جامعة البحرين
University of Bahrain
مركز ضمان الجودة والاعتماد الأكاديمي
Quality Assurance and Accreditation Center

Academic Course Specification Form

استمارة توصيف المقرر الأكاديمي

القسم الخاص بالطالب
Section Concerning the Student

1. Course Code:	BIOLS 465	**1. رمز المقرر:**
2. Course Title	Gene Technology	**2. اسم المقرر:**
3. College:	Science	**3. الكلية:**
4. Department:	Biology	**4. القسم:**
5. Academic Program:	Bachelor of Science in Biology	**5. البرنامج الأكاديمي:**
6. Course Credits:	2-2-3	**6. عدد الساعات المعتمدة:**
7. Course NQF Level:	8	**7. مستوى المقرر وفقا للإطار الوطني للمؤهلات:**
8. Notional Hours:	124	**8. عدد الساعات الافتراضية:**
9. NQF Credits:	12	**9. عدد الساعات المعتمدة للمقرر وفقا للإطار الوطني للمؤهلات:**
10. Prerequisite:	BIOLS 250 and BIOLS 360	**10. المتطلب السابق للمقرر:**
11. Lectures Timing & Location:		**11. وقت المحاضرة ومكانها:**
12. General Mode of Teaching and Learning	Traditional تقليدي	**12. النمط العام للتعليم والتعلّم:**

13. Course Coordinator:	-	**13. منسّق المقرر:**
14. Course Instructor:		**14. مدرّس المقرر:**
15. Office Hours and Location:		**15. الساعات المكتبية ومكانها:**
16. Instructor's Email:		**16. البريد الإلكتروني لمدرّس المقرر:**
17. Academic Year:		**17. السنة الأكاديمية:**
18. Semester:		**18. الفصل الدراسي:**

19. Textbook(s):	**19. الكتب الدراسية للمقرر:**
Gene Cloning & Analysis: An Introduction/T. A. Brown; 8th ed; 2021; Wiley-Blackwell publishing- ISBN: 9781119640783 - LAB Manuals: Laboratory DNA Science; By: Bloom; Freyer, and Micklos; Benjamin/Cummings Publishing Company; 1995	
20. References:	**20. المراجع:**
Molecular Biology: Principles and Practice; Michael Cox etal., 2015;2nd ed. W. H. Freeman and Company. https://scholar.google.com/scholar?q=gene+technology+review+references&hl=en&as_sdt=0%2C5&as_vis=1&as_ylo=2000&as_yhi=2024	
21. Other Learning Resources Used (e.g. e-learning, field visits, periodicals, software, etc.):	**21. مصادر التعلّم الأخرى (مثال: التعلّم الإلكتروني، زيارات ميدانية، دوريات، برمجيات، إلخ....)**
a. www.ncbi.nlm.nih.gov (PubMed; genebank and software therein) b. www.sciencedirect.com (literature search) Journals: Nature; Nature genetics; Science; Nature Biotechnology; Journal of Biotechniques.	
22. Course Description (as published in the College Catalogue):	**22. توصيف المقرر (حسب ما ورد في دليل الكلية):**
Perpetuation of DNA; fine structure of the gene; mapping bacterial and viral chromosomes; transposition. Gene cloning: isolation and characterization of DNA and the gene, development of cloning vectors, in vitro mutagenesis; introduction of different vectors to prokaryotes and eukaryotes	
23. Course Intended Learning Outcomes (3 to 5 CILOs):	**23. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعلّمية):**
1. Summarize the range of strategies for cloning foreign genes in *E. coli* and the factors involved in selection of a strategy for a particular gene.	
2. Evaluate the methodologies available for the analysis of genes and genomes.	

3. Apply key procedures needed for gene cloning and the analysis of cloned genes.
4. Determine the problems of achieving high level expression of foreign genes in bacterial hosts and the approaches taken to overcoming these difficulties.
5. Evaluate the range of cloning tools used for eukaryotes and their applications.

24. Course Assessment Percentages (as per Regulations of Study and Examination at the University of Bahrain):		**24. أساليب التقييم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين):**	
Assessment **التقييم**	**Type** **النوع**	**Percentage** **النسبة**	**Assessment Date** **تاريخ التقييم**
Test I	Individual فردي	*20%*	
Test II	Individual فردي	*30%*	
Assignment I	Individual فردي	*20%*	
Lab Attendance and Participation	Individual فردي	*10%*	
Final Exam		*40%*	
Total	**100%**		

25. Description of Topics Covered	**25. وصف الموضوعات التي ينبغي تناولها:**
Topic Title ***(e.g. chapter/experiment title)*** **الموضوع**	***Description*** **التفصيل**
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 1 Introduction: Why Gene Cloning and DNA Analysis are Important
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 2 Vectors for Gene Cloning: Plasmids and Bacteriophages
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 3 Purification of DNA from Living Cells
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 4 Manipulation of Purified DNA
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 5 Introduction of DNA into Living Cells
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 6 Cloning Vectors for E. coli
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 7 Cloning Vectors for Eukaryotes
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 8 How to Obtain a Clone of a Specific Gene
Part I The Basic Principles of Gene Cloning and DNA Analysis	Ch. 9 The Polymerase Chain Reaction

Part II The Applications of Gene Cloning and DNA Analysis in Research	Ch. 10 Sequencing Genes and Genomes
Part II The Applications of Gene Cloning and DNA Analysis in Research	Ch. 11 Studying Gene Expression and Function
Part II The Applications of Gene Cloning and DNA Analysis in Research	Ch. 12 Studying Genomes
Part II The Applications of Gene Cloning and DNA Analysis in Research	Ch. 13-17 omics & gene products and application in agriculture, medicine; analysis and forensics

26. Weekly Schedule **26. الجدول الأسبوعي**

Week الأسبوع	Date التاريخ	Topics Covered الموضوعات المتناولة	CILOs مخرجات التعلّم للمقرر (CILOs)	Teaching/Assessment Mode and Method منهجية ونمط التدريس/التقييم
1		1.1 The early development of genetics 1.2 The advent of gene cloning and the polymerase chain reaction 1.3 What is gene cloning? 1.4 What is PCR? 1.5 Why gene cloning and PCR are so important 2.1Plasmids: Features, sizes, classes and replication	*1and 3*	Tranditional تقليدي
2		2.2 Bacteriophages: Features, sizes, and cycle 3.1 Preparation of total cell DNA 3.2 Preparation of plasmid DNA	1,2, and 3	Tranditional تقليدي
3		3.3 Preparation of bacteriophage DNA 4.1 The range of DNA manipulative enzymes	1 and 3	Tranditional تقليدي

4		4.2 Enzymes for cutting DNA—restriction endonucleases 4.3 Ligation—joining DNA molecules together 5.1 Transformation—the uptake of DNA by bacterial cells 5.2 Identification of recombinants 5.3 Introduction of phage DNA into bacterial cells	1,2, and 3	Tranditional تقليدي
5		5.4 Identification of recombinant phages 5.5 Introduction of DNA into non-bacterial cells	1,2, and 3	Tranditional تقليدي
6		6.1 Cloning vectors based on *E. coli* plasmids 6.2 Cloning vectors based on M13 bacteriophage 6.3 Cloning vectors based on e bacteriophage 6.4 λ and other high-capacity vectors enable genomic libraries to be constructed 6.5 Vectors for other bacteria	1 and 3	Choose an item.
7		.1 Vectors for yeast and other fungi 7.2 Cloning vectors for higher plants 7.3 Cloning vectors for animals	5	Tranditional تقليدي
8		**Midsemester Break**	Click or tap here to enter text.	Choose an item.

9		8.1 The problem of selection 8.2 Direct selection 8.3 Identification of a clone from a gene library 8.4 Methods for clone identification	1 and 5	Tranditional تقليدي
10		9.1 The polymerase chain reaction in outline 9.2 PCR in more detail 9.3 After the PCR: studying PCR products 9.4 Real-time PCR enables the amount of starting material to be quantified	3 and 5	Tranditional تقليدي
11		10.1 chain termination DNA sequencing 10.2 next-generation sequencing 10.3 how to sequence a genome	3	Tranditional تقليدي
12		11.1 Studying the RNA transcript of a gene 11.2 Studying the regulation of gene expression 11.3 Identifying and studying the translation product of a cloned gene	2,3, and 5	Tranditional تقليدي
13		12.1 Genome annotation 12.2 Studies of the transcriptome and proteome	2,3, and 5	Tranditional تقليدي
14		Production of Protein from Cloned Genes 13.1 Special vectors for expression of	3 and 5	Tranditional تقليدي

		foreign genes in *E. coli* 13.2 General 3 and 5problems with the production of recombinant protein in *E. coli* 13.3 Production of recombinant protein by eukaryotic cells		
15		Production of Protein from Cloned Genes 13.1 Special vectors for expression of foreign genes in *E. coli* 13.2 General problems with the production of recombinant protein in *E. coli* 13.3 Production of recombinant protein by eukaryotic cells	3 and 5	Tranditional تقليدي
16				

27. Academic Integrity Statement	**27. بيان النزاهة الأكاديمية**
Students are to observe the highest level of honesty and academic ethics in pursuit of their academic goals as per UOB Regulations of Student Conduct and Academic Integrity, Anti-plagiarism Policies, and Students' Rights and Responsibilities Handbook. The consequences for cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty can be very serious and will be dealt with as per the aforementioned policies and regulations.	يتعيّن على الطلبة الالتزام بأعلى مستويات الصدق والأمانة والأخلاق الأكاديمية في سعيهم لتحقيق أهدافهم الأكاديمية وفقًا للوائح سلوك الطلاب والنزاهة الأكاديمية، سياسات مكافحة الانتحال، ودليل حقوق الطلبة وواجباتهم، المعمول بها في جامعة البحرين. يمكن لعواقب الغش والسرقة الأدبية والتعاون غير المصرح به وغيرها من أشكال عدم الأمانة الأكاديمية أن تكون خطيرة للغاية وسيتم التعامل معها وفقًا للسياسات واللوائح المذكورة آنفا.
28. Attendance and Absence Regulations	**28. نظام الحضور والغياب**
Students are required to adhere to regular attendance for class lectures and practical sessions, as determined by the nature of the course, as per Article (33) of Regulations of Study and Examination at the University of Bahrain.	يجب على الطلبة الالتزام بالحضور المنتظم للمحاضرات الصفية والعملية، حسبما تحدده طبيعة المقرر الدراسي، ووفقا للمادة (33) من نظام الدراسة والامتحانات في جامعة البحرين.

1. Laboratory Weekly Schedule

Week	*Date*	*Topics covered*	*CILOs*	*Teaching Method*	*Assessment*
2		Orientation/ Micropipetting and Sterile Technique; Bacterial Culture Techniques	2,3,5	Practical	***Assignment 1***
3		DNA Restriction & Electrophoresis	2,3,5	Practical	***Assignment 1***
4		DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	***Assignment 1***
5		DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	***Assignment II***
6		DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	***Assignment II***
7		DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	***Assignment II***
8		Replica Plating to Identify Mixed *E. coli* with recombinant DNA	2,3,5	Practical	***Assignment II***
9		Polymerase Chain Reaction	2,3,5	Practical	*Assignment II*
10		Basics of Bioinformatics	2,3,5	Practical	*Assignment II*
11		Review and Q & A session	1-5	Discussion	