MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Geographical Information Systems		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMU0302053			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	**Semester of Delivery**		5
Administering Department	الأنظمة الطبية الذكية	**College**	العلوم	
Module Leader		**e-mail**		
Module Leader's Acad. Title		**Module Leader's Qualification**		
Module Tutor		**e-mail**		
Peer Reviewer Name	ا.د مهدي عبادي مانع	**e-mail**	mahdi.ebadi@uomus.edu.iq	
Scientific Committee Approval Date	1/10/2025	**Version Number**	2.0	

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	1. Understand the scope of medical and health geography and how the discipline relates to the fields of medicine, public health, and environmental health; 2. Implement a variety of common statistical and computational methods used to understand the geography of health; and 3. Produce high quality, professional maps that communicate a variety of health and medical topics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Collect and organise spatial data on disease and its ecological determinants (e.g. climate, land-use and poverty) using appropriate tools, including Global Positioning Systems, Geographic Information Systems platforms (qGIS) and R statistical software; 2. Apply basic statistical techniques to analyse the spatial patterns of infection and disease; 3. Appreciate the relative merits of alternative spatial statistical approaches for exploring and predicting spatial distributions of infection and disease; 4. Demonstrate an understanding of how the output of these analyses can be integrated into a rational disease control programme; 5. Critically read and assess relevant literature.
Indicative Contents المحتويات الإرشادية	**The module is expected to cover the following topics:** • Collection and organisation of spatial data using Global Positioning Systems, Geographic Information Systems, and Remote Sensing; (10 hrs) • Exploring spatial patterns of infection and disease, using a range of spatial analytical methods; (10 hrs) • Spatial prediction of infection and disease, using alternative statistical modeling approaches; (10 hrs) • Critical review of spatial epidemiological literature; (10 hrs) • Integration of spatial data collection and analysis into a rational disease control programs (10 hrs). **Contact time (including through remote platforms):-** This time includes activities that take place in face-to-face contexts such as lectures, seminars, demonstrations, tutorials, supervised laboratory workshops, practical classes, project supervision as well as where tutors are available for one-to-one discussions and interaction by email. **Self-directed learning:-**

	Involved obtaining information on adding up to at least seven hours where more than half of the person's total motivation is to gain and retain certain fairly clear knowledge and skill, or to produce some other lasting change. **Review, Reflect, and Revise:-** During the "Review, Reflect, and Revise" step, students engage in an improvement cycle where they consider how they can improve both the process and product of their learning. They review by looking for opportunities to make improvements, they reflect by thinking carefully about potential changes to be more effective, and they revise by adjusting both their process and product of learning as needed to improve their practices and outcomes.

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module will be achieved through encouraging the students to designs several specific engineering projects according to the teaching content and the actual situation of students and the project will run through all aspects of the whole teaching activities, while mastering the basic theory, further improve the engineering practice ability and innovation ability of students.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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 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	3 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Map Anatomy** – Maps' Types – Map Scale's Types – Reference surfaces for mapping – Coordinate systems – Map projections – Coordinate transformations – Map Abstraction
Week 2 &3	**GIS and Spatial Data** – Models and representations of the real world – Geographic phenomena – Computer representations of geographic information – Hardware and software trends – GIS software – GIS architecture and functionality – Spatial Data Infrastructure (SDI) – Stages of spatial data handling – Spatial data capture and preparation – Spatial data storage and maintenance – Spatial query and analysis – Spatial data presentation – Database management systems
Week 4	**Spatial Databases for Public Health** - Why Spatial Data in Public Health? - Why Statistical Methods for Spatial Data? - Components of Spatial Data - An Odyssey into Geodesy, - Sources of Spatial Data
Week 5	**Data Models for GIS** - Raster Data Models - Vector Data Models

Week 6 &7	**Data entry and preparation** - Spatial data input - Data quality - Observational vs. Experimental Data - Risk - Modeling Counts and Rates - Challenges in the Analysis of Observational Data - Data checks and repairs - combining data from multiple sources - interpolating discrete data - interpolating continuous data
Week 8	- **Mid-term Exam**
Week 9	**Visualizing Spatial Data** - Types of Statistical Maps - Modifiable Areal Unit Problem - Visualization - Additional Types of Maps - Exploratory Spatial Data Analysis
Week 10 & 11	**Data entry and preparation** - Spatial data input - Data quality - Observational vs. Experimental Data - Risk - Modeling Counts and Rates - Challenges in the Analysis of Observational Data - Data checks and repairs - combining data from multiple sources - interpolating discrete data - interpolating continuous data
Week 12 & 13	**Analyzing Public Health Data** - Classification of analytical GIS capabilities - Retrieval, classification and measurement - Measurement - Spatial selection queries - Classification - Overlay functions - Vector overlay operators - Raster overlay operators - Overlays using a decision table - Neighborhood functions
Week 14	**Mathematical modeling** **Diseases Diffusion**
Week 15	**Course Review**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	- GIS TOOL in MATLAB

Week 3-4	- GIS TOOL in MATLAB
Week 5-6	- Map Projection with Matlab
Week 7-8	- Health Data Implementation on Map with Matlab
Week 9-10	- Introduction to ARCMap Software
Week 11-12	- Analysis and Management of ARCMap tools
Week 13-14	- Implementation of ARC Map tools with different Map's types and layers
Week 15	- Implementation of ARC Map tools with different Map's types and layers

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	RINT ITEM Pfeiffer, DU, Robinson, TP, Stevenson, M, et al. Spatial analysis in epidemiology. Oxford: Oxford University Press; 2008. This text book forms an excellent introduction and reference throughout the course	No
Recommended Texts	– Applied Spatial Statistics for Public Health Data by LANCE A. WALLER and CAROL A. GOTWAY, 2004. – GIS and Public Health, by Ellen K. Cromley and Sara L. McLafferty, Second Edition, 2011 – Geographic Information Systems, V. 1.0	No
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 (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.