وزارة التعليم العالي والبحث العلمي
جامعة المستقبل
كلية العلوم
قسم الكيمياء الحياتية

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Nanobiochemistry**			**Module Delivery**	
Module Type	Basic			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	UOMU036365				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		3	**Semester of Delivery**		2
Administering Department		Biochemistry department	**College**	College of Science	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval Date			**Version Number**	1.0	

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

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

Module Aims أهداف المادة الدراسية	• Introduce students to the interdisciplinary field of nanobiochemistry and its applications in life sciences. • Explain the principles of nanomaterials and their interactions with biological systems. • Explore the design, functionalization, and biochemical roles of nanostructures in diagnostics, drug delivery, and biosensing. • Develop a foundational understanding of techniques used in nanobiochemical research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students should be able to: 1. **Introduction to Nanobiochemistry** .Definitions, scope, and interdisciplinary nature 2. **Types of Nanomaterials Used in Biochemistry** .Metal nanoparticles, liposomes, quantum dots, dendrimers 3. **Surface Functionalization of Nanoparticles** .Bioconjugation with proteins, DNA, antibodies 4. **Nano-Bio Interactions** .Cellular uptake, toxicity, biocompatibility 5. **Nanoparticles in Drug Delivery** .Targeted delivery, release mechanisms, nanocarriers 6. **Nanostructures in Diagnostics** .Biosensors, nanoprobes, imaging agents 7. **DNA/RNA-Based Nanostructures** .DNA origami, aptamers, RNA nanotech 8. **Enzyme Immobilization on Nanomaterials** .Applications in biocatalysis and biosensors 9. **Analytical and Characterization Techniques** .TEM, SEM, DLS, AFM, spectroscopy 10. **Ethical and Safety Considerations** .Nanotoxicology, environmental impact, regulation
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• . Lectures supported by visual and interactive media • Laboratory practical sessions • Case-based learning and clinical discussions • Group assignments and mini-presentations

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظر ي

	Material Covered
Week 1	Introduction to Nanobiochemistry
Week 2	Fundamentals of Nanotechnology
Week 3	Types of Nanomaterials
Week 4	Synthesis Methods of Nanomaterials

Week 5	Surface Functionalization
Week 6	Nanoparticle-Biomolecule Interactions
Week 7	Nanocarriers in Drug Delivery
Week 8	Midterm Review + Quiz
Week 9	Nanobiosensors
Week 10	Applications in Diagnostics
Week 11	Nanoenzymes and Catalysis
Week 12	Nanotoxicology
Week 13	Ethical and Regulatory Aspects
Week 14	Student Presentations / Case Studies
Week 15	Course Review and Final Exam Prep

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Niemeyer, C.M. & Mirkin, C.A. *Nanobiotechnology: Concepts, Applications and Perspectives*. 2. Bhushan, B. *Springer Handbook of Nanotechnology*. 3. Rai, M. et al. *Nanobiotechnology: Principles and Applications*.	*Clinical Chemistry*
Recommended Texts	• Selected journal articles from *ACS Nano*, *Nano Letters*, and *Nature Nanotechnology*.	
Websites	https://www.afoninlab.com/chem4090	

APPENDIX:

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

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

ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة يف وزارة التعليم العا يل والبحث العل ي م