جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة المستقبل
كلية العلوم
قسم التقنيات الاحيائية الطبية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Experimental design**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMU0307056**				
ECTS Credits	6				
SWL (hr/sem)	100				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Medical biotechnology		**College**	Sciences	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Rasha Fajer Kezar		**e-mail**	rasha.fajer@uomus.edu.iq	
Peer Reviewer Name	-		**e-mail**	-	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Graduation project	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**I. Introductory Knowledge & Theoretical Objectives** Students will understand the principles and purpose of experimentation. Define the Purpose of Experimentation and identify the Core **II. Practical Skills & Procedural Objectives** Students will be able to design and plan a valid experiment. **III. Analytical & Evaluative Objectives** Students will be able to interpret results and critique experimental designs. **IV. Higher-Order Thinking & Ethical Objectives** Students will apply experimental design principles to complex, real-world problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Conceptual Understanding:** To grasp core scientific principles like variables, hypotheses, and control groups. 2. **Design and Application:** To ability to design a methodologically sound experiment with replication and randomization to minimize bias. 3. **Analysis and Interpretation:** To analyze data and draw evidence-based conclusions linked back to the original hypothesis. 4. **Evaluation and Assessment:** To assess the validity and reliability of experiments and identify potential sources of error. **5. Critical and Ethical Thinking**: To apply these principles to novel problems, analyze scientific claims, and understand research ethics.
Indicative Contents المحتويات الإرشادية	1. **Understand & Design:** Grasp core concepts like variables and hypotheses to design methodologically sound, controlled experiments. 2. **Analyze & Conclude:** Systematically collect and analyze data to draw evidence-based conclusions and identify experimental limitations. 3. **Evaluate & Apply:** Critically evaluate the validity of scientific claims and apply ethical research principles to solve novel problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Learn by Designing**: Actively create experiments for real-world problems, like a clinical trial for a new drug or a field test for a crop fertilizer. 2. **Analyze Case Studies**: Deconstruct published studies from both medicine and agriculture to identify strong designs and common pitfalls. 3. **Use Simulations**: Run virtual experiments to safely model complex or long-

	term processes, like patient outcomes or crop growth over seasons. 4. **Collaborate on Projects**: Work in teams to conduct hands-on experiments, fostering skills in planning, data collection, and analysis. 5. **Compare Design Types**: Understand the strengths of different structures, from controlled lab studies to randomized field trials. 6. **Connect Design to Data**: Integrate statistical analysis from the start to draw valid, evidence-based conclusions applicable to both fields.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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**	3	6	4,6, 10	#1 and#2, #3-#5, #9
	Assignments	2	6	13 and 14	#1 and #12
	Projects / Lab.	1	5	continuous	all
	Report	1	5	15	#14
Summative assessment	**Midterm Exam**	2hr	28	7	#1-#6, #8-#14
	Final Exam	3hr	50	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction To Experimental Design**
Week 2	**Medical Study Designed**
Week 3	**Choice Of Animals Properly For Your Experiment**
Week 4	**Single Case Experiments**
Week 5	**Questionnaire Design | Methods, Question Types & Examples**
Week 6	**Statistical Expression In Medical Study Designed**
Week 7	**Midterm Exam**
Week 8	**التصميم التام العشوائي** **المفهوم والتطبيق. (CRD)**
Week 9	**في التصميم التام العشوائي (Anova) تحليل التباين**
Week 10	**التصميم العشوائي للقطاعات (Rcbd)** **الفكرة الأساسية.** **استخداماته ومميزاته**
Week 11	**3-تصميم المربعات اللاتينية (Lsd) مبدأ التوازن والسيطرة على التباين.** **تحليل التباين وتفسير النتائج.**
Week 12	**التصاميم العاملية (Factorial Designs)** **التجارب ذات العوامل المتعددة.**
Week 13	**تحليل وتفسير التأثيرات الرئيسية والتفاعلية.** **التجارب الجزئية (FRACTIONAL FACTORIAL DESIGNS**
Week 14	**تصاميم القطاعات المنشقة (Split Plot Design)**
Week 15	**التداخل بين العوامل (Interaction).**
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Designing Experiments and Analyzing Data: A Model Comparison Perspective (3rd ed.)**	**No**
Websites	**NIST — Experiment Design (National Institute of Standards and Technology)**	

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 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.