



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 وفقاً للإطار الوطني للمؤهلات:
8. Notional Hours:	124	8. عدد الساعات الافتراضية:
9. NQF Credits:	12	9. عدد الساعات المعتمدة للمقرر وفقاً للإطار الوطني للمؤهلات:
10. European Credit Transfer System (ECTS) credits	6	10. عدد الساعات للمقرر بالنظام الأوروبي
11. Prerequisite:	BIOLS 250 and BIOLS 360	11. المتطلب السابق للمقرر:
12. Lectures Timing & Location:		12. وقت المحاضرة ومكانها:

13. General Mode of Teaching and Learning	Traditional تقليدي	13. النمط العام للتعليم والتعلم:
14. Course Coordinator:	-	14. منسق المقرر:
15. Course Instructor:		15. مدرّس المقرر:
16. Office Hours and Location:		16. الساعات المكتبية ومكانها:
17. Instructor's Email:		17. البريد الإلكتروني لمدرّس المقرر:
18. Academic Year:		18. السنة الأكاديمية:
19. Semester:		19. الفصل الدراسي:
20. Textbook(s):	20. 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		
21. References:	21. المراجع:	
Molecular Biology: Principles and Practice; Michael Cox et al., 2015; 2 nd 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		
22. Other Learning Resources Used (e.g. e-learning, field visits, periodicals, software, etc.):	22. مصادر التعلم الأخرى (مثال: التعلم 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.		
23. Course Description (as published in the College Catalogue):	23. 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		
24. Course Intended Learning Outcomes (3 to 5 CILOs):	24. مخرجات التعلم للمقرر (CILOs) (3 إلى 5 مخرجات تعليمية):	
1. Summarize the range of strategies for cloning foreign genes in <i>E. coli</i> 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.			
25. Course Assessment Percentages (as per Regulations of Study and Examination at the University of Bahrain):		25. أساليب التقييم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين):	
Assessment التقييم	Type النوع	Percentage النسبة	Assessment Date تاريخ التقييم
Test I	Individual فردى	20%	
Test II	Individual فردى	30%	
Assignment I	Individual فردى	20%	
Lab Attendance and Participation	Individual فردى	10%	
Final Exam		40%	
Total	100%		
26. Description of Topics Covered		26. 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	
27. Weekly Schedule			27. الجدول الأسبوعي	
Week الأسبوع	Date التاريخ	Topics Covered الموضوعات المتناولة	CILOs مخرجات التعلم 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 2.1 Plasmids: Features, sizes, classes and replication	1 and 3	Traditional 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	Traditional تقليدي
3		3.3 Preparation of bacteriophage DNA 4.1 The range of DNA manipulative enzymes	1 and 3	Traditional 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 <i>E. coli</i> plasmids 6.2 Cloning vectors based on M13 bacteriophage 6.3 Cloning vectors based on ϕ 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.
7-8		7.1 Vectors for yeast and other fungi 7.2 Cloning vectors for higher plants 7.3 Cloning vectors for animals	5	Tranditional تقليدي
9		8.1 The problem of selection	1 and 5	Tranditional تقليدي

		8.2 Direct selection 8.3 Identification of a clone from a gene library 8.4 Methods for clone identification		
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 foreign genes in <i>E. coli</i>	3 and 5	Tranditional تقليدي

		13.2 General 3 and 5 problems with the production of recombinant protein in <i>E. coli</i> 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 <i>E. coli</i> 13.2 General problems with the production of recombinant protein in <i>E. coli</i> 13.3 Production of recombinant protein by eukaryotic cells	3 and 5	تقليدي Tranditional
16				
28. Academic Integrity Statement			28. 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.			يتعين على الطلبة الالتزام بأعلى مستويات الصدق والأمانة والأخلاق الأكاديمية في سعيهم لتحقيق أهدافهم الأكاديمية وفقاً للوائح سلوك الطلاب والنزاهة الأكاديمية، سياسات مكافحة الانتحال ، دليل حقوق الطلبة واجباتهم ، 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 وفقاً للسياسات واللوائح المذكورة آنفاً.	
29. Attendance and Absence Regulations			29. 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، ووفقاً للمادة (33) من نظام الدراسة والامتحانات في جامعة البحرين .	

1. Laboratory Weekly Schedule

<i>Week</i>	<i>Date</i>	<i>Topics covered</i>	<i>CILOs</i>	<i>Teaching Method</i>	<i>Assessment</i>
2	17-19 Sep	Orientation/ Micropipetting and Sterile Technique; Bacterial Culture Techniques	2,3,5	Practical	<i>Assignment I</i>
3	24-26 Sep	DNA Restriction & Electrophoresis	2,3,5	Practical	<i>Assignment I</i>
4	1-3 Oct	DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	<i>Assignment I</i>
5	8-10 Oct	DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	<i>Assignment II</i>
6	15-17 Oct	DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	<i>Assignment II</i>
7	22-24 Oct	DNA cutting, ligation and transformation of E. coli with Recombinant DNA	2,3,5	Practical	<i>Assignment II</i>
8	29-31 Oct	Replica Plating to Identify Mixed <i>E. coli</i> with recombinant DNA	2,3,5	Practical	<i>Assignment II</i>
9	5-7 Nov	Polymerase Chain Reaction	2,3,5	Practical	<i>Assignment II</i>
10	12-14 Nov	Basics of Bioinformatics	2,3,5	Practical	<i>Assignment II</i>
11	19-21 Nov	Review and Q & A session	1-5	Discussion	