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 409	**1. رمز المقرر:**
2. Course Title	Biotechnology and Development	**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:	3-0-3	**6. عدد الساعات المعتمدة:**
7. Course NQF Level:	8	**7. مستوى المقرر وفقا للإطار الوطني للمؤهلات:**
8. Notional Hours:	134	**8. عدد الساعات الافتراضية:**
9. NQF Credits:	13	**9. عدد الساعات المعتمدة للمقرر وفقا للإطار الوطني للمؤهلات:**
10. Prerequisite:	BIOLS 404	**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:**
Current Developments in Biotechnology and Bioengineering; 1st Edition - January 3, 2023, 1st ed; Huu Hao Ngo et al., ISBN: 9780323918732	
20. References:	**20. المراجع:**
Biotechnology, John Smith, 5th ed	
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....)**
www.sciencedirect.com (literature search) **Nature Biotechnology; Journal of Biotechniques**	
22. Course Description (as published in the College Catalogue):	**22. توصيف المقرر (حسب ما ورد في دليل الكلية):**
Promises of biotechnology for developing countries; agriculture horticulture forestry; Importance of plant genetic resources; food and nutrition; medicine and public health; production of pharmaceuticals, Energy production; pollution control.	
23. Course Intended Learning Outcomes (3 to 5 CILOs):	**23. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعلّمية):**
1. Discuss the role of biotechnological approaches as driving solutions for sustainable development in developing countries.	
2. Evaluate the safety of genetically modified food and its nutritional value and biotechnological products and its related ethical issues.	
3. Interpret the applications of biotechnology for Medicine and public health	
4. Discuss the proper biotechnological methods to enhance petroleum oil recovery, upgrading and bioremediation of oil pollution .	
5. Present a minireview in a manuscript format on selected current issues pertaining biotechnology and sustainable development.	

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**
Midterm I	Individual فردي	*15%*	
Midterm II	Individual فردي	*15%*	
Minireview	Pair ثنائي	*20%*	
Minireview presentation	Pair ثنائي	*5%*	
Article summary	Pair ثنائي	*5%*	
Final Exam	Individual فردي	*40%*	
Total	**100%**		

25. Description of Topics Covered	25. وصف الموضوعات التي ينبغي تناولها:
Topic Title ***(e.g. chapter/experiment title)*** **الموضوع**	***Description*** **التفصيل**
Chapter 1	Introduction to biotechnology & sustainable development goals
Chapter 2	The use of microorganism for crop improvement through transgenic technology (genetically modified crops)
Chapter 3	Microbes as a biocontrol: Insect resistance GM crops.The use of Bt-GM-crops, mechanism of Bt-toxicity, insect resistance and potential risks to use Bt, Bt crop refuge area. Herbicide-resistant GM crops. Glyphosate-tolerant GM crops.
Chapter 4	**Applications of biotechnology for food and nutrition:** Golden rice 1 & 2 **and** Cavendish bananas. **Controversy regarding GM foods** Public knowledge & attitudes toward genetically modified food. Regulations of food biotechnology. Health and safety of GM foods Environmental issues (super-weeds)
Chapter 5	**The role of endophytes bacteria in plant growth and crop improvement** Plant growth promoting rhizobacteria (PGPR) Classification, direct and indirect mechanisms, nitrogen fixations,

	phosphate solubilization, phytohormone production, siderophore production. Biofertilizers and metagenomics of the agriculture soil.
Chapter 6	**Application of biotechnology for Medicine and public health.** Biotechnology and Production of pharmaceuticals Products. Biotechnology and emergent infectious disease COVID-19 vaccine, ACE2 receptor, Metagenomics Approaches to Investigate the Gut Microbiome of COVID-19 Patients, antibodies, nucleic acid products (proteins) and vaccines. Pharmacogenetics and recombinant proteins.
Chapter 7	Application of biotechnology in Energy production (petroleum refinery sector). Bioupgrading of heavy crude oil, Microbial enhanced oil recovery (MEOR).
Chapter 8	Applications of biotechnology in Pollution control Classifications of in situ bioremediation (bio-attenuation-bio-stimulation-bio-augmentation)

26. Weekly Schedule | **26. 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		Introduction: Course objectives, content, the term project and the requirements for the course	**1,5**	Traditional تقليدي
2		**Biotechnology driving solutions for sustainable development**	**1,5**	Traditional تقليدي
3		The use of microorganism for Crop improvement through transgenic technology (genetically modified crops)	1,2,5	Tranditional تقليدي

4		**Microbes as a biocontrol:** **Insect resistance GM crops** The use of Bt-GM-crops, mechanism of Bt-toxicity, insect resistant and potential risks to use Bt, Bt crop refuge area **Herbicide-resistant GM crops** Glyphosate-tolerant GM crops	1,2,5	Tranditional تقليدي
5		**Applications of biotechnology for food and nutrition** Golden rice 1 & 2 Cavendish bananas	1,2,5	Tranditional تقليدي
6		**Controversy regarding GM foods** Public knowledge & attitudes toward genetically modified food Regulations of food biotechnology Health and safety of GM foods Environmental issues (super-weeds)	1,2,5	Tranditional تقليدي
7		**The role of endophytes bacteria in plant growth and crop improvement** Plant growth promoting rhizobacteria (PGPR) Classification, direct and indirect mechanisms, nitrogen fixations, phosphate solubilization, phytohormone production, siderophore production Biofertilizers Metagenomics of the agriculture soil	1,2,5	Tranditional تقليدي
8		**Application of biotechnology for Medicine and Public Health** Biotechnology and Production of	1,3,5	Tranditional تقليدي

		pharmaceuticals products **antibodies, nucleic acid products (proteins) and vaccines. Pharmacogenetics recombinant proteins**		
9		Biotechnology and emergent infectious disease COVID-19 vaccine, ACE2 receptor, Metagenomics Approaches to Investigate the Gut Microbiome of COVID-19 Patients	1,3,5	Tranditional تقليدي
10		**Application of biotechnology in Energy production (petroleum refinery sector)** Bioupgrading of heavy crude oil, Microbial enhanced oil recovery (MEOR)	1,4,5	Tranditional تقليدي
11		Use of Microbial products in petroleum bioupgrading (biosurfactants, gases, acids, solvents, biopolymers and biomass). Biosurfactants as a key tool in oil industry	1,4,5	Tranditional تقليدي
12		Use of Microbial products in petroleum bioupgrading (biosurfactants, gases, acids, solvents, biopolymers and biomass). Biosurfactants as a key tool in oil industry	1,4,5	Tranditional تقليدي
13		Biodesulfurization of fossil fuels	1,4,5	Tranditional تقليدي
14		**Applications of biotechnology in Pollution control**	1,4,5	Tranditional تقليدي

		Classifications of in situ bioremediation (bio-attenuation-bio-stimulation-bio-augmentation)		
15		**Monitoring bioremediation strategies** -Culture- dependent and independent techniques **Case study1:** Gulf of Mexico Deepwater horizon oil spill. **Case study2:** Bioremediation of PHCs in the high Arctic Limitation of omics in bioremidation	1,4,5	Tranditional تقليدي

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.