

MODULE DESCRIPTION FORM

Module Information				
Module Title	Genetics		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	FOR23004			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		1
Administering Department	Forensic Evidence	College	Science	
Module Leader	Ali Hamid Oraibi		e-mail	ali.h@uowa.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	Master
Module Tutor	Ali Hamid Oraibi		e-mail	ali.h@uowa.edu.iq
Peer Reviewer Name	Dhurgham Adil Obaid		e-mail	dirgham.ad@uowa.edu.iq
Scientific Committee Approval Date	2026-9-8	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	FORN 104 (Molecular biology)	Semester	2/1
Co-requisites module	None	Semester	



Department Head Approval

أ.م.د. سياره مكي نوري
2026/9/8



Dean of the College Approval

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	<p>1-genetics begins with scientific research, which translates through clinical practice to touch the lives of patients and families with genetic disease on a daily basis.</p> <p>2- This module aims to provide a lens through which to view the core aspects of this multidisciplinary subject, describing how and why genetics is important in the development, diagnosis and treatment of disease.</p> <p>3-focus firstly on the basics of how genetic material is replicated, curated, and inherited, to enable an understanding of how genetic sequence variants lead to genetic disease, or to susceptibility to complex diseases.</p> <p>4-Genetic research and disease often raises challenging ethical questions and considerations, which will also be explored in the module You will also explore the molecular mechanisms by which genes are regulated alongside the contribution and role of environment influences.</p> <p>5- Overall the module link clinical genetics practice with internationally-leading research strengths at CMH, to provide a holistic view of medical genetics from the scientific, clinical and patient perspectives.</p>
Module Learning Outcomes	<p>On successfully completing the module you will be able to...</p> <ol style="list-style-type: none"> 1. Describe in some detail and discuss the cellular and molecular basis of inheritance 2. Explain the differences between acquired, monogenic, polygenic and epigenetic disease 3. Explain the different mechanisms by which genes are regulated in humans 4. Discuss the contribution of genetics and environment to disease processes in humans 5. Show awareness of, and discuss the ethical issues in modern genetics 6. Discuss with examples the importance of interaction between patients, scientists and clinician
Indicative Contents	<p>Indicative content includes the following.</p> <p>Our genetics influence every aspect of our growth, reproduction and health. Due to this, a deep understanding of how our genes are inherited and regulated, and how genetic sequence variants or</p>

	<p>epigenetic factors affect gene function is crucial for understanding normal human development, and the basis of genetic diseases.[16h]</p> <p>Knowing how molecular pathways function and are altered by gene variants is important to identify molecular biomarkers to monitor disease onset and progression, and define new therapies to treat disease. For example, research studies have detailed how breast cancer risk is greatly increased by the inheritance of specific <i>BRCA1</i> gene variants, and discovered that some patients with maturity-onset diabetes of the young (MODY) may transfer from insulin injections onto sulphonylurea tablets taken orally. [16h]</p> <p>Thus medical genetics as practiced today involves close scientific, clinical and patient interaction. This module describes how genomic research and clinical genetic services work in close synergy to deliver modern diagnostic and clinical genetic services, and discusses some of the ethical challenges and considerations, as well as patient perspectives, associated with this ever increasingly important discipline.[16h]</p> <p>Genetics provides an introduction to both classical and modern molecular genetics. We start by looking at Mendelian genetics, including consideration of how genetic maps are created and an introduction to human pedigrees. We then examine the basic mechanisms of transcription and translation and how gene expression can be regulated. The module concludes by considering the molecular tools that geneticists use and how these have been used to uncover the content of diverse genomes.[16h]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<ul style="list-style-type: none"> Aligning genome data to reference sequence using up to date alignment programmes (e.g. BWA). Assessment of data quality through application of quality control measures. How to determine the analytical sensitivity and specificity of genomic tests.

	<ul style="list-style-type: none"> • Use of tools to call sequence variants e.g. GATK, annotation of variant-call files using established databases. • Filtering strategies of variants, in context of clinical data, and using publicly available control data sets • Use of multiple database sources, in silico tools and literature for pathogenicity evaluation, and familiarisation with the statistical programmes to support this. • Principles of integration of laboratory and clinical information, and place of best practice guidelines for indicating the clinical significance of results.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	86	Structured SWL (h/w)	6
Unstructured SWL (h/sem)	64	Unstructured SWL (h/w)	4.5
Total SWL (h/sem)	150		

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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Introduction to genetic
Week 2	Classical Mendelian genetics
Week 3	The population genetic
Week 4	Human genome
Week 5	Functions of gene and chromosome
Week 6	Mitosis and meiosis genetic code
Week 7	Genetic variation
Week 8	Gene flow and new species
Week 9	Mutation and chromosomal abnormalities
Week 10	Medical genetic diseases
Week 11	Karyotype, Banding techniques
Week 12	Mutagens and carcinogens
Week 13	Autosomal dominant inheritance
Week 14	Autosomal recessive inheritance
Week 15	Exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Organisms supported as a model system for genetics
Week 2	Lab 2: The first law of Mendel and the deviations from Mendel's first law
Week 3	Lab 3: The second law of Mendel and the deviation from Mendel's second law
Week 4	Lab 4: The quantitative inheritance
Week 5	Lab 5: Genetics and sex
Week 6	Lab 6: Link and crossing over
Week 7	Lab 7: Cases of crossing over suppression
Week 8	Lab 8: Genetic mapping
Week 9	Lab 9: Mutation and chromosomal abnormalities

Week 10	Lab 10: Medical genetic diseases
Week 11	Lab 11: Karyotype, Banding techniques
Week 12	Lab 12: Mutagens and carcinogens
Week 13	Lab 13: Autosomal dominant inheritance
Week 14	Lab 14: Autosomal recessive inheritance
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	FReece J, Urry L, Cain M, Wasserman S, Minorsky P, Jackson, R. (Eds) 9th Global Edition, 2011, Campbell Biology, Pearson Benjamin Cummings.	Yes
Recommended Texts	Butler, J. (2005) Forensic DNA Typing 2nd Ed. Elsevier (MA) ISBN: 9780121479527 Forensic Science – Jackson A.R. & Jackson J., Prentice Hall, ISBN: 130432512	No
Websites	Cochrane reviews: http://www.cochrane.org/cochrane-reviews Pubmed/MedLine: http://www.ncbi.nlm.nih.gov/pubmed	

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.