

Academic Program Description Form

University Name: AL-Nahrain University.

Faculty/Institute: Collage of Biotechnology.

Scientific Department: Plant Biotechnology.

Academic or Professional Program Name: Bachelors

Final Certificate Name: Bachelors of Plant Biotechnology

Academic System: Semester system.

Description Preparation Date: 24\4\2024

File Completion Date: 24\4\2024

Signature:

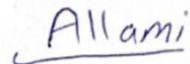


Head of Department Name:

Asst.prof. Inas H. Majeed

Date: 28/4/2024

Signature:



Scientific Associate Name:

Prof. Risala R. Hussain

Date: 28/4/2024

The file is checked by:

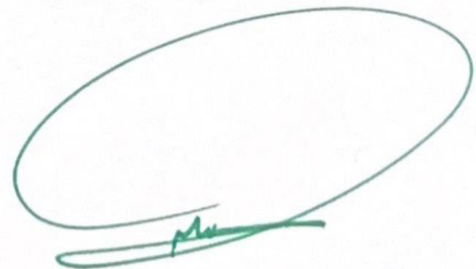
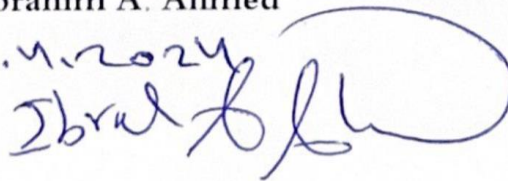
Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Asst. Prof. Ibrahim A. Ahmed

Date: 24.4.2024

Signature:



Approval of the Dean

Prof. Dr. Mohsen H. Risan

1. Program Vision

Working to prepare scientific cadres who possess the necessary practical skills in the field of plant biotechnology to contribute to work in agricultural, industrial and health institutions.

2. Program Mission

Preparing specialized personnel in the fields of plant biotechnology, making full use of plant products and farms, genetically engineering living organisms, producing pharmaceutical compounds, and investing living plant organisms in extracting materials of biological value..

3. Program Objectives

1. Keeping pace with global development in all scientific fields, especially in the specializations of plant biotechnology.
2. Providing society and state institutions with scientific and technical expertise in the field of life sciences and developing its scientific, health and environmental institutions.
3. Raising the level of performance and quality to the ranks of advanced international universities.
4. Develop and modernize scientific curricula, both theoretical and practical.
5. Developing the scientific competencies and performance of teachers, researchers and students.
6. Adopting modern technologies and developing research in scientific fields.
7. Study the pathogens spread in our environment and society, study them scientifically, and participate in finding effective treatment for them.
8. Investing in biotechnology research and genetic engineering techniques to develop the country's industry in its various fields, such as the medical, chemical, food, pharmaceutical, and other industries.

9. Contributing to addressing problems related to plant and microbial flora in Iraq.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

- 1– The economic, health, and social conditions that affect the academic program. For example, economic conditions can affect the availability of funding for academic programs. Or the medical situation can affect student performance, such as the Corona pandemic.
- 2– The development of technology and its use in academic programs can affect how knowledge is presented and acquired.

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

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First year – first semester				
	PBt1-PGB	General plant Biology-I	2	2
	PBt1-CB	Cell Biology	2	2
	PBt1-AC	Analytical Chemistry	2	2
	PBt1-Bph	Biophysics	2	2
	UN1-Eng	New Head way plus	2	-
	UR- DEM	Democracy and Human Right	2	-
First year – second semester	PBt2-AGB	General Animal Biology	2	2
	PBt2-OC	Organic Chemistry	2	2
	PBt2-PrBt	Principle of Biotechnology	2	-
	PBt2-Bst	Biostatistics	2	2
	UR-COM	Computer Science	2	2
	UR-ARA	Arabic	2	-
Second year – first semester				
	BTP21-His	Histology	2	2
	BTP21-BicI	Biochemistry- I	2	2
	BTP41-SM	Secondary Metabolites	2	2
	BTP21-GMic	General Microbiology	2	2
	BTP21-BiSa	Biosafety and Risk Management	2	-
	BTP21-EvBt	Environmental Biotechnology	2	2
	UN21-HR	Human Rights	2	-
	UN21-EnI	New Head way plus	1	-
		جرائم حزب البعث	2	
Second year – second semester	BTP22-BiFe	Biofertilizers	2	2
	BTP22-BicII	Biochemistry II	2	2
	BTP22-BiCo	Biological control	2	-
	BTP22-MePl	Medicinal Plants	2	2
	BTP22-PIDi	Plant Diseases	2	2
	BTP22-PPh	Plant Physiology	2	2
	UN22-Dem	Democracy	2	-
	UN22-EnII	New Head way plus	1	-

Third year – first semester	BTP31-MoB	Molecular biology	2	2
	BTP31-PhChem	Phytochemistry	2	2
	BTP31-PMiTo	Plant and Microbial Toxins	2	2
	BTP31-Enz	Enzymology	2	-
	BTP31-PBiot	Plant Biotechnology	2	-
	BTP31-PTC	Plant Tissue Culture-I	2	2
	BTP31-SeTe	Seed Technology	2	2
	UN31-EnI	New Head way plus	1	-
Third year – second semester	BTP32-TP	Transgenic Plants	3	-
	BTP32-Cyt	Cytogenetics	2	2
	BTP32-RepBiot	Reproductive Biotechnology	2	-
	BTP32-DNAT	DNA Typing	2	2
	BTP32-Phar	Pharmacology	2	2
	BTP32-PTC	Plant Tissue Culture-II	2	2
	UN32-EnII	New Head way plus	1	-
Fourth year – first semester	BTP41-EdV	Edible Vaccins	2	2
	BTP41-FT	Biofuel production	2	-
	BTP41-ScWr	Scientific Writing	2	-
	BTP41-GeEng	Genetic Engineering	2	-
	BTP41-GraPro	Research Project- I	-	2
	BTP41-BioInf	Bioinformatics	2	-
	BTP41E-I	Elective-1	2	-
	BTP41-StAp	Statistical Applications	2	-
	UN41-EnI	New Head way plus	1	-
	BTP42-Phtr	Phytoremediation	2	-
Fourth year – second semester	BTP42-BiSe	Bioseparation	2	2
	BTP42-GePr	Genomics & Proteomics	3	-
	BTP42-BE	Biochemical Engineering	3	-
	BTP42-ReProII	Research Project - II	-	2

	BTP42-PhBt	Pharmaceutical Biotechnology	3	-
	BTP42E-II	Elective - II	2	-
	UN42-EnII	New Head way plus	2	-
	BTP4E-IPB	Industrial Plant Biotechnology	2	-
	BTP4E-IVB	Plant in vitro breeding	2	-
	BTP4E-NBi	Nanobiotechnology	2	-

8. Expected learning outcomes of the program

Knowledge	
Enabling students to obtain knowledge and understanding of the intellectual framework in the field of plant biotechnology	Providing students with the basics and topics related to knowledge and explaining the study subjects by the educational staff through the modern capabilities available.
Skills	
Enabling students to think and analyze topics related to the intellectual framework and international standards for plant biotechnology and beware of the dangers of genetic manipulation with plants.	Providing students with the basics and additional topics related to the outcomes of thinking and technical analysis of plants. Forming discussion groups during lectures to discuss topics in plant technology that require thinking and analysis
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Students learn the value of continued research and exploration in the field of plant biotechnology	Teach students to gain a comprehensive understanding of basic and advanced concepts in plant biotechnology
Promoting the values of integrity and scientific ethics among students, with an emphasis on the importance of working safely and adhering to ethical standards in scientific experiments and research.	Teach students the ability to effectively express technical ideas and concepts, whether through writing or oral explanation.

9. Teaching and Learning Strategies

Encouraging work in small groups to solve problems related to scientific experiments in the field of plant biotechnology, which can contribute to enhancing communication and cooperation skills among students in addition to stimulating critical thinking and exchanging ideas.

10. Evaluation methods

- Daily and semester tests with various questions for the academic subject
- Establishing grades for students' participation in difficult competitive questions
- Establishing grades for assigned class and extracurricular assignments

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirement s/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof.		Plant biotechnology			2	
Prof.		Environmental biotechnology			1	
Prof.		fungi			1	
Assistant Professor		Insects			1	
Assistant Professor		public health			1	
Assistant Professor		Molecular microbiology			1	
Assistant Professor		Molecular genetic			1	
Assistant Professor		Biotechnology			1	

lecturer		cytogenetic			1	
lecturer		p.t.c			2	
lecturer		Plant physiology			1	
lecturer		Molecular genetic			1	
lecturer		Molecular genetic			1	
lecturer		Molecular genetic			2	
lecturer		Molecular genetic			2	
lecturer		Molecular genetic			2	
assistant teacher		Molecular genetic			1	
assistant teacher		Molecular genetic			3	
assistant teacher		Molecular genetic			1	
assistant teacher		Molecular genetic			1	
assistant teacher		Molecular genetic			1	
assistant teacher		Molecular genetic			1	
assistant teacher		Molecular genetic			1	

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

During surveys, workshops, faculty members identify needs –
–. Academic development needs to identify student areas and analyze data

The use of custom training software includes design and specific requirements upon construction

. Personal professional assessment techniques, modern teaching development, and strategies Professionals, whether inside or outside the university, with training by trainers, the programs are implemented –

. Group discussions to exchange experiences and provide opportunities for workshops

Examples of continuous professional development in participation and teaching activities for faculty members are encouraged –

12. Acceptance Criterion

According to the requirements and laws of the Ministry of Higher Education

- **Central admission – scientific branch**
- **Parallel admission – scientific branch**
- **Acceptance of evening study – scientific branch**
- **Accepting a scholarship**

13. The most important sources of information about the program

- University requirements
- Local scientific requirements
- Global scientific requirements
- Covering the specialized staff locally..

14. Program Development Plan

- Defining the educational objectives of the program, such as enhancing students' understanding of basic plant biotechnical concepts, developing practical experimental skills, and promoting scientific research in specific fields.
- Determine the academic subjects and concepts that students will learn

- Determine appropriate educational methods, such as traditional lectures, applied activities, practical experiments, and interactive lessons via the Internet.
- Developing curricula and courses
- Training teachers on the new curricula and educational methods used in the program
- Providing ongoing courses, workshops, seminars and discussions to improve and develop teaching skills.
- Evaluate the program periodically to measure its effectiveness in achieving educational goals.
- Conduct a poll for students and teachers to identify strengths, weaknesses, and areas that can be improved

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	PBt1-PGB	General plant Biology-I	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt1-CB	Cell Biology	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt1-AC	Analytical Chemistry	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt1-Bph	Biophysics	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UN1-Eng	New Head way plus	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UR- DEM	Democracy and Human Right	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt2-AGB	General Animal Biology	essential	√	√	√	√	√	√	√	√	√	√	√	√

	PBt2-OC	Organic Chemistry	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt2-PrBt	Principle of Biotechnology	essential	√	√	√	√	√	√	√	√	√	√	√	√
	PBt2-Bst	Biostatistics	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UR-COM	Computer Science	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UR-ARA	Arabic	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP21-His	Histology	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP21-BicI	Biochemistry- I	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-SM	Secondary Metabolites	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP21-GMic	General Microbiology	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP21-BiSa	Biosafety and Risk Management	essential	√	√	√	√	√	√	√	√	√	√	√	√

	BTP21-EvBt	Environmental Biotechnology	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UN21-HR	Human Rights	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UN21-EnI	New Head way plus	essential	√	√	√	√	√	√	√	√	√	√	√	√
		جرائم حزب البعث	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-BiFe	Biofertilizers	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-BicII	Biochemistry II	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-BiCo	Biological control	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-MePl	Medicinal Plants	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-PiDi	Plant Diseases	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP22-PPh	Plant Physiology	essential	√	√	√	√	√	√	√	√	√	√	√	√

	UN22-Dem	Democracy	essential	√	√	√	√	√	√	√	√	√	√	√	√
	UN22-EnII	New Head way plus	essential	√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-MoB	Molecular biology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-PhChem	Phytochemistry		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-PMiTo	Plant and Microbial Toxins		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-Enz	Enzymology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-PBiot	Plant Biotechnology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-PTC	Plant Tissue Culture-I		√	√	√	√	√	√	√	√	√	√	√	√
	BTP31-SeTe	Seed Technology		√	√	√	√	√	√	√	√	√	√	√	√

	UN31-EnI	New Head way plus		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-TP	Transgenic Plants		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-Cyt	Cytogenetics		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-RepBiot	Reproductive Biotechnology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-DNAT	DNA Typing		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-Phar	Pharmacology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP32-PTC	Plant Tissue Culture-II		√	√	√	√	√	√	√	√	√	√	√	√
	UN32-EnII	New Head way plus		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-EdV	Edible Vaccins		√	√	√	√	√	√	√	√	√	√	√	√

	BTP41-FT	Biofuel production		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-ScWr	Scientific Writing		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-GeEng	Genetic Engineering		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-GraPro	Research Project- I		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-BioInf	Bioinformatics		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41E-I	Elective-1		√	√	√	√	√	√	√	√	√	√	√	√
	BTP41-StAp	Statistical Applications		√	√	√	√	√	√	√	√	√	√	√	√
	UN41-EnI	New Head way plus		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42-Phtr	Phytoremediation		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42-BiSe	Bioseparation		√	√	√	√	√	√	√	√	√	√	√	√

	BTP42-GePr	Genomics & Proteomics		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42-BE	Biochemical Engineering		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42-ReProII	Research Project - II		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42-PhBt	Pharmaceutical Biotechnology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP42E-II	Elective - II		√	√	√	√	√	√	√	√	√	√	√	√
	UN42-EnII	New Headway plus		√	√	√	√	√	√	√	√	√	√	√	√
	BTP4E-IPB	Industrial Plant Biotechnology		√	√	√	√	√	√	√	√	√	√	√	√
	BTP4E-IVB	Plant in vitro breeding		√	√	√	√	√	√	√	√	√	√	√	√

	BTP4E-NBi	Nanobiotec hnology		√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form

1. Course Name:					
Pharmaceutical Biotechnology					
2. Course Code:					
PBt8-PhBt					
3. Semester / Year:					
Semester 2, Year 4					
4. Description Preparation Date:					
24\4\2024					
5. Available Attendance Forms:					
Attendance					
6. Number of Credit Hours (Total) / Number of Units (Total):					
45 hrs					
7. Course administrator's name (mention all, if more than one name)					
Name: Asst. Prof. Dr. Ibrahim Ahmed Email: Ibrahim.ahmed@nahrainuniv.edu.iq					
8. Course Objectives					
Course Objectives	The course is an accelerated basic-level course covering molecular biology (DNA, cloning, protein expression and purification) and some aspects of the discovery, production and use of biotherapeutics. It focuses on protein-based therapeutics producing in different hosts.				
9. Teaching and Learning Strategies					
Strategy	<ul style="list-style-type: none"> Lectures Case Studies Group Discussions Online Resources 				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction			
2	3	Drug development process			
3	3	Therapeutic Proteins			
4	3	Cloning vectors			
5	3	Post-translational modifications in proteins			
6	3	Production of recombinant			

		protein in Prokaryotic cells			
7	3	Production of recombinant protein in Eukaryotic cells			
8	3	Midterm exam			
9	3	Recombinant protein detection and quantification			
10	3	Upstream processing			
11	3	Downstream processing			
12	3	Scale- up process			
13	3	"OMICS" technologies in drug industry.			
14	3	Personalized medicine			
15	3	Final Exam			

11.Course Evaluation

Presentations, daily oral discussions, reports etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports...)	<p>Pharmaceutical Biotechnology, Concepts and Applications by Gray Walsh</p> <p>Pharmaceutical Biotechnology, Fundamentals and Applications by Daan Crommelin ; Robert Sendelar & Bernd Meibohm.</p>
Electronic References, Websites	

Course Description Form

13.Course Name:					
Molecular Biology					
14.Course Code:					
PBt4-MB					
15.Semester / Year:					
1 st semester / 3 rd year					
16.Description Preparation Date:					
24/4/2024					
17.Available Attendance Forms:					
Attendance					
18.Number of Credit Hours (Total) / Number of Units (Total)					
60 hrs					
19.Course administrator's name (mention all, if more than one name)					
<p>Name: Asst. Prof. Dr. Noora Adil</p> <p>Email: noora.adil@nahrainuniv.edu.iq</p> <p style="padding-left: 40px;">Asst. Prof. Dr. Ibrahim Ahmed</p> <p>Email: ibrahim.ahmed@nahrainuniv.edu.iq</p>					
20.Course Objectives					
Course Objectives	<p>The course focuses on:</p> <ul style="list-style-type: none"> The basics of molecular biology and genetics, Structure and function of biologically important molecules, give a range of theoretical knowledge and practical lab skills. Basic mechanisms such as DNA replication, translation and transcription. 				
21.Teaching and Learning Strategies					
Strategy					
22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Macromolecules		Power point and white board	Quizzes, Assignments and written exam
2	2	Properties of nucleic acids		"	"
3	2	Spectroscopic and thermal properties of nucleic acids		"	"
4	2	Prokaryotic chromosome structure		"	"

5	2	Eukaryotic chromosome structure		"	"
6	2	DNA replication		"	"
7	2	Gene anatomy		"	"
8	2	Midterm exam			
9	2	Split genes		"	"
10	2	Transcription in prokaryotes		"	"
11	2	Transcription in Eukaryotes		"	"
12	2	RNA processing and RNPs		"	"
13	2	Gene expression		"	"
14	2	The genetic code		"	"
15	2	Final exam			
23.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final examsetc					
24.Learning and Teaching Resources					
Required textbooks (curricular books, if any)		<p>Molecular Biology of the Cell. 8th edition Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2020.</p> <p>Practical Handbook Of Biochemistry And Molecular Biology/ Gerald D Fasman</p>			
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Course Description Form

25.Course Name:					
Cell Biology					
26.Course Code:					
PBtI-CB					
27.Semester / Year:					
1 st semester / 1 st year					
28.Description Preparation Date:					
24/4/2024					
29.Available Attendance Forms:					
Attendance					
30.Number of Credit Hours (Total) / Number of Units (Total)					
60 hrs					
31.Course administrator's name (mention all, if more than one name)					
<p>Name: Asst. Prof. Dr. Noora Adil</p> <p>Email: noora.adil@nahrainuniv.edu.iq</p> <p style="padding-left: 40px;">Asst. Prof. Dr. Ibrahim Ahmed</p> <p>Email: ibrahim.ahmed@nahrainuniv.edu.iq</p>					
32.Course Objectives					
Course Objectives	The course focuses on study of the structure and function of the cell. In this course we will focus on Eukaryotic cell biology and will cover topics such as membrane structure and composition and transport.				
33.Teaching and Learning Strategies					
Strategy					
34. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	History of Cell discovery		Power point and white board	Quizzes, Assignments and written exam
2	2	Cell structure		"	"
3	2	Cell organelle part 1		"	"
4	2	Cell organelle part 2		"	"
5	2	Cell organelle part 3		"	"
6	2	Active and Passive Transport		"	"
7	2	Cell Signaling		"	"
8	2	Midterm exam			
9	2	Cells division		"	"

10	2	Cell cycle		"	"
11	2	Cell Apoptosis		"	"
12	2	Photosynthesis		"	"
13	2	Cellular Respiration		"	"
14	2	Aerobic Respiration		"	"
15	2	Final Exam			
35.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final examsetc					
36.Learning and Teaching Resources					
Required textbooks (curricular books, if any)		Molecular biology (the cell) 7 th edition			
Main references (sources)		Concepts and Techniques in cell division			
Recommended books and references (scientific journals, reports...)		Principles of biotechnology			
Electronic References, Websites		https://www.nature.com/scitable/topic/cell-biology-13906536/			

Course Description Form

37.Course Name:					
Principle Of Biotechnology					
38.Course Code:					
PBt2-PrBt					
39.Semester / Year:					
2 semester / 1 st year					
40.Description Preparation Date:					
24/4/2024					
41.Available Attendance Forms:					
Attendance					
42.Number of Credit Hours (Total) / Number of Units (Total)					
30 hrs					
43.Course administrator's name (mention all, if more than one name)					
Name: Asst. Prof. Dr. Noora Adil Email: noora.adil@nahrainuniv.edu.iq Asst. Prof. Dr. Ibrahim Ahmed Email: ibrahim.ahmed@nahrainuniv.edu.iq					
44.Course Objectives					
Course Objectives	The course provides a basic introduction to the field of biotechnology				
45.Teaching and Learning Strategies					
Strategy					
46. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction Of Biotechnology		Power point and white board	Quizzes, Assignments and written exam
2	2	Genetic Material		"	"
3	2	Stages of biotechnology		"	"
4	2	Plant and biotechnology		"	"
5	2	TRANSGENEC PLANTS		"	"
6	2	Mid. Exam. 1		"	"
7	2	Application of Biotechnology		"	"
8	2	Fermentation			
9	2	Fermentor		"	"

10	2	Fermenter types and application		"	"
11	2	Modern Biotechnology		"	"
12	2	Application of Biotechnology in food industry		"	"
13	2	Insulin production		"	"
14	2	Nanobiotechnology		"	"
15					
47.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily homework, oral exam, quizzes, reports, seminars, mid-term, and final examsetc					
48.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Principle of biotechnology		
Main references (sources)			Biotechnology in Cartoons, 1st Edition 2015		
Recommended books and references (scientific journals, reports...)			Biotechnology		
Electronic References, Websites			https://www.ntnu.edu/ibt/about-us/what-is-biotechnology/		

Course Description Form

49. Course Name:	
Plant Genetic Engineering	
50. Course Code:	
PIGeEng	
51. Semester / Year:	
2 nd Semester / MSc	
52. Description Preparation Date:	
1 / 9 / 2023	
53. Available Attendance Forms:	
Attending	
54. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
55. Course administrator's name (mention all, if more than one name)	
Name: Khalid H. Alobaidi Email: khaled.alobaidi@nahrainuniv.edu.iq Name: Asma G. Oraibi Email: asma.ghatea@nahrainuniv.edu.iq	
56. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> Covering the basics of molecular biology of eukaryotic organisms. Complete understanding of how the cells of living organisms work at the molecular level. The possibility of using modern applications of molecular life science to develop various pharmaceutical and medical industries
57. Teaching and Learning Strategies	
Strategy	The graduate must be able to know and understand all of the following: 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects Education methods 1- Lectures 2- Power point system 3- Homework and seminar system Learning methods 1- Weekly rapid exams 2- Discussion, immediate questions and answers 3- The international network for information on the subject of specialization

58. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the elementary theoretical principles and foundations related to subject	Introduction in Plant Genetic Engineering.	Lectures and seminars	Oral and written exams Seminars
2	2	=	Methods for the Development of Genetically engineered plants for Production of Natural Products.	=	=
3	2	=	Genetic Engineering Applications in Improvement of Cereal Grain Quality.	=	=
4	2	=	Genetic Modification for Engineer Salt Tolerance plants.	=	=
5	2	=	Applications of Genetic Modification to Engineer Drought Tolerance plants.	=	=
6	2	=	Engineering Fungal Resistance plants.	=	=
7	2	=	Nanotechnology for Plant Genetic Engineering.	=	=
8	2	=	1 st Mid Exam	=	=
9	2	=	Agro- bacterium Mediated Gene Transfer in Plants	=	=
10	2	=	Gene Transfer	=	=
11	2	=	Chloroplast Transformation	=	=
12	2	=	Transgenic Science in Plant Improvement	=	=
13	2	=	Gene Mapping in Plants	=	=
14	2	=	Physical Mapping	=	=
15	2	=	Marker-Assisted Selection for Plant Breeding and Livestock Improvement	=	=
59. 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					
60. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Gerstein A.S. 2004. <i>Molecular Biology Problem Solver: A Laboratory Guide</i> . John Wiley & Sons. Gilbert S. F. 2010. <i>Developmental Biology</i> (9 th edition); Sinauer Associates, Inc		
Main references (sources)			Li Hong Wang.2008.How effective is T-DNA insertional mutagenesis in <i>Arabidopsis</i> ? J Biochem Tech 1(1):11-20.		

	Day A and Clermont MG. 2011. The chloroplast transformation toolbox: selectable markers and marker removal. <i>Plant Biotechnology Journal</i> , 9, 540–553.
Recommended books and references (scientific journals, reports...)	Miguel Muñoz Ruiz and José R. Regueiro (2012). New Tools in Regenerative Medicine: Gene Therapy. <i>Stem Cell Transplantation</i> . Chapter 17, 254-275
Electronic References, Websites	http://www.nature.com/scitable/topicpage/plant-cells-chloroplasts-and-cell-walls-14053956

Course Description Form

61. Course Name:	
Plant Biotechnology	
62. Course Code:	
BTA31-PBiot	
63. Semester / Year:	
1 st Semester / 3 rd year	
64. Description Preparation Date:	
1 / 9 / 2023	
65. Available Attendance Forms:	
Attending	
66. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
67. Course administrator's name (mention all, if more than one name)	
Name: Khalid H. Alobaidi Email: khaled.alobaidi@nahrainuniv.edu.iq Name: Asma G. Oraibi Email: asma.ghadea@nahrainuniv.edu.iq	
68. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> Covering the basics of biotechnology regarding plants. A complete understanding of how the cells of living organisms work at the molecular level. The possibility of using modern applications of molecular life science and genetic engineering to benefit from plants at the industrial, food, pharmaceutical and various medical industries.
69. Teaching and Learning Strategies	
Strategy	<p>The graduate must be able to know and understand all of the following:</p> <ol style="list-style-type: none"> 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects <p>Education methods</p> <ol style="list-style-type: none"> 1- Lectures 2- Power point system 3- Homework and seminar system

	<p>Learning methods</p> <p>1- Weekly rapid exams</p> <p>2- Discussion, immediate questions and answers</p> <p>3- The international network for information on the subject of specialization</p>
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70. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T	Understanding the elementary theoretical principles and foundations related to subject	Introduction	Lectures and seminars	Oral and written exams Seminars
2	2T	=	Scope and Importance of Biotechnology.	=	=
3	2T	=	Genetic Engineering.	=	=
4	2T	=	Tissue Culture facts.	=	=
5	2T	=	Biosensors, Biosurfactents, Biochips and Biofilms.	=	=
6	2T	=	Uses of Biotechnology to Agriculture.	=	=
7	2T	=	Transgenic Plants.	=	=
8	2T	=	1 st Mid Exam	=	=
9	2T	=	Methods to Transfer Genes in Plants.	=	=
10	2T	=	Some of the uses of transgenic plants.	=	=
11	2T	=	Edible vaccines.	=	=
12	2T	=	Molecular Breeding.	=	=
13	2T	=	Microsatellites.	=	=
14	2T	=	Transgenic plants with beneficial traits.	=	=
15	2T	=	Commercial use of transgenic plants.	=	=

71. 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

72. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Plant Biology and Biotechnology Volume II: Plant Genomics and Biotechnology 2015
Main references (sources)	Plant Biotechnology: Principles and Applications 2017
Recommended books and references (scientific journals, reports...)	Plant Biotechnology and Genetics Principles, Techniques, and Applications 2016

Course Description Form

73. Course Name:	
Phytoremediation	
74. Course Code:	
BTA42-Phtr	
75. Semester / Year:	
2 nd Semester / 4 th year	
76. Description Preparation Date:	
1 / 9 / 2023	
77. Available Attendance Forms:	
Attending	
78. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours / 30 Units	
79. Course administrator's name (mention all, if more than one name)	
Name: Khalid H. Alobaidi Email: khaled.alobaidi@nahrainuniv.edu.iq	
80. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> Introducing the basics of environmental reclamation techniques. Fully understand the qualitative work of plants at the agricultural and functional levels in agricultural agricultural decomposition. The possibility of using modern applications of biotechnology for environmental reclamation.
81. Teaching and Learning Strategies	
Strategy	<p>The graduate must be able to know and understand all of the following:</p> <ol style="list-style-type: none"> 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects <p>Education methods</p> <ol style="list-style-type: none"> 1- Lectures 2- Power point system 3- 3- Homework and seminar system <p>Learning methods</p> <ol style="list-style-type: none"> 1- Weekly rapid exams 2- Discussion, immediate questions and answers 3- The international network for information on the subject of specialization
82. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the elementary theoretical principles and foundations related to subject	Introduction	Lectures and seminars	Oral and written exams Seminars
2	2	=	Environmental pollution.	=	=
3	2	=	Land Pollution.	=	=
4	2	=	Bioremediation.	=	=
5	2	=	Phytoremediation.	=	=
6	2	=	Essential Plant's Metabolic Processes for Phytoremediation.	=	=
7	2	=	Cellular and molecular mechanisms involved in phytoremediation.	=	=
8	2	=	1 st Mid Exam	=	=
9	2	=	Different Processes/Techniques in Phytoremediation.	=	=
10	2	=	Things Considered for Successful Phytoremediation Implementation.	=	=
11	2	=	Advantages and Limitations of Phytoremediation.	=	=
12	2	=	Recent Advancements in Phytoremediation.	=	=
13	2	=	Genetically engineered plants for phytoremediation.	=	=
14	2	=	Transgenic Plants in Phytoremediation.	=	=
15	2	=	Future Prospects and Conclusions.	=	=

83. 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

84. Learning and Teaching Resources

Required textbooks (curricular books, if any)	<u>Phytoremediation</u> Management of Environmental Contaminants, Volume 3 2016
Main references (sources)	de Mello-Farias, Paulo Celso, Ana Lúcia Soares Chaves, and Claiton Leoneti Lencina. "Transgenic plants for enhanced phytoremediation–physiological studies." <i>Genetic transformation</i> (2011): 305-328.
Recommended books and references (scientific journals, reports...)	National Risk Management Research Laboratory (US). Introduction to phytoremediation. National Risk Management Research Laboratory, Office of Research and Development, US Environmental Protection Agency; 2000.
Electronic References, Websites	

Course Description Form

85.	Course Name:		
		DNA \typing	
86.	Course Code:		
		BTA32-DNAT	
87.	Semester / Year:		
		2 nd Semester / 3 rd year	
88.	Description Preparation Date:		
		1 / 9 / 2023	
89. Available Attendance Forms:			
Attending			
90. Number of Credit Hours (Total) / Number of Units (Total)			
60 Hours / 45 Units			
91.	Course administrator's name (mention all, if more than one name)		
	Name: Khalid H. Alobaidi Email: khaled.alobaidi@nahrainuniv.edu.iq Name: Hasan Abdulhadi Hussein Email: hasan.abdulhadi@nahrainuniv.edu.iq		
92.	Course Objectives		
Course Objectives	<ul style="list-style-type: none"> • Understanding and appreciation of the field of forensic science and DNA Typing. • Understand and appreciate the scope, versatility and utility of many DNA Typing techniques. • Understand and appreciate the possibility of using modern applications of PCR technology to facilitate DNA Typing techniques. 		
93.	Teaching and Learning Strategies		
Strategy	The graduate must be able to know and understand all of the following: 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects Education methods 1- Lectures 2- Power point system 3- Homework and seminar system Learning methods 1- Weekly rapid exams 2- Discussion, immediate questions and answers		

3- The international network for information on the subject of specialization

94. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2T+2L	Understanding the elementary theoretical principles and foundations related to subject	Introduction	Lectures and seminars	Oral and written exams Seminars
2	2T+2L	=	Environmental pollution.	=	=
3	2T+2L	=	Land Pollution.	=	=
4	2T+2L	=	Bioremediation.	=	=
5	2T+2L	=	Phytoremediation.	=	=
6	2T+2L	=	Essential Plant's Metabolic Processes for Phytoremediation.	=	=
7	2T+2L	=	Cellular and molecular mechanisms involved in phytoremediation.	=	=
8	2T+2L	=	1 st Mid Exam	=	=
9	2T+2L	=	Different Processes/Techniques in Phytoremediation.	=	=
10	2T+2L	=	Things Considered for Successful Phytoremediation Implementation.	=	=
11	2T+2L	=	Advantages and Limitations of Phytoremediation.	=	=
12	2T+2L	=	Recent Advancements in Phytoremediation.	=	=
13	2T+2L	=	Genetically engineered plants for phytoremediation.	=	=
14	2T+2L	=	Transgenic Plants in Phytoremediation.	=	=
15	2T+2L	=	Future Prospects and Conclusions.	=	=

95. 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

96. Learning and Teaching Resources

Required textbooks (curricular books, if any)	DNA Fingerprinting in Plants Principles, Methods, and Applications Second Edition 2005
Main references (sources)	Paranaiba, Renato TF, et al. "Forensic botany and forensic chemistry working together: application of plant DNA barcoding as a complement to forensic chemistry—a case study in Brazil." <i>Genome</i> 62.1 (2019): 11-18.
Recommended books and references (scientific journals, reports...)	Plant Biology and Biotechnology Volume II: Plant Genomics and Biotechnology 2015
Electronic References, Websites	

Course Description Form

97.	Course Name:		
		Genetic Engineering	
98.	Course Code:		
		BTA41-GeEng	
99.	Semester / Year:		
		1 st Semester / 4 th year	
100.	Description Preparation Date:		
		1 / 9 / 2023	
101.	Available Attendance Forms:		
		Attending	
102.	Number of Credit Hours (Total) / Number of Units (Total)		
		30 Hours / 30 Units	
103.	Course administrator's name (mention all, if more than one name)		
		Name: Khalid H. Alobaidi Email: khaled.alobaidi@nahrainuniv.edu.iq	
104.	Course Objectives		
Course Objectives	<ul style="list-style-type: none"> • Covering the basics of molecular biology of eukaryotic and prokaryotic organisms. • A complete understanding of how the cells of living organisms work at the molecular level. • The possibility of using modern applications of molecular life science to develop various pharmaceutical and medical industries. 		
105.	Teaching and Learning Strategies		
Strategy	<p>The graduate must be able to know and understand all of the following:</p> <ol style="list-style-type: none"> 1- The theoretical principles and foundations related to the scientific subject of cognitive sciences 2- The foundations of scientific research, methods of measurement, analysis, and finding solutions to scientific problems 3- The importance of theoretical scientific aspects related to the applications of various sciences 4- Scientific and linguistic terms and their definition of various scientific subjects 5- Methods related to analyzing and designing scientific experiments for various scientific subjects <p>Education methods</p> <ol style="list-style-type: none"> 1- Lectures 2- Power point system 3- Homework and seminar system <p>Learning methods</p> <ol style="list-style-type: none"> 1- Weekly rapid exams 2- Discussion, immediate questions and answers 		

3- The international network for information on the subject of specialization

106. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the elementary theoretical principles and foundations related to subject	Introduction	Lectures and seminars	Oral and written exams Seminars
2	2	=	Environmental pollution.	=	=
3	2	=	Land Pollution.	=	=
4	2	=	Bioremediation.	=	=
5	2	=	Phytoremediation.	=	=
6	2	=	Essential Plant's Metabolic Processes for Phytoremediation.	=	=
7	2	=	Cellular and molecular mechanisms involved in phytoremediation.	=	=
8	2	=	1 st Mid Exam	=	=
9	2	=	Different Processes/Techniques in Phytoremediation.	=	=
10	2	=	Things Considered for Successful Phytoremediation Implementation.	=	=
11	2	=	Advantages and Limitations of Phytoremediation.	=	=
12	2	=	Recent Advancements in Phytoremediation.	=	=
13	2	=	Genetically engineered plants for phytoremediation.	=	=
14	2	=	Transgenic Plants in Phytoremediation.	=	=
15	2	=	Future Prospects and Conclusions.	=	=
107. 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					
108. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Plant Biology and Biotechnology Volume II: Plant Genomics and Biotechnology 2015		
Main references (sources)			Plant Biotechnology: Principles and Applications 2017		
Recommended books and references (scientific journals, reports...)			Plant Biotechnology and Genetics Principles, Techniques, and Applications 2016		
Electronic References, Websites					

Course Description Form

109.	Course Name: Enzymology				
110.	Course code: PBt6-ENZ				
111.	Semester / Year: Semester 1, Year 3				
112.	Description Preparation Date: 25\4\2024				
113.	Available Attendance Forms: Attendance				
114.	Number of Credit Hours (Total) / Number of Units (Total): 2\2 unit				
115.	Course administrator's name (mention all, if more than one name)				
Name: Dr. Nedhaal Suhail Zbar Email: Nedhaal.suhail@nahrainuniv.edu.iq					
116.	Course Objectives				
Course Objecti	The module aims to provide students with a good working knowledge of the properties and behaviour of enzymes and also to provide the basic practical skills necessary to work with enzymes in the laboratory.				
117.	Teaching and Learning Strategies				
Strategy	<p style="text-align: center;">At the end of the course students will be able to:</p> <ol style="list-style-type: none"> 1. Describe the principles of enzymatic catalysis and plot and analyse enzyme kinetic data 2. Determine the specific activity of an enzyme preparation 3. Determine values for KM and Vmax for an enzyme 4. Determine the optimum pH and temperature of an enzyme <p style="text-align: center;">Determine the inhibition constant of an enzyme inhibitor</p>				
118. Course Structure					
Week	Ho ur s	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Nomenclature and classification of enzymes	Properties of proteins and enzymes, macromolecules essential to all life.	Blackboard	Daily exams and homework
2	2	Protein secondary structure, super secondary structure and tertiary folds and introduce key concepts in protein folding, including intrinsically unfolded proteins.	Study structures of protein	Blackboard	Daily exams and homework
3	2	Enzyme Inhibition and Kinetics Classification of Inhibitors	Study methods of enzyme inhibition	Blackboard	Daily exams and homework
4	2	Kinetic parameters that describe enzyme catalysis, inhibition and allosteric regulation	Completing the lesson of enzyme inhibition	Blackboard	Daily exams and homework
5	2	Mid Exam	Mid exam		
6	2	Mechanisms of action of several major enzyme classes	Study and illustrate key catalytic strategies.	Blackboard	Daily exams and homework
7	2	Characteristics and Properties of Enzymes Catalytic power and specificity Enzymes as catalysts Enzyme-substrate interactions	lock & key model induced fit model transition state model	Blackboard	Daily exams and homework
8	2	○ Reversible ○ Irreversible	Noncompetitive ○ Substrate	Blackboard	Daily exams and homework
9	2	○ Competitive ○ Uncompetitive	How to inhibit enzymes	Blackboard	Daily exams and homework
10	2	Nomenclature /Classification	Classification of enzymes	Blackboard	Daily exams and homework
11	2	Lineweaver - Burk plot,	Each student must know modules of enzymes and its pathway	Blackboard	Daily exams and homework
12	2	Coenzymes - prosthetic group,	Activator of enzymes	Blackboard	Daily exams and homework

119. Course Evaluation

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

120. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- Lehninger: Principles of Biochemistry (Textbook) David Nelson and Michael Cox (2013)
- Lehninger: Principles of Biochemistry, 6th edition, W.H. Freeman & Co., New York.
- Enzymes: Biochemistry, Biotechnology and Clinical

	<p>Chemistry (Textbook) Trevor Palmer (2007)</p> <p>Enzymes: Biochemistry, Biotechnology and Clinical Chemistry, 2nd edition, Albion Press. Introduction to Protein Structure (Textbook) Carl Branden & John Tooze (1999) Introduction to Protein Structure, 2nd edition, Garland Publ., New York.</p>
Main references (sources)	<ul style="list-style-type: none"> • Lehninger: Principles of Biochemistry (Textbook) David Nelson and Michael Cox (2013) • Lehninger: Principles of Biochemistry, 6th edition, W.H. Freeman & Co., New York. <p>Enzymes: Biochemistry, Biotechnology and Clinical Chemistry (Textbook) Trevor Palmer (2007)</p> <p>Enzymes: Biochemistry, Biotechnology and Clinical Chemistry, 2nd edition, Albion Press. Introduction to Protein Structure (Textbook) Carl Branden & John Tooze (1999) Introduction to Protein Structure, 2nd edition, Garland Publ., New York.</p>

Course Description Form

121. Course Name: computer science

122. Course Code:

123. Semester / Year: second semester

124. Description Preparation Date: 2024_4_28

125. Available Attendance Forms: In person

126. Number of Credit Hours (Total) / Number of Units (Total): ٤

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

Name: noor Khalid Hussain

Email: noor.khalidhussien@nahrainuniv.edu

128. Course Objectives

Course Objectives

- Complete knowledge of the computer and its parts
- Full knowledge of how to use its applications
- Full knowledge of computer programming languages and ways to use them

129. Teaching and Learning Strategies

Strategy

The strategy is to teach in person through lectures, electronic activities, and homework
And implementing small projects

130. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		Functionalities of a computer	Practice/home work	Quiz/practice
2			Application of Computers/ Computer Components		
3			Computer hardware Components/ Computer Software Components/ Type of computer Software		
4			Disk Operating System DOS/ Instructions of Disk Operating System		
5			Microsoft office basics/ Microsoft word basics/ Microsoft word Functionalities		

6			Microsoft power point basics/ Microsoft power point Functionalities		
7			Computer languages/ Introduction to computer algorithms		
8			Introduction to Flowchart		
9			built algorithms using flowchart		
10			Introduction to C++ language/ C++ structure		
11			C++ component/ C++ Output (Print Text)/ C++ Syntax/ C++ Comments		
12			C++ Comments/ C++ Identifiers/ C++ User Input & Display Variables		
13			mathematical calculations in C++& Creating a Simple Calculator		
14			condition statements		
15			If ...then condition statement		

131. Course Evaluation

132. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer principles/C++ language/Microsoft office applications
Main references (sources)	Computer science/ C++ language/ Microsoft office applications
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

133.	Course Name: Genomics and proteomics				
134.	Course Code:				
135.	Semester / Year: Semester 2, Year 4				
136.	Description Preparation Date: 28-4-2024				
137.	Available Attendance Forms: Lectures, seminars and attendance				
138.	Number of Credit Hours (Total) / Number of Units (Total): 3hour \3 unit				
139.	Course administrator's name (mention all, if more than one name)				
	Name: Dr. Noora adil		Email: noora.adil@nahrainuniv.edu.iq		
	Name: Dr. Tabarak Sabah		Email: tabarak.sabah@nahrainuniv.edu.iq		
140.	Course Objectives				
Course Objectives	Basic coverage of biological inputs • Understand and appreciate the possibility of using modern applications in the science of plant and medical precautionary measures				
141.	Teaching and Learning Strategies				
Strategy	1- Lectures 2- Power point system 3- Homework and seminar system				
142.	Course Structure				
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction in genomics	Introduction in genomics	Presentation and whiteboard	Oral Discussion and Quiz
2	3	Types of genomics	Types of genomics	Presentation and whiteboard	Oral Discussion and Quiz
3	3	Structural genomics	Structural genomics	Presentation and whiteboard	Oral Discussion and Quiz
4	3	Functional genomics	Functional genomics	Presentation and whiteboard	Oral Discussion and Quiz
5	3	Comparative genomics	Comparative genomics	Presentation and whiteboard	Oral Discussion and Quiz
6	3	Mid. Exam. 1	Mid. Exam. 1		
7	3	Introduction and scope of proteomics	Introduction and scope of proteomics	Presentation and whiteboard	Oral Discussion and Quiz

8	3	Steps in proteomic analysis	Steps in proteomic analysis	Presentation and whiteboard	Oral Discussion and Quiz
9	3	Strategies for protein identifications	Strategies for protein identifications	Presentation and whiteboard	Oral Discussion and Quiz
10	3	Protein purification	Protein purification	Presentation and whiteboard	Oral Discussion and Quiz
11	3	Protein modification	Protein modification	Presentation and whiteboard	Oral Discussion and Quiz
12	3	Protein engineering	Protein engineering	Presentation and whiteboard	Oral Discussion and Quiz
13	3	Proteomics applications	Proteomics applications	Presentation and whiteboard	Oral Discussion and Quiz
14	3	review	review	Presentation and whiteboard	Oral Discussion and Quiz
15	3	Mid. Exam. 2	Mid. Exam. 2		

143. Course Evaluation Presentations, daily oral discussions, reports etc.

144. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Genomics and Proteomics 1st Edition by <u>Devarajan Thangadurai</u> (Editor), <u>Jeyabalan Sangeetha</u> (Editor)
Main references (sources)	Concepts and Techniques in Genomics and Proteomics
Recommended books and references (scientific journals, reports...)	<u>Principles of Genomics and Proteomics</u> 1st Edition - January 25, 2023 Authors: Rakeeb Ahmad Mir, Sheikh Mansoor Shafi, Sajad Majeed Zargar Language: English Paperback ISBN: 9780323990455
Electronic References, Websites	https://www.sciencedirect.com/book/9780323990455/principles-of-genomics-and-proteomics

Course Description Form

145. Course Name: cytogenetics

146. Course Code:

147. Semester / Year: semester system

148. Description Preparation Date: 1/9/2023

149. Available Attendance Forms: Lectures and seminars

150. Number of Credit Hours (Total) / Number of Units (Total): 4 hours weekly

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

Name: Dr. Asmaa Obaid

Email: asmaa.ismeel@yahoo.com

Dr. Noor Ahmed

noor.ahmed@nahrainuniv.edu.iq

152. Course Objectives

Course Objectives

- 1- Understand of cytogenetics science.
- 2- Understand and explain chromosome of the cell.
- 3- Knowledge the chromosomal abnormalities.
- 4- detection of chromosomal abnormalities by using modern procedure.

153. Teaching and Learning Strategies

Strategy

Lectures / power points / homework, seminars and reports

154. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 hr.	Understand the principles and fundamental of theory and practice related to the subjects.	Introduction of Cytogenetics	Lectures and seminars	Written and oral exams
2	2 hr.	=	Introduction to chromosomes	=	=
3	2hr.	Explain types of chromosomes	Typed, size and numbers of chromosomes	=	=
4	2hr.	Understand the process of cell division	mitosis	=	=
5	2 hr.	Explain the process of cell division	meiosis	=	=
6	2 hr.	Understand the chromosomal abnormalities	Structural abnormalities of chromosome	=	=
7	2 hr.	Mid exam			

8	2 hr.	Understand the numerical chromosome	Numerical abnormalities of chromosomes	=	=
9	2 hr.	Explain the principles of plant cytogenetics	Plant cytogenetics	=	=
10	2 hr.	Explain the methods for detection of chromosomal abnormalities	Cytogenetics techniques such as fish, karyotyping and CGH	=	=
11	2 hr.		Review of cytogenetics and seminars	=	=
12	2 hr.	Mid exam 2.			

155. Course Evaluation

Degree distribution about 100 degree to the student for exam, homework ,seminars, oral exam

156. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Text book
Main references (sources)	Text book, scientific journal, thesis
Recommended books and references (scientific journals, reports...)	Reports
Electronic References, Websites	Websites

Course Description Form

1. Course Name: **Pharmaceutical Biotechnology**

2. Course Code:

3. Semester / Year: **Second Semester / 4th year**

4. Description Preparation Date: **28 / 4 / 2024**

5. Available Attendance Forms: **in the University**

6. Number of Credit Hours (Total) / Number of Units (Total): **45 hr. / 3 units**

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

Name: **Assis. Prof. Dr. Ibraheem**

Email:

Name: **Assis. Prof. Dr. Mohammed Ayyed Najm**

Email: dr.mohammed.ayyed@ibnsina.edu.iq

8. Course Objectives

Course Objectives

1. Students will understand the various techniques used in modern biotechnology.
2. Students can design research strategy with step-by-step instructions to address a research problem.
3. Students can able to provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic.
4. Students can explain the concept and application of monoclonal antibody technology
5. Students can demonstrate and Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products
6. Students can able to explain the general principles of generating transgenic plants, animals and microbes.

9. Teaching and Learning Strategies

Strategy

1. Active learning.
2. Case study.
3. Cooperative learning
4. Direct Instruction.
5. Discussion.
6. Problem solving
7. Small group work.
8. Quizzes.
9. Exams.

10. Course Structure

Week	Hours	Title	Evaluation method
1	2	Drug discovery phases.	Discussion & Tests
2	2	New approaches in drug industry.	Discussion & Tests
3	2	"OMICS" technologies in drug industry.	Discussion & Tests
4	2	Upstream and downstream processing of drugs.	Discussion & Tests
5	2	Purification steps of drugs.	Discussion & Tests
6	2	The dose-effect relationship.	Discussion & Tests
7	2	Pharmacokinetic and pharmacodynamics.	Discussion & Tests
8	2	1 st Exam.	Discussion & Tests
9	2	Concepts of increasing pharmaceuticals in in vitro plant cultures.	Discussion & Tests
10	2	Genomics in new drug discovery	Discussion & Tests
11	2	Gene therapy in drug industry.	Discussion & Tests
12	2	gene transfer as gene therapy.	Discussion & Tests

Course Description Form

157. Course Name:					
Biochemistry II					
158. Course Code:					
BTM22-BicII					
159. Semester / Year:					
2 nd semester / 2 nd year					
160. Description Preparation Date:					
28 / 1 / 2024					
161. Available Attendance Forms:					
162. Number of Credit Hours (Total) / Number of Units (Total)					
4 Hours / 3 units					
163. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mustafa Kahtan Sameen Al-Bayaty					
Email: Mustafa.kahtan@nahrainuniv.edu.iq					
164. Course Objectives					
Course Objectives	The objectives of this course involve building the foundation for application of the understanding of the basic chemical processes of the body in health and diseases. Providing insights into principles of carbohydrates, lipids, and proteins metabolism. The course also provides an understanding of the integrated metabolism of the human body in the well-fed state, and in an extended starvation state. Providing an understanding of the reaction chemistries of individual metabolic pathways and how the activities of these pathways are integrated and regulated by neurotransmitters and hormones. the course also provides insights into the causes of some disorders and syndromes caused by metabolic errors. The course also aims to apply the knowledge and understanding of integrated metabolism to the ability of the human body to adapt and respond to its environment and maintain health. Demonstrate the role of chemistry in health and disease. Learning about the chemical processes that occur within living organisms and studying how cells work at the sub-cellular and molecular levels. Providing some general principles of plant biochemistry. Providing an understanding of photosynthesis reactions in photosynthetic organisms, defining, and introducing chlorophyll pigments, types, and functions in addition to accessory pigments of other photosynthetic organisms. Understanding of carbon dioxide cycle which represents one of the phenomena of life on earth.				
165. Teaching and Learning Strategies					
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by practical experiments at the laboratory involving the different aspects of biochemistry.				
166. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to carbohydrates metabolism	Carbohydrates metabolism 1	Power point presentation and white board	Daily exams and homework
2	2	Introduction to carbohydrates metabolism	Carbohydrates metabolism 2	Power point presentation and white board	Daily exams and homework

3	2	Introduction to carbohydrates metabolism	Carbohydrates metabolism 3	Power point presentation and white board	Daily exams and homework
4	2	Introduction to the regulation of blood glucose	Regulation of blood glucose	Power point presentation and white board	Daily exams and homework
5	2	Introduction to lipid metabolism	Lipids metabolism 1	Power point presentation and white board	Daily exams and homework
6	2	Introduction to lipid metabolism	Lipids metabolism 2	Power point presentation and white board	Daily exams and homework
7	2	Introduction to protein metabolism	Proteins metabolism 1	Power point presentation and white board	Daily exams and homework
8	2	Introduction to protein metabolism	Proteins metabolism 2	Power point presentation and white board	Daily exams and homework
9	2	Mid-term exam	Mid-term exam	Power point presentation and white board	Daily exams and homework
10	2	Introduction to some disorders caused by errors in amino acid metabolism	Inborn errors of amino acid metabolism	Power point presentation and white board	Daily exams and homework
11	2	Introduction to the types of plasma proteins	Plasma proteins	Power point presentation and white board	Daily exams and homework
12	2	Introduction to Plant Biochemistry	Introduction to plant biochemistry	Power point presentation and white board	Daily exams and homework
13	2	Introduction to photosynthesis: light reactions	Photosynthesis I	Power point presentation and white board	Daily exams and homework
14	2	Introduction to photosynthesis: dark reactions	Photosynthesis II	Power point presentation and white board	Daily exams and homework
15	2	Final exam	Final exam	Power point presentation and white board	Daily exams and homework

167. Course Evaluation

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

168. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Heldt - Plant Biochemistry 3 rd Ed. Marks Essentials of Medical Biochemistry A Clin Approach Essentials of biochemistry by Pankaja Naik
Main references (sources)	Plant Biochemistry 2 nd Ed. by Caroline Bowsher & Alyson Tobin Lehninger Principles of Biochemistry Mathews biochemistry Introduction To Plant Biochemistry, 2 nd Ed. By Goodwin & Mercer Principles of Medical Biochemistry, 3E (2012)
Recommended books and references (scientific journals, reports...)	Lippincott Illustrated Reviews: Biochemistry Fundamentals of plant biochemistry by L.K. Attri & V.C. Chandel
Electronic References, Websites	

Course Description Form

169. Course Name:					
Biochemistry I					
170. Course Code:					
BTM21-BicI					
171. Semester / Year:					
1 st semester / 2 nd year					
172. Description Preparation Date:					
173. Available Attendance Forms:					
174. Number of Credit Hours (Total) / Number of Units (Total)					
4 Hours / 3 units					
175. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mustafa Kahtan Sameen Al-Bayaty Email: Mustafa.kahtan@nahrainuniv.edu.iq					
176. Course Objectives					
Course Objectives	The objectives of this course involve providing the essentials for understanding all living processes. This module aims to teach core concepts in biochemistry including topics on structure of proteins, carbohydrates, lipids, enzymes, and nucleic acids. The module will also provide a background to fundamental aspects of chemistry. This module provides the core knowledge and skills to enhance performance in the area of biological chemistry. Understand how the chemical properties of molecules determine the ways in which they interact and react with each other. Understand different types of chemical reactions and how they are used by living organisms. Use a variety of models to understand and explain chemical and biochemical phenomena, being aware of their strengths and weaknesses.				
177. Teaching and Learning Strategies					
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by practical experiments at the laboratory involving the different aspects of biochemistry.				
178. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to carbohydrates	Chemistry of carbohydrates 1	Power point presentation and white board	Daily exams and homework
2	2	Introduction to carbohydrates	Chemistry of carbohydrates 2	Power point presentation and white board	Daily exams and homework
3	2	Introduction to lipids	Chemistry of lipids 1	Power point presentation and white board	Daily exams and homework
4	2	Introduction to lipids	Chemistry of lipids 2	Power point presentation and white board	Daily exams and homework

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

179. Course Evaluation

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

180. Learning and Teaching Resources

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

Course Description Form

181.	Course Name:
	Biostatistics
182.	Course Code:
	PBT2-Bst
183.	Semester / Year:
	Semester 2, Year 1
184.	Description Preparation Date:
	28\4\2024
185.	Available Attendance Forms:
	Attendance
186.	Number of Credit Hours (Total) / Number of Units (Total):
	2hour \2 unit
187.	Course administrator's name (mention all, if more than one name)
	Name: Dr. Zaid Nsaif Abbas Email: zaid.altameemi@nahrainuniv.edu.iq
188.	Course Objectives
Course Objectives	<p>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:</p> <ol style="list-style-type: none"> 1. Understanding Statistical Concepts: The module aims to familiarize students with fundamental statistical concepts, such as population, sample, variables, measures of central tendency, and measures of dispersion. Students will learn how to describe, summarize, and analyze data using appropriate statistical techniques. 2. Data Analysis and Interpretation: The module aims to equip students with the necessary skills to collect, organize, and analyze data effectively. Students will learn how to apply statistical methods to explore relationships, patterns, and trends within datasets. They will also gain proficiency in interpreting and drawing meaningful conclusions from statistical analyses. 3. Statistical Inference: The module aims to introduce students to the principles of statistical inference, including hypothesis testing and confidence interval estimation. Students will learn how to formulate research hypotheses, select appropriate statistical tests, and make valid inferences about populations based on sample data. 4. Statistical Software and Tools: The module aims to familiarize students with commonly used statistical software and tools. Students will gain hands-on experience in using statistical software packages to perform data analysis, conduct statistical tests, and generate graphical representations of data. 5. Critical Thinking and Problem-Solving: The module aim to enhance students' critical thinking and problem-solving skills through the application of statistical methods. Students will develop the ability to identify real-world problems that can be addressed using statistical analysis and propose appropriate solutions based on data-driven evidence.

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

189. Teaching and Learning Strategies

Strategy	<ol style="list-style-type: none"> 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 clarify their understanding.
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190. Course Structure

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

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

191. Course Evaluation

Presentations, daily oral discussions, reports etc.

192. Learning and Teaching Resources

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