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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information **معلومات المادة الدراسية**			
Module Title	**Scientific Thinking and Research Skills**		**Module Delivery**
Module Type	SUPLEMENT		• ☒ **Theory** • ☒ **Lecture** • ☐ **Lab** • ☐ **Tutorial** • ☐ **Practical** • ☐ **Seminar**
Module Code	UOMU036356		
ECTS Credits	3		
SWL (hr/sem)			
Module Level	3	**Semester of Delivery**	1
Administering Department	Department of BioChemistry	**College**	كلية العلوم
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules 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**	• Equip students with fundamental skills in scientific reasoning, critical thinking, and problem-solving. • Introduce the principles and methods of scientific research. • Develop students' abilities in literature review, research design, data analysis, and scientific communication. • Prepare students for conducting independent or group-based scientific projects.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	By the end of this course, students will be able to: 1. Demonstrate understanding of the principles of scientific thinking and the scientific method. 2. Formulate clear and testable research questions or hypotheses relevant to biochemistry. 3. Locate, evaluate, and critically analyze scientific literature and sources. 4. Understand the structure and components of scientific reports and research papers. 5. Apply appropriate citation and referencing techniques to avoid plagiarism. 6. Recognize and discuss ethical issues related to scientific research and publication. 7. Communicate scientific ideas and findings clearly and logically in written form.
Indicative Contents **المحتويات الإرشادية**	1. **Nature and Philosophy of Science;** Scientific method, logic, hypothesis formulation 2. **Critical and Analytical Thinking;** Differentiating evidence from opinion, logical fallacies 3. **Structure of Scientific Research;** Problem identification, objectives, hypothesis, variables 4. **Types of Scientific Research;** Basic vs. applied, qualitative vs. quantitative

	5. **Literature Review and Source Evaluation;** Scientific databases, referencing, avoiding plagiarism 6. **Research Planning and Design;** Experimental design, sampling, ethics 7. **Data Collection and Basic Analysis;** Types of data, reliability, validity 8. **Interpreting and Presenting Results;** Tables, graphs, statistics (introductory) 9. **Scientific Writing;** Structure of a research paper/report, abstract, conclusion 10. **Oral and Poster Presentations**

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	This theoretical course aims to develop students' abilities in scientific thinking and essential research skills within the context of biochemistry. It covers the foundational principles of logical reasoning, the scientific method, and the process of scientific inquiry. Students will be introduced to techniques for critically evaluating scientific literature, formulating research questions, and structuring scientific reports. The course also addresses the ethical responsibilities associated with conducting and presenting scientific research. Through this course, students will enhance their capacity to think systematically, analyze data, and communicate scientific information effectively.

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	48	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	3.2
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	27	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	1.8
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	75		

Module Evaluation **تقييم المادة الدراسية**					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	1	5% (5)	2, 12	LO # 3, 4, 6 and 7

	Projects	1	5%(5)	-	
	Report	1	10% (10)	11	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8,13	LO # 1-7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Scientific Thinking and Reasoning Principles
Week 2	The Scientific Method: Steps and Applications
Week 3	Formulating Research Questions and Hypotheses
Week 4	Sources of Scientific Information: Databases and Libraries
Week 5	Evaluating the Quality of Scientific Literature
Week 6	Structure of Scientific Papers: Abstract, Introduction, Methods
Week 7	Structure of Scientific Papers: Results, Discussion, Conclusion
Week 8	Writing Scientific Reports: Style and Clarity
Week 9	Referencing and Citation Styles (APA, MLA, etc.)
Week 10	Avoiding Plagiarism: Ethics and Best Practices
Week 11	Ethics in Scientific Research and Publication
Week 12	Critical Analysis of Published Studies
Week 13	Communicating Scientific Ideas: Writing and Presentation Tips
Week 14	Course Review and Q&A
Week 15	Final Assessment / Project Presentation

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications. 2. Day, R.A., & Gastel, B. (2012). *How to Write and Publish a Scientific Paper*. Cambridge University Press. 3. Lipson, C. (2018). *Doing Honest Work in College: How to Prepare Citations, Avoid Plagiarism, and Achieve Real Academic Success*. University of	yes

	Chicago Press. 4. Peat, J., & Barton, B. (2008). *Medical Statistics: A Guide to Data Analysis and Critical Appraisal*. Wiley-Blackwell. 5. American Psychological Association. (2020). *Publication Manual of the American Psychological Association* (7th ed.). APA. 6. Smith, R. (2012). *Ethics and Research*. BMJ Publishing Group.	
Recommended Texts	1. American Psychological Association. (2020). *Publication Manual of the American Psychological Association* (7th ed.). APA.	
Websites	https://criticalthinkingsecrets.com/scientific-thinking-and-research/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	**امتياز**	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	**راسب (قيد المعالجة)**	(45-49)	More work is required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required

Note: Marks 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.