

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Molecular genetic techniques		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOMU-037033		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Mohammed Zuhair Naji	e-mail	Mohammed.zuhair.naji@uomus.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MBT-35020	Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none"> 1- To identify the fundamental aspects of molecular bioengineering techniques relevant for design in diagnosing, understanding and regulating biological systems. 2- To apply the principles of molecular methods in a design to sense, study or

	<p>control a biological system</p> <p>3- To analyze peer-reviewed current research articles in some of the course topic areas.</p> <p>4- To report on a thorough analysis of a design involving a quantitative molecular application used in a research, biotechnology or healthcare setting.</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After successful completion of the course, the student will be able to: 1- Apply basic molecular biology methods for the study of nucleic acids and proteins 2- State and interpret the result and data produced by the methods. 3- Comprehends modern methods in molecular biology, understanding the principle of the methods. 4- Summarize what they have done during laboratory exercises 5- Raise awareness regarding disposal of toxic chemical wastes used in the lab
Indicative Contents المحتويات الإرشادية	The module is expected to cover the following topics: • Description and integration of the biochemistry of nucleic acids; • Genetic diversity; • Gene expression; • Basic methods used in molecular biology; • How molecular biology relates to other fields of science.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A grounding of molecular biology technique is provided through a combination of recorded lectures (screencasts) and demonstrations. These will cover various aspects of basic molecular biology including nucleic acids and proteins; gene expression; DNA analysis; gene cloning; molecular evolution; typing and diagnostics. A summative assessment will be carried out via a timed Quizstyle test on Moodle at the end of the module. This assessment does not count toward the grade.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		125	

Module Evaluation تقييم المادة الدراسية					
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative	Quizzes	3	10	4, 6, 10	#1 and #2, #3-#5, #9

assessment	Assignments	2	10	13 and 14	#1 and #12
	Projects / Lab.	1	10	continuous	all
	Report	1	10	15	#14
Summative assessment	Midterm Exam	2h	10	7	#1-#6, #8-#14
	Final Exam	3h	50	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Techniques in Molecular Biology - Biosafety rules - Syllabus review
Week 2	DNA/RNA isolation methods and Quantification and Electrophoresis Techniques
Week 3	Blotting, Probing, structural analysis
Week 4	Electrophoresis Techniques.
Week 5	Polymerase chain reaction (PCR / qRT-PCR).
Week 6	Vector, molecular cloning
Week 7	Mid-term Exam
Week 8	Probes, hybridization.
Week 9	Microarray analysis and Omics technology
Week 10	Protein isolation and purification 1
Week 11	Protein isolation and purification 2
Week 12	Protein and nucleic acid detection methods
Week 13	Protein-protein interaction assays: ELISA, Western blot
Week 14	Restriction enzymes and DNA sequencing
Week 15	Modern methods in Molecular biology
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	DNA isolation from plant cells using traditional methods
Week 2	DNA isolation from bacterial cells traditional methods
Week 3	DNA isolation from blood cells

Week 4	Electrophoresis of DNA
Week 5	RNA isolation by TRIzol-Chloroform
Week 6	Mid-term Exam
Week 7	Protein purification
Week 8	Measurement of protein concentration
Week 9	Measurement of protein activity
Week 10	Restriction enzyme 1
Week 11	Restriction enzyme 1
Week 12	Conventional PCR technique
Week 13	qPCR technique
Week 14	Review
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريب		
	Text	Available in the Library?
Required Texts	<p>Bartlett J.M.S. & Stirling D., 2003. PCR Protocols, 2nd Ed., Humana Press, New Jersey.</p> <p>Hartl D. & Jones E.W., 2009. Genetics. Analysis of genes and genomes, 9th Ed., Jones and Bartlett Publishers, Boston.</p> <p>Lima N. & Mota M. (Ed), 2003. Biotecnologia: fundamentos e aplicações. Lidel – Edições Técnicas, Lda., Lisboa.</p> <p>Ausubel F. M., et. al. (Ed), 2002. Short protocols in molecular biology: a compendium of methods from current protocols in molecular biology, 5th Ed. (2 volumes), John Wiley & Sons, Inc., New Jersey.</p> <p>Tagu D. & Moussard C., 2006. Techniques for molecular biology. Taylor and Francis Group, Science Publishers, New Hampshire.</p> <p>Watson J.D., Baker T.A., Bell S.P. & Gann A., 2008. Molecular Biology of the gene, 5th Ed., Pearson Benjamin Cummings.</p> <p>Winfrey M.R., Rott M.A. & Wortman A.T., 1997. Unraveling DNA: molecular biology for the laboratory. Prentice Hall, Inc., New Jersey.</p>	
Recommended Texts	<ul style="list-style-type: none"> • Gene Cloning and DNA Analysis: An Introduction. • Biotechnology: Applying the Genetic Revolution. • Principles of Gene Manipulation and Genomics. • Molecular Cloning: A Laboratory Manual. • Prescott/Harley/Klein's Microbiology. 	

	Genomes 3	
Websites		

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 (فيق المعايير)	(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.