

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Knowledge Representation		Module Delivery	
Module Type	C		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	AI201			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	GUII	Semester of Delivery		3
Administering Department	AI	College	CIT	
Module Leader	Mohammed A.S. Al-Hitawi		e-mail	al_hitawe@uofallujah.edu.iq
Module Leader's Acad. Title	Assist. Lec.		Module Leader's Qualification	Master
Module Tutor	Name (if available)		e-mail	
Peer Reviewer Name	Asst. Prof. Dhia Ahmed		e-mail	Diaa.a.Ibrahim@uofallujah.edu.iq
Scientific Committee Approval Date	1/06/2026	Version Number	2.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- will understand the foundations of KRR and the tradeoff between representation and reasoning - will understand which knowledge-based techniques are appropriate for which tasks; - can apply KRR systems to their research and challenging problems;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Students satisfying the prerequisites are expected to understand the fundamental principles of logic-based Knowledge Representation; - be able to model simple application domains in a logic-based language; - understand the notion of a reasoning service; - master the fundamentals of the reasoning algorithms underlying current systems; - understand the fundamental trade-off between representation power and computational properties of a logic-based representation language; - be conversant with several widely used knowledge representation languages; and - understand how the theoretical material covered in the course is currently being applied in practice.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	- Lectures delivered by the teacher; - guided self-studies on specific, individual topics; - seminars delivered by the students on these specific topics; - practical group exercises. Hands-on Practical Exercises - Case Studies and Real-World Examples - Collaborative Learning - Continuous Assessment and Feedback

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem)	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

الحمل الدراسي غير المنتظم للطالب خلال الفصل		
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	10% (10)	3 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects	1	10%(10)	Continuous	All
	Report	2	10% (10)	13	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Knowledge Representation - Overview of knowledge representation and its importance in AI
Week 2	- Different types of knowledge representation methods
Week 3	Logical Representations - Propositional logic - First-order logic
Week 4	- Inference and reasoning with logical representations
Week 5	Semantic Networks - Basic concepts of semantic networks - Types of semantic networks (taxonomic, part-whole relations, etc.) - Inference in semantic networks
Week 6	Frame-Based Representation - Basic concepts of frames as a knowledge representation tool - Frame attributes, default values, and slots - Inheritance hierarchies and reasoning with frames
Week 7	Ontologies - Definition and components of ontologies - Ontology languages like OWL - Developing and using ontologies for knowledge sharing

Week 8	Midterm Term
Week 9	Rules and Production Systems - Basic concepts of rules and rule-based systems
Week 10	- Forward chaining and backward chaining inference - Conflict resolution strategies
Week 11	Uncertainty in Knowledge Representation - Representing uncertainty using Bayesian networks
Week 12	- Reasoning with uncertain knowledge - Applications involving uncertainty
Week 13	Knowledge Graphs - Structure and construction of knowledge graphs - Querying knowledge graphs
Week 14	- Knowledge graph applications
Week 15	Projects Presentation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Van Harmelen, F., Lifschitz, V., Porter, B. (ed.). Handbook of knowledge representation. – Elsevier, 2008. – Vol. 1. – 1034 pp.	NO
Recommended Texts	Boolos, G. S., Burgess, J. P., Jeffrey, R. C. Computability and logic. – Cambridge university press, 2002. – 364 pp. Nipkow, T., Grumberg, O., Hauptmann, B. (ed.). Software Safety and Security: Tools for Analysis and Verification. – IOS Press, 2012. – 400 pp.	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.