	Ministry of Higher Education and Scientific Research - Iraq University of Technology Department of Computer Science	

MODULE DESCRIPTOR
وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

Module Title	SEARCHING STRATEGIES	Module Delivery
Module Type	CORE	**Theory** **Lecture** **Lab** **Tutorial** **Practical** **Seminar**
Module Code	SEST215	
ECTS Credits	5	
SWL (hr/sem)	125	

Module Level	2	Semester of Delivery	3
Administering Department	Artificial Intelligence	**College**	Computer Science Department
Module Leader	Dr. Mustafa Jasim Hadi	**e-mail**	Mustafa.J.Hadi@uotechnology.edu.iq
Module Leader's Acad. Title	Assist Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	

<table>
<tr><td colspan="4" align="center">Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>Knowledge Representation Methods</td><td>Semester</td><td>2</td></tr>
<tr><td>Co-requisites module</td><td>Heuristic Search Methods</td><td>Semester</td><td>4</td></tr>
<tr><td colspan="4" align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr><td>Module Aims
أهداف المادة الدراسية</td><td colspan="3">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</td></tr>
<tr><td>Module Learning Outcomes

مخرجات التعلم للمادة الدراسية</td><td colspan="3">1-Understand the basic syntax and semantics of Python programming language.

2-Implement logical rules and queries using Python.

3-Analyze and solve problems using Python programming.

4-Develop the student thinking skills and the ability to analyze problems using logical programming principles.

5- Develop skills in debugging and testing Python programs.

6-Demonstrate the ability to develop and implement Python programs to solve problems in different domains.</td></tr>
<tr><td>Indicative Contents
المحتويات الإرشادية</td><td colspan="3">• 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)
• 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</td></tr>
</table>

	• 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.