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	**Lipid Chemistry I**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	UOMU036352				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	**Semester of Delivery**		1
Administering Department		Biochemistry department	**College**	College of Science	
Module Leader			**e-mail**		
Module Leader's Acad. Title					
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	• Provide a comprehensive understanding of lipid structures, classifications, and chemical properties. • Explore the biosynthesis, metabolism, and functional roles of lipids in biological systems. • Highlight the significance of lipids in membrane structure, energy storage, and cellular signaling. • Develop the ability to analyze lipid-related biochemical pathways and interpret lipid profiles in physiological and pathological conditions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: 1. Classify different types of lipids and their structures. 2. Describe the chemical and physical properties of fatty acids and lipids. 3. Explain the roles of lipids in biological membranes and metabolism. 4. Perform basic laboratory techniques for lipid extraction and analysis. 5. Evaluate lipid quality and interpret experimental results. 6. Apply safe laboratory practices during biochemical lipid procedures.
Indicative Contents المحتويات الإرشادية	1. **Introduction to Lipids**. Definition, importance, and overview of lipid types 2. **Classification of Lipids**. Fatty acids, triglycerides, phospholipids, glycolipids, sterols 3. **Physical and Chemical Properties of Lipids**. Solubility, hydrolysis, saponification, peroxidation 4. **Fatty Acids**. Saturated and unsaturated, essential fatty acids, nomenclature 5. **Lipid Metabolism**. β-oxidation, lipogenesis, ketogenesis 6. **Phospholipids and Membrane Lipids**. Structure, types, role in membrane dynamics 7. **Steroids and Cholesterol**. Biosynthesis and physiological roles 8. **Lipid Transport and Storage**. Lipoproteins (LDL, HDL), lipid droplets 9. **Lipid Signaling Molecules**. Eicosanoids, prostaglandins, leukotrienes 10. **Clinical Aspects of Lipid Chemistry**. Dyslipidemia, atherosclerosis, metabolic disorders

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	This course introduces the chemical nature, classification, and functional roles of lipids. It explores the structures, physical properties, and biological importance of fatty acids, simple lipids, complex lipids, and sterols. It also includes basic analytical techniques used for lipid extraction and quantification. The practical part provides hands-on experience in lipid analysis, including fat extraction, fatty acid determination, and quality assessment of lipids.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	65	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	85	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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	5	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	5% (5)	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 Lipids: Definition and Importance
Week 2	Fatty Acids: Classification and Nomenclature

Week 3	Physical and Chemical Properties of Fatty Acids
Week 4	Simple Lipids: Triglycerides
Week 5	Complex Lipids: Phospholipids, Glycolipids
Week 6	Sterols and Cholesterol
Week 7	Lipids in Biological Membranes
Week 8	Lipid Functions in the Body
Week 9	Lipid Peroxidation and Oxidative Stress
Week 10	Essential Fatty Acids and Nutritional Role
Week 11	Review of Analytical Methods in Lipid Chemistry
Week 12	Case Studies: Lipid Disorders
Week 13	Practical Exam
Week 14	Theoretical Review
Week 15	Final Written Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1 -2	Lab safety and lipid sample overview
Week 2 -4	Identification of fatty acids
Week 3	Determination of saponification and iodine values
Week 4	Extraction of triglycerides from biological samples
Week 5	Thin-layer chromatography (TLC) of lipids
Week 6	Cholesterol quantification
Week 7	Membrane model construction and lipid solubility
Week 8	Case-based discussion: lipid disorders
Week9	Detection of lipid peroxides
Week 10	Comparative lipid profiles in oils and fats

Week 11	Lab: Analytical technique recap and quality control
Week 12	Interpretation of experimental results
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. *Lehninger Principles of Biochemistry* – Nelson & Cox 2. *Biochemistry* – Garrett & Grisham 3. *Lipid Biochemistry* – Michael Gurr, John Harwood	Yes
Recommended Texts	• Departmental lab manuals • Peer-reviewed journal articles on lipid analysis • Instructor handouts and lecture slides	
Websites	https://en.wikipedia.org/wiki/Lipid	

APPENDIX:

GRADING SCHEME مخطط الدرجا ت				
Group	**Grade**	التقدي ر	**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