subject while ensuring comprehension and retention. Here are some effective learning and teaching strategies for fundamental organic chemistry: **Learning Strategies:** 1. **Active Learning**: Engage in active learning techniques such as problem-solving, concept mapping, and group discussions to reinforce understanding and promote critical thinking. 2. **Visualization Tools**: Utilize molecular modeling kits, software, or interactive online tools to visualize molecular structures and reactions, helping to grasp spatial arrangements and mechanisms. 3. **Practice Problems**: Regularly solve organic chemistry problems from textbooks, worksheets, and online resources to apply concepts and develop problem-solving skills. 4. **Conceptual Understanding**: Focus on understanding fundamental concepts and principles rather than memorization. Relate concepts to real-world

	examples and applications to enhance comprehension. 5. **Self-Assessment**: Use quizzes, flashcards, and practice exams to assess understanding and identify areas for improvement. Regular self-assessment aids in retention and reinforces learning. 6. **Multimodal Learning**: Employ a variety of learning resources such as textbooks, videos, tutorials, and interactive simulations to accommodate different learning styles and preferences. Teaching Strategies: 1.Active Learning Activities: Incorporate active learning strategies into lectures and tutorials, such as think-pair-share, group problem-solving, and case studies, to promote student engagement and participation. 2.Interactive Demonstrations: Use interactive demonstrations, molecular models, and animations to illustrate complex concepts, mechanisms, and reactions, enhancing understanding and retention. 3.Real-World Applications: Relate organic chemistry concepts to real-world applications and examples in fields such as medicine, pharmaceuticals, materials science, and environmental science to emphasize relevance and motivation. 4.Formative Assessment: Use formative assessment techniques such as concept quizzes, clicker questions, and group discussions to gauge student understanding, provide feedback, and address misconceptions in real-time.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 7and 9
	Assignments	2	10% (10)	4, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction and General principles about organic chemistry**
Week 2	**Hybridization in organic compounds**
Week 3	**Alkanes: structure and nomenclature**
Week 4	**Alkanes: synthesis and reactions**
Week 5	**Alkenes: structure and nomenclature**
Week 6	**Alkenes: synthesis and reaction**
Week 7	**Mid-term Exam**
Week 8	**Alkynes: structure, nomenclature and reaction.**
Week 9	**Alkyl halides: structure, nomenclature and reaction**
Week 10	**Amines: nomenclature**
Week 11	**Ethers: structure and nomenclature,**
Week 12	**Ethers: synthesis and reactions**
Week 13	**Alcohols: structure, physical and chemical properties, nomenclature**
Week 14	**Alcohols: Reaction and preparation**
Week 15	**Preparatory week before the final Exam**
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Laboratory safety**
Week 2	**Equipment and tools**
Week 3	**Determination of Melting Point**
Week 4	**Determination of Boling Point**
Week 5	**Filtration**
Week 6	**Recrystallization**
Week 7	**Sublimation**
Week 8	**Solubility**
Week 9	**Midterm exam**
Week 10	**Simple Distillation**
Week 11	**Fraction Distillation**
Week 12	**Extraction**
Week 13	**Isolation of natural product**

Week 14	**Thin Layer Chromatography (TLC)**
Week 15	**Second Midterm Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bruice, Paula Yurkanis.Organic chemistry, University of California, Santa Barbara.8ed.2015	yes
Recommended Texts	Carey, Francis A., and Robert M. Giuliano. *Organic chemistry*. McGraw-Hill, 2017.	yes
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Biostatistics			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt12-BS				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Molecular and medical biotechnology		**College**	Biotechnology	
Module Leader	**Zaid Nsaif Abbas**		**e-mail**	zaid.altameemi@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	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: • **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. • **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. • **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. • **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. • **Critical Thinking and Problem-Solving:** The module aims 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. • **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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the Statistics module, students will be able to: 1. Demonstrate a solid understanding of fundamental statistical concepts, including population, sample, variables, measures of central tendency, and measures of dispersion. 2. Collect, organize, and analyze data using appropriate statistical methods and software tools. 3. Apply statistical techniques to describe, summarize, and interpret data, identifying relationships, patterns, and trends within datasets. 4. Formulate research hypotheses, select appropriate statistical tests, and perform hypothesis testing and confidence interval estimation. 5. Critically evaluate and interpret statistical information presented in research

	studies, reports, and media sources. 6. Communicate statistical findings effectively through clear and concise written and visual presentations. 7. Apply critical thinking and problem-solving skills to address real-world problems using statistical analysis and evidence-based decision making. 8. Work collaboratively in teams to design and conduct statistical studies, analyze data, and present findings. 9. Recognize the ethical considerations and limitations associated with statistical analysis and interpretation. 10. Continuously update and expand their statistical knowledge and skills to adapt to evolving research methodologies and technological advancements.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Introduction to Biostatistics 2. Data Types and Measurement Scales 3. Descriptive Statistics 4. Probability Theory 5. Statistical Inference 6. Parametric Tests 7. Non-Parametric Tests 8. Correlation and Regression 9. Survival Analysis 10. Experimental Design 11. Statistical Software

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 address specific questions or concerns regarding statistical concepts, calculations, or data analysis techniques. This personalized support can assist students in overcoming challenges and clarifying their understanding.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 9	LO # 3, 4, 6 and 10
	Onsite Assignments	1	10% (10)	12	1-11
	Report	1	10% (10)	10	LO # 5, 8 and 14
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Biostatistics
Week 2	Description and Presentation of Numerical Data
Week 3	Description and Presentation of Numerical Data (tutorial)
Week 4	Description and Presentation of Categorical Data
Week 5	Description and Presentation of Categorical Data (tutorial)
Week 6	Probability
Week 7	Estimation
Week 8	Midterm Exam
Week 9	Hypothesis Testing
Week 10	Sampling Techniques
Week 11	Inferential Statistics
Week 12	T-test and Chi Square Distribution
Week 13	Analysis of Variance (ANOVA)
Week 14	Correlation and Linear Regression
Week 15	Measure of Association and Impact
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	Fundamentals of Biostatistics" – Bernard Rosner Very popular among public health students; good problem sets. "Biostatistics for Epidemiology and Public Health Using R" – Bertram Karon Great for applied analysis using R.	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	اللغة العربية		**Module Delivery**
Module Type	**Basic**		• ☒ Theory • ☒ Lecture • ☐Lab • ☐ Tutorial • ☐ Practical • ☒Seminar
Module Code	**URARA**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level		**Semester of Delivery**	2
Administering Department	Department of molecular and medical biotechnology	**College**	College of Biotechnology
Module Leader	مجد رحمن	**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D
Module Tutor	None	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1.10.2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	هدف دراسة مادة حقوق اللغة العربية يتمثل في تعزيز الفهم والوعي باللغة العربية. هناك بعض الأهداف الرئيسية لدراسة هذه المادة: 1. فهم اللغة العربية: تعريف ومقدمة عن اللغة العربية ومراحل تشكلها، واطلاع

	الطلبة على الأدب عبر العصور. 2 .تعريف الطلبة على الجوانب اللغوية والادبية غير المدروسة سابقا، او تغذيتهم بالمستحدث منها، والغاية الرئيسة هي الثقافة اللغوية والادبية كونهم اقسام غير التخصص الدقيق، عليه كان الهدف الرئيس هو تجاوز الاخطاء اللغوية وتصحيح المعلومات اللغوية والادبية قدر المستطاع 3 .العمل على بناء شخصية متميزة للطالب من خلال تطوير الوعي الثقافي والاجتماعي بما يؤهله بعد التخرج من المساهمة الفعالة في خدمة مجتمعه. 4. السعي الدائم في البحث عن كل ما هو حديث في مجالات اللغة، وتعريف الطالب بمفاتيح اللغة التي توصله الى الكتابة والنطق السليم 5. ليكون خريج البكالوريوس قادرا على الكتابة الصحيحة وتعميق المفاهيم اللغوية والادبية 6. فضلا عن القدرة على التعامل مع اللغة والاخذ والعطاء مع الاخر بعقول ناضجة لغة، بما يؤمن سالمة الكتابة والنطق على مستوى عالٍ من الدقة
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	تعمل جامعة النهرين من خلال تدريس اللغة العربية لتعزيز التثقيف والتوعية وتعريف الطلبة على اهمية اللغة العربية وادابها لما تمثله اللغة العربية من اهمية بالغة في الحياة الدينية والعملية وتكريس القيم والمعتقدات والمواقف التي تشجع جميع الطلبة على معرفة التراث اللغوي والحضاري والديني والثقافي ، كما أنه يتيح فهماً للمسؤولية المشتركة لهذه الشريحة جعل العربية وادابها أمراً واقعاً يعايشونه ويتسلحون بالمعارف والمهارات اللغوية والمواقف التي تمكنهم من إدراك المفاهيم العلمية والادبية
Indicative Contents **المحتويات الإرشادية**	• المعرفة والفهم • فهم اساليب الكتابة الصحيحة • تقديم مفاتيح ختامية للتخلص من الاخطاء او تجنبها قدر المستطاع • مراجعة المادة السابقة • فسح المجال للمناقشة لمعرفة مدى الاستجابة ومواطن الضعف • معرفة التطور التاريخي للغة العربية والتطور الذي مر به الادب العربي • دراسة مصادر اللغة العربية والادبية • دراسة المفاهيم والمصطلحات اللغوية والادبية

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	5. POWERPOINT 6. كتابة التقارير 7. التعلم عبر الانترنيت 8. زيارات ميدانية

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**		**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**		**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	

Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Seminar	1	10% (10)	11	LO # 5, 8 and 10
	Report	1	10%	13	1-12
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**اقسام الكلام (الاسم، الفعل، الحرف)المبتدأ والخبر**
Week 2	**كان واخواتها، ان واخواتها**
Week 3	**المثنى والملحق به، جمع المذكر السالم والملحق به، جمع المؤنث السالم والملحق به**
Week 4	**بناء الفعل الماضي، بناء فعل الامر**
Week 5	**الفعل المضارع بناؤه واعرابه**
Week 6	**الاسماء المنصوبة**
Week 7	**الشعر / نازك الملائكة**
Week 8	**محمد مهدي الجواهري**
Week 9	**الاملاء/ كتابة الهمزة الوصل والقطع**
Week 10	**الهمزة المتوسطة والمتطرفة**
Week 11	**كتابة الضاد والظاء**
Week 12	**كتابة التاء القصيرة والطويلة**
Week 13	**علامات الترقيم وقاعدة الالف الفارقة**
Week 14	**كتابة العدد**
Week 15	**القران الكريم/ سورة يس**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	د. طه محسن، النحو الادبي ودروس العربية، 2022	نعم
Recommended Texts	د. محمد الطريحي، موسوعة النحو والادب والبلاغة والعروض، 2004	لا
Websites		

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	**امتياز**	90 – 100	Outstanding Performance
	B - Very Good	**جيد جدا**	80 – 89	Above average with some errors
	C – Good	**جيد**	70 – 79	Sound work with notable errors
	D – Satisfactory	**متوسط**	60 – 69	Fair but with major shortcomings
	E – Sufficient	**مقبول**	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	**راسب (قيد المعالجة)**	(45-49)	More work required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required

Second Level –Semester-3

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MBt-21-HE	Histology and Embryology	79	71	6.00	C	General Biology
MBt-21-Bc	Biochemistry	79	71	6.00	S	analytical chemistry and organic chemistry
MBt-21-PG	Principles of Genetics	79	71	6.00	C	General Biology
MBt-21-GM	General Microbiology	79	71	6.00	C	
MBt-21-BRM	Biosafety and Risk management	33	17	2.00	B	
URBRC	Baath Regime crimes	33	17	2.00	B	

Level-2 / Semester-4

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MBt-22-AP	Animal Physiology	79	46	5.00	C	General Biology
MBt-22-AP	Medical Biochemistry	79	21	4.00	S	Biochemistry
MBt-22-MM	Medical Microbiology	79	71	6.00	C	General Microbiology
MBt-22-MG	Microbial Genetics	79	71	6.00	C	Principle of Genetics
URCOM2	ComputerScience-II	64	11	3.00	B	Computer Science -I
MBt22-Ps	Parasitology	79	71	6.00	C	General Microbiology
URARA2	Arabic language-II	33	17	2.00	B	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Histology&Embryology			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt-21-HE				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**biotechnology**	
Module Leader	Dr: Zina Fawzi. AL-obaidi		**e-mail**	E-mail zena.alobaeady@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assist.Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General biology-I &II	**Semester**	1&II
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Covering the basics of histology. • Full understanding of histology, how to cut tissue and make smears from

	tissues, • how tissues work in the human body at the functional level. Study the tissue preparation • Understand and appreciate the field of embryology and fetal development • Understand and appreciate the diversity and usefulness of embryonic techniques. • Understanding embryology in human embryos and the possibility of using modern applications of IVF technology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- called microscopic anatomy and histochemistry, 2- histology allows for the visualization of tissue structure and characteristic changes the tissue may have undergone. Because of this, it is utilized in medical diagnosis, scientific study, autopsy, and forensic investigation. 3- Histology is the study of the tissues as well as the structures that are associated with the tissues. This form of study proves to be really important when it comes to understanding the complexity of the tissue structure in the human body 4- The student will be able to determine the abnormalities of the human system and organs under a microscope, but will recognize the developmental stages of the face, jaw and neck, as well as the sensory 5- help understand the causes of variations in humans and it offers an understanding of normal development and malformations 6- starting with the formation of gametes, fertilization, formation of the zygote, development of the embryo and fetus, and ending with the birth of a new person
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1-The first stage in the development of a fetus is fertilization – the process by which the male sperm and female egg join together 2-the fertilized oocyte (egg) splits into two cells of equal size; called blastomeres. 3-the group of cells is referred to as the morula. 4-This subject involves all aspects of tissue biology, with the focus on how cells' structure and arrangement optimize functions specific to each organ 5-The study of tissues and cells under a microscope 6-There are 4 basic types of tissue: connective tissue, epithelial tissue, muscular tissues and nervous tissue

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Type something like: 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 Study the main stages of embryonic development Explain the the assistant reproductive system such as IVF,IUI

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Embryology
Week 2	Spermatogenesis& oogenesis
Week 3	Cell division
Week 4	Neuralation
Week 5	Fertilization
Week 6	Mid-term Exam
Week 7	Introduction of histology
Week 8	Epithelial tissue
Week 9	Transitional epithelial
Week 10	simple epithelial tissue+ Stratified epithelial tissue
Week 11	Pseudostratified epithelial tissue
Week 12	Mid-term Exam
Week 13	Egg layers
Week 14	Embryo implantation
Week 15	Connective tissue
Week 16	**final Exam**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction of histology

Week 2	Epithelial tissue
Week 3	Transitional epithelial
Week 4	simple epithelial tissue
Week 5	Stratified epithelial tissue
Week 6	Psuedostrtiefied epithelial tissue
Week 7	Mid-term Exam
Week 8	Introduction to embryology
Week 9	Gametogenesis
Week 10	Fertilization and Morula formation
Week 11	Blastocyst Implantation
Week 12	Development of placenta
Week 13	Gastrulation
	Mid exam
Week 14	Introduction to embryology
Week 15	Gametogenesis
Week 16	Fertilization and Morula formation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Junqueira's Basic Histology: Text and Atlas** *By Anthony L. Mescher* — One of the most widely used histology textbooks with clear explanations and detailed atlas images. **Langman's Medical Embryology** *By T.W. Sadler* — The most commonly used embryology reference; clear explanations and clinical correlations.	
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	General microbiology			**Module Delivery**	
Module Type	Core			☒ **Theory** **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt21-GM				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**Biotechnology**	
Module Leader	Dr.Bushra hindi Saleh Asst. prof. Dr. Dhufar		**e-mail**	Bushra.aftan@nahrainuniv.edu.iq dhafar.alugaili@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assist.Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Provide students with the knowledge and information about the principles of General 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 the methods of sterilization . • Study the role of antiseptic and detergent in control the growth of M.O. • (Mycology):The main aim of this module is to provide you with an understanding of fundamental principles in medical mycology and fungal immunology. After an introduction to key concepts in the field, you will be taught about the nature of fungal infections, state-of-the-art research approaches that are being applied to dissect molecular mechanisms underlying fungal pathogenesis, the processes that underlie antifungal immunity, and how fungal infections are treated in the clinic. The module will also provide basic training in aseptic technique, safe handling and culture of pathogenic fungi, molecular tools, immunology, cytometry and bioinformatics tools. In addition to learning about this clinically important field, you will engage with original research literature, develop research level critical thinking skills in in medical mycology and fungal immunology, and learn to communicate complex ideas to both groups and individuals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Understand the principles of microbiology. • Recognize the differences between prokaryotic and Eukaryotic cells. • Define metabolism and learn differences between anabolism and catabolism. • Identify the nutritional types of M.o.and recognize the transport system in bacteria • Discuss the respiration and recognize differences between catabolism and anabolism. • Identify the virus, structure of virus ,most important viruses , replication
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – principles of general microbiology</u> Discovery of microbes , microbes classification. Prokaryotic cell, Eukaryotic cell, structure and function. Microbial nutrition, macro element, micro elements, autotroph, heterotroph. microbial transport system ,active transport, passive transport <u>Part B – Major process</u>

	Metabolism of cell, anabolism ,catabolism Growth curve, changes during each phase of growth curve Respiration, aerobic respiration, anaerobic respiration

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through interactive tutorials and by considering type of simple experiments interesting to the students and help them in identification of bacteria through learn different staining technique and other important test.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7

assessment	**Final Exam**	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Growth curve of bacteria ,factors influence on growth curve
Week 2	Bacterial nutrition, major elements required for growth of microorganism ,classification of microorganism according to their nutrition.
Week 3	Transport system in bacteria , active transport, passive transport, Facilitated diffusion compares between them .
Week 4	Respirations ,aerobic respiration ,Krebs cycle , Anaerobic respiration and fermentation
Week 5	Metabolism, catabolism, anabolism
Week 6	Antibiotics, definition ,classification, Antiseptic and detergents, their types and mode of actions
Week 7	Viruses, Classification of virus according nucleocapsid, types of nucleic acid. Replication of viruses
Week 8	**Mid exam**
Week 9	Transpiration
Week 10	Phototropism and Photoperiodism
Week 11	Plant secondary compounds
Week 12	Flowering plant reproduction
Week 13	Primary growth
Week 14	Secondary growth in plant
Week 15	Plant cell division In general
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction about apparatus and tools in lab
Week 2	Lab 2: Types of microscope
Week 3	Lab 3: Types of culture media ,preparation of culture media
Week 4	Lab 4: Method of microbial culture
Week 5	Lab 5: Methods for counting of bacteria
Week 6	Lab 6: Types of stain
Week 7	**Lab 7: Mid exam**
Week 8	Lab 8 :Simple stain
Week 9	Lab 9: Negative stain
Week 10	Lab 10:Gram stain
Week 11	Lab 11:Acid fast stain
Week 12	Lab12: Capsule stain
Week 13	Lab 13:Biological control
Week 14	Lab 14:Antibiotic sensitivity test
Week 15	Lab 15: Preparation of bacterial culture in compared with MacFarlands tubes.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Ogunseilan,O.Microbial Diversity,form and function in prokaryotic.1st(ed.).Blackwell. USA	No

Recommended Texts	Schaechingter,M.;Ingraham,J. L .and Neidhardt ,F.C. ,F.CMicrobe.1st(ed.).ASMpress. Washington.chapter.	No
Websites	https://www.ncbi.nlm.nih.gov/books/NBK7627/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Biochemistry			**Module Delivery**	
Module Type	**Support**			☒ **Theory** **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt21-Bc**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**Biotechnology**	
Module Leader	د. مصطفى قحطان سمين مصطفى		**e-mail**	Mustafa.kahtan@ced.nahrainuniv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Analytical Chemistry** **Organic Chemistry**	**Semester**	1 2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Biochemistry is an introductory module providing the essentials for understanding all living processes. • This module aims to teach core concepts in biochemistry including topics on structure of proteins, enzyme kinetics and metabolic

	pathways. • 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. • Develop effective and safe chemical and biochemical laboratory skills that require use of the methods and instrumentation of modern biochemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain the basic concepts of biochemistry. • Recall the range and structures of biological molecules. • Summarize the relationship between chemical structure and biological function. • Identify metabolic pathways. • Communicate key practical skills relating specifically to biochemistry.
Indicative Contents المحتويات الإرشادية	<u>Chemistry of Carbohydrates:</u> Definition, structure, types, and functions of carbohydrates. <u>Chemistry of Lipids:</u> Definition, structure, types, and functions of lipids. <u>Chemistry of proteins:</u> Definition, amino acids types and structure, peptide bond, polypeptides, primary, secondary, tertiary and quaternary structure of proteins, types of proteins, and functions of proteins. <u>Enzymes:</u> Definition, structure, classes, mechanism of enzyme action, Michaelis–Menten constant, theories of enzyme-substrate interaction, cofactors and coenzymes, factors affecting enzyme action, inhibitors and enzyme inhibition, allosteric enzymes, isozymes. <u>Nucleic acids:</u> DNA and RNA, definition, structure, types, and function. In addition to replication, transcription, and translation.

	Carbohydrates metabolism: Composition of dietary carbohydrates, digestion of carbohydrates, glucose intolerance, glycolysis, TCA cycle, glycogenesis, glycogenolysis, gluconeogenesis, cori cycle, pentose phosphate pathway, regulation of blood glucose. Lipids metabolism: Composition of dietary lipids, digestion of lipids, beta oxidation of fatty acids, ketone bodies, atherosclerosis. Proteins metabolism: Digestion and absorption of proteins, gastric juice, digestion by pancreatic enzymes, digestion by intestinal enzymes, protein turnover, nitrogen balance, catabolism of amino acids, urea cycle and blood urea.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chemistry of carbohydrates 1
Week 2	Chemistry of carbohydrates 2
Week 3	Chemistry of lipids 1
Week 4	Chemistry of lipids 2
Week 5	Chemistry of amino acids and proteins 1
Week 6	Chemistry of amino acids and proteins 2
Week 7	Mid-term Exam
Week 8	Enzymes 1
Week 9	Enzymes 2
Week 10	Chemistry of nucleic acids
Week 11	Nucleic acids: Replication, transcription, and translation

Week 12	Carbohydrates metabolism
Week 13	Lipids metabolism
Week 14	Proteins metabolism 1
Week 15	Proteins metabolism 2
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Spectrophotometry
Week 2	Carbohydrates (Molisch test, Sellwanoff's test
Week 3	Carbohydrates (Benedicts and osazone tests)
Week 4	Carbohydrates (Nelson-Somogi method, sumner's method, Barfoed and Bials tests)
Week 5	Estimation of reducing and non-reducing sugars (ferricyanide method for reducing sugars)
Week 6	Glycogen isolation and hydrolysis
Week 7	Lipids and fatty acids tests
Week 8	Quantitative determination of amino acids (Ninhydrin test)
Week 9	Mid-term Exam
Week 10	Quantitative determination of proteins (Biuret method)
Week 11	Proteins (Folin-Lowry method)
Week 12	Proteins (Bradford method)
Week 13	Nucleic acids (Extraction of total nucleic acids)
Week 14	The isolation of DNA
Week 15	The isolation of RNA
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Lehninger Principles of Biochemistry** • Authors: David L. Nelson, Michael M. Cox • Publisher: W.H. Freeman • Edition: 8th (2021	Yes
Recommended Texts	**Biochemistry** • Authors: Donald Voet and Judith G. Voet • Publisher: Wiley • Edition: 5th (201	No
Websites	https://www.ncbi.nlm.nih.gov/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Principle of Genetics			**Module Delivery**	
Module Type	Core			☒ **Theory** **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt21-PG				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**Biotechnology**	
Module Leader	Dr.Ruqaia Mohammed Dr. Farah t.Orabi		**e-mail**	ruqaia.alezzy @nahrainuniv.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General biology	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Provide students with the knowledge and information about the principles of

	genetics • Study DNA and RNA structure • Study Mendels principle, cell cycle , cell division • The main aim of this module is to provide you with an understanding of fundamental principles in genetics. After an introduction to key concepts in the field, you will be taught about DNA structure and disease associated with defects in DNA repair system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Understand the principles of genetics. • Recognize the differences between DNA and RNA structure . • Define Mendel's role. • Knowledge about cell cycle and division
Indicative Contents المحتويات الإرشادية	**This course is intended to give the students an understanding of the principles of genetics by studying the nature of inheritance within a conceptual framework.**

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through interactive tutorials and by considering type of simple experiments interesting to the students

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to genetics
Week 2	DNA: Components and Structure
Week 3	Mendel's Principles(I)
Week 4	Mendel's Principles(II)
Week 5	Cell Cycle, Mitosis and Meiosis
Week 6	Sex Determination, Sex Linkage
Week 7	Dosage Compensation
Week 8	**Mid exam**
Week 9	Sex linked Genes in Human Beings
Week 10	Pedigree Analysis
Week 11	Eukaryotic Chromosomes

Week 12	Chromosomal Banding
Week 13	The Non Mendelian Inheritance
Week 14	Disease associated with genetics abnormality
Week 15	DNA repair system
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to basic of genetic,
Week 2	Lab 2: DNA Structure, genetic units
Week 3	Lab 3: Genotype and phenotype
Week 4	Lab 4: Genetic transport (show slide of meiosis)
Week 5	Lab 5: Application of Mendel's Principles(I)
Week 6	Lab 6: Application of Mendel's Principles (II)
Week 7	**Lab 7: Mid exam**
Week 8	Lab 8: blood group inheritance
Week 9	Lab 9: inheritance patterns part I
Week 10	Lab 10: Inheritance patterns part II
Week 11	Lab 11: inheritance tests
Week 12	Lab12: Mid exam
Week 13	Lab 13: reports discussion
Week 14	Lab 14: reports discussion
Week 15	Lab 15: Preparation for final exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The Language of Life: DNA and the Revolution in Personalized Medicine" by Francis Collins. "DNA: The Secret of Life" by James D. ... "The Gene: An Intimate History" by Siddhartha Mukherjee.	No
Recommended Texts	Best genetics textbook Human Genetics and Genomics, Includes Wiley E-Text, 4th	No
Websites	https://www.wiley.com › en-gb › Human+Genetics+and+...	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Bio-Safety and Risk Assessments معلومات المادة الدراسية					
Module Title	**Bio-Safety and Risk Assessments**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt21-BRM				
ECTS Credits	2				
SWL (hr/sem)					
Module Level	2		**Semester of Delivery**	3	
Administering Department	Molecular &Medical biotechnology		**College**	Biotechnology	
Module Leader	Prof. Dr. Ali Zaid Al-Saffar		**e-mail**	ali.saffar@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Understand the fundamental principles of bio-safety and risk assessment in various laboratory and research settings. • Gain knowledge of the potential hazards associated with biological agents and genetically modified organisms (GMOs).

	• Learn about the legal and regulatory frameworks governing bio-safety and risk assessment. • Explore different levels of bio-safety containment and their corresponding practices and requirements. • Develop skills to identify and assess potential risks in laboratory procedures and experimental protocols. • Understand the principles and techniques of risk assessment, including hazard identification, exposure assessment, and risk characterization. • Learn about the importance of implementing appropriate control measures and safety protocols to mitigate risks. • Develop critical thinking and problem-solving skills to address bio-safety challenges effectively. • Understand the ethical considerations and responsibilities associated with bio-safety and risk assessment. • Gain practical knowledge of emergency response procedures and contingency planning for bio-safety incidents.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Demonstrate a comprehensive understanding of the principles and concepts of bio-safety and risk assessment in laboratory and research environments. • Identify and assess potential hazards associated with biological agents, including pathogens and genetically modified organisms (GMOs). • Apply knowledge of legal and regulatory frameworks to ensure compliance with bio-safety guidelines and protocols. • Conduct thorough risk assessments, including hazard identification, exposure assessment, and risk characterization. • Develop effective control measures and safety protocols to mitigate risks and protect personnel and the environment. • Apply critical thinking and problem-solving skills to address bio-safety challenges and make informed decisions. • Demonstrate ethical responsibility in handling biohazardous materials and communicating potential risks. • Participate in emergency response procedures and implement contingency plans for bio-safety incidents. • Collaborate effectively with colleagues to promote a culture of bio-safety and risk management. • Continuously update knowledge and skills in bio-safety through ongoing professional development and research.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Bio-Safety: Definition and importance of bio-safety in laboratory and research settings. Historical incidents and lessons learned in bio-safety. Classification of Bio-Hazardous Agents: Different categories and levels of bio-hazardous agents. Characteristics and risks associated with each category. Legal and Regulatory Framework: International, national, and local regulations and guidelines for bio-safety. Compliance requirements and responsibilities. Risk Assessment Principles: Hazard identification: identification of potential hazards and risks in laboratory procedures. Exposure assessment: evaluation of the likelihood and extent of exposure to bio-hazardous agents. Risk characterization: assessment of the severity and consequences of identified risks. Bio-Safety Levels and Practices: Bio-Safety Level (BSL) classifications and their corresponding containment practices. Standard operating procedures (SOPs) for handling bio-hazardous agents at different BSLs. Personal protective equipment (PPE) and engineering controls. Bio-Safety in Genetically Modified Organisms (GMOs): Risks and regulations associated with GMOs in research and industrial applications. Containment strategies and practices for handling GMOs. Control Measures and Safety Protocols: Implementation of bio-safety measures, including facility design, access control, and waste management. Decontamination procedures and methods for sterilization and disinfection. Emergency response planning and protocols for bio-safety incidents. Ethical Considerations in Bio-Safety: Responsible conduct of research and ethical responsibilities in bio-safety practices. Communication of risks to stakeholders and public awareness of bio-safety issues. Auditing and Monitoring:

	Internal and external audits for bio-safety compliance. Ongoing monitoring and evaluation of bio-safety practices and protocols. Professional Development and Training: Ongoing education and training programs for bio-safety personnel. Continual improvement and staying updated with emerging bio-safety practices.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11

assessment	**Assignments**	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Project	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles of Biological Safety; and Biosafety Course Resources
Week 2	Laboratory-acquired Infections; Routes of exposure
Week 3	Good Laboratory Practices (BSL1 and -2 requirements)
Week 4	Risk Groups (1-4) and Biological Safety Levels (BSL1-4)
Week 5	Biological Safety Cabinets (BSC-I, II, III)
Week 6	Regulations, Standards, and Guidelines Applicable to Biological Safety
Week 7	Mid-Course Exam
Week 8	Risk Assessment, Biosafety Program Management
Week 9	Controls in Biological safety:
Week 10	I: Facility Design and Containment Equipment
Week 11	II Personal Protective Equipment (PPE)
Week 12	Decontamination, Spills, and Waste Management
Week 13	Biosecurity and Select Agents
Week 14	Biosafety Level 3 and 4 Containments
Week 15	Human Gene Transfer and Animal Biosafety

Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th edition.	No (Available as an e-book)
Recommended Texts	Biosecurity: Understanding, Assessing, and Preventing the Threat. Editor(s): Ryan Burnette. 2013. Edition, Leboffe and Pierce.	No (Available as an e-book)
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microbial Genetics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt22-MG**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	**2**		**Semester of Delivery**	**4**	
Administering Department	**Molecular and Medical Biotechnology**		**College**	**Biotechnology**	
Module Leader	dhafar.alugaili		**e-mail**	dhafar.alugaili@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	PhD	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/9/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Principle of Genetics	**Semester**	4
Co-requisites module	None	**Semester**	None

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course will provide an inquiry based study of prokaryotic genetics. Emphasis will be placed on the advances in microbial genetics and effects on technological and medical advances.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the course students will be able to: □ Demonstrate proficiency in summarizing and paraphrasing simple scientific topics as they relate to life. □ Demonstrate proficient application of the steps of the scientific method. □ Learn how to analyze data and generate scientific conclusions. □ Perform accurate metric measurements. □ Use a compound microscope and a dissecting microscope. □ Master the art of writing concise and coherent lab reports. □ Design and execute an independent research project.
Indicative Contents المحتويات الإرشادية	The number of teaching units are three units which consists of approximately 14-15 week timetabled study over a two hours lecturing with a two-hour practical laboratory every week. The teaching methods involve interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homework assignment 15 hours will be independent or self-directed study.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 2. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 3. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills.

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Why study Prokaryotic genetics?
Week 3	DNA as the genetic material
Week 4	Genetic exchange in bacteria
Week 5	Bacterial transformation
Week 6	Bacterial conjugation
Week 7	Transduction
Week 8	Transposable genetic elements
Week 9	Midterm exam
Week 10	Mutations as the raw material of genetic variation
Week 11	Genetic repair system in prokaryote (DNA damage and mutation)
Week 12	Protoplast formation in microorganisms

Week 13	Operons
Week 14	Regulation of gene expression
Week 15	Genetically modified organisms (GMOs)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Microbial Genetics Laboratory : - Lab safety protocols and guidelines. - Introduction to lab equipment (micropipettes, centrifuges, PCR machines, etc.). - Aseptic techniques and sterile handling of microbial cultures.
Week 2	Why Study Prokaryotic Genetics? - Observation of prokaryotic diversity under the microscope (Gram staining). - Culturing bacteria on selective and differential media. - Discussion: Importance of prokaryotic genetics in biotechnology, medicine, and environmental science.
Week 3	DNA as the Genetic Material: - Isolation of genomic DNA from *E. coli* or another model bacterium. - Quantification and quality assessment of DNA using spectrophotometry or gel electrophoresis. - Discussion: Historical experiments proving DNA as the genetic material (Avery-MacLeod-McCarty experiment).
Week 4	Genetic Exchange in Bacteria - Demonstration of horizontal gene transfer mechanisms (transformation, conjugation, transduction). - Preparation of competent cells for transformation (to be used in Week 5). - Discussion: Natural genetic exchange and its role in bacterial evolution.
Week 5	Bacterial Transformation:

	- Transformation of competent *E. coli* cells with a plasmid containing an antibiotic resistance gene. - Selection of transformants on antibiotic-containing plates. - Analysis of transformation efficiency.
Week 6	Transposable Genetic Elements - Detection of transposons in bacterial genomes using PCR or gel electrophoresis. - Discussion: Role of transposable elements in antibiotic resistance and genome evolution.
Week 7	Midterm Exam
Week 8	Bacterial Conjugation: - Demonstration of conjugation using donor (F+) and recipient (F-) strains of E. coli. - Selection of transconjugants on selective media. - Discussion: Role of plasmids in bacterial conjugation.
Week 9	Mutations as the Raw Material of Genetic Variation: - Inducing mutations in *E. coli* using UV radiation or chemical mutagens. - Selection and screening of mutants (e.g., antibiotic resistance or auxotrophy). - Discussion: Role of mutations in genetic diversity and adaptation.
Week 10	Genetic Repair Systems in Prokaryotes - Demonstration of DNA repair mechanisms using UV-induced DNA damage. - Comparison of survival rates of repair-proficient and repair-deficient strains. - Discussion: Importance of DNA repair systems in maintaining genomic integrity.
Week 11	Protoplast Formation in Microorganisms - Preparation of protoplasts from Gram-positive bacteria (e.g., *Bacillus subtilis*). - Observation of protoplasts under the microscope. - Discussion: Applications of protoplasts in genetic engineering.
Week 12	Operons - Study of the lac operon in *E. coli*: Induction with IPTG and observation of β-galactosidase activity. - Discussion: Regulation of gene expression in prokaryotes.
Week 13	Regulation of Gene Expression - Experiment: Analysis of gene expression under different environmental conditions (e.g., nutrient availability). - Use of reporter genes (e.g., GFP) to monitor gene expression.

	- Discussion: Transcriptional and post-transcriptional regulation in prokaryotes.
Week 14	Genetically Modified Organisms (GMOs) - Demonstration of creating a GMO: Cloning a gene into a plasmid and transforming *E. coli*. - Ethical and safety considerations in GMO research. - Final discussion: Applications of microbial genetics in biotechnology and medicine.
Week 15	Nano Drop spectrophotometer

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Genetics. Bengamin A. pierce. Sixth edition. W.H. freeman	نعم
Recommended Texts	**Molecular Genetics of Bacteria. Fifth Edition.** Tina M. Henkin and Joseph E. Peters (Successors to Larry Snyder and Wendy Champness) Wiley-Liss (ASM Press) September 2022	نعم
Websites	NATIONAL CENTER FOR BIOTECHNOLOGY INFORMATION (NCBI): http://www.ncbi.nlm.nih.gov/.	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Animal physiology			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt22_AP**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Medical and Mol. Biotechnology		**College**	Collage of Biotechnology	
Module Leader	Dr: Zina Fawzi. AL-obaidi		**e-mail**	zena.alobaeady@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assistant professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/9/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General biology	**Semester**	I&ii
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• animal can physiologically adapt to a new habitat. For example, a fox may adapt to extreme heat in order to survive in the environment. Most animals physiologically adapt by developing means for protection, body temperature regulation and predation. • physiological responses are changes in heart rate, a higher respiration rate,

	sweating, changes in body temperature and changes in blood pressure. • Physiology deals respectively with the functions of those anatomical parts and the chemical processes involved. This is the basic subject for all electrical and electronic circuits. • physiological enquiry focuses on the human body as an entire structure, all the way down to the single cellular component. Anatomy and physiology represent two complementary approaches in biological science • physiological needs are physical things needed for human survival and proper functioning of the human body.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Most animals physiologically adapt by developing means for protection, body temperature regulation and predation. • The HPA system releases cortisol, corticotrophin-releasing hormone and other hormones for relieving a person's emotional or physical stress, according to the Centers for Disease Control and Prevention Summarize what is meant by a basic electric circuit. • Physiological activity refers to the normal function of an organism. It may refer to specific organs or the organism as a whole. Describe electrical power, charge, and current. • Define Osmoregulation • Identify the Thermoregulation in heat and cold • Discuss the operations of sinusoid and phasors in an electric circuit. • Discuss physical things needed for human survival and proper functioning of the human body. • learn about all of the major systems of the body, and how they work together to keep the body functioning at its best. • Identify introduction to the discipline of anatomy and physiology.
Indicative Contents المحتويات الإرشادية	Osmoregulation, Thermoregulation, Homeostasis, Adaptation , respiration, Gas Exchange, Blood physiology, skeletal and Reproductive physiology
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-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

	2-simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	Introduction
Week 2	General physiology
Week 3	Osmoregulation
Week 4	Circulatory system
Week 5	Exchange/Respiration
Week 6	Thermoregulation
Week 7	Mid-term Exam 1
Week 8	The Digestive system physiology
Week 9	The Urinary system physiology
Week 10	Muscle system physiology
Week 11	Human Reproductive physiology
Week 12	Human Reproductive Hormones
Week 13	Mid-term Exam 2
Week 14	Blood physiology
Week 15	Neuron physiology
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Cell membrane function
Week 2	Type of cell
Week 3	Complete blood unite
Week 4	Synthesis and functions of hemoglobin
Week 5	Types of hemoglobin

Week 6	Hematocrit blood test
Week 7	Mid-term Exam 1
Week 8	Red blood cells counts
Week 9	White blood cell and types
Week 10	White blood cell counts
Week 11	Erythrocyte sedimentation rate
Week 12	Bleeding time
Week 13	Clotting time
Week 14	Blood pressure measure
Week 15	Platelet count

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Animal Physiology** • **Authors:** Richard W. Hill, Gordon A. Wyse, Margaret Anderson • **Publisher:** Sinauer Associates / Oxford University Press • **Edition:** 4th (2022	Yes
Recommended Texts	**Comparative Animal Physiology** • **Authors:** C.L. Prosser and F.A. Brown • **Publisher:** Saunders	No
Websites	https://www.ncbi.nlm.nih.gov/books	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical microbiology			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt22-MM				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		**Semester of Delivery**	4	
Administering Department	**Department of molecular and medical biotechnology**		**College**	**College of Biotechnology**	
Module Leader	Dr.Bushra hindi Saleh		**e-mail**	Bushra.aftan@nahrainuniv.edu.iq	
Module Leader's Acad. Title	Assist.Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	19/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General microbiology	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Provide students with the knowledge and information about the principles of Medical microbiology , who bacteria caused diseases. • Identify students about most important gram positive bacterial family

	and important diseases caused by each type. • Study most important gram negative bacterial *spp* that causes important diseases , classification ,virulence factors and their role in mechanism of pathogenesis in bacteria, predisposing factor, Lab diagnosis and treatment. • Identify students about the mechanism of most important risk diseases effect on human health like tuberculosis, cholera, Diphtheria.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Learn students important terms in medical microbiology. • Understand the mechanism of pathogenesis in bacteria. • Learn the role of virulence factors in pathogenesis of diseases. • Identify most important gram positive bacteria , most important diseases caused by it. • Recognize the differences' between endotoxin and exotoxin • Identify Enterobacteriacae family and diseases caused by important *spp*. • Learn about prevention of diseases • Identification of bacteria by lab diagnosis
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Medical microbilogy</u> Medical microbiology principles ,most important terms in it. Gram positive bacteria, family classification, clinical sings, pathogenesis. Diagnosis Enterobacteriacae family ,gram negative lactose fermenter *spp*., pathogenesis, diagnosis Gram negative non-lactose fermenter *spp*., pathogenesis, diagnosis . Gram(-)Non enteric bacteria-, diseases, pathogenesis. Gram positive bacilli ,Family classification, diseases, pathogenesis, diagnosis.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through interactive tutorials and by involving the students to take sampling from different clinical cases and encourage them to participate in lab diagnosis.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction into medical microbiology, Most important terms in medical microbiology
Week 2	Family micrococcaceae, Staphylococcus virulence factors ,pathogenesis of most important disease caused by important *spp*, diagnosis
Week 3	Streptococcus**.** classification of bacteria ,pathogenesis ,most important diseases caused by main groups
Week 4	Family Enterobacteriacae**.** most important characters of it ,E.coli ,important diseases caused by it
Week 5	Salmonella, virulence factors, typhoid fever , mechanism of pathogenesis, diagnosis
Week 6	Proteus, most important spp., virulence factors, pathogenesis, diagnosis
Week 7	Tuberculosis ,causative agent, risk factor ,mechanism of disease, prevention
Week 8	**Mid exam**
Week 9	Pseudomonas, Characters of bacteria, virulence factors and pathogenesis, most important diseases
Week 10	Clostridia, virulence factors, gas gangrene, most important clinical sings, pathogenesis, diagnosis,.
Week 11	Bacillus *spp***,** characters of bacteria, virulence factors, most important disease
Week 12	Coryne bacteria, virulence factors, Diphtheria ,most important clinical sings, pathogenesis, diagnosis.
Week 13	Listeria, virulence factors, Listeriosis, clinical sings, pathogenesis
Week 14	Brucella, virulence factors, most important *spp*. malta fever, clinical sings, pathogenesis
Week 15	Cholera, causative agents, transmission , signs and symptoms of disease, pathogenesis of disease**.**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Lab 1: Sample collection
Week 2	Apl 20 E system
Week 3	Lab 3: Gram (+) bacteria ,Staph *spp*, identification of bacteria by biochemical test and lab diagnosis
Week 4	Lab 4: strept *spp*. identification by biochemical tests and lab diagnosis
Week 5	Lab 5:Gram negative enterobacteriacae , E.coli, identification by biochemical test and lab diagnosis
Week 6	Lab 6: Salmonella biochemical test and lab diagnosis
Week 7	**Lab 7: Mid exam**
Week 8	Klebsiella *spp.* biochemical test and lab diagnosis
Week 9	Proteus *spp* .biochemical test and lab diagnosis
Week 10	Shigella *spp.* biochemical test and lab diagnosis
Week 11	Pseudomonas *spp.* biochemical test and lab diagnosis
Week12	Brucella *Spp*. biochemical test and lab diagnosis
Week 13	Acintobacter *spp*. biochemical test and lab diagnosis
Week 14	*Nesseria gonorrhea* lab diagnosis
Week 15	Bacillus *spp*. lab diagnosis

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Garrity,G),Berges Manual of systematic Bacteriology . 2nd(ed.)spr verla.New York.465-471	No
Recommended Texts	Murray,p.R;Rosenthal,K.S.and Pfaller,M.A.(2020).Medical Microbiology. E-Book.9th(ed.).ElsevierHealth science.Houston	No
Websites	https://www.ncbi.nlm.nih.gov/books/NBK7627/	

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Medical Biochemistry			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	MBt22-MBc				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	**Semester of Delivery**		4
Administering Department		**Department of molecular and medical biotechnology**	**College**	Biotechnology	
Module Leader	د. مصطفى قحطان سمين مصطفى		**e-mail**	Mustafa.kahtan@ced.nahrainuniv.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Biochemistry	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• The aim of this course is to build the foundation for application of the understanding of the basic chemical processes of the body in health and diseases. • Gain an in-depth understanding of the biochemical function of living organisms, particularly humans. • learn about the chemical processes that occur within living organisms and study how cells work at the sub-cellular and molecular levels. • Provide all students with an in-depth knowledge and understanding of the core elements of Biochemistry relating to medicine. • Gain an adequate basic knowledge and experience to enable students to work within a research institute, pharmaceutical industry, or hospital laboratory. • Demonstrate the role of chemistry in health and disease. • Demonstrate the health and safety procedures in medical and biochemical laboratories.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of this course, the student should be able to: • Explain the context of medical biochemistry in health and disease conditions. • Demonstrate knowledge and understanding of the structure of the major classes of biochemical compounds and the relationship of these structural attributes to their function within a cell/organism. • Demonstrate knowledge and understanding of the molecular basis of selected human diseases. • Apply health and safety procedures in the medical biochemical laboratory. • Demonstrate knowledge and understanding, skills and other attributes that will aid in understanding of all the basic medical sciences. • Provide a knowledge of the molecular and sub-cellular causes of some selected human diseases. • Explain and understand the role of chemistry in health, disease and medicine.
Indicative Contents المحتويات الإرشادية	<u>Hormones:</u> Endocrinology, autocrine, paracrine, human body glands and their hormones. <u>Chemistry of the immune system:</u> Innate and adaptive immune systems, inflammation and blood clotting, chemical structure, types and function of immunoglobulins.

	Hemoglobin: structure and function: Hemoglobin structure, heme, types and functions of hemoglobin, myoglobin. Hemoglobinopathies: Thalassemia alpha and beta, sickle cell anemia, methemoglobin, abnormal derivatives of hemoglobin. Biogenic amines and selected inborn errors of amino acid metabolism: Albinism, maple syrup disease, Phenylketonuria, Hartnup's disease, Homocystinuria, serotonin and melatonin, histamine. Plasma proteins: Components and types of plasma proteins, synthesis of plasma proteins, albumin, function of albumin, ferritin, transferrin, c-reactive protein, alpha feto protein, globulins, lipoproteins, HDL, LDL, VLDL. Regulation of blood glucose: Insulin, glucagon, epinephrine (adrenaline), regulation of blood glucose in fed and fasting states. Diabetes mellitus: Definition, types, causes and diagnosis. Water homeostasis: Total body water content, water compartments in the body, hypervolemia, hypovolemia, thirst mechanism, blood pressure, renin, angiotensin. Electrolytes and trace elements: Sodium, potassium, iron, calcium magnesium phosphate, vitamin D Liver function tests: Total bilirubin, direct bilirubin, indirect bilirubin, GOT, GPT, ALP. Renal function tests: Uremia definition, types and causes, blood urea, blood urea nitrogen (BUN), creatinine. Cardiac function tests: Cardiac muscle and function, AST, ALT, LDH, creatine kinase (CK), troponins.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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 involving the different subjects of medical biochemistry.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Hormones 1
Week 2	Hormones 2
Week 3	Chemistry of the immune system
Week 4	Hemoglobin: structure and function
Week 5	Hemoglobinopathies
Week 6	Selected inborn errors of amino acid metabolism
Week 7	Mid-term Exam
Week 8	Plasma proteins
Week 9	Regulation of blood glucose
Week 10	Diabetes mellitus
Week 11	Water homeostasis
Week 12	Electrolytes and trace elements
Week 13	Liver function tests
Week 14	Renal function tests
Week 15	Cardiac function tests
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Laboratory safety
Week 2	Biochemical specimen
Week 3	Blood collection and types of blood collection tubes
Week 4	How to use the micropipette
Week 5	Standard tools and equipment in medical and clinical laboratories

Week 6	Determination of blood glucose
Week 7	Mid-term Exam
Week 8	Glucose tolerance test
Week 9	Glycosylated hemoglobin (HbA_{1c})
Week 10	Lipid profile: Total Cholesterol
Week 11	Lipid profile: Triglycerides
Week 12	Renal function tests: Determination of blood urea and plasma creatinine
Week 13	Liver function tests: Determination of GOT, GPT and bilirubin
Week 14	Electrolytes: Determination of serum calcium, phosphate, iron, sodium and potassium
Week 15	Determination of uric acid
Week 16	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Marks Essentials of Medical Biochemistry A Clinical Approach Lippincott Illustrated Reviews: Biochemistry Clinical Biochemistry and Metabolic Medicine by Martin Crook	Yes
Recommended Texts	Essentials of biochemistry by Pankaja Naik, Lehninger Principles of Biochemistry Mathews biochemistry Principles of Medical Biochemistry, 3E (2012)	No
Websites	https://www.rcsb.org/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	اللغة العربية		**Module Delivery**
Module Type	**Basic**		• ☒ Theory • ☒ Lecture • ☐Lab • ☐ Tutorial • ☐ Practical • ☒Seminar
Module Code	**URDEM**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	2	**Semester of Delivery**	4
Administering Department	Department of molecular and medical biotechnology	**College**	College of Biotechnology
Module Leader	محمد رحمن	**e-mail**	Mohammed.rahman@nahrein unvi.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D
Module Tutor	None	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1/10/2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	
Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**			
Module Aims **أهداف المادة**	هدف دراسة مادة حقوق اللغة العربية يتمثل في تعزيز الفهم والوعي باللغة العربية. هناك بعض الأهداف		

الدراسية	الرئيسية لدراسة هذه المادة: 1. فهم اللغة العربية: تعريف ومقدمة عن اللغة العربية ومراحل تشكلها، واطلاع الطلبة على الأدب عبر العصور. 2 .تعريف الطلبة على الجوانب اللغوية والادبية غير المدروسة سابقا، او تغذيتهم بالمستحدث منها، والغاية الرئيسة هي الثقافة اللغوية والادبية كونهم اقسام غير التخصص الدقيق، عليه كان الهدف الرئيس هو تجاوز الاخطاء اللغوية وتصحيح المعلومات اللغوية والادبية قدر المستطاع 3 .العمل على بناء شخصية متميزة للطالب من خلال تطوير الوعي الثقافي والاجتماعي بما يؤهله بعد التخرج من المساهمة الفعالة في خدمة مجتمعه. 4. السعي الدائم في البحث عن كل ما هو حديث في مجالات اللغة، وتعريف الطالب بمفاتيح اللغة التي توصله الى الكتابة والنطق السليم 5. ليكون خريج البكالوريوس قادرا على الكتابة الصحيحة وتعميق المفاهيم اللغوية والادبية 6. فضلا عن القدرة على التعامل مع اللغة والاخذ والعطاء مع الاخر بعقول ناضجة لغة، بما يؤمن سالمة الكتابة والنطق على مستوى عالٍ من الدقة
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	تعمل جامعة النهرين من خلال تدريس اللغة العربية لتعزيز التثقيف والتوعية وتعريف الطلبة على اهمية اللغة العربية وادابها لما تمثله اللغة العربية من اهمية بالغة في الحياة الدينية والعملية وتكريس القيم والمعتقدات والمواقف التي تشجع جميع الطلبة على معرفة التراث اللغوي والحضاري والديني والثقافي ، كما أنه يتيح فهماً للمسؤولية المشتركة لهذه الشريحة جعل العربية وادابها أمراً واقعاً يعايشونه ويتسلحون بالمعارف والمهارات اللغوية والمواقف التي تمكنهم من إدراك المفاهيم العلمية والادبية
Indicative Contents **المحتويات الإرشادية**	• المعرفة والفهم • فهم اساليب الكتابة الصحيحة • تقديم مفاتيح ختامية للتخلص من الاخطاء او تجنبها قدر المستطاع • مراجعة المادة السابقة • فسح المجال للمناقشة لمعرفة مدى الاستجابة ومواطن الضعف • معرفة التطور التاريخي للغة العربية والتطور الذي مر به الادب العربي • دراسة مصادر اللغة العربية والادبية • دراسة المفاهيم والمصطلحات اللغوية والادبية

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	9. POWERPOINT 10. كتابة التقارير 11. التعلم عبر الانترنيت 12. زيارات ميدانية

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	33	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	2.2
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	17	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	1.1

Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	50

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Seminar	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	اقسام الكلام (الاسم، الفعل، الحرف)المبتدأ والخبر
Week 2	كان واخواتها، ان واخواتها
Week 3	المثنى والملحق به، جمع المذكر السالم والملحق به، جمع المؤنث السالم والملحق به
Week 4	بناء الفعل الماضي، بناء فعل الامر
Week 5	الفعل المضارع بناؤه واعرابه
Week 6	الاسماء المنصوبة
Week 7	الشعر / نازك الملائكة
Week 8	محمد مهدي الجواهري
Week 9	الاملاء/ كتابة الهمزة الوصل والقطع
Week 10	الهمزة المتوسطة والمتطرفة
Week 11	كتابة الضاد والظاء
Week 12	كتابة التاء القصيرة والطويلة
Week 13	علامات الترقيم وقاعدة الالف الفارقة
Week 14	كتابة العدد
Week 15	القران الكريم/ سورة يس

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	د. طه محسن، النحو الادبي ودروس العربية، 2022	نعم
Recommended Texts	د. محمد الطريحي، موسوعة النحو والادب والبلاغة والعروض، 2004	لا
Websites		

Grading Scheme **مخطط الدرجات**				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A –** Excellent	**امتياز**	90 – 100	Outstanding Performance
	B - Very Good	**جيد جدا**	80 – 89	Above average with some errors
	C – Good	**جيد**	70 – 79	Sound work with notable errors
	D – Satisfactory	**متوسط**	60 – 69	Fair but with major shortcomings
	E – Sufficient	**مقبول**	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	**راسب (قيد المعالجة)**	(45-49)	More work required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	جرائم حزب البعث		**Module Delivery**
Module Type	**Basic**		• ☒ Theory • ☒ Lecture • ☐Lab • ☐ Tutorial • ☐ Practical • ☒Seminar
Module Code	**URDEM**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	2	**Semester of Delivery**	1
Administering Department	Department of plant biotechnology	**College**	College of Biotechnology
Module Leader	محمد رحمن الذهبي	**e-mail**	Mohammed.rahman@nahrein unvi.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	1/10/2024	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	

أهداف المادة الدراسية	الأهداف المهاراتية الخاصة بالمقرر 1- التعريف بتاريخ العراق السياسي ومراحل التطور. 2- نشر الثقافة وتغذية الطالب من الجانب السياسي . 3- كيفية الحفاظ على المجتمع والوطن من خلال تعزيز حب البلد لهم . 4- التعرف على اهم الحقوق الممنوحة لهم وفق الاعراف والقوانين الدولية. تعزيز المواطنة لدى الطالب
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	-الاهداف المعرفية أ- استفادة الطلبة من معرفة انواع الانظمة والحكومات التي توالت لحكم العراق. - توضيح المراحل التاريخية لتطور النظام السياسي في العراق وكيف وصل نظام البعث
Indicative Contents **المحتويات الإرشادية**	• المعرفة والفهم • فهم التاريخ السياسي للعراق في حقبة حزب البعث .

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**			
Strategies	13. POWERPOINT 14. كتابة التقارير 15. التعلم عبر الانترنيت 16. زيارات ميدانية		
Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	33	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	2.2
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	17	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	1.1
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب**	50		

خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Seminar	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	عرض مفردات المادة على الطلبة والخطة الدراسية بغية الالتزام بتنفيذها
Week 2	انتهاكات النظام البعثي للحقوق والحريات
Week 3	– الميدان النفسي
Week 4	– عسكرة المجتمع
Week 5	–تسلط حزب البعث على السلطة
Week 6	استعمال الاسلحة المحرمة دوليًا
Week 7	حادثة الدجيل
Week 8	امتحان 1
Week 9	تجفيف الاهوار
Week 10	المقابر الجماعية
Week 11	الهجرة القسرية
Week 12	تدمير البيئة الزراعية والثروة الحيوانية
Week 13	محاربة الاحزاب المعارضة
Week 14	لاستبداد في فرض العقوبات والانتهاكات ومحاربة العلماء
Week 15	امتحان 2

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ملزمة (جرائم حزب البعث)	نعم
Recommended Texts	جرائم حزب البعث البائد مجموعة باحثين	لا
Websites	المقابر الجماعية في العراق، الوضع السياسي العراقي من سنة 1968ألى سنة 2003 د خالد العطار	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A –** Excellent	**امتياز**	90 – 100	Outstanding Performance
	B - Very Good	**جيد جدا**	80 – 89	Above average with some errors
	C – Good	**جيد**	70 – 79	Sound work with notable errors
	D – Satisfactory	**متوسط**	60 – 69	Fair but with major shortcomings
	E – Sufficient	**مقبول**	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	**راسب (قيد المعالجة)**	(45-49)	More work required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Parasitology			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MBt22-Ps**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department	**Molecular &medical biotechnology**		**College**	**Biotechnology**	
Module Leader	**Dr. yahia yass khudair**		**e-mail**	Yahia.yass@alnahrainuniv.edu.iq	
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**		**PhD**
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microbiology	**Semester**	1 2
Co-requisites module	None	**Semester**	None

Module Aims **أهداف المادة الدراسية**	Parasitology has many important goals are:- 1-Understanding types of pathogenic parasites 2- common clinical cases 3- To provide basis for treating .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Learning outcomes and teaching and learning methods** **Knowledge and understanding:** The graduate must be able to know and understand all of the following: **1**- Principles and theoretical basics related to the scientific material of cognitive sciences **2 -** Foundations of scientific research and methods of measurement and scientific analysis. **3-** The importance of theoretical scientific aspects related to the applications of various sciences **4-** Scientific and linguistic terms and their definition for different scientific subjects **5-** Methods related to the analysis and design of scientific experiments for various scientific subject.

Indicative Contents المحتويات الإرشادية	1- The ability to deal with sources of information and search for scientific topics different 2 - The ability to write and analyze in a work style for scientific applications in the fields different 3 - Identifying obstacles and problems for applications and finding appropriate solutions 4- Using the best descriptive and quantitative methods to analyze scientific issues **General and transferable skills (other skills related to employability and personal development).** 1 - Enable students to think and analyze issues related to the intellectual framework and international biotechnology standards 2- Enable students to think and analyze topics related to biotechnology 3 - Enable students to think and analyze issues related to systems and punishment of abusers by using dangerous microorganisms. 4 - The ability to use computer capabilities and modern technological media in communication and information and search for information 5 - The ability to write and present reports using modern means of communication and technology 6 - The ability to communicate ideas, whether in written or oral form 7 - The ability to deal with a foreign language - at least one - spoken or written 8 - The ability to efficiently use methods to solve problems, whether between individuals or within an institutional framework 9 - The ability to self-learning using time management and self-regulation 10 - The ability to work together and manage the team

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	**Methods of teaching and learning** The style of the lectures 2- The power point system 3- The system of homework and seminars **learning modalities** 1- Quick exams per week 2- Discussion, questions and immediate answers 3-The international network for information on the subject of specialization **Evaluation modalities** 1- Weekly and quarterly exams 2- Evaluation of students' performance through seminars 3- Grades determined by homework.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11

assessment	**Assignments**	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to parasitology**
Week 2	**Protozoa**
Week 3	***Giardia intestinalis* ,*Giardia lamblia* *Giardia duodenalis***
Week 4	***Cryptosporidium* (cryptosporidiosis)**
Week 5	**Trypanosomiasis**
Week 6	Leishmaniasis
Week 7	*Cryptosporidium* (cryptosporidiosis)
Week 8	Mid term exam
Week 9	Trichomoniasis
Week 10	Cestodea
Week 11	*Taenia saginata*
Week 12	Trematodes, digenea, bilharzia
Week 13	Vector born diseases
Week 14	Discusions of reports
Week 15	Final exam

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Terms in lab. diagnosis
Week 2	Molecular based identification of parasites
Week 3	Bioinformatics related to parasite diagnosis.
Week 4	ELISA and IFA
Week 5	Describe basic morphological properties of all protozoans stage
Week 6	Whife test , entero test and xenodiagnoses test.
Week 7	Type of worm diagnosis, (nanotechnology based method)
Week 8	Mid term exam
Week 9	GSE and Concentration techniques
Week 10	Morphological characters of cestodes
Week 11	Morphological diagnosis of nematodes
Week 12	Blood smear and Serological diagnosis of parasites
Week 13	Pseudo parasites
Week 14	Labe. Report
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Medical Parasitology A Textbook, Rohela Mahmud Yvonne Ai Lian Lim • Amirah Amir, 2017	**Available in the Library?**
Required Texts		

Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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.

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة النهرين

الكلية/ المعهد: كلية التقنيات الاحيائية

القسم العلمي: قسم التقنيات الحيوية الجزيئية والطبية اسم البرنامج الأكاديمي او

المهني: بكالوريوس

اسم الشهادة النهائية: بكالوريوس في التقنيات الحيوية الجزيئية والطبية النظام الدراسي: فصلي

تاريخ اعداد الوصف: 2024/11/1

تاريخ ملء الملف: 2024/9/1

التوقيع : **التوقيع :**

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التاريخ : **التاريخ :**

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: أ.م.د ابراهيم عبد الله احمد التاريخ:

التوقيع:

ا.د..محسن هاشم رسن

مصادقة السيد العميد

1. رؤية البرنامج

اعداد خريجين مزودين بالمعرفة النظرية والمهارات العلمية من خلال البرامج الاكاديمية المتميزة وبلوغ افاق جديده في ابحاث التقنيات الحيوية الجزيئية والطبية لتصبح اداة رائدة في البحث العلمي التطبيقي للتشخيص والعلاج على مستوى عالمي وتوظيفها لخدمه المجتمع.

2. رسالة البرنامج

تتمثل مهمة القسم في اعداد برامج تعليمية مميزة تجمع بين الدراسة الأكاديمية الشاملة والتدريب العملي المكثف في بيئة منتجة للبحث والابتكار والمساهمة في تعزيز البحث العلمي والشراكة المجتمعية من خلال الاستثمار الامثل للموارد البشرية والتقنية وبناء شراكة فعالة.

3. اهداف البرنامج

1. تزويد الطلاب بالخلفية النظرية اللازمة وتطوير المهارات التحليلية والبحثية الاساسية التي ستساعد الطلاب على متابعة التعليم العالي في المؤسسات العلمية المرموقة على المستويين الوطني والدولي.

2. تهيئة فنيين قادرين على تطبيق المعرفة والمهارات لحل المشكلات النظرية والعملية وإنشاء بنية تحتية قوية وموثوقة لتنفيذ التطبيقات المتقدمة في مجال التقنيات الحيوية الجزيئية والطبية والتسلسل الجيني كأداة تشخيصية وعلاجية للأمراض الوراثية و المناعية و الاورام الخبيثة.

3. تأكيد مفهوم العمل الجماعي ومهارات الاتصال لدى الخريجين في مجال التقنيات الحيوية الجزيئية والطبية وتعزيز ريادة الأعمال بين الطلاب في مجالات التقنيات الحيوية الجزيئية والطبية.

4. تعزيز مهارات الطلبة العلمية والعملية والمساهمة في تعزيز البحث العلمي والشراكة المجتمعية من خلال الاستثمار الامثل للموارد البشرية والتقنية وبناء شراكة فاعلة.

5. تعزيز ريادة الاعمال بين الطلاب في مجالات ذات الصلة بالتقنيات الحيوية الجزيئية والطبية. 6. اظهار مستوى عالي من الخبرة والاحترافية بما ينسجم مع المعايير الاخلاقية للقطاع الطبي وبما يتوافق مع قيم المهنة في المجتمع.

7. مواءمة المخرجات الاكاديمية مع احتياجات سوق العمل ومواكبة مستجداته لتطوير البرامج الاكاديمية.

8. التنظيم والمشاركة في الاجتماعات والمؤتمرات والندوات و ورش العمل والتفاعل والتعاون بين الباحثين والمؤسسات الاكاديمية وطنيا ودوليا.

4. الاعتماد البرامجي

كلا

5. المؤثرات الخارجية الأخرى

وزارة التعليم العالي والبحث العلمي

6. هيكلية البرنامج

هيكل البرنامج	عدد المقررات	وحدة د ارسية	النسبة المئوية	ملاحظات *
متطلبات المؤسسة	8		%16	القسم يعتمد حاليا منهاج بولونيا للمرحلة الاولى والبرنامج الجامعي الاكاديمي لبقية المراحل الدراسية
متطلبات الكلية	8		%16	
متطلبات القسم	34		%68	
التدريب الصيفي	نعم			
أخرى				

* ممكن ان تتضمن الملاحظات فيما اذا كان المقرر أساسي او اختياري .

7. وصف البرنامج

	اسم المقرر او المساق	رمز المقرر او المساق	الساعات المعتمدة		
			نظري	عملي	المجموع الكلي
المرحلة الاولى/الفصل الاول	علم الاحياء العام-1	MBt11-GB	2	2	6
	كيمياء تحليلية	MBt11-AC	2	2	6
	مبادئ التقنيات الاحيائية	MBt11-PB	2	2	6
	فيزياء حياتية	MBt11-Bp	2	2	6
	احصاء حياتي	MBt12-BS	2	-	2
	علوم الحاسبات	MBt 11-CS	2	-	2
	اللغة الانكليزية	UN11-Eng	2	-	2
المرحلة الاولى/الفصل الثاني	علم الاحياء العام-2	MBt12-GB	2	2	6
	مبادئ التقنيات الاحيائية	MBt12-PB	2	2	6
	كيمياء عضوية	MBt12-OC	2	2	6

	مبادئ علم الوراثة	MBt12-PG	2	2	6
	السلامة الاحيائية وادارة المخاطر	MBt12-BRM	2	-	2
	حقوق الانسان والديمقراطية	UN12-HR-D	2	-	2
	اللغة العربية	UN12-Ab	2	-	2
المرحلة الثانية/الفصل الاول	علم الانسجة	BTM21-His	2	2	4
	كيمياء حياتية	BTM21-BicI	2	2	4
	علم الاجنة	BTM22-Em	2	2	4
	احياء مجهرية عام	BTM21-GMic	2	2	4
	تقنيات احيائية بيئية	BTM21- EvBt	2	2	4
	السلامة الاحيائية وادارة المخاطر	BTM21-BiSa	2	-	2
	حقوق الانسان	UN21-HR	2	-	2
	لغة انكليزية I	UN21-EnI	1	-	1
	تربية رياضية	-	-	-	-
المرحلة الثانية/الفصل الثاني	فسلجة حيوانية	BTM22– APhy	2	2	4
	كيمياء حياتية طبية	BTM22– BicII	2	2	4
	الاحياء المجهرية الطبية	BTM22– MeMi	2	2	4
	وراثة احياء مجهرية	BTM22– MiGe	2	2	4
	فسلجة احياء مجهرية	BTM22– MiPhy	2	2	4
	علم فطريات	BTM22– Myc	2	2	4
	ديمقراطية	UN22– Dem	2	-	2
	لغة انكليزية II	UN22-EnII	1	-	1
	تربية رياضية	-	-	-	-
المرحلة الثالثة/الفصل الاول	علم المناعة	BTM31-Im	2	2	4
	علم الحياة الجزيئي-1	BTM31-MoBI	2	2	4
	هندسة وراثية- 1	BTM31-GeEnI	2	-	2
	احياء مجهرية صناعية	BTM31-InMi	2	2	4
	زراعة انسجة حيوانية	BTM31-ATC	2	2	4
	التقنيات الجزيئية	BTM31-MoTech	2	-	2
	تصميم التجارب وكتابة الجامعية	BTM31-ExDe	2	-	2
	تربية رياضية	-	-	-	-
المرحلة الثالثة/الفصل الثاني	الوراثة الخلوية للانسان	BTM32-HuCy	2	2	4
	علم الفايروسات واللقاحات	BTM32-Vi	2	2	4
	هندسة وراثية-II	BTM32-GeEnII	2	-	2
	تقنيات احيائية نانوية	BTM32-NaBt	2	-	2
	مضادات حيوية	BTM32-AnVa	2	2	4
	علم الحياة الجزيئي-II	BTM32-MoBII	2	2	4
	تقنيات جزيئية	BTM32-MoTech	2	-	2
	تربية رياضية	-	-	-	-
المرحلة الرابعة/الفصل الاول	علم الانزيمات	BMT41-Ez	2	2	4

	علم السموم	BTM41-To	2	2	4
	طب عدلي وتنميط الدنا	BTM41-DnaTy	2	2	4
	علم الجينوم والبروتيوم	BTM42-PrGe	2	-	2
	مشروع البحث التخرج-I	BTM41-RePro	-	2	2
	اختياري I	BTM41I-E	2	-	2
	تربية رياضية	-	-	-	-
المرحلة الرابعة/الفصل الثاني	وراثة جزيئية	BTM42-MoGe	2	2	4
	تقنيات احيائية طبية	BTM42-MeBt	2	-	2
	المعلوماتية الحيوية	BTM41-Binfo	2	2	4
	تقنيات احيائية صيدلانية	BTM42-PhBt	2	-	2
	مشروع بحث التخرج-II	BTM42-ReProII	-	2	2
	اختياري II	BTM42E-II	2	-	2
	تربية رياضية	-	-	-	-

8. مخرجات التعلم المتوقعة للبرنامج

المعرفة

تمكين الطلبة من الحصول على المعرفات والفهم للإطار الفكري في القسم تمكين الطلبة من الحصول على المعرفة والفهم للمعايير المختلفة في القسم	توضيح وشرح المواد الدراسية من قبل الكادر الأكاديمي من خلال الإمكانيات الحديثة المتاحة تزويد الطلبة بالمعرفة بواسطة الواجبات الصفية واللاصفية للمفردات الدراسية مطالبة الطلبة بزيارة المكتبة للحصول على معرفة اكاديمية تتعلق بالمفردات الدراسية.

المها ارت

1. فهم عميق للمفاهيم الأساسية في علوم الحياة والتقنيات الحيوية. 2. القدرة على استخدام وتطبيق التقنيات والأساليب المختلفة المستخدمة في البحوث الحيوية، مثل التقنيات الجزيئية والخلوية والجينية. 3. تطوير مهارات المختبرات الأساسية، بما في ذلك التحضير والتحليل والتفسير الصحيح للبيانات الحيوية. 4. فهم الأخلاقيات المهنية والمسؤوليات الاجتماعية المتعلقة بالعمل في مجال التقنيات الحيوية. 5. تنمية القدرة على التفكير النقدي والتحليلي وتقييم البحوث والنتائج الحيوية. 6. تطوير مهارات الاتصال العلمية، بما في ذلك الكتابة العلمية والتقارير والعروض التقديمية. 7. تطوير القدرة على العمل كفريق والتعاون مع الزملاء في البيئة العلمية	1 - تقديم برامج دراسية ومشاريع بحثية متطورة و التي تهدف الى التعامل مع الاحياء المجهرية في المجالات الطبية والمناعية. 2 - والالمام بمفردات التخصص قادرة على العمل في المختبرات الطبية واجراء التحليلات المختبرية والفحوصات الجزيئية مع استيفاء معايير الجودة ورفع المهارات المهنية الخاصة بهذا الاختصاص للمساهمة في بناء مجتمع وتقوية الأواصر العلمية مع الجامعات ومراكز البحث العربية والعالمية. 3 – تعليم مهارات وتقنيات التحري المبكر علن الجينات المسؤولة لكثير من الامراض الوراثية باتباع التقنيات الحديثة للهندسة الوراثية والمناعية والزراعة النسيجية للخلايا الحيوانية وبالتالي جعل الاختصاص قادر على تزويد المجتمع بالمعارف والكوادر المتميزة ذات اختصاص علمي في مجال التقنيات الحياتية الجزيئية والطبية 4- تفسير الظواهر الحيوية باستخدام المفاهيم العلمية والتقنيات المناسبة. 5- تطبيق التقنيات الحيوية المتقدمة في المختبرات البحثية والصناعية. 6. تحليل البيانات الحيوية باستخدام البرمجيات والأدوات الإحصائية المعتمدة. 7. التواصل بفعالية مع الجمهور المختلف بشأن المواضيع الحيوية المعقدة. 8. تقديم الحلول الابتكارية للتحديات الحيوية المعاصرة. 9. تقديم الإسهامات في تطوير البحوث والابتكارات في مجال التقنيات الحيوية. 10. تطبيق المعايير الأخلاقية والمهنية في جميع جوانب العمل في مجال التقنيات الحيوية.

والمهنية. 8. تطوير مهارات البحث والاستكشاف والابتكار في مجال التقنيات الحيوية الجزيئية والطبية .	11. العمل كفريق بناء والتعاون مع الزملاء لتحقيق أهداف مشتركة في مجال البحث والتطوير الحيوي.
القيم	
1. الجودة: تحقيق معايير عالية في فهم المفاهيم الحيوية وتطبيق التقنيات الحيوية بفعالية. 2. الاستدامة: القدرة على استخدام المعرفة والمهارات المكتسبة بشكل دائم وفعّال في مختلف السياقات الحياتية والمهنية. 3. الابتكار: القدرة على التفكير الإبداعي وتقديم حلول جديدة ومبتكرة للتحديات الحيوية. 4. المسؤولية: التعامل بأخلاقية ومسؤولية في استخدام التقنيات الحيوية وتطبيقها لحل المشكلات وتحقيق التطور العلمي والاجتماعي. 5. التعاون: القدرة على العمل كفريق والتفاعل مع الآخرين بشكل فعّال وبناء علاقات تعاونية تعزز النجاح المشترك. 6. التميز: تحقيق الأداء المتميز وتقديم إسهامات ملموسة وملحوظة في مجال التقنيات الحيوية. 7. التنوع: احترام وتقدير التنوع في المعرفة والثقافات والخبرات، والتعلم من التنوع لتحقيق النمو والتطور. 8. النفع: توجيه المعرفة والمهارات المكتسبة نحو تحقيق الفائدة الاجتماعية والاقتصادية والبيئية في المجتمع.	1. فهم عميق للمفاهيم الحيوية والتقنيات المتقدمة المستخدمة في البحوث والتطبيقات الصناعية. 2. تطوير مهارات العمل في المختبرات بما في ذلك التحضير والتحليل والتفسير الصحيح للبيانات الحيوية. 3. القدرة على استخدام البرمجيات والأدوات الإحصائية المتخصصة في تحليل البيانات الحيوية. 4. تطوير مهارات الاتصال الفعّالة، سواء في الكتابة العلمية أو التقارير أو العروض التقديمية. 5. الالتزام بالأخلاقيات المهنية والمسؤولية الاجتماعية في مجال التقنيات الحيوية. 6. القدرة على العمل كفريق بناء والتعاون مع الزملاء لتحقيق الأهداف المشتركة. 7. تطوير القدرة على الابتكار وتقديم الحلول الإبداعية للتحديات الحيوية المعاصرة. 8. تحقيق الأداء المتميز والإسهام في تطوير البحوث والابتكارات في مجال التقنيات الحيوية.

9. استراتيجيات التعليم والتعلم
استخدام الطرق الحديثة للإيصال المعلومة بطريقة علمية ومفهومة كاستخدام السبورة التفاعلية مع الطلبة ووسائل العرض الحديثة والفيديو التقدمى لتسهيل ايصال المعلومة للطلبة.

10. طرائق التقييم
اجراء الامتحانات اليومية والمشاركة التفاعلية داخل الصف بالإضافة الى اعداد التقارير العلمية والقاء الحلقات النقاشية لعرض المواضيع العلمية الحديثة في التخصص العلمي بالإضافة الى اجراء الامتحانات الفصلية والنهائية للمواد العملية والنظرية .

11. الهيئة التدريسية

أعضاء هيئة التدريس

الرتبة العلمية	التخصص		المتطلبات/المها ارت الخاصة (ان وجدت)		اعداد الهيئة التدريسية	
	عام	خاص			ملاك	محاضر
استاذ	تقنيات احيائية	بايولوجي جزيئي			3	
استاذ مساعد	تقنيات احيائية	بايولوجي جزيئي			2	
مدرس	تقنيات احيائية	بايولوجي جزيئي			6	
مدرس مساعد	تقنيات احيائية	بايولوجي جزيئي			5	
استاذ	تقنيات احيائية	احياء مجهرية			1	
استاذ مساعد	تقنيات احيائية	احياء مجهرية			3	
مدرس	تقنيات احيائية	احياء مجهرية			6	
مدرس مساعد	تقنيات احيائية	احياء مجهرية			5	
استاذ	تقنيات احيائية	مناعة			1	
استاذ مساعد	تقنيات احيائية	مناعة			1	
مدرس	تقنيات احيائية	مناعة			1	
مدرس مساعد	تقنيات احيائية	مناعة			2	
استاذ	تقنيات احيائية	كيمياء حياتية وانزيمات			3	
مدرس	تقنيات احيائية	كيمياء حياتية وانزيمات			1	
مدرس مساعد	تقنيات احيائية	كيمياء حياتية وانزيمات			1	
استاذ	تقنيات احيائية	زراعة انسجة حيوانية			1	
استاذ	تقنيات احيائية	زراعة انسجة حيوانية			1	
استاذ مساعد	تقنيات احيائية	زراعة انسجة حيوانية			1	
استاذ	تقنيات احيائية	وراثة خلوية			2	
استاذ مساعد	تقنيات احيائية	وراثة خلوية			1	

التطوير المهني
توجيه أعضاء هيئة التدريس الجدد
التطوير المهني لأعضاء هيئة التدريس
المراجعة المستمرة للأدبيات والمصادر الحديثة - .استخدام المكتبة الافتراضية للحصول على بعض الكتب الحديثة بصيغة الكترونية - .المشاركة بالندوات والمؤتمرات و ورش العمل.

12. معيار القبول
خريجي الدراسة الاعدادية / الفرع العلمي الاحيائي / القبول المركزي

13. أهم مصادر المعلومات عن البرنامج

14. خطة تطوير البرنامج
تتنوع خطط التطوير المقترحة لبرنامج أكاديمي في التقنيات الحيوية حسب احتياجات السوق والتطورات العلمية والتكنولوجية الحديثة، ومن بين الخطط المقترحة: 1. تحديث المناهج الدراسية لتضمن التطورات الحديثة في مجالات التقنيات الحيوية. 2. إدخال مقررات جديدة تغطي المواضيع الناشئة مثل الجينوميات، والتحرير الجيني، والطب الشخصي. 3. تطوير برامج تعليمية متخصصة في التقنيات الحيوية المتقدمة مثل الهندسة الوراثية والأنظمة البيولوجية المعقدة. 4. تعزيز التدريب العملي والتجارب المختبرية لتعزيز مهارات الطلاب في التطبيق العملي للتقنيات الحيوية. 5. توفير فرص التدريب العملي والتعاون مع الصناعة والمؤسسات البحثية لتعزيز فهم الطلاب لتطبيقات التقنيات الحيوية في الواقع.

مخطط مهارات البرنامج																					
			مخرجات التعلم المطلوبة من البرنامج																		
السنة / المستوى	رمز المقرر	اسم المقرر	اساسي أم اختياري	المعرفة				المها ارت								القيم					
				أ1	أ2	أ3	أ4	ب1	ب2	ب3	ب4	ج1	ج2	ج3	ج4						
المرحله الاولى/الفصل الاول	MBt11-GB	علم الاحياء العام-1	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt11-AC	كيمياء تحليلية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt11-PB	مبادئ التقنيات الاحيائيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt11-Bp	فيزياء حياتية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt12-BS	احصاء حياتي	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt 11-CS	علوم الحاسبات	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	UN11-Eng	اللغة الانكليزية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
المرحلة الاولى/الفصل الثاني	MBt12-GB	علم الاحياء العام-2	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt12-PB	مبادئ التقنيات الاحيائيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt12-OC	كيمياء عضوية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt12-PG	مبادئ علم الوراثة	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	MBt12-BRM	السلامه الاحيائيه وادارة المخاطر	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						
	UN12-HR-D	حقوق الانسان والديمقراطيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√						

	UN12-Ab	اللغة العربية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
المرحلة الثانية /الفصل الاول	BTM21-His	علم الانسجه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM21-BicI	كيمياء حياتيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM22-Em	علم الاجنة	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM21-GMic	احياء مجهرية عام	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM21-EvBt	تقنيات احيائية بيئية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM21-BiSa	السلامة الاحيائية وادارة المخاطر	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	UN21-HR	حقوق الانسان	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	UN21-EnI	لغة انكليزية I	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	-	تربيه رياضيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
المرحلة الثانية/الفصل الثاني	BTM22– APhy	فسلجة حيوانية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM22– BicII	كيمياء حياتية طبية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM22– MeMi	الاحياء المجهرية الطبية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM22– MiGe	وراثة احياء مجهرية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√

	BTM22- MiPhy	فسلجة احياء مجهرية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM22-Myc	علم فطريات	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	UN22– Dem	ديمقراطية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	UN22-EnII	لغة انكليزية II	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	-	تربية رياضية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
المرحلة الثالثة/الفصل الاول	BTM31-Im	علم المناعة	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM31- MoBI	علم الحياة الجزيئي-1	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM31-GeEnI	هندسة وراثية- 1	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM31-InMi	احياء مجهرية صناعية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM31-ATC	زراعه انسجه حيوانيه	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	BTM31-MoTech	التقنيات الجزيئية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	- BTM31-ExDe	تصميم التجارب وكتابة الجامعية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

	-	تربية رياضية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
المرحلة الثالثة/الفصل الثاني	BTM32-HuCy	الوراثة الخلوية للانسان	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-Vi	علم الفايروسات واللقاحات	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-GeEnII	هندسة وراثية-II	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-NaBt	تقنيات احيائية نانوية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-AnVa	مضادات حيوية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-MoBII	علم الحياة الجزيئي-II	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM32-MoDia	تشخيصات جزيئية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	-	تربية رياضية	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
المرحلة الرابعة /الفصل الاول	BMT41-Ez	علم الانزيمات	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM41-To	علم السموم	أساسي	√	√	√	√	√	√	√	√	√	√	√	√
	BTM41DnaTy	طب عدلي وتنميط الدنا	أساسي	√	√	√	√	√	√	√	√	√	√	√	√

√	√	√	√	√	√	√	√	√	√	√	√	أساسي	علم الجينوم والبروتيوم	BTM42-PrGe	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	مشروع البحث التخرج-I	BTM41-RePro	
√	√	√	√	√	√	√	√	√	√	√	√	اختياري	اختياري I	BTM41I-E	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	تربية رياضية	-	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	وراثة جزيئية	BTM42-MoGe	المرحلة الرابعة/الفصل الثاني
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	تقنيات احيائيه طبيه	BTM42-MeBt	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	المعلوماتية الحيوية	BTM41-Binfo	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	تقنيات احيائيه صيدلانيه	BTM-42PhBt	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	مشروع بحث التخرج-II	BTM42ReProII	
√	√	√	√	√	√	√	√	√	√	√	√	اختياري	اختياري II	BTM42-E-II	
√	√	√	√	√	√	√	√	√	√	√	√	أساسي	تربية رياضية	-	

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: 1/9/2024 File
Completion Date: 1/11/2024

Signature:	**Signature:**
Head of Department Name:	**Scientific Associate Name:**
Prof. Shahlaa Mahdi Salih	**Prof. Risala Rzuki Hussain**
Date:	**Date:**

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department: Date:

Signature:
Assit.Prof. Dr.Ibrahim A.Ahmed

Prof.Dr. Mohsen H.Risan

Approval of the Dean

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.

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-MoTech	Molecular Technique	
-	-	-	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	
-	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. . The ability to use and apply different techniques and methods used in biological research, such as molecular, cellular and genetic techniques. . Develop basic laboratory skills, including the correct preparation, analysis, and interpretation of biological data. . Understand professional ethics and social responsibilities related to working in the field of biotechnology. . Developing the ability to think critically and analytically and evaluate vital research and results. . 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. . Sustainability: The ability to use acquired knowledge and skills permanently and effectively in various life and professional contexts. . Innovation: The ability to think creatively and provide new and innovative solutions to vital challenges. . 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. . Develop laboratory work skills including preparation, analysis, and correct interpretation of biological data. . The ability to use software and statistical tools specialized in analyzing vital data. . Develop effective communication skills, whether in scientific writing, reports, or presentations. . 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.

rogram 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 ofBiotechno logy- |	**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**	

												Biotechnolo gy		
√	√	√	√	√	√	√	√	√	√	√	**Basic**	Organic Chemistry	**MBt12-OC**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	Principles of Genetics	**MBt12-PG**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	Biosafety and Risk manageme nt	**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**	**Environment al**	**BTM21-**	

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	**14. Biotechnology**	**15. EvBt**	16.
17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	**29. Basic**	**30. Biosafety and Risk Management**	31. **32. BTM 21-BiSa**	
33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	44.	**45. Basic**	**46. Human Rights**	**47. UN21-HR**	
48.	49.	50.	51.	52.	53.	54.	55.	56.	57.	58.	59.	**60. Basic**	**61. English Language I**	**62. UN21-EnI**	
63.	64.	65.	66.	67.	68.	69.	70.	71.	72.	73.	74.	**75. Basic**	**76. Physical Education**	**77. -**	
78.	79.	80.	81.	82.	83.	84.	85.	86.	87.	88.	89.	**90. Basic**	**91. Animal Physiology**	**92. BTM 22-APhy**	93.

96. ↴	97. ↴	98. ↴	99. ↴	100.	101.	102.	103.	104.	105.	106.	107.	**108. asic**	**109. Biochemistry II**	**110. TM22-BicII**	94. Second stage/Sec. 95. semester
111.	112.	113.	114.	115.	116.	117.	118.	119.	120.	121.	122.	**123. asic**	**124. Medical Microbiology**	**125. TM22-MeMi**	
126.	127.	128.	129.	130.	131.	132.	133.	134.	135.	136.	137.	**138. asic**	**139. Microbial Genetics**	**140. TM22-MiGe**	
141.	142.	143.	144.	145.	146.	147.	148.	149.	150.	151.	152.	**153. asic**	**154. Microbial Physiology**	**155. TM22–MiPhy**	
156.	157.	158.	159.	160.	161.	162.	163.	164.	165.	166.	167.	**168. asic**	**169. Mycology**	**170. TM22-Myc**	

√	√	√	√	√	√	√	√	√	√	√	**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**	**BTM22-MoBI**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Genetic Engineering- I**	**BTM31-GeEnI**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Industrial Microbiology**	**BTM31-InMi**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Animal Tissue Culture**	**BTM31-ATC**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Technologies**	**BTM31-MoTech**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Experimental Design and Academic Writing**	**BTM31-ExDe**	

√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Human Cytogenetic**	**BTM32-HuCy**	Third stage/Sec.semester
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Virology and Vaccines**	**BTM32-Vi**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Genetic Engineering II**	**BTM32-GeEnII**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Nanobiotechno logy**	**- BTM32-NaBt**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Antibiotics**	**-AnVa BTM32**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Biology-II**	**BTM32MoBII**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Diagnostics**	**BTM32-MoDia**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Enzymology**	**BMT41-Ez**	fourth stage/first semester
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Toxicology**	**BTM41-To**	
√	√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Forensic Science and DNA Typing**	**BTM41DnaTy**	

√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Genomics and Proteomics**	**BTM42PrGe**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Graduation Research Project I**	**BTM41-RePro**	
√	√	√	√	√	√	√	√	√	√	√	**optional**	**Elective I**	**BTM41I-E**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Molecular Genetics**	**BTM42-MoGe**	fourth stage/Sec.semester
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Medical Biotechnology**	**BTM42-MeBt**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Bioinformatics**	**BTM41-Binfo**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Pharmaceutical Biotechnology**	**BTM42-PhBt**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Graduation Research Project II**	**BTM42-ReProII**	
√	√	√	√	√	√	√	√	√	√	√	**optional**	**Elective II**	**BTM42E-II**	
√	√	√	√	√	√	√	√	√	√	√	**Basic**	**Physical Education**	**-**	

Course Description Form

1. Course Name:	
Immunology	
2. Course Code:	
BTM31-Im	
3. Semester / Year:	
first semester/third class	
4. Description Preparation Date:	
1-9-2024	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
7. Course administrator's name (mention all, if more than one name)	
Dr. Shahlaa M. Salih Shahlaa.mahdi@nahrainuniv.edu.iq	Dr. & Rawaa Nazar Rawaa.alchalabi@ nahrainuniv.edu.iq
8. Course Objectives	
Course Objectives	• Describe how the immune system is able to discriminate self vs. non-self. • Explain how the innate and adaptive immune systems work together to generate an effective • immune response against a specific pathogen. • Explain how the immune system is able to respond to so many diverse antigens. • Distinguish between humoral and cell-mediated (cellular) immunity and the location of the • pathogens they target (extracellular, intracellular). • 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	4. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 5. **PowerPoint Presentations** – Use of multimedia presentations to

	enhance visualization, provide diagrams, animations, and summary tables for complex topics. 6. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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 Practical		**Introduction of immunolo**	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		**Fundamental of blood ce biology**	Presentation &white board	
3	2 theory +2 Practical		**Lymphoid and lymphoi tissue**	Presentation &white board	
4	2 theory +2 Practical		**Inflammatory response**	Presentation &white board	
5	2 theory +2 Practical		**Complement system**	Presentation &white board	
6	2 theory +2 Practical		**Innate immunity**	Presentation &white board	
7			**Mid-term Exam**		
8	2 theory +2 Practical		**Antigen and immunogens**	Presentation &white board	
9	2 theory +2 Practical		**Antigen presentation an MHC complex**	Presentation &white board	

10	2 theory +2 Practical		**Antibodies**	Presentation &white board	
11	2 theory +2 Practical		**Immune response**	Presentation &white boa	
12	2 theory +2 Practical		**Cytokines**	Presentation &white boa	
13	2 theory +2 Practical		**Autoimmune diseases**	Presentation &white boa	
14	2 theory +2 Practical		**Hypersensitivity**	Presentation &white boa	
15	2 theory +2 Practical		**Immunological toleranc**	Presentation &white boa	
16			Final exam		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

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)	Molecular Immunology by Abul K. Abbas, Andrew H. Lichtman, Jordan S. Pober Paperback -
Recommended books and references (scientific journals, reports...)	Kuby Immunology by Richard A.Goldsby,Thomas J. Kindt and Barbara A. Osborne Paperback
Electronic-References, Website	https://www.livescience.com/26579-immune-system.html

Description Form

13.Course Name:	
Molecular Biology-I	
14.Course Code:	
BTM31-MoBI	
15.Semester / Year:	
First semester/third class	
16.Description Preparation Date:	
1-9-2024	
17.Available Attendance Forms:	
Attendance	
18.Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
19.Course administrator's name (mention all, if more than one name)	
Dr. Hameed M. Jasim Dr. Risala R. Allami	Hameed.jasim@nahrainuniv.edu.iq risala.allami@nahrainuniv.edu.iq ririallami@yahoo.com
20.Course Objectives	
Course Objectives	• The outcomes of this course provide students with knowledge and information as well as practical experience about Molecular Biology • Molecular Biology is the field of biology that studies the composition, structure and interactions of cellular molecules – such as nucleic acids and proteins – that carry out the biological processes essential for the cell's functions and maintenance. The course covers the following subjects: Introduction to DNA basics, Properties of Nucleic acids • Nucleic acid structure, The flow of genetic information, Replication of DNA, Gene Expression, PCR techniques, Gel electrophoresis, and other application in molecular biology..
21.Teaching and Learning Strategies	
Strategy	7. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 8. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 9. **Assignments and Tutorials** – Weekly homework assignments and

	small-group discussion sessions to reinforce understanding and problem-solving skills. The main strategy that will be adopted in delivering this module is encouraging students to interact positively with others, think critically,.

22.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +2 Practical		Macromolecules Large macromolecular assemblies	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		Properties of nucleic acids Nucleic acid structure Chemical and physical properties of nucleic acids	Presentation &white board	
3	2 theory +2 Practical		Spectroscopic and thermal properties of nucleic acids DNA supercoiling	Presentation &white board	
4	2 theory +2 Practical		Prokaryotic and eukaryotic chromosome structure Prokaryotic chromosome structure Chromatin structure	Presentation &white board	

5	2 theory +2 Practical		Eukaryotic chromosome structure Genome complexity The flow of genetic information	Presentation &white board	
6	2 theory +2 Practical		DNA replication: an overview Bacterial DNA replication The cell cycle Eukaryotic DNA replication	Presentation &white board	
7			Gene anatomy Promoters, Terminators, Enhancers, sense strand		
8	2 theory +2 Practical		Mid Term Exam 1	Presentation &white board	
9	2 theory +2 Practical		Split Genes	Presentation &white board	
10	2 theory +2 Practical		Transcription in prokaryotes Basic principles of transcription *Escherichia coli* RNA polymerase The *E. coli* _70 promoter Transcription, initiation, elongation and termination	Presentation &white board	
11	2 theory +2 Practical		Transcription in eukaryotes The three RNA polymerases: characterization	Presentation &white board	

			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		
12	2 theory +2 Practical		RNA processing rRNA processing and ribosomes tRNA processing and other small RNAs mRNA processing, hnRNAs and snRNAs Alternative mRNA processing	Presentation &white board	
13	2 theory +2 Practical		Gene Expression Translation of prokaryotic	Presentation &white board	
14	2 theory +2 Practical		eukaryotic genes	Presentation &white board	
15	2 theory +2 Practical		The genetic code tRNA structure and function	Presentation &white board	
16			Mid Term Exam 2		

23.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

24.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**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.
Main references (sources)	- 2-**Molecular Biology of the Cell. 8th edition.** Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2020.
Recommended books and references (scientific journals, reports...)	
Electronic-References, Websites	

Course Description Form

25.Course Name:
Industrial Microbiology
26.Course Code:
BTM31-InM
27.Semester / Year:
First semester/third class
28.Description Preparation Date:
1-9-2024
29.Available Attendance Forms:
Attendance
30.Number of Credit Hours (Total) / Number of Units (Total)
60 hours 3 units
31.Course administrator's name (mention all, if more than one name)

Dr.Nedhaal Suhail Zbar	Nedhaal.suhail@nahrainuniv.edu.iq	Nedhaal.su

32. Course Objectives	
Course Objectives	• 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.

33. Teaching and Learning Strategies	
Strategy	10. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 11. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 12. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +2 Practical		Definition and use of the term 'fermentation'	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		Industrial Microbiology Vs Biotechnology	Presentation &white board	
3	2 theory +2 Practical		History(An Art from the Past, a Skill for the Future)	Presentation &white board	
4	2 theory +2 Practical		Multidisciplinary nature	Presentation &white board	
5	2 theory +2 Practical		A Typical Bioprocess: introduction, advantages and limitations.	Presentation &white board	
6	2 theory +2 Practical		Types of fermentations: Aseptic and non-aseptic fermentations	Presentation &white board	
7			Mid-term Exam		
8	2 theory +2 Practical		Fermentation types according to the organization of the biological system :Suspended and support culture	Presentation &white board	
9	2 theory +2 Practical		Upstream processing (USP) and downstream processing (DSP), unit	Presentation &white board	

			downstream processing		
10	2 theory +2 Practical		Industrial fermentation products and their producer microorganisms(List)	Presentation &white board	
11	2 theory +2 Practical		Obsolescence of procedures and methods	Presentation &white boa	
12	2 theory +2 Practical		Patents and Intellectual Property Rights	Presentation &white boa	
13	2 theory +2 Practical		Use of mutants / Genetically Modified Microorganisms (GMM) as against Wild type isolates for production.	Presentation &white boa	
14	2 theory +2 Practical		Culture Collections of industrially important microorganism	Presentation &white boa	
15	2 theory +2 Practical		Isolation of suitable producer microorganisms from the environment (Discuss approach for isolation)	Presentation &white boa	
16			Final exam		

35. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

1. 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...)	
Electronic-References, Website	

Course Description Form

2. Course Name:		
Genetic Engineering –I		
3. Course Code:		
BTM31-GeEnI		
4. Semester / Year:		
First semester/third class		
5. Description Preparation Date:		
1-9-2024		
6. Available Attendance Forms:		
Attendance		
7. Number of Credit Hours (Total) / Number of Units (Total)		
30 hours 2 units		
8. Course administrator's name (mention all, if more than one name)		
Yaseen Ismael Omran	**yaseen.ismael@nahrainuniv.edu.iq**	nuniv.edu.i

9. Course Objectives	
Course Objectives	• This module will provide students with aspects of genetic engineering. • This module incorporates fundamental knowledge of DNA and protein structure and function • The learner will acquire the basic knowledge to construct and use cloning and expression vectors containing recombinant DNA in prokaryotic and eukaryotic systems

10. Teaching and Learning Strategies	
Strategy	13. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 14. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 15. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory		The basic principle of gene cloning.	The basic principle of gene cloning.	The basic principle of gene cloning.
2	2 theory		Cutting of DNA molecules.	Cutting of DNA molecules.	Cutting of DNA molecules.
3	2 theory		Restriction Modification System, Restriction Endonucleases.	Restriction Modification System, Restriction Endonucleases.	Restriction Modification System, Restriction Endonucleases.
4	2 theory		Joining of DNA molecules: Sticky end, Flash end	Joining of DNA molecules: Sticky end, Flash end	Joining of DNA molecules: Sticky end, Flash end
5	2 theory		Cloning Vectors. Plasmids: pBR322 and Its derivatives	Cloning Vectors. Plasmids: pBR322 and Its derivatives	Cloning Vectors. Plasmids: pBR322 and Its derivatives
6	2 theory		Phages (bacteriophages), Vectors derived from Lambda. Cosmids and Phasmids	Presentation &white board	
7	2 theory		Mid Exam		

8	2 theory		Single Stranded phages Vectors	Presentation &white board	
9	2 theory		*In vitro*- Mutagenesis	Presentation &white board	
10	2 theory		Cloning vectors for bacteria other than *E. coli*. Shuttle Vectors.	Presentation &white board	
11	2 theory		Introducing of hybrid DNA Mol. hybrid plasmid DNA, phage vectors and cosmids, In vitro-packaging.	Presentation &white boa	
12	2 theory		Selection of Recombinants	Presentation &white boa	
13	2 theory		Cloning Strategies: Via genetic complementation	Presentation &white boa	
14	2 theory		Construction of gene banks, cDNA cloning, Cloning of chemically synthesized genes.	Presentation &white boa	
15	2 theory		Restriction Mapping, DNA sequencing	Presentation &white boa	
16			Southern Blotting, Northern, Western.		

12. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

13. Learning and Teaching Resources

Main references (sources)	• Brown, T.A. – Gene Cloning and DNA Analysis: An Introduction • 8th Edition, Wiley Blackwell, 2016. Glick, B.R., & Pasternak, J.J. – Molecular Biotechnology: Principles and

	Applications of Recombinant DNA 5th Edition, ASM Press, 2017
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

36.Course Name:	
Animal Tissue culture	
37.Course Code:	
BTM31-ATC	
38.Semester / Year:	
first semester/third class	
39.Description Preparation Date:	
1-9-2024	
40.Available Attendance Forms:	
Attendance	
41.Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
42.Course administrator's name (mention all, if more than one name)	
Pro. Zahraa K. Zedan **Dr. Moyassar Basil Hadi**	**Dr.zahraa.zedan@gmail.com** **Moyassar.basil@nahrainuniv.edu.iq**
43. 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..
44. Teaching and Learning Strategies	
Strategy	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

45. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +2 Practical		**Introduction to animal tissue culture**	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		**Primary cell culture**	Presentation &white board	
3	2 theory +2 Practical		**Cell Lines**	Presentation &white board	
4	2 theory +2 Practical		**Animal cell culture media**	Presentation &white board	
5	2 theory +2 Practical		**Types of cell culture**	Presentation &white board	
6	2 theory +2 Practical		**Applications of animal tissue culture**	Presentation &white board	
7			**Midterm Exam**		
8	2 theory +2 Practical		**Biology of Cells in Culture**	Presentation &white board	
9	2 theory +2 Practical		**Factors affecting cell behavior in vitro**	Presentation &white board	
10	2 theory +2 Practical		**The difference between two-dimensional and three-dimensional cultivation environment**	Presentation &white board	
11	2 theory +2 Practical		**Applications of 3D tissue culture**	Presentation &white boa	
12	2 theory +2 Practical		**Scaffolds of 3D tissue**	Presentation &white boa	

			culture		
13	2 theory +2 Practical		**Use of microfluidic system as a tissue culture system**	Presentation &white boa	
14	2 theory +2 Practical		**Review and answer students' questions**	Presentation &white boa	
15	2 theory +2 Practical		**Review and answer students' questions**	Presentation &white boa	
16			**Preparatory week before the final Exam**		

46. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as： Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

47. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, Sixth Edition. 2. Basics of animal cell culture: Foundation for modern science
Main references (sources)	1. Animal Cell Culture and Technology
Recommended books and references (scientific journals, reports...)	1. An Introductory Undergraduate Course Covering Animal Cell Culture Techniques. https://iubmb.onlinelibrary.wiley.com/doi/epdf/10.1002/bmb.2004.494032050381
Electronic-References, Website	3. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, Sixth Edition. 4. Basics of animal cell culture: Foundation for modern science

Course Description Form

14.Course Name:		
Experimental Design &Academic Writing		
15.Course Code:		
BTM31-ExDe		
16.Semester / Year:		
firstsemester/third class		
17.Description Preparation Date:		
1-9-2024		
18.Available Attendance Forms:		
Attendance		
19.Number of Credit Hours (Total) / Number of Units (Total)		
30 hours 2 units		
20.Course administrator's name (mention all, if more than one name)		
Yaseen Ismael Omran	**yaseen.ismael@nahrainuniv.edu.iq**	nuniv.edu.i

21. Course Objectives	
Course Objectives	• To understand the experimental design for different types of sciences • To understand how to write academically •

22. Teaching and Learning Strategies	
Strategy	16. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 17. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 18. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

23. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory		Why we take experimental design course?	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory		Methods of acquiring knowledge	Presentation &white board	Quiz, Attendance seminar and written examination
3	2 theory		The Scientific Method	Presentation &white board	Quiz, Attendance seminar and written examination
4	2 theory		Scientific Research	Presentation &white board	Quiz, Attendance seminar and written examination
5	2 theory		Deductive reasoning, Inductive reasoning, Theories and hypothesis	Presentation &white board	Quiz, Attendance seminar and written examination
6	2 theory		Types of research studies	Presentation &white board	Quiz, Attendance seminar and written examination
7	2 theory		Research proposal	Presentation &white board	Quiz, Attendance seminar and

					written examination
8	2 theory		Midterm Exam	Presentation &white board	Quiz, Attendance seminar and written examination
9	2 theory		What is academic writing	Presentation &white board	Quiz, Attendance seminar and written examination
10	2 theory		Types of academic writing	Presentation &white board	Quiz, Attendance seminar and written examination
11	2 theory		How to write a reference	Presentation &white board	Quiz, Attendance seminar and written examination
12	2 theory		How to write concisely with examples	Presentation &white boa	
13	2 theory		The writing process	Presentation &white boa	
14	2 theory		How to write presentation	Presentation &white boa	
15	2 theory		Final Exam	Presentation &white boa	
16			Predatory to final exam .		
24. Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as： Attendance, preparedness,					

contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

25. Learning and Teaching Resources	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

26.Course Name:	
Viruses and Vaccines	
27.Course Code:	
BTM32-vi	
28.Semester / Year:	
second semester/third class	
29.Description Preparation Date:	
1-9-2024	
30.Available Attendance Forms:	
Attendance	
31.Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
32.Course administrator's name (mention all, if more than one name)	
Dr. Lamiaa Fingan Nashi Al-Maliki Dr. Rawaa Nazar Alchalabi	lamiaafingan@yahoo.com rawaaalchalabi-1984@yahoo.com
33. Course Objectives	
Course Objectives	• --- Learn about Medical Virology and the history of Virology. • --- Learn about the virus shapes and types. • --- Study the genetic material of different types of viruses • --- Study on viral replication and effect of virus on the cells. • ---Study the methods for virus culturing and types of cell cultures. • --- Study about viral replication and host rang determination. • •
34. Teaching and Learning Strategies	
Strategy	19. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 20. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 21. **Assignments and Tutorials** – Weekly homework assignments and

	small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

35. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +2 Practical		Definition of Virology, viruses and general characteristics of virus	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		Virus replication	Presentation &white board	
3	2 theory +2 Practical		Classification and GENETICAS OF VIRUSES	Presentation &white board	
4	2 theory +2 Practical		Viruses pathogencity	Presentation &white board	
5	2 theory +2 Practical		Functions of Envelope and Consequences of Properties for Enveloped viruses	Presentation &white board	
6	2 theory +2 Practical		Host defense mechanism	Presentation &white board	
7			DNA Viruses families		
8	2 theory +2 Practical		RNA Viruses families	Presentation &white board	
9	2 theory +2 Practical		Mid term exam	Presentation &white board	
10	2 theory +2 Practical		Vaccines and types of Vaccines	Presentation &white board	
11	2 theory +2		Steps of Vaccines	Presentation &white boa	

	Practical		production		
12	2 theory +2 Practical		Attenuated, Killed Vaccines and mechanisms of actions	Presentation &white boa	
13	2 theory +2 Practical		Corona virus ,whole virus, protein subunit, viral vector and nucleic acid of the virus	Presentation &white boa	
14	2 theory +2 Practical		Second mid exam	Presentation &white boa	
15	2 theory +2 Practical		Second mid exam	Presentation &white boa	
16			Final exam		

36. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

37. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Medical Virology by David o white and Frank J Finner 2 - Viruses of Microorganisms. By Paul Hyman and Stephen T. Abedon Published: 2018. 3 - Viruses and interferon: Current Research. Edited by: Karen Mossman Published: 2011
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

38.Course Name:	
Molecular Biology II	
39.Course Code:	
BTM31-Im	
40.Semester / Year:	
Third semester/third class	
41.Description Preparation Date:	
1-9-2024	
42.Available Attendance Forms:	
Attendance	
43.Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
44.Course administrator's name (mention all, if more than one name)	
Dr. Hameed M. Jasim Dr. Risala R. Allami	Hameed.jasim@nahrainuniv.edu.iq risala.allami@nahrainuniv.edu.iq ririallami@yahoo.com
45. Course Objectives	
Course Objectives	• To provide students with knowledge and information as well as practical experience about Molecular Biology. • Studying the composition, structure and interactions of cellular molecules – such as nucleic acids and proteins • Carrying out the biological processes essential for the cell's functions and maintenance. • system (i.e., autoimmune diseases, allergy, organ/tissue rejection.
46. Teaching and Learning Strategies	
Strategy	22. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 23. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 24. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

47. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +2 Practical		Regulation of transcription in prokaryotes General features of genes that are regulated, molecules involved in regulation	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory +2 Practical		Regulation of gene expression in prokaryotes • Operon • lac Operon • Activation of the lac operon by cyclic AMP and the CAP protein	Presentation &white board	
3	2 theory +2 Practical		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	Presentation &white board	

4	2 theory +2 Practical		Controls of Gene Expression in Eukaryotes • Methylation of DNA • RNA Interference (RNAi) Micro RNA (miRNA	Presentation &white board	
5	2 theory +2 Practical		Mutations • Missense mutation • Nonsense mutation • Silent mutation • Frameshift mutation	Presentation &white board	
6	2 theory +2 Practical		• Transposon • Types and structure of transposons • The transposition machinery	Presentation &white board	
7			• Recombination: homologous recombination, Site specific recombination, Illegitimate recombination		
8	2 theory +2 Practical		**Mid Term Exam**	Presentation &white board	
9	2 theory +2 Practical		• Genomics and Proteomics	Presentation &white board	
10	2 theory +2 Practical		• Epigenetics	Presentation &white board	
11	2 theory +2 Practical		• Metagenomics	Presentation &white boa	
12	2 theory +2 Practical		• Bacteriophages and eukaryotic viruses: Introduction to viruses,	Presentation &white boa	

			Bacteriophages		
13	2 theory +2 Practical		• Bioinformatics Algorithms: Introduction to bioinformatics	Presentation &white boa	
14	2 theory +2 Practical		• Cancer Molecular basis of cancer	Presentation &white boa	
15	2 theory +2 Practical		**Mid Term Exam**	Presentation &white boa	
16			**Preparatory week before the final Exam**		

48. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

49. Learning and Teaching Resources

Required textbooks (curricular books, if any)	David Clark (2005). Molecular Peter J. Russell (2010). Genetics A Molecular Approach Third Edition Brown, T.A. (2010). Gene cloning and DNA analysis: An Introduction. Sixth Edition , John Wiley & Sons, Ltd., Publication
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

48.Course Name:	
Nanobiotechnology	
49.Course Code:	
BTM32-NaBt	
50.Semester / Year:	
second semester/third class	
51.Description Preparation Date:	
1-9-2024	
52.Available Attendance Forms:	
Attendance	
53.Number of Credit Hours (Total) / Number of Units (Total)	
30 hours 45 units	
54.Course administrator's name (mention all, if more than one name)	
Dr. Widad Jassim Atia	Widad.atia@nahrainuniv.edu.iq
55. Course Objectives	
Course Objectives	• This course covers the basics of nanobiotechnology, focusing on nanoparticles, their properties, classification and different methods of their syntheis, such as chemica , physical and green(bio)methods. Last one characterized as eco-friendly biofabrication methods. Students perform practical experiments includes the biosynthesis and their effects on microbes and plants, and explore applications in medicine, pharmaceuticals, and agriculture. Biofabrication is highlighted for its safety, simplicity, low cost, and high productivity
56. Teaching and Learning Strategies	
Strategy	25. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 26. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 27. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills.

	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.

57. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory		Introduction to Nanotechnology,	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory		Nanoparticle and Nanomaterials: Definitions. And Classification them depended on different bases	Presentation &white board	
3	2 theory		Studying the properities of Nanomaterials: - Physical and Chemical properities.	Presentation &white board	
4	2 theory		Synthesis methods of Nanomaterials	Presentation &white board	
5	2 theory		Chemical and Physical Synthesis methods of Nanomaterials	Presentation &white board	
6	2 theory		Advantages and Disadvantages properities	Presentation &white board	
7			Mid term exam		
8	2 theory		Green synthesis of	Presentation &white	

			Nanomaterials	board	
9	2 theory		Biosynthsis methods of Nanomaterials by using microorganisms : Bacteria, Fugi, Yeasts, Algae	Presentation &white board	
10	2 theory		Detection and Charactrrization Techniques of nanomaterials.	Presentation &white board	
11	2 theory		Antibacterial activity effect of nanomaterials.	Presentation &white boa	
12	2 theory		Antifungal activity effect of nanomaterials.	Presentation &white boa	
13	2 theory		Application of Nanomaterials in different fields of life: Medical(therapeutic and diagnostic), Pharmalogical ,Agricultural and other applications	Presentation &white boa	
14	2 theory		Bio–Nano Interactions	Presentation &white boa	
15			Second Midterm	Presentation &white boa	
16			Final exam		

58. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

59. Learning and Teaching Resources

Required textbooks (curricular books, if any)	■ Nanotechnology-and-plant-sciences-Nanoparticles-and-their-impact- plants

	Manzer H. Siddiqui · Mohamed H. Al-Whaibi Firoz Mohammad ■ Intodction to Nanotechnology. Charles P. Poole, Jr. Frank J. Owens ■ Nanobiotechnology. Amultidisplinary field of science. Ram Prasad (Department of Botany) Mahatma Gandhi Central University Motihari, Bihar, India .
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

60.Course Name:	
Human Cytogenetics	
61.Course Code:	
BTM32-HuCy	
62.Semester / Year:	
Second semster/third class	
63.Description Preparation Date:	
1-9-2024	
64.Available Attendance Forms:	
Attendance	
65.Number of Credit Hours (Total) / Number of Units (Total)	
60 hours 3 units	
66.Course administrator's name (mention all, if more than one name)	
Prof. Dr. Ali Zaid Al-Saffar	ali.saffar@nahrainuniv.edu.iq
67. Course Objectives	
Course Objectives	• Understand the fundamental principles and techniques of human cytogenetics. • Gain knowledge of the structure and organization of the human genome. • Explore the various types of chromosomal aberrations and their impact on human health. • Learn about the different methods used in the cytogenetic analysis, including karyotyping and FISH (Fluorescence in situ Hybridization). • Understand the role of cytogenetics in the diagnosis and classification of genetic disorders. • Study the principles of prenatal and postnatal cytogenetic testing and their applications. • Explore the use of cytogenetics in cancer research and its implications for diagnosis and treatment. • Develop critical thinking and analytical skills in the interpretation of cytogenetic data. • Understand the ethical, legal, and social implications of cytogenetic testing. • Gain practical laboratory skills for conducting cytogenetic experiments and data analysis.
68. Teaching and Learning Strategies	
Strategy	28. **Lectures** – Traditional classroom lectures delivered by the

	instructor to explain core concepts and theories. 29. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 30. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

69. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory		Introduction: What are Chromosomes	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory		Chromosomes and Cell Cycle	Presentation &white board	
3	2 theory		Variation in Chromosomal Structure Part I	Presentation &white board	
4	2 theory		Variation in Chromosomal Structure Part II	Presentation &white board	
5	2 theory		Variation in Chromosome Number Part I	Presentation &white board	
6	2 theory		Variation in Chromosome Number Part II	Presentation &white board	

7			Mid–Course Exam		
8	2 theory		Y and X Chromosomes, X-Inactivation	Presentation &white board	
9	2 theory		Sex Related Disorders	Presentation &white board	
10	2 theory		Nomenclature and formulation of chromosomal disorders	Presentation &white board	
11	2 theory		The biology of cancer cells	Presentation &white boa	
12	2 theory		Introduction to Cancer Cytogenetics	Presentation &white boa	
13	2 theory		Epigenetics and Cancer	Presentation &white boa	
14	2 theory		Modern Techniques Used in Human Cytogenetic Analysis (Part 1)	Presentation &white boa	
15			Modern Techniques Used in Human Cytogenetic Analysis (Part 2)	Presentation &white boa	
16			**Preparatory week before the final Exam**		

70. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

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

Course Description Form

50.Course Name:
Genetic Engineering –II
51.Course Code:
BTM32-GeEnII
52.Semester / Year:
Second semester/third class
53.Description Preparation Date:
1-9-2024
54.Available Attendance Forms:
Attendance
55.Number of Credit Hours (Total) / Number of Units (Total)
30 hours 2 units
56.Course administrator's name (mention all, if more than one name)

Yaseen Ismael Omran	yaseen.ismael@nahrainuniv.edu.iq

57. Course Objectives	
Course Objectives	• This module will provide students with aspects of genetic engineering. • This module incorporates fundamental knowledge of DNA and protein structure and function • The learner will acquire the basic knowledge to construct and use cloning and expression vectors containing recombinant DNA in prokaryotic and eukaryotic systems.

58. Teaching and Learning Strategies	
Strategy	31. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 32. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 33. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills. 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.

59. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theor		Introduction and common properties for cloning experiments of eukaryotes. Cloning in yeast, Transformation of yeast, Cloning vectors for yeast	The basic principle of gene cloning.	The basic principle of gene cloning.
2	2 theory		Artificial Chromosomes: BAC & YAC. The structure & use of YAC	Cutting of DNA molecules.	Cutting of DNA molecules.
3	2 theory		Cloning in molds and other yeast	Restriction Modification System, Restriction Endonucleases.	Restriction Modification System, Restriction Endonucleases.
4	2 theory		Cloning in plants Cloning vector derived from (Ti) plasmid & development.	Joining of DNA molecules: Sticky end, Flash end	Joining of DNA molecules: Sticky end, Flash end
5	2 theory		The Ri plasmid Cloning genes in plant by direct gene transfer, transfer into organelles.	Cloning Vectors. Plasmids: pBR322 and Its derivatives	Cloning Vectors. Plasmids: pBR322 and Its derivatives
6	2 theory		Plant viruses as Cloning vectors. Introduction of	Presentation &white board	

			foreign DNA into plant cells,		
7	2 theory		Expression of foreign DNA in the plant cells		
8	2 theory		Cloning in animals Introducing of DNA into mammalian cells.	Presentation &white board	
9	2 theory		Cloning vector for mammalian cells Direct gene transfer	Presentation &white board	
10	2 theory		Expression of genes cloned in *E. coli.* and mammalian cell	Presentation &white board	
11	2 theor		Probes: Labeling, problem, cDNA probes.	Presentation &whi board	
12	2 theor		Application of genetic engineering Medical Application: Diagnosis of genetic diseases, Gene therapy.	Presentation &whi board	
13	2 theor		Industrial Application: Production of Insulin, Somatotropin, Interferons	Presentation &whi board	
14	2 theor		Vaccins, Single Cell protein, Degradation of toxic compounds	Presentation &wl board	
15	2 theor		Agriculture Application: Resistance to Viruses, Resistance to	Presentation &wl board	

			pesticide, Resistance to Fungi.		
16			Preparatory week before the final Exam		

60. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

61. Learning and Teaching Resources

Main referer (sources)	• Brown, T.A. – Gene Cloning and DNA Analysis: An Introduction • 8th Edition, Wiley Blackwell, 2016. Glick, B.R., & Pasternak, J.J. – Molecular Biotechnology: Principles and Applications of Recombinant DNA 5th Edition, ASM Press, 2017
Recommended books and references (scientific journals, reports...)	
Electronic-Referenc Websites	

Course Description Form

72.Course Name:	
Molecular Techniques	
73.Course Code:	
BTM31-MoTech	
74.Semester / Year:	
first semester/third class	
75.Description Preparation Date:	
1-9-2024	
76.Available Attendance Forms:	
Attendance	
77.Number of Credit Hours (Total) / Number of Units (Total)	
30 hours 2 units	
78.Course administrator's name (mention all, if more than one name)	
Dr. Hameed M. Jasim Dr. Risala R. Allami	Hameed.jasim@nahrainuniv.edu.iq risala.allami@nahrainuniv.edu.iq ririallami@yahoo.com
79. Course Objectives	
Course Objectives	• The outcomes of this course provide students with knowledge and information as well as practical experience about Molecular Techniques. • Molecular Techniquesis the field of biology that studies the composition, structure and interactions of cellular molecules – such as nucleic acids and proteins – that carry out the biological processes essential for the cell's functions and maintenance. The course covers the following subjects: Introduction to DNA basics, Properties of Nucleic acids • Nucleic acid structure, The flow of genetic information, Replication of DNA, Gene Expression, PCR techniques, Gel electrophoresis, and other application in molecular techniques.
80. Teaching and Learning Strategies	
Strategy	34. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 35. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary

	tables for complex topics. 36. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills

81. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory +		Measurement of DNA concentration Separation of molecules by gel electrophoresis	Presentation &white board	Quiz, Attendance seminar and written examination
2	2 theory		Estimation of the sizes of DNA molecules Special gel electrophoresis methods for separating larger molecules	Presentation &white board	
3	2 theory		Protein gel electrophoresis	Presentation &white board	
4	2 theory		The Polymerase Chain Reaction Correct temperatures to use Melting temperature	Presentation &white board	
5	2 theory		Real-time PCR enables the amount of starting material to be quantified Carrying out a quantitative PCR experiment	Presentation &white board	
6	2 theory +		Real-time PCR for quantifying RNA Southern transfer	Presentation &white board	

7			Genetic maps Single nucleotide polymorphisms (SNPs)		
8	2 theory		Mid Term Exam 1	Presentation &white board	
9	2 theory		Restriction fragment length polymorphisms (RFLPs) Random Amplified Polymorphic DNA (RAPD)	Presentation &white board	
10	2 theory		Amplified Fragment Length Polymorphism (AFLP) Short tandem repeats (STRs)	Presentation &white board	
11	2 theory		Sequencing Genes and Genomes DNA sequencing	Presentation &white boa	
12	2 theory		Chain termination DNA sequencingAlternative mRNA processing	Presentation &white boa	
13	2 theory		Fluorescence in situ hybridization (FISH)	Presentation &white boa	
14	2 theory		DNA Microarrays	Presentation &white boa	
15	2 theory		Mid Term Exam 2	Presentation &white boa	
16			Final exam		

82. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

83. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Immunology by Ivan M .Roitt (Editor), J. Brostoff and D. Male Paperback. 1- Gene cloning and DNA analysis: An Introduction. Sixth Edition , Brown, T.A. (2010). John Wiley & Sons, Ltd., Publication Molecular Biology of the Cell. 8th edition.

	Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2020.
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

84.Course Name:
Antibiotics
85.Course Code:
BTM32- An
86.Semester / Year:
Second semester/third class
87.Description Preparation Date:
1-9-2024
88.Available Attendance Forms:
Attendance
89.Number of Credit Hours (Total) / Number of Units (Total)
60 hours 3 units
90.Course administrator's name (mention all, if more than one name)

ظفر نجم عبد الامير	dhafar.alugaili@nahrainuniv.edu.iq

91. Course Objectives

Course Objectives	• This course provides a comprehensive overview of antibiotics, their historical development, and their profound impact on human health. We will explore the mechanisms of action of major antibiotic classes.

92. Teaching and Learning Strategies

Strategy	37. **Lectures** – Traditional classroom lectures delivered by the instructor to explain core concepts and theories. 38. **PowerPoint Presentations** – Use of multimedia presentations to enhance visualization, provide diagrams, animations, and summary tables for complex topics. 39. **Assignments and Tutorials** – Weekly homework assignments and small-group discussion sessions to reinforce understanding and problem-solving skills.

93. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2 theory +2 Practical		• Chemotherapeutic agents and	Presentation &white board	Quiz, Attendance

			antimicrobials. • Antibiotics Discovery and Development. • Sources of antimicrobials.		seminar and written examination
2	2 theory +2 Practical		The biosynthesis and regulation of the production of antibiotics in microorganisms. The production of synthetic and semi-synthetic antibiotics.	Presentation &white board	
3	2 theory +2 Practical		**Mechanisms of Action of Antibiotics** • Inhibition of Cell Wall Synthesis • Inhibition of Protein Synthesis • Inhibition of Nucleic Acid Synthesis	Presentation &white board	
4	2 theory +2 Practical		• Antimetabolites and Other Mechanisms. • Factors Affecting Choice of Antimicrobial Agent	Presentation &white board	
5	2 theory +2 Practical		Pharmacokinetics and Pharmacodynamics of Antibiotics	Presentation &white board	
6	2 theory +2 Practical		Superbugs origin and dissemination	Presentation &white board	
7			Midterm exam		
8	2 theory +2 Practical		Common Infections and Antibiotic Treatment. Antibiotics for Gram positive bacteria	Presentation &white board	
9	2 theory +2 Practical		Antibiotics for Gram negative bacteria	Presentation &white board	

10	2 theory +2 Practical		Antibiotics for an aerobic infections	Presentation &white board	
11	2 theory +2 Practical		Classes of antibiotics and some potential side effects.	Presentation &white boa	
12	2 theory +2 Practical		Herbal antibiotics	Presentation &white boa	
13	2 theory +2 Practical		Final Topics antibiotics (general concepts)	Presentation &white boa	
14	2 theory +2 Practical		2nd Midterm exam	Presentation &white boa	
15	2 theory +2 Practical		Seminar presentation	Presentation &white boa	
16			Final exam		

94. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

95. Learning and Teaching Resources

Required textbooks (curricular books, if any)	CLSI AST News Update. Volume 7, Issue 1, June 2022. Mechanisms of Antibiotic Resistance (20216). Microbiol Spectr. April ; 4(2) .
Main references (sources)	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
Recommended books and references (scientific journals, reports...)	Centers for Disease Control and Prevention. (2019) US antibiotic use rates by state. NHS. (2019) Antibiotic resistance
Electronic-References, Website	https://www.cdc.gov/antibiotic-use/community/images/materials/Antibiotic-Prescriptions-Map https://www.nhs.uk/conditions/antibiotics/antibiotic-antimicrobial-resistance/

Course Description Form

Course Name:
Enzymology
Course Code:
BMT41-Ez
Semester / Year:
Semester 1, Year 4
Description Preparation
Date: 1\9\2024
Available Attendance Forms:
Attendance
Number of Credit Hours (Total) / Number of Units (Total): unit
60 hrs 3 units
Course administrator's name (mention all, if more than one name)
Name: Dr. Asmaa Ali Hussein Email: asmaa.ali@nahrainuniv.edu.iq

96. Course Objectives

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

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.

97. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	2	Introduction, History & Course purpose	Introduction on biochemical reactions	PowerPoint, white board	Daily exams and homework
	2	Explaining the Enzyme nomenclature for the students	Enzyme nomenclature and classifications	Whiteboard Presentation	Daily exams and homework
	2	Explaining the differences between Enzymatic and non enzymatic reactions	Enzymatic and non enzymatic reactions	Whiteboard Presentation	Daily exams and homework
	2	Explaining the importance of Enzyme structure	Enzyme structure and active site	Whiteboard	Daily exams and homework
	2	Mid Exam	Mid exam		
	2	Definition of an isoenzymes	Isoenzymes and their importance in disease diagnosis	Presentation	Daily exams and homework
	2	Explaining optimum conditions enzyme production	Optimum conditions for enzyme production	Whiteboard Power Point	Daily exams and homework
	2	Discussing the outline for purification techniques	Purification of	Whiteboard	Daily exams and

			enzymes using chromatographic techniques		homework
	2	Studying the importance of one step purification technique	Affinity chromatography purification	Whiteboard Power point	Daily exams and homework
	2	Mid Exam	Mid exam	Whiteboard	Daily exams and homework
	2	Studying the factors affecting Enzyme activity	Characterization of purified enzyme	Whiteboard Power point	Daily exams and homework
	2	Studying enzyme kinetics	Enzyme kinetics	Whiteboard	Daily exams and homework
	2	Studying the importance for Medical applications of enzymes	Medical applications of enzymes	Whiteboard	Daily exams and homework
	2	Studying the industrial applications of enzymes	Industrial applications of enzymes	Whiteboard	Daily exams and homework
	2	Revision	revision		Daily exams and homework

98. 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

99. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
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. – https://www.sciencedirect.com/bookseries/methods-in-enzymology -Webb E.C., NC-IUBMB. (1992) Enzyme Nomenclature: Recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the Nomenclature and Classification of Enzymes. Academic Press, New York, NY.
Recommended books and references (scientific journals, reports…)	Enzyme Technology , Published by N.K. Muraleedharan for Asiatech Publishers Inc.,2006 Enzymes A Practical Introduction to Structure, Mechanism, and Data Analysis By Robert A. Copeland · 2023
Electronic References, Websites	https://www.brenda-enzymes.org/

Course Description Form

Course Name:
Toxicology
Course Code
BTM41-To
Semester/Year
Semester 1, Year 4
Description Preparation Date:
1-9-2024
Avialable Attendance Form
Attendance
number of Credit Hours (Total) number of Units (Total)
60h 3 units
Course administrator's name (mention all, if more than one name)
Dr. Ruqaia mohammed, dr. Ali Zaid
Course Objectives
The outcomes of this course provide students with knowledge and information as well as practical experience ab how toxic compounds and mechanism of disease progression in human body, where they act?, what they c Students learn how toxic materials affected our body
Teaching and Learning Strategies
The number of teaching units are three units which consists of approximately 14-15 week timetabled study ov 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.

1. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Introduction, History & Course objective	PowerPoint, white board	Daily exams and homewo

					rk
2	2		Principles of toxicology	Whiteboard Presentation	Daily exams and homework
3	2		Chemical toxin part 1	Whiteboard Presentation	Daily exams and homework
4	2		Chemical toxin part 2	Whiteboard	Daily exams and homework
5	2		Bacterial toxin part 1		
6	2		Bacterial toxin part 1	Presentation	Daily exams and homework
7	2		Fungal toxin part 1	Whiteboard Power Point	Daily exams and homework
8	2		Fungal toxin part 1	Whiteboard	Daily exams and homework
9	2		**Exam**	Whiteboard Power point	Daily exams and homework
10	2		Food toxin	PowerPoint, white board	Daily exams and homework

11	2		Factor affected activity of food toxin	Whiteboard Presentation	Daily exams and homework
12	2		Immunotoxicity	Whiteboard Presentation	Daily exams and homework
13	2		Disease related to toxin	Whiteboard	Daily exams and homework
14	2		How could our body eliminate tox		
15	2		Seminar	Presentation	Daily exams and homework
16	2		**Exam**	Whiteboard Power Point	Daily exams and homework

2. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

3. Learning and Teaching Resources

Required textbooks (curricular books, if any)	A text book of modern toxicology, 4 th edition ISBN: 978-46206-5 Internet source
Main references (sources)	Power point presentation, videos
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

نموذج وصف المقرر

اسم المقرر:	
المعلوماتية الحيوية	
رمز المقرر:	
BTM41-Binfo	
الفصل / السنة:	
الفصل الدراسي الثاني/ المرحلة الرابعة	
تاريخ إعداد هذا الوصف:	
1/10/2024	
أشكال الحضور المتاحة:	
حضوري	
عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي):	
60ساعة / 3, وحدة	
اسم مسؤول المقرر الدراسي (اذا اكثر من اسم يذكر)	
الاسم: م.د. زيد نصيف عباس	الآيميل: zaid.altameemi@nahrainuniv.edu.iq
4. اهداف المقرر	
اهداف المادة الدراسية	تهدف هذه المادة إلى تزويد الطلبة بالمعرفة النظرية والمهارات العملية الأساسية في علم المعلوماتية الحيوية، وهو العلم الذي يجمع بين **البيولوجيا، علوم الحاسوب، والرياضيات** لتحليل وفهم البيانات الحيوية الجزيئية. بنهاية هذا المقرر، يُتوقع من الطالب أن يكون قادراً على: 1. **فهم المفاهيم الأساسية** في المعلوماتية الحيوية، بما في ذلك بنية الجينوم، التسلسل الجيني، والبروتينات، وأنواع البيانات البيولوجية المختلفة. 2. **التعامل مع قواعد البيانات الحيوية العالمية** مثلNCBI ، UniProt، وEnsembl، والقدرة على استخراج وتحليل المعلومات الجينية منها. 3. **تطبيق أدوات وخوارزميات المعلوماتية الحيوية** مثل خوارزميات المحاذاة (Alignment) المحلية والعالمية، وخوارزميات البحث السريع.(BLAST) 4. **تحليل البيانات الجزيئية** (DNA، RNA، Proteinباستخدام البرمجيات والمنصات الحاسوبية المناسبة. 5. **تفسير نتائج التحليل البيولوجي الحاسوبي** وربطها بالمفاهيم البيولوجية والوظيفية. 6. **اكتساب مهارات البرمجة الأساسية**)مثل Python أو R) المستخدمة في تحليل البيانات الجينومية والبروتينية. 7. **تعزيز التفكير النقدي والتحليلي** في تفسير البيانات المعقدة والتعامل مع مشكلات البحث العلمي في مجالات الجينوميات والبروتيوميات. 8. **تطبيق المعرفة المكتسبة** في مجالات تطبيقية مثل الطب الجزيئي، تصميم الأدوية، تحليل الطفرات، ودراسة التعبير الجيني. 9. **العمل الجماعي والبحث الذاتي** من خلال المشاريع الصغيرة، لربط الجانب النظري بالتطبيقي

	في بيئة بحثية واقعية.

5. استراتيجيات التعليم والتعلم

الاستراتيجيات

يُعتمد في تدريس مادة **المعلوماتية الحيوية (Bioinformatics)** على مجموعة من الاستراتيجيات التعليمية المتنوعة التي تهدف إلى تنمية الفهم العميق، والمهارات العملية، والتفكير التحليلي لدى الطلبة، وتشمل ما يأتي:

1. **المحاضرات النظرية:(Lectures)**
لتقديم المفاهيم الأساسية في المعلوماتية الحيوية، مثل بنية الجينوم، قواعد البيانات الحيوية، والخوارزميات المستخدمة في تحليل التسلسلات.
2. **التطبيقات العملية:(Practical Sessions / Hands-on Training)**
من خلال جلسات تدريبية في المختبر أو عبر الحاسوب، يتعلم الطلبة استخدام أدوات التحليل الحيوي، مثلNCBI BLAST ، Clustal Omega، MEGA، وExPASy.
3. **التعلّم القائم على المشاريع:(Project-Based Learning)**
يُكلف الطلبة بمشاريع فردية أو جماعية لتحليل بيانات حقيقية (DNA أوProtein) ، مما يعزز قدرتهم على البحث الذاتي وتطبيق المفاهيم النظرية عملياً.
4. **التعلّم المدمج:(Blended Learning)**
الجمع بين المحاضرات الحضورية والمنصات الإلكترونية لتوفير مصادر تعليمية متعددة (فيديوهات، محاضرات رقمية، قواعد بيانات تفاعلية).
5. **المناقشات الصفّية ودراسة الحالات:(Class Discussions & Case Studies)**
تحليل مشكلات بحثية واقعية في الجينوميات أو البروتيوميات، مما يشجع التفكير النقدي والنقاش العلمي البنّاء.
6. **التعلّم الذاتي:(Self-Directed Learning)**
تشجيع الطلبة على استكشاف مصادر إضافية مثل الأبحاث العلمية والمقررات الإلكترونية (MOOCs)لتوسيع معارفهم واستقلاليتهم العلمية.
7. **العروض التقديمية والمناقشات الطلابية:(Student Presentations)**
لتقوية مهارات العرض العلمي والتواصل الأكاديمي، من خلال تقديم تقارير أو نتائج مشاريع تحليل بيانات.

6. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة او الموضوع	طريقة التعلم	طريقة التقييم
1	2	التعرف على مفهوم المعلوماتية الحيوية وتاريخها وأهم تطبيقاتها	مقدمة في المعلوماتية الحيوية	محاضرة تفاعلية + مناقشة صفّية	أسئلة شفهية واختبار تمهيدي
2	2	فهم أنواع البيانات الحيويةDNA) ، RNA، Proteinوطرق تمثيلها رقميًا)	البيانات الحيوية وأنواعها	محاضرة + أمثلة تطبيقية	واجب قصير
3	2	التعرف على قواعد البيانات الحيوية العالمية وكيفية استخدامها	قواعد البيانات الحيوية (NCBI, UniProt, Ensembl	تدريب عملي باستخدام الإنترنت	اختبار عملي قصير

			)		
4	2	القدرة على البحث في قواعد البيانات الجينية واستخراج التسلسلات	البحث البيولوجي Bio-Search	تدريب عملي + نقاش	تقييم أداء عملي
5	2	فهم مبدأ المحاذاة التسلسلية (Sequence Alignment)	المحاذاة التسلسلية (Global vs Local)	محاضرة + شرح خوارزميات	اختبار نظري قصير
6	2	تطبيق أدوات المحاذاة الحاسوبية	تطبيقات BLAST و Clustal Omega	تدريب عملي	تقييم عملي
7	2	تحليل النتائج وتفسير العلاقات الجينية بين التسلسلات	تفسير نتائج المحاذاة	نقاش جماعي + عرض تطبيقي	تقرير عملي
8	2	التعرف على مبادئ شجرة التطور وكيفية بنائها	تحليل التطور Evolutionary Analysis	محاضرة + تطبيق باستخدامMEGA	اختبار نظري + عملي
9	2	تطبيق مهارات بناء الأشجار التطورية وتفسيرها	Phylogenetic Tree Construction	تدريب عملي	تقييم تطبيقي
10	2	التعرف على المفاهيم الأساسية في علم البروتيوميات	مقدمة في Proteomics	محاضرة تفاعلية	اختبار قصير
11	2	استخدام أدوات تحليل البروتين والبنى الثانوية والثالثية	Protein Structure Analysis	تدريب عملي على ExPASy	تقييم عملي
12	2	فهم الأساسيات البرمجية في المعلوماتية الحيوية (Python أو(R	Bioinformatics Programming Basics	محاضرة + تطبيقات حاسوبية	واجب برمجي
13	2	تنفيذ مشروع بسيط لتحليل بيانات جينية حقيقية	Mini Project (Data Analysis)	تعلم قائم على المشروع	تقرير وعرض تقديمي

14	2	مراجعة شاملة للمقرر وتقييم التعلم	مراجعة وتطبيقات ختامية	مناقشة + اختبار شامل	الاختبار النهائي (Final Exam)

7. تقييم المقرر

التحضير اليومي والامتحانات اليومية والشفوية والشهرية والتحريرية والتقارير .... الخ

8. مصادر التعلم والتدريس

الكتب المقررة المطلوبة (المنهجية أن وجدت)	
المراجع الرئيسة (المصادر)	Genomics, Proteomics & Bioinformatics Journal https://academic.oup.com/gpb
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	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.
المراجع الإلكترونية، مواقع الانترنيت	https://pubmed.ncbi.nlm.nih.gov/

Course Description Form

Course Name:	
Molecular Genetics	
Course Code:	
BTM42-MoGe	
SemsterYear:	
2nd Semester / 4th year	
Description Preparation Date:	
1 / 10 / 2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
60 Hours / 3 Units	
Course administrator's name (mention all, if more than one name)	
Name	Sahar M. Hussein, Sahar.hussain@nahrainuniv.edu.iq,
9. Course Objectives	
Course Objectives	• Covering the basics of molecular biology genetics. • Understanding and appreciating the potential of using modern applications of molecular biology. • Learning outcomes, teaching, learning, and assessment methods..
10. Teaching and Learning Strategies	
Strategy	Teaching and Learning Methods 1- Lecture Method 2- PowerPoint System 3- Homework and Seminar System Learning Methods

	1- Weekly Quick Exams 2- Discussion, Questions, and Answers 3- International Network for Information on the Subject of Specialization Evaluation Methods 1- Weekly and Termly Exams 2- Student Performance Evaluation through Seminars 3- Grades Based on Homework

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T+2I	Understandi the theoretic and practical principles ar foundations related to the subject	Introduction of molecular genetics, Genomestructure and function	Lectures and Seminars	1- Oral and written exams 2- Seminars
2	2T+2I	"	Eukaryotic gene regulation	"	"
3	2T+2I	"	Differences between Prokaryotes and Eukaryotes mechanisms of regulation.	"	"
4	2T+2I	"	Transcription factors	"	"
5	2T+2I	"	Structure and Function of RNA	"	"
6	2T+2I	"	Mid exam	"	"
7	2T+2I	"	Micro RNA	"	"
8	2T+2I	"	Oncogenes and Tumor Suppressor Genes	"	"
9	2T+2I	"	Mutation and SNPs	"	"
10	2T+2I	"	Personality medicine	"	"

11	2T+2I	″	Protein folding & Stability	″	″
12	2T+2I	″	Protein folding and stability	″	″
13	2T+2I	″	Genes and environment	″	″
14	2T+2I	″	Human genetic projects	″	″
15	2T+2I	″	Final exam	″	″

12. Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning.

13. Learning and Teaching Resources	
Required textbooks (curricular books, any)	Text books Book of Molecular biology of gene Biology 304 –Spring 2016 Section 1001
Main referer (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-Referen Websites	

Course Description Form

urse Name:	
Pharmaceutical biotechnology	
urse Code: PTM, PP	
PhBt42-BTM	
nester / Year	
: 2nd semester/ 4th year	
scription Preparation Date:	
1-10-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 h/2 units	
Course administrator's name (mention all, if more than one name)	
Prof.Dr.Zahraa K. Zedan	zahraa.kamel@nahrainuni.edu.iq
Course Objectives	
Course Objectives	• **Training specialized personnel in pharmaceutical biotechnology fields, such as biopharmaceutical manufacturing, gene therapy, and treatment.** • **Understanding the mechanisms of drug production and development using technologies such as genetic engineering, nanotechnology, and code replication techniques.** • **Developing innovative treatments and understanding the mechanisms of biopharmaceutical production using modern biotechnology tools.** • **Designing innovative drug delivery systems that contribute to improving treatment efficacy and reducing side effects.** • **Contributing to the production of vaccines and serums using advanced biotechnology, thus enhancing global health security.** • **Developing sustainable biological solutions to address environmental and health challenges, such as reducing**

	pollution and improving production quality..

14. Teaching and Learning Strategies

Strategy	**First: Advanced Theoretical Education** **- Focusing on the integration of fundamental sciences such as biochemistry, genetics, molecular biology, and pharmacology.** **- Utilizing interactive lectures that combine presentations, educational videos, and scientific discussions.** **- Analyzing real-world case studies from biopharmaceutical companies to illustrate industry challenges and solutions.** **For Research-Based Learning** **- Encouraging students to participate in scientific research within research teams or graduation projects.** **- Publishing research in peer-reviewed scientific journals to develop scientific writing and academic communication skills.** **- Participating in workshops and scientific conferences to enhance knowledge exchange and networking with experts.** **Fourth: E-Learning and Technology** **- Utilizing digital learning platforms to provide interactive content and simulate laboratory experiments.** **- Employing artificial intelligence and virtual reality to explain complex biological processes.** **- Assessing performance through online tests and educational applications.**

15. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Introducing the student to the fundamentals and history of pharmaceutical biotechnology.	An introduction to pharmaceutical biotechnolog and a brief overview of the history of this field.	The whiteboar The screen	Daily quizzes and homework assignments in addition to monthly exams

2	**2**	Introducing the student to the most important pharmaceutical materials produced using rDNA technology	A detailed explanation of hov to use the rDNA method and necessary steps for doing so.	The whiteboar The screen	Daily quizzes and homework assignments in addition to monthly exams
3	**2**	Introducing the student to t most important application of pharmaceutical biotechnology.	Applications of pharmaceutic biotechnology in medicine	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
4	**2**	Introducing the student to t thod of producing insulin ar wth hormone using bacteria ls through gene cloning.	Key applications of insulin ar growth hormone production using biotechnology; detailed explanation.	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
5	**2**	First monthly exam	First monthly exam	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
6	**2**	Introducing the student to t trade and scientific names drugs produced using biotechnology	The most important methods used in naming and commercially marketing pharmaceutical materials produced using biotechnolog	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
7	**2**	Pharmaceutical Biotechnology: Legal & Ethical Issues.	The most important ethical protocols for pharmaceutical drug industry	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
8	**2**	Introducing the student to methods of producing medical enzymes using	Medical enzymes, their cloni and their applications in deta	The whiteboard	Daily quizzes and homework

		biotechnology, with examples.		The screen	assignments in addition to monthly exams
9	**2**	Introducing the student to vaccine production using biotechnology methods	Manufactured vaccines and their production methods in detail	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
10	**2**	Definition and explanation the most important cases o treatment using biotechnology-manufactur drugs	Applications of treatment wit bio produced drugs	The whiteboard The screen	Daily quizzes and homework assignments in addition to monthly exams
11	**2**	Introducing the student to t most important sources of cells used in drug manufacturing	Sources of cells used in drug manufacturing, their types, a reasons for their use.	The whiteboard The screen	Daily quizzes a homework assignments in addition to monthly exam
12	**2**	Identifying the main obstac that accompany gene thera	A detailed explanation of the types of gene therapy	The whiteboard The screen	Daily quizzes a homework assignments in addition to monthly exam
13	**2**	Introducing the student to t most important cases of treatment with genetically engineered pharmaceutical materials.	Types of cases in which treatment with gene-based drugs has been successful, an the most important companie specializing in this line of production.	The whiteboard The screen	Daily quizzes a homework assignments in addition to monthly exam
14	**2**	The student is required to define the vectors used to transfer the genes responsil for drug manufacturing.	Types of vectors used to transfer genes used in pharmaceutical manufacturin and methods of modifying th	The whiteboard The screen	Daily quizzes a homework assignments in addition to monthly exam
15	**2**	2nd monthly exam	2nd monthly exam	The whiteboard The screen	Daily quizzes homework assignments addition monthly exam

16. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning	
17. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Introduction to biotechnology Book,2020 Pharmaceutical Biotechnology, Basics 2023
Main references (sources)	**Introduction: Trends and Developments in the Pharmaceutical an Life Sciences Industry** • **Chapter** • **Open Access** • **First Online: 20 February 2020** • **pp 1–5** **Application of Biotechnology in Pharmaceutical Manufacturing Control** • **Chapter** • **First Online: 21 May 2024** • **pp 31–42**
Recommended books and references (scientific journals, reports...)	**Harnessing synthetic biology for advancing RNA therapeutics and vaccine design** ○ Review Article ○ Open access ○ Published: 30 November 2023 ○ Volume 9, article number 60, (2023)
Electronic-References, Websites	https://link.springer.com/10.1007/978-3-030-35918-8_1?fromPaywallRec=true

Course Description Form

18.Course Name:
Stem cells and gene therapy
19.Course Code:
E41-IBTM
20.Semester /
Year: 1st/4th
21.Description Preparation Date:
1-9-2024
22.Available Attendance Forms:
Attendance
3.Number of Credit Hours (Total) / Number of Units (Total) 2
30 h/2 units
24.Course administrator's name (mention all, if more than one name) P
Prof. Dr. Zahraa k. Zedan & Asst. Prof. Moyasser B. Hadi

25. Course Objectives	
Course Objectives	• Enabling students to acquire the practical skills necessary to isolate and grow stem cells in the laboratory for therapeutic applications and laboratory studies, maintain stem cells in the laboratory, manipulate stem cells in the laboratory, and differentiate them into different cell types as needed. The main objectives can be listed below: • 1. Developing students' skills in isolating stem cells from various tissues, such as bone marrow, and growing them in culture dishes. • 2. Developing students' skills in understanding and identifying ideal applications of stem cells in therapeutic and medical applications. • 3. Developing skills in successfully growing stem cells in the laboratory. • 4. Developing skills in preserving stem cells under laboratory conditions. • 5. Developing students' skills in modifying stem cells in the laboratory according to experimental conditions..

26. Teaching and Learning Strategies
• Effective teaching and learning strategies include pre-lab preparati demonstrations, guided inquiry, collaborative learning, feedba reflection, integration of theory and practice, and a strong focus safety. These strategies aim to actively engage students, reinfo theoretical concepts, develop critical thinking skills, and ensure a s

learning environment.	

27. Course Structure

Week	Hours		Unit or subject name	Learning method	Evaluation method
Week	Hrs		Lecture Objective (English)	White boar smart scre	Lecture Topics (English)
1	2		Introduce students to the fundamentals an history of stem cells and gene therapy	White boar Smart scree	Introduction and historical background of stem cells and gene therapy
2	2		Identify the main types and classifications stem cells and gene therapy	White board Smart screen	Detailed types and classifications of stem cells and gene therapy
3	2		Explain main medical applications of stem cells	White board Smart screen	Applications of stem cells in medicine
4	2		Explain induced pluripotent stem cell (iPS generation	White board Smart screen	iPSC generation methods and laboratory procedures
5	2		**First Monthly Exam**	White board Smart screen	First monthly exam
6	2		Introduce methods of stem cell isolation a cultivation	White board Smart screen	Stem cell isolation and culture techniques and applications
7	2		Explain methods of stem cell preservation and biobanking	White board Smart screen	Stem cell preservation methods and stem cell banks

8	2		Introduce embryonic stem cells and their significance	White board Smart screen	Detailed study of embryonic stem cells and applications
9	2		Explain adult stem cells and their applications	White board Smart screen	Adult stem cells and medical uses
10	2		Discuss key clinical cases treated with stem cell therapy	White board Smart screen	Applications of stem cell therap
11	2		Identify stem cell sources and their specific applications	White board Smart screen	Sources and applications of various stem ce types
12	2		Explain challenges and limitations in gene therapy	White board Smart screen	Detailed explanation of gene therapy ty and challenges
13	2		Present successful cases of targeted gene therapy	White board Smart screen	Successful cases and reasons for gene therapy success
14	2		Medical application of gene therapy	White board Smart screen	Viral vectors u in gene therapy
15	2		2nd exam	White board Smart screen	Second mont exam

28. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

29. Learning and Teaching Resources

Advances in Stem Cells and their Niches

Book series

Menu

Volume 7pp. 1 - 90 • 2023

Volume 6pp. 1 - 207 • 2022 Recapitulating the Stem Cell Niche Ex Vivo **Volume 5**pp. 1 - 236 • 2021 Stem Cell Therapy Research (Hardback) volume 6 : 2023 Advances in gene therapy tools volume 5: 2022		

Course Description Form

Course Name:
Medical biotechnology
Course Code:
MeBt42-BTM
Semester / Year
Semester 2, Year 4
Description Preparation Date:
1\10\2024
Available Attendance Forms:
Attendance
Number of Credit Hours (Total) / Number of Units (Total): 2\2 unit
30h/2 units
Course administrator's name .30 (mention all, if more than one name)
Name: Dr. Mayaada S Mahdi Email: mayyadah.mahdi@nahrainuniv.edu.iq Name: Dr:

31. 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.

32. 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 methods invo interactive/active learning lectures, videos, tutorial sessions, laboratory classes and homework assignment hours will be independent or self-directed study.

33. Course Structure

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

			name		
	2	Introducing to medical biotechnology	Study biotechnology and medicine	White board and power points	Quizzes and homework Seminar or written exams
	2	Introducing to biotechnology and Healthcare	Study h biotechnolog has made a h impact c healthcare s as diagnos and biopharmace als	White board and power points	Quizzes and homework Seminar or written exams
	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
	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
	2	Mid Exam	Mid exam		
	2	Introducing to Gene therapy	Study treating disease	White board and power	Quizzes and homework

			by inserting functional genes to replace defective ones.	points	Seminar or written exams
	2	Introducing to The Application of Antise Technology to 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
	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
	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
	2	Mid Exam	Mid exam		
	2	Introducing to Regenerative medical biotechnologies	Study the applications of regenerative medicine	White board and power points	Quizzes and homework Seminar or written exams
	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
	2	Introducing to The genetic basis of	Study the ba	White board and power	Quizzes and

		Disease	of gen disease	points	homework Seminar or written exams
	2	Introducing to RNA-based therapeutics	Study applications RNA-based therapeutics	White board and power points	Quizzes and homework Seminar or written exams
	2	Revision	revision	White board and power points	Quizzes and homework Seminar or written exams

34. 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

35. 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

Course Name:	
Forensic and DNA typing	
Course Code:	
DnaTy41-BTM	
Semester / Year:	
First Semeste4 th class	
Description Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
60 h/3 units	
Course administrator's name (mention all, if more than one name)	
Dr sahar m. huseein + dr. mays T. abdalla	

36. Course Objectives	
Course Objectives	• Understand the scientific fundamentals of forensic science. • Identify the molecular structure of DNA and the importance of mutations and genetic variations. • Use PCR, STR, and SNP techniques for DNA fingerprinting. • Apply methods for collecting and preserving biological samples for investigative purposes. • Analyze results using specialized software such as BioEdit, MEGA, and GeneMapper. • Discuss the ethical and legal issues associated with forensic genetic testing..

37. Teaching and Learning Strategies	
Strategy	- Lecture Method 2- PowerPoint System 3- Homework and Seminar System Learning Methods

	1- Weekly Quick Exams 2- Discussion, Questions, and Instant Answers 3- International Network for Information on the Subject of Specialization

38. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+2	Understanding the theoretical and practical principles and foundation related to the subject	Introduction of Foren Science	Lecture styl	- Oral and written exams 2- Seminars
2	2+2	″	Collection and Preservation of Biologi Evidence	″	″
3	2+2	″		″	″
4	2+2	″	Forensic Serology	″	″
5	2+2	″		″	″
6	2+2	″	Mid exam	″	″
7	2+2	″	Crime Scene	″	″
8	2+2	″		″	″
9	2+2	″	'Short Tandem Repeat STR)	″	″
10	2+2	″		″	″
11	2+2	″	Mitochondrial DNA in Forensics	″	″
12	2+2	″	Y-Chromosome Analy	″	″
13	2+2	″		″	″
14	2+2	″	Statistical Analysis in D Typing	″	″
15	2+2	″	Bioinformatics in Forer DNA Analysis	″	″
16	2+2	″	Final exam	″	″

39. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

40. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Text books Book of Molecular biology of gene 2013 Next Generation Sequencing in Forensic Science https://taylorandfrancis.com Kelly M. Elkins and Cynthia B. Zeller 2022
Main references (sources)	○
Recommended books and references (scientific journals, reports...)	Text books
Electronic-References, Websites	

Course Description Form

Course Name:
Immunochemistry
Course Code:
BTM42E-II
Semester / Year:
Second /Fourth class/Elective
Description Preparation Date:
1-9-2024
.Available Attendance Forms:
Attendance
.Number of Credit Hours (Total) / Number of Units (Total)
30 hours /2 units
Course administrator's name (mention all, if more than one name)

Dr. Shahlaa M. Salih Shahlaa.mahdi@nahrainuniv.edu.iq	

Course Objectives	
Course Objectives	• Provide students with fundamental knowledge of immunochemical reactions and mechanisms. • Understand the relationship between the molecular structure of antigens and antibodies and their immunological functions. • Train students in laboratory immunochemistry techniques and their applications in medical diagnosis and scientific research. • Develop critical thinking skills and the ability to analyze and interpret data. • Enhance students' ability to integrate theoretical concepts with practical applications in medical and research field .
43. Teaching and Learning Strategies	
Strategy	• Deliver core concepts through structured lectures. • Use interactive presentations and classroom discussions to reinforce understanding. • Assign reports and short research projects to integrate theory with practice. • Encourage active participation and teamwork in solving immunochemistry-related problem
44. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theory		Introduction to Immunochemistry	Presentation &white board	Quiz, Attendance seminar and written examination
	2 Theory		Antigens and Antibodies		
	2 Theory		Antigen–Antibody Interactio		
	2 Theory		Precipitation reaction		
	2 Theory		Agglutination		
	2 Theory		ELISA technique		
	2 Theory		Mid term exam		
	2 Theory		Complement fixation		
	2 Theory		Monoclonal antibodies productio		
	2 Theory		Antibody purification		
	2 Theory		Radioimmunoassay		
	2 Theory		Molecular diagnostics		
	2 Theory		Immunofluorescence		
	2 Theory		Flow cytometry		
	2 Theory		Immunohistochemistry		
			Final exam		

45. Course Evaluation

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

contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning	
46. 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)	Molecular Immunology by Abul K. Abbas, Andrew H. Lichtman, Jordan S. Pober Paperback -
Recommended books and references (scientific journals, reports...)	Kuby Immunology by Richard A.Goldsby,Thomas J. Kindt and Barbara A. Osborne Paperback
Electronic-References, Website	https://www.livescience.com/26579-immune-system.html

Course Description Form

Course Name:	
Genomics and proteomics	
Course Code:	
PrGe42-BTM	
Semester / Year:	
Second /Fourth class	
Description Preparation Date:	
1-9-2024	
47.Available Attendance Forms:	
Attendance	
48.Number of Credit Hours (Total) / Number of Units (Total)	
30 hours /2 units	
Course administrator's name (mention all, if more than one name)	
Dr. Asmaa Ali Hussein Dr. Zaid Nsaif Abbas	Asmaa.ali@nahrainuniv.edu.iq zaid.altameemi@nahrainuniv.edu.iq

Course Objectives	
Course Objectives	The aim of the Genomics and Proteomics module is 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..
49. Teaching and Learning Strategies	
Strategy	• 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. • Group Discussions: Organize group discussions to facilitate active learning and exchange of ideas. Assign topics or case studies related to genomics and proteomics for students to analyze, discuss, and

	present their findings. • Case Studies: Introduce real-life case studies and scenarios that highlight 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.

50. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theory		Introduction to Genomics	Presentation &white board	Quiz, Attendance seminar and written examination
	2 Theory		DNA Sequencing Techniques		
	2 Theory		Genome annotation and gene prediction		
	2 Theory		Genomic variation and SNP analysis		
	2 Theory		Metagenomics		
	2 Theory		Epigenetics		
	2 Theory		Functional genomics and transcriptomics		
	2 Theory		Mid Exam		
	2 Theory		Introduction and scope of		

			Proteomics		
	2 Theory		Steps in Proteomic Analysis		
	2 Theory		Protein Purification		
	2 Theory		Strategies for protein identification		
	2 Theory		Protein Modifications and Proteomics		
	2 Theory		Protein Engineering		
	2 Theory		Irrational design of protein engineering		
			Exam		

51. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

52. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. 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
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

الدراسات العليا /الماجستير

ت	الموضوع	Subject	الرمز	عدد الساعات	عدد الوحدات
1	علم الحياة الجزيئي المتقدم	Adv. Molecular Biology	MBIO51	2	2
2	علم المناعة المتقدم	Adv. Immunology	MBIO52	2	2
3	علم الاحياء المجهرية الطبية المتقدم	Adv. Medical Microbiology	MBIO53	2	2
4	المعلوماتية الحياتية والاحصاء الحياتي	Bioinformatics and Biostatistics	MBIO54	2	2
5	كمياء حياتية متقدم	Adv. Biochemistry	MBIO55	2	2
6	طرائق بحث	Research Methodology	MBIO56	2	2
7	اللغة الإنكليزية 1	English language I	MBIO57	1	1

ت	الموضوع	Subject	الرمز	عدد الساعات	عدد الوحدات
1	التلاعب الجيني	Gene Manipulation	MBIO58	2	2
2	علم الوباء الجزيئي	Molecular Epidemiology	MBHO59	2	2
3	علم السموم المتقدم	Adv. Toxicology	MBIO501	2	2
4	الاختياري 1	Elective I	MBIO502	2	2
5	الاختياري 2	Elective II	MBIO503	2	2
6	ندوه	Seminar	MBIO504	-	-

Course Description Form

Course Name:	
Advanced Immunnolgy	
Course Code:	
MBIO52	
Semester/Y	
First Semester /Master/	
scription Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours /2 units	
Course administrator's name (mention all, if more than one name)	
Name: Profess Shahlaa Mahdi Salih Email:shahlaa.mahdi@ahrainuniv.edu.iq	Name: Assistant Prof. Rawaa Nazar Email:rawaa.alchalabi@nahrainuniv.edu.iq

53. Course Objectives

Course Objectives	•

54. Teaching and Learning Strategies

Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions, problem-based scenarios, and analysis of clinical case studies (e.g., autoimmunity, cancer immunotherapy, HIV) to strengthen critical thinking and clinical correlation.

55. Course Structure

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

Week 1	2	Explain hematopoiesis and immune cell differentiation	Fundamentals of Blood Cell Biology	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2	Describe innate defense mechanisms and PRRs	Innate Immunity	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 3	2	Identify structure & function of lymphoid organs	Lymphoid & lymphoid tissue	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2	Integrate stages of immune response	The immune respons	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 5	2	Distinguish immunogens, antigens & vaccine principles	Immunogen, antigen and vaccines	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 6	2	Explain antigen processing MHC pathways	Antigen presentatio and MHC complex	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2	Describe immunoglobulin structure, genes and diversity	Immunoglobulins & Immunoglobulin genes	Power point presentation and white board	Written Examinations Seminars and class disussion

Week8	2	Analyze B-cell development & humoral immunity	B- cells developmen & Humoral response	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2	Compare T-cells & NK functions	T-lymphocytes & NK cells	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 10	2	Classify cytokines & their signaling Pathways	Cytokines	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 11	2	Explain chemokine roles in cell trafficking	Chemokines	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2	Describe-complement pathways & kinin system	Complement & kinin	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 13	2	Analyze apoptosis pathways in immune regulation	Apoptosis	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2	Evaluate applications of engineered NK cells	Engineered NK ce	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 15	2	Explain CAR T-cell	CAR T-cell therap	Power point	Written

		therapy design & applicati		presentation and white board	Examinations Seminars and c disussion
Week 16	2	Critically assess immune checkpoints & inhibitors	Immune check point and immune check points inhibitors	Power point presentation and white board	Written Examinations Seminars and c disussion

56. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

57. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Parslow, T. G., Stites, D. P., Terr, A. I., & Imboden, J. B.). Medical immunology. McGraw-Hill.. • Roitt, I., Brostoff, J., & Male, D.). *Essential immunology* (10th ed.). Blackwell Science.
Main references (sources)	• Parslow, T. G., Stites, D. P., Terr, A. I., & Imboden, J. B.). Medical immunology. McGraw-Hill..
Recommended books and references (scientific journals, reports...)	• Owen, J. A., Punt, J., & Stranford, S. A.). Kuby immunology. New York, NY, USA:: WH Freeman.
Electronic-References, Website	Immunopaedia. (n.d.). *Immunopaedia: educational immunology resource*. Retrieved from http://www.immunopaedia.org.za/ Immune Epitope Database (IEDB). (n.d.). *Immune Epitope Database and Analysis Resource*. http://www.iedb.org/

Course Description Form

Course Name:	
Adv. Molecular Biology	
Course Code:	
MBIO51	
Semester / Year:	
First Semester /Master	
Description Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours /2 units	
Course administrator's name (mention all, if more than one name)	
Name: Professor: Dr. Hameed M. Jasim Dr. Resala R. Allami	Hameed.jasim@nahrainuniv.edu.iq ririallami@yahoo.com
Course Objectives	
Course Objectives	• **Understand advanced molecular mechanisms** governing DNA replication, repair, recombination, transcription, and translation in prokaryotic and eukaryotic systems. • **Analyze gene regulation pathways**, including epigenetic regulation, chromatin remodeling, non-coding RNAs, and transcription factor networks. • **Apply modern molecular biology techniques**, such as PCR variants, qPCR, next-generation sequencing (NGS), CRISPR/Cas systems, RNA-seq, and cloning strategies. • **Interpret genomic, transcriptomic, and proteomic data** using bioinformatic tools to understand molecular pathways and regulatory networks. • **Evaluate molecular mechanisms underlying human diseases**, including cancer, genetic disorders, immune dysregulation, and infectious

	diseases.

Teaching and Learning Strategies

Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions, problem-based scenarios, and analysis of clinical case studies.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2		DNA replication , Bacterial DNA replication	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2		Transcription in prokaryotes , Transcription of DNA to RNA , The genetic code	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 3	2		Regulation of Gene Expression in prokaryotes , Transfer RNA	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2		Control of Gene Expression in Prokaryotes	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 5	2		Regulation of Transcription Initiation in Bacteria	Power point presentation and white	Written Examinations Seminars and class

				board	disussion
Week 6	2		Post-translational processing of proteins	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2		Mid-term Exam 1	Power point presentation and white board	Written Examinations Seminars and class disussion
Week8	2		Eukaryotic Chromosomes	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2		Eukaryotic promoters, Eukaryotic RNA Polymerases	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 10	2		Eukaryotic mRNAs, Production of Mature mRNA in Eukaryotes	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 11	2		Processing of pre-mRNA, Processing of Pre-mRNA to Mature mRNA	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2		Regulation of Gene Expression in Eukaryotes, Regulation of Transcription Initiation by Activators, Inhibiting Transcription Initiation	Power point presentation and white board	Written Examinations Seminars and class disussion

			by Repressors		
Week 13	2		Combinatorial Gene Regulation, Gene Silencing	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2		Regulation by Antisense RNA, Micro RNA, Repetitive-Sequence DNA	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 15	2		Mid-term Exam 2		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Molecular Biology of the Cell • Alberts, Bruce et al.6th Edition, Garland Science, 2014. • . Molecular Biology Techniques: A Classroom Laboratory Manual • Heather Miller, 4th Edition, Academic Press, 2019.Good for hands-on laboratory application
Main references (sources)	• Lewin's Genes XII • Krebs, Jocelyn E., et al. Jones & Bartlett Learning, 2020. • A key reference for DNA replication, transcription, translation, and gene expression.
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

58. Course Name:	
Advanced Biochemistry	
59. Course Code:	
MBIO55	
60. Semester / First Year: 2025-2026	
First semester/ Master	
61. Description Preparation Date:	
1-9-2024	
Available Attendance Forms: 1. Manual/Traditional Attendance Sheet 2. Paper-based sign-in sheet where students write their names and signatures for each class.	
Attendance	
3. Number of Credit Hours (Total) / Number of Units (Total):	
30/2 units	
4. Course administrator's name (mention all, if more than one name	
Professor Dr. Maha Hameed Al-Bahrani	
5. Course Objectives	
Course Objectives	• **Deepen Theoretical Knowledge** • Provide an in-depth understanding of biochemical principles, including the structure, function, and regulation of biomolecules. • **Explore Advanced Metabolism** • Analyze complex metabolic pathways, their integration, and regulation in health and disease. • **Molecular Mechanisms** • Explain molecular mechanisms of enzymology, signal transduction, gene expression, and cellular communication. • **Critical Thinking & Problem Solving** • Develop analytical skills to interpret experimental data and solve advanced biochemical problems. • **Laboratory Skills** • Train students in advanced biochemical and molecular biology techniques for research applications. •
6. Teaching and Learning Strategies	
Strategy	**Lectures with Interactive Discussions**

	Problem-Based Learning (PBL) **Laboratory Practical Sessions** • Hands-on training in advanced biochemical and molecular biology techniques, encouraging experimental design and data interpretation. **Seminars & Student Presentations** **Independent Learning & Self-Study** **E-learning Tools & Online Resources**. **Research-Oriented Assignments** • **Tutorials & Mentorship**

7. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1			Buffers and acid-base		
2			Blood Gases		
3			Electrolyte and Water Balance		
4			Clinical applications of electrolytes		
5			Hemoglobin (Structure, Oxygen and Carbon Dioxide, Transport, Abnormal Hemoglobins		
6			Tissue Proteins in Health and Disease -Part 1		
7			Tissue Proteins in Health and Disease -Part 2		
8			Exam-1		
9			Metabolic Pathways of Carbohydrates		
10			Regulation of Blood Glucose, Insulin and Diabetes Mellitus		
			Mechanisms of Action of Hormones/ Thyroid Hormones		
11			Exam-2		

12			Reports		
13			General Amino Acid Metabolism (Urea Cycle, One Carbon Metabolism		
14			Biochemistry of AIDS and HIV		
15			Clinical Laboratory: Screening of Metabolic Diseases; Quality Control		

8. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

9. Learning and Teaching Resources

Required textbooks (curricular books, if any)	TEXTBOOK OF BIOCHEMISTRY For Medical Students
Main references (sources)	. Medical Biotechnology: Advancement and Ethics Lippincott's Illustrated Reviews: Biochemistry Fifth Edition
Recommended books and references (scientific journals, reports...)	http://hwmaint.clsjournal.ascls.org/ https://www.uhcw.nhs.uk/
Electronic-References, Website	

Course Description Form

62. Course Name:	
Academic Skills II / MSc	
63. Course Code:	
MBIO57	
64. Semester / Year:	
1st and 2nd Semester – Master	
65. Description Preparation Date:	
1/9/2024	
66-. Available Attendance Forms:	
Attendance	
67. Number of Credit Hours (Total) / Number of Units (Total):	
30 Hours /2 units	
66. Course administrator's name (mention all, if more than one name)	
Name: Moyas Basil Hadi Email: moyassar.basil@rainuniv.edu.iq	Name: Moyassar Basil Hadi Email: moyassar.basil@nahrainuniv.edu.iq
Course Objectives	
Course Objectives	The course objectives for Headway Academic Skills Level 2 are centered around developing essential skills for academic success. Here are the key objectives:

	• **Reading Skills**:
	  o Improve reading speed and comprehension of complex academic texts
	  o Develop strategies for drawing meaning from context and extracting essential information
	  o Learn to identify main ideas, supporting details, and author's purpose
	• **Writing Skills**:
	  o Produce coherent writing and make clear, appropriate, and relevant notes from academic texts
	  o Develop skills in writing different types of texts, such as summaries, descriptions, and essays
	  o Learn to organize ideas, link ideas, and correct errors
	• **Vocabulary Development**:
	  o Learn strategies for dealing with new or unknown vocabulary
	  o Develop effective use of dictionaries and vocabulary records
	  o Practice recording and using vocabulary in context
	• **Research Skills**:
	  o Develop skills in formulating efficient search plans and finding reliable sources of information
	  o Learn to evaluate sources, credit information, and avoid plagiarism
	  o Understand the importance of academic integrity and proper citation

Teaching and Learning Strategies

Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions, problem-based scenarios, and analysis of clinical case studies.

1. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2		Reading Methods	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2		Effective Reading	Power point	Written

				presentation and white board	Examinations Seminars and class disussion
Week 3	2		Skimming and scannir	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2		Brainstorming idea an linking ideas	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 5	2		Writing an article	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 6	2		Identifying the main id and organizing ideas	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2		Midterm Exam	Power point presentation and white board	Written Examinations Seminars and class disussion
Week8	2		Using formal expressi	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2		Paraphrasing	Power point presentation	Written Examinations

				and white board	Seminars and class disussion
Week 10	2		Writing a summary	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 11	2		Using original sources	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2		Writing from Research	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 13	2		Interpreting data	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2		Interpreting data	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 15	2		Interpreting and illustrating data		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning	
Learning and Teaching Resources	
Required textbooks	Headway Academic Skills: Reading, Writing, and Study Skills (Level 2) Student Book: This book focuses on developing specific skills required for

(curricular books, if any)	academic studies, exploring strategies for success, and providing guidance in key study areas. ISBN: 9780194741606
Main references (sources)	Headway Academic Skills: Reading, Writing, and Study Skills. Student's Book. Sarah Philpot, Editors: Liz and John Soars. Oxford.
Recommended books and references (scientific journals, reports...)	Journal of Academic Language and Learning Journal of English for Academic Purposes Academic Writing Journal
Electronic-References, Website	Academic Skills https://www.indeed.com/career-advice/career-development/academic-skills

Course Description Form

Course Name:	
Adv. Medical Microbiology	
Course Code:	
MBIO53	
Semester / Year:	
First Semester /Master	
Description Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours /2 units	
Course administrator's name (mention all, if more than one name)	
Name: **Dr.Bushra hindi Sal Dr.Ahmed Ali+ DR. Dhafer a alamer**	**Bushra.aftan@nahrainuniv.edu.iq** **Ahmed.ali@nahrainuniv.edu.iq** **dhafar.alugaili@nahrainuniv.edu.iq**
Course Objectives	
Course Objectives	The outcomes of this course provide students with the knowledge and information about the principles of Adv. Medical microbiology , Most important families of bacteria, and most common diseases caused by important *spp* of bacteria, bacterial classification, virulence factors and their role in mechanism of pathogenesis of diseases , clinical sings ,diagnosis, prevention and treatment.
Teaching and Learning Strategies	
Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions, problem-based scenarios, and analysis of clinical case studies.
Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2		Introduction into Adv. medical microbiology, classification of bacteria	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2		Family Micrococcaceae, Staphylococcus most important *spp*, most important diseases caused by each *spp* , pathogenesis of food poisoning ,most important clinical sings, diagnosis , prevention and treatment	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 3	2		Streptococcus**.** classification of bacteria ,Diseases caused by each *spp*, scarlet fever ,causative agent ,most important clinical sings, pathogenesis **of** disease**,** diagnosis and treatment	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2		Family Enterobacteriacae, most important characters of it..*E.coli* most important diseases caused by each species. pathogenesis Salmonella, classification, virulence factors, typhoid fever ,stages of pathogenesis,	Power point presentation and white board	Written Examinations Seminars and class disussion

			diagnosis		
Week 5	2		Brucella *spp*, virulence factors ,Malta fever	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 6	2		Vibrio cholera ,causative agent ,virulence factors, pathogenesis of disease	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2		*Mycobacterium .tuberculosis*,, route of transmission, mechanism of disease.	Power point presentation and white board	Written Examinations Seminars and class disussion
Week8	2		Bacillus *spp*, *Bacillus .anthracis*, , anthrax, most important clinical sings, pathogenesis of bacteria, Clostridia, virulence factors, Gas gangrene, Coryne bacteria, virulence factors, Diphtheria. Listeria ,virulence factors, Listeriosis, clinical sings and pathogenesis	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2		**Exam**	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 10	2		Classification of fungi Ecology of fungi Disease mechanism of fungi	Power point presentation and white board	Written Examinations Seminars and class disussion

Week 11	2		Overview of fungal diseases Predisposing factors Fungal Immunity Laboratory Diagnosis (of Fungal Infection	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2		Superficial and Cutaneous Mycoses Subcutaneous mycoses; Systemic mycoses; Opportunistic Mycoses	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 13	2		Introduction: General aspects in Parasitology Protozoans of Clinical) Importance) ;Free living amoeba (Naegleria species	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2		Intestinal and Urogenital Parasites Entamoeba) ;histolytica Entamoeba coli; Giardia lamblia) ;Cryptosporidium ;species Balantidium coli; Trichomonas vaginalis	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 15	2		Mid-term Exam 2		

Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1-- Murray,p.R;Rosenthal,K.S.and Pfaller,M.A.(2020).Medical Microbiology. E-

	Book.9th(ed.).Elsevier Health 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.
Main references (sources)	3-Forbes,B.A,;Sahm,D.F.;Weissfeld,A.S.and Baron,E.(2007).In Bailey and Scotts diagnostic microbiology.2nd(ed),Mosby,Elsevier,Inc.USA.10-840 4-James,C.and Natalie.(2014).Microbiology.A laboratory manual. 10th (ed.).Pearson.Boston. •
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

Course Name:
Research Methodology
Course Code:
MBIO56
Semester / Year:
First Semester /Master
Description Preparation Date:
1-9-2024
Available Attendance Forms:
Attendance
Number of Credit Hours (Total) / Number of Units (Total)
30 Hours /2 units
Course administrator's name (mention all, if more than one name)
Name: Ali ZAID Fadhl

Course Objectives	
Course Objectives	• U**nderstand the fundamental principles of scientific research**, including the nature of scientific inquiry, research ethics, and characteristics of good research design. • **Identify and formulate research problems**, develop research questions, and construct hypotheses with clarity and precision. • **Learn various research designs**, including qualitative, quantitative, mixed-method, descriptive, experimental, and analytical approaches.

Teaching and Learning Strategies	
Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions

Course Structure

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

Week 1	2		Introduction to Research Methodology	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2		Research Proposal	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 3	2		Literature Review	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2		Experimental Design	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 5	2		Sampling Techniques	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 6	2		Biotechnological Tools and Techniques	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2		Data Collection and Analysis in Medical Biotechnology	Power point presentation and white board	Written Examinations Seminars and class disussion

Week8	2		1st Mid Exam	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2		Research Ethics	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 10	2		Case stidies in medical biotechnology	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 11	2		Ideal supervisor – student relationship	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2		Writing and puplishing research papers	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 13	2		EndNote referencing programmer	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2		Mendeley Referencing Programmer	Power point presentation and white	Written Examinations Seminars and class

				board	disussion
Week 15	2		Final Exam		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as： Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Sharma, J. (2016). Research Methodology in Biological Sciences. CRC Press Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Age International Neumann, K. H., Kumar, A., & Imani, J. (2009). Plant Cell and Tissue Culture – A Tool in Biotechnology: Basics and Application (1st ed.). Springer.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

67.Course Name:	
Molecular Epidemiology	
68.Course Code:	
69.Semester / Year:	
2nd Semester / master	
70.Description Preparation Date:	
1 / 9 / 2024	
71.Available Attendance Forms:	
Attendance	
72.Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 2 Units	
73.Course administrator's name (mention all, if more than one name)	
Name	Sahar M. Hussein, Yasen esmael umran Sahar.hussain@nahrainuniv.edu.iq,
74. Course Objectives	
Course Objectives	• Understand key concepts in epidemiology and molecular biology as they apply to population studies. • Explain molecular mechanisms of disease emergence, transmission, and progression. • Perform and interpret molecular diagnostic assays (PCR, Real-time PCR, sequencing). • Analyze genetic markers used in epidemiology (SNPs, VNTRs, STRs). • Apply molecular tools to outbreak investigation , public health, cancer epidemiology and pathogen typing. • Use bioinformatics databases (NCBI, GISAID) in epidemiological research. • Interpret phylogenetic trees and molecular clock analyses. • Evaluate scientific literature in molecular epidemiology.
75. Teaching and Learning Strategies	
Strategy	Teaching and Learning Methods

	1- Lecture Method 2- PowerPoint System 3- Homework and Seminar System Learning Methods 1- Weekly Quick Exams 2- Discussion, Questions, and Answers 3- International Network for Information on the Subject of Specialization Evaluation Methods 1- Weekly and Termly Exams 2- Student Performance Evaluation through Seminars 3- Grades Based on Homework

76. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T	Understanding the theoretica and practical principles and foundations related to the subject	• **Introduction** • Definition, history, scope of Molecular Epidemiology • Differences between classical vs. molecular epidemiology	Lectures and Seminars	1- Oral and written exams 2- Seminars
2	2T	〃	**Basic Concepts in Epidemiology** • Incidence, prevalence, risk, outbreak definitions • Study designs (case–control, cohort, cross-	〃	〃

			sectional)		
3	2T	″	**Diagnosis in molecular epidemiology** **Molecular Markers** • Host genetic markers • Pathogen genetic markers (virulence genes, resistance genes) **PCR-based Methods** • Conventional PCR • Real-time PCR • Multiplex PCR • Gel electrophoresis interpretation	″	″
4	2T	″	**Complete diagnosis** **Genotyping Methods** • SNP analysis • RFLP • MLST (Multi-Locus Sequence Typing) • PFGE • MLVA **Sequencing Technologies** • Sanger sequencing • Next-Generation Sequencing (Illumina, Nanopore) • WGS in outbreak investigation	″	″
5	2T	″	Cancer epidemiology • Define epidemiological measures in cancer research. • Understand determinants of	″	″

			cancer at population and molecular levels.		
6	2T	″	• Cancer epidemiology • Apply epidemiological reasoning to cancer surveillance and control. • Develop public health recommendations based on evidence.	″	″
7	2T	″	Mid exam	″	″
8	2T	″		″	″
9	2T	″		″	″
10	2T	″		″	″
11	2T	″		″	″
12	2T	″		″	″
13	2T	″		″	″
14	2T	″		″	″
15	2T	″	Final exam	″	″

77. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning.

78. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Epigenetic Epidemiology, Second Edition . Editor Karin B. Michels** **Department of Epidemiology , UCLA Fielding School of Public Health** **Los Angeles, USA 2022**
Main references (sources)	1 - Text books

Recommended books and references (scientific journals, reports...)	
Electronic-References, Websites	الشبكة الدولية للمعلومات في موضوع المقرر

Course Description Form

Course Name:	
Gene Manipulation	
Course Code:	
MBIO58	
Semester / Year:	
Second Semester /Master	
Description Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours /2 units	
Course administrator's name (mention all, if more than one name)	
Name: Professor: Dr. Hameed M. Jasim Dr. Resala R. Allami	Hameed.jasim@nahrainuniv.edu.iq ririallami@yahoo.com
Course Objectives	

Course Objectives	• **Understand fundamental principles of gene manipulation:**
	  • DNA cloning, recombinant DNA technology, plasmids, and vectors.
	  • Mechanisms of gene expression and regulation in prokaryotes and eukaryotes.
	• **Learn modern gene editing techniques:**
	  • CRISPR/Cas systems, TALENs, ZFNs, and RNA interference.
	  • Compare their specificity, efficiency, and applications.
	• **Apply molecular techniques in the laboratory:**
	  • Transformation, transfection, PCR, restriction enzyme digestion, ligation.
	  • Expression of recombinant proteins in bacterial, yeast, or

	mammalian cells.
	
	• **Analyze and interpret experimental data:**
	
	  • Verify gene editing events using sequencing, PCR, or reporter assays.
	  • Troubleshoot molecular experiments.
	
	• **Evaluate ethical, legal, and safety considerations:**
	
	  • Discuss biosafety levels, ethical concerns, and regulatory frameworks.
	  • Assess risks of gene manipulation in medicine, agriculture, and research.
	
	• **Explore applications of gene manipulation:**
	
	  • Gene therapy, synthetic biology, genetically modified organisms (GMOs).
	  • Functional genomics and molecular medicine.
	
	• **Develop critical thinking and research skills:**
	
	  • Design gene manipulation experiments.
	  • Critically read and evaluate current literature in genetic engineering

Teaching and Learning Strategies	
Strategy	• Lectures **& Expert Seminars** Delivered by faculty and guest specialists to provide in-depth theoretical foundations and current advances in immunology. • Interactive **Discussions & Case-Based Learning** Students engage in group discussions, problem-based scenarios, and analysis of clinical case studies.

2. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2		Steps in a gene manipulation experiment, PCR and gene manipulation, Vectors for Gene manipulation, Plasmids, Bacteriophages	Power point presentation and white board	Written Examinations Seminars and class disussion ,reports
Week 2	2		Cloning Vectors for E.	Power point	Written

			coli, pBR322, Other E. coli cloning vectors, pUC8—a Lac selection plasmid	presentation and white board	Examinations Seminars and class disussion
Week 3	2		Bacteriophages, The phage infection cycle, Gene organization in the λ phage, The linear and circular forms of λ DNA	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 4	2		Vectors derived from lambda phage, λ insertion and λ replacement vectors, Cosmid vectors	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 5	2		Manipulation of Purified DNA, DNA manipulative enzymes, DNA modifying enzymes, Enzymes for cutting DNA-restriction endonucleases	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 6	2		Ligation and joining DNA molecules, Linkers, Adaptors,	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 7	2		Mid-term Exam 1	Power point presentation and white board	Written Examinations Seminars and class disussion
Week8	2		Introduction of DNA into Living Cells, Selection for transformed cells,	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 9	2		Vectors for expression of foreign genes in *E. coli*, Promoters used in	Power point	Written Examinations

			expression vectors	presentation and white board	Seminars and class disussion
Week 10	2		Gene manipulation in Medicine, Recombinant insulin, Synthesis of human growth hormones, Recombinant factor VIII	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 11	2		The Polymerase Chain Reaction, Designing the oligonucleotide primers for a PCR, studying PCR products	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 12	2		Sequencing Genes and Genomes, Chain termination DNA sequencing	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 13	2		Studying Gene Expression and Function, studying the RNA transcript of a gene,	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 14	2		Transcript mapping by hybridization between gene andRNA	Power point presentation and white board	Written Examinations Seminars and class disussion
Week 15	2		Final exam		

Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Brown, T.A. – Gene Cloning and DNA Analysis: An Introduction • 8th Edition, Wiley Blackwell, 2016.

	• Glick, B.R., & Pasternak, J.J. – Molecular Biotechnology: Principles and Applications of Recombinant DNA 5th Edition, ASM Press, 2017. • Focuses on recombinant DNA technology, vectors, and applications.Heather Miller, 4th Edition, Academic Press, 2019.Good for hands-on laboratory application
Main references (sources)	• Cox, M.M., Doudna, J.A., & O'Donnell, M. – Molecular Biology: Principles and Practice 2nd Edition, W.H. Freeman
Recommended books and references (scientific journals, reports...)	
Electronic-References, Website	

Course Description Form

Course Name:	
Gene therapy	
Course Code:	
MBIO503	
Semester / Year:	
2nd/MSc	
Description Preparation Date:	
1-9-2024	
Available Attendance Forms:	
Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
30 h/2 units	
Course administrator's name (mention all, if more than one name)	
Prof. Dr. Zahraa k. Zedan & Asst. Prof. Moyasser B. Hadi	Zahraa.kamel@nahrainuniv.edu.iq moyassar.basil@nahrainuniv.edu.iq
Course Objective	
Course Objectives	• Enabling students to acquire the practical skills necessary to understand the gene therapy technology and the main therapeutic applications, **as well as Understand the molecular basis of gene therapy**, including gene regulation, vector design, and delivery mechanisms. • **Critically evaluate different gene therapy strategies**, such as in vivo vs. ex vivo approaches, viral vs. non-viral vectors, and genome editing technologies. • **Analyze ethical, legal, and social implications** of gene therapy in clinical and research contexts. • **Interpret preclinical and clinical trial data** related to gene therapy applications for genetic and acquired diseases. • **Design experimental protocols** for gene therapy research,

	including vector construction, transfection techniques, and efficacy/safety assessments. • **Apply knowledge of regulatory frameworks** governing gene therapy products and clinical trials. • **Explore emerging technologies**, such as CRISPR/Cas systems, RNA-based therapies, and personalized medicine in the context of gene therapy. • Would you like me to help you turn these into a syllabus outline or learning outcomes next?

Teaching and Learning Strategies

• Effective teaching and learning strategies include pre-lab preparation, demonstrations, guided inquiry, collaborative learning, feedback, reflection, integration of theory and practice, and a strong focus on safety. These strategies aim to actively engage students, reinforce theoretical concepts, develop critical thinking skills, and ensure a safe learning environment.

Course Structure

Week	Hrs	Required learning outcomes	Lecture Objective (English)	Learning method	Evaluation method
1	2	Introduction to gene thera	Introduce students to the fundamentals and history gene therapy	White boar Smart scre	Daily quizzes and homework assignments in addition to monthly exams
2	2	Types of gene therapy	Identify the main types and classifications of gene therapy	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
3	2	Medical application for gene therapy	Explain main medical applications of gene therap	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
4	2	*In vivo* gene therapy	Explain in details the method for *in vivo* gene	White board Smart	Daily quizzes and homework

			Therapy	screen	assignments in addition to monthly exams
5	2	*In vitro* gene therapy	Explain in details the method for *in vitro* gene Therapy	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
6	2	1st monthly exam	1st monthly exam	-	1st monthly exam
7	2	Somatic gene therapy	Explain in details the method for *somatic* gene Therapy	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
8	2	Cleaning genes meanings	The theory of using the selective genes in gametes ideal human generation	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
9	2	The types of vectors used in Gene therapy	Main types and applications of each type Of vectors	White board Smart screen	Daily quizzes and homework assignments in addition to monthly exams
10	2	Importance of viral and cellular Vectors used in gene therapy	Main types of viral and Non-viral vectors with Their properties and Packaging capacity	White boarc Smart scree	Daily quizzes and homewo assignments addition to monthly exar
11	2	Successful cases of gene therapy With approaches used	The main diseases which successfully treated via gene therapy	White boarc Smart scree	Daily quizzes and homewo assignments addition to monthly exar

12	2	challenges and limitations in ge therapy	Explain challenges and limitations in gene therapy	White boarc Smart scree	Daily quizzes and homewo assignments addition to monthly exar
13	2	Ethical issues of gene therapy and Advantages and disadvantages Of gene therapy	Main global ethical issues c using gene therapy proced	White boarc Smart scree	Daily quizzes and homewo assignments addition to monthly exar
14	2	Medical application of gene thera	Medical application of ge therapy in details	White boarc Smart scree	Daily quiz and homew assignments addition monthly exar
15	2		2nd exam	White boarc Smart scree	Second mont exam

79. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning

80. Learning and Teaching Resources

Advances in gene therapy 2022

Book series

Application of Innovative Techniques in Genetic and Cellular Therapies,**Yuan Xiong, Jingfeng Li, Yori Er Frontiers Media SA**

Gene Therapy and Tissue Engineering in Orthopaedic and Sports Medicine - Methods in Bioengineering (Paperback

Johnny Huard (editor), **Freddie H. Fu** (editor) 2023

Course Description Form

Bioinformatics and biostatistics
:Course Code .
MBIO54
emester / Yea .81
1/9/2024
Date
2024-9-1
5. Attendance Mode:
Attendace
Total Credit Hours / Units:
30 h/2 units
7. Course Instructors:

Asst. Prof. Dr. Ali Hafidh Abbas	Asst. Prof. Dr. Sahar Medhat Hussein

Course Objectives .82

• **Biostatistics** Biostatistics: 1. Expanding students' understanding of statistical tests used in research experiments. 2. Introducing students to different types of data for their research. 3. Enhancing scientific reasoning to solve research-related obstacles. 4. Preparing graduates with statistical competence for the job market. Bioinformatics:	**Course Objectives**

1. Providing fundamental knowledge of bioinformatics, its importance, and applications.

2. Introducing students to biological databases (genomic, proteomic, microRNA, SNP, etc.) and their usage.

3. Developing skills in sequence analysis (DNA, RNA, protein) using computational tools such as BLAST and ClustalW.

4. Enabling students to construct and interpret phylogenetic trees.

5. Introducing next-generation sequencing (NGS) concepts and RNA-seq analysis.

6. Explaining clinical applications of bioinformatics in diagnostics, biomarker discovery, personalized medicine, and cancer genomics.

7. Enhancing critical thinking through practical data analysis projects.

8. Promoting ethical awareness in handling genomic and clinical data.

Teaching and Learning .83 :Strategies

Strategies

1. Using LCD projector, PowerPoint, Acrobat Reader, and video-based explanations.

2. Assigning homework to reinforce learning.

3. Improving skills through accessing scientific websites.

4. Using the Genome Browser as a reference tool in bioinformatics for genomics, clinical genetics, pharmaceutical development, and more.

In bioinformatics use the genome browser as a reference tool in many different disciplinary fields. It can be used in bioinformatics, clinical genetics, genomic research, pharmaceutical development, and many others. Scientists can navigate the entire human genome, as well as other species, base pair by base pair.

:(Course Structure (.84

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
1- Oral and written exams	Lectures a Seminars	**Introduction to Bioinformatic** o Definition, scope, applications	Used bioinformatics toolse , websi	2	1

2- Seminars		molecular biology and medicine ○ Overview of biological data (DNA, RNA, protein). • **Practical:** ○ Introduction to bioinformatics resources (NCBI, Ensembl, UniP			
		Biological Databases ○ Primary vs. secondary databas ○ Nucleotide databases: GenBank, EMBL, DDBJ. ○ Protein databases: UniProt, PDB. • **Practical:** ○ Data retrieval using NCBI, PubMed, Ensembl.		2	2
		Sequence File Formats & Tool ○ FASTA, FASTQ, GenBank, GFF PDB formats. • **Practical:** ○ Download and interpret sequence files. ○ Basic use of BioEdit and MEG software. **Sequence Alignment Basics** ○ Pairwise alignment (global vs local). ○ Algorithms: Needleman–Wunsch, Smith–Waterman. • **Practical:** ○ Hands-on BLAST search (nucleotide & protein).		2	3
		Multiple Sequence Alignment Phylogenetics ○ Multiple Sequence Alignment (ClustalW, MUSCLE). ○ Phylogenetic trees (UPGMA, Neighbor-Joining). • **Practical:**		2	4

		○ Building and interpreting phylogenetic trees using MEGA.			
		Mid exam		2	5
		Genomics & NGS Data ○ Genome sequencing strategies ○ Next-Generation Sequencing (NGS): concepts and workflow. • **Practical:** ○ Introduction to Galaxy server for NGS analysis		2	6
		Transcriptomics (RNA-seq) ○ RNA-seq basics: expression profiling, normalization. • **Practical:** ○ Analyzing RNA-seq data (HISAT2/STAR, visualization wi IGV		2	7
		Seminar		2	8
		Starting SPSS Entering Data Defining Variables Loading and Saving Data Files Running the First Analysis Examining and Printing Output Files Modifying Data Files Exercises	استخدام البرامج الاحصائية ادخال البيانات الإحصائية والاحصاء الوصفي رسم الاشكال البيانية وعوامل الارتباط والانحدار اختبار الفرضيات الاحصائية	2	9
		Entering and Modifying Data Variables and Data Representation Transformation and Selection of	الاختبارات الغير معلمية اختبارات الأنماط	2	10

		Data Exercises Descriptive Statistics Frequency Distributions and Percentile Ranks for a Single Variable Frequency Distributions and Percentile Ranks for Multiple Variables Measures of Central Tendency and Measures of Dispersion for a Single Group Measures of Central Tendency and Measures of Dispersion for Multiple Groups Standard Scores Exercises	والاليلات الوراثية		
		Graphing Data Graphing Basics Bar Charts, Pie Charts, and Histograms Scatterplots Advanced Bar Charts Prediction and Association Pearson Correlation Coefficient Spearman Correlation Coefficient Simple Linear Regression Multiple Linear Regression Exercises		2	11

		Parametric Inferential Statistics Review of Basic Hypothesis Testing (Null and Alternative Hypotheses(Single Sample t-Test The Independent Samples t-Test Paired Samples t-Test One-Way ANOVA Factorial ANOVA Repeated Measures ANOVA Mixed-Design ANOVA Analysis of Covariance Multivariate Analysis of Variance (MANOYA(		2	12
		Mid exam		2	13
		Nonparametric Inferential Statistics Chi-Square Goodness of Fit Chi-Square Test of Independence Mann-Whitney U Test Wilcoxon Test Kruskal-Wallis H Test Friedman Test Exercises		2	14
		Genotyping and alleles frequencies Hardy-Weinberg equilibrium calculation Pearson's chi-square Odds ratio and 95% confidence		2	15

		interval Fisher's exact probability and Bonferroni corrected probability Exercises			
		Seminar		2	16

85. Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as : Attendance, preparedness, contribution to discussions, engagement in seminars., oral quizzes, and interactive questioning.

86. Learning and Teaching Resources	
Essential bioinformatics by Jin Xiong Bioinformatics and Functional Genomics by Jonathan Pevsner	Required textbooks (curricular books, if any)
Essential bioinformatics by Jin Xiong Bioinformatics and Functional Genomics by Jonathan Pevsner	Main references (sources)
PubMed	Recommended books and references (scientific journals, reports...)
Goggle , fire fox , Ncbi , EMB, SPSS	المراجع الإلكترونية ، مواقع الانترنيت