	Ministry of Higher Education and Scientific Research – Iraq Al-Mustaqbal University College College of Sciences		

MODULE DESCRIPTOR
وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2">SEARCHING STRATEGIES</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2">CORE</td><td rowspan="4">Theory
Lecture
Lab
Tutorial
Practical
Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2">UOMU0304035</td></tr>
<tr><td>ECTS Credits</td><td colspan="2">5</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2">125</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>Artificial Intelligence</td><td>College</td><td>College of Sciences</td></tr>
<tr><td>Module Leader</td><td>maytham nabil</td><td>e-mail</td><td>maytham.meqdad@uomus.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Dr.</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>None</td><td>e-mail</td><td>None</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Review Committee Approval</td><td></td><td>Version Number</td><td></td></tr>
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Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Knowledge Representation Methods	**Semester**	2
Co-requisites module	Heuristic Search Methods	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• Understanding the problem state space and problem solving. • Implementing and employing intelligent search methods to solve problems that are not solved with traditional methods. • Using Heuristics in games. • Understanding the difference between blind search and heuristics in search
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Define and explain** AI problem concepts including problem state space, search space, and problem-solving approaches. 1. **Describe and analyze** the main AI system components (knowledge base, inference engine, working memory, and user interface). 2. **Differentiate and apply** forward chaining and backward chaining mechanisms with appropriate representations (AND-OR and search graphs). 3. **Construct** solution paths using both backward and forward chaining for selected problems. 4. **Classify and implement** AI search strategies, including blind search algorithms (Depth First and Breadth First). 5. **Apply** problem reduction techniques and solve constraint satisfaction problems using suitable AI methods.
Indicative Contents المحتويات الإرشادية	• Problem in AI (Problem state space, Search space and Problem solving) • AI system components (Knowledge base, Inference engine, Working memory and User Interface). • Control strategy fundamentals • Backward chaining (BW)Blind search • Forward chaining (FW) • Rule Cycle (Hybrid method) • Determining the control strategy for some problems • Search strategy and Working memory • Working memory via BW chaining (mechanism and AND-OR graph representation) • Working memory via FW chaining (mechanism and search graph representation) • Path building using BW chaining • Path building using FW chaining • AI search taxonomy • Blind search algorithms (Depth first search, Breadth first search) • Problem Reduction Using AND/OR Graphs

	• Constraint Satisfaction Problems

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Lectures (Theoretical and Practical) Examples, Homework and Programs Exams and using modern data show devices to display lectures subjects. References as books, internet subjects.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 3 and 6
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 5 and 6
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 4, 5 and 6
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
	Material Covered
Week 1	Problem in AI (Problem state space, Search space and Problem solving)
Week 2	AI production system components (Knowledge base, Inference engine, Working memory and User Interface)
Week 3	Forward chaining (FW)
Week 4	Backward chaining (BW)
Week 5	Rule Cycle (Hybrid method)
Week 6	Determining the control strategy for some problems
Week 7	Working memory via BW chaining (mechanism and AND-OR graph representation)
Week 8	Working memory via FW chaining (mechanism and search graph representation)
Week 9	Path building using BW chaining
Week 10	Path building using FW chaining
Week 11	AI search taxonomy
Week 12	Depth first search
Week 13	Breadth first search
Week 14	Problem Reduction Using AND/OR Graphs
Week 15	Constraint Satisfaction Problems

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Quick review for the basic prolog programs
Week 2	Quick review for using database in prolog
Week 3	Quick review for using compound objects in prolog
Week 4	Forward chaining program
Week 5	Forward chaining program (animal classification), continue.
Week 6	Backward chaining program
Week 7	Backward chaining program (animal classification), continue.
Week 8	Path building program using forward chaining

Week 9	Path building program using forward chaining, continue.
Week 10	Path building program using backward chaining
Week 11	Path building program using backward chaining, continue.
Week 12	Depth first search program
Week 13	Breadth first search program
Week 14	Problem reduction program using AND/OR graphs
Week 15	Program for constraint satisfaction problem

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig (2020, 4th Edition) 2. "Artificial Intelligence: Structures and Strategies for Complex Problem Solving" by George F. Luger (2021, 7th Edition)	Yes
Recommended Texts	Dimitris Varkas and Ioannis Pl. Vlashavos, " Artificial Intelligence for Advanced Problem-Solving Technique", published in the USA by Information science reference (an imprint of "IGI" Global),2008.	No
Websites		

APPENDIX:

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	مقبول بقرار	(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.