

COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Computer Science			NQF level	6
Course Title	Expert Systems	Code	501451	Prerequisite	501292
Credit Hours	3	Theory	3	Practical	0
Course Leader	Prof. Dr. Mohammad Al-Batah	email	albatah@jadara.edu.jo		
Lecturers	Prof. Dr. Mohammad Al-Batah	emails	albatah@jadara.edu.jo		
Lecture time	11:00- 12:15	Classroom	Online		
Semester	First	Production	2015	Updated	2022
Awards				Attendance	Fulltime

Short Description

This course is an introduction to expert systems. In this course, Students will be learned how theory and applications complement each other. Both theory and application are presented. Students are provided with the basic of PROLOG language, which they can use to develop systems of their own in solving problem. In this course, different methods and techniques of creating and design a knowledge base: Rules, Semantic nets Frames and others will be covered in addition to various knowledge representation methods. By integrating theory with a fully functional means of applying that theory to real-world situations, students will gain an appreciation for the role played by expert systems in today's world.

Course Objectives

- ◆ An ability to explain and describe the central concepts to the creation of knowledge bases and expert systems.
- ◆ Students be able to understand and use a number methods and techniques of creating and design a knowledge base: Rules, Semantic nets Frames and others.
- ◆ Understand the problem domain and knowledge domain in addition to learn the advantages of an expert system.
- ◆ Understand the stages in the development of an expert system and the components of ES.
- ◆ Analyze some methods for dealing with uncertainty, and learn about the theory of uncertainty based on fuzzy logic.
- ◆ An ability to use various knowledge representation methods and different expert system structures.
- ◆ An ability to apply AI techniques to the problem of acquisition and representation of expert knowledge for problem solving in the expert's domain.
- ◆ An ability to implement a small knowledge- based system with **Prolog** language.

Learning Outcomes

A. Knowledge - Theoretical Understanding
a.1 Understand principles, the concepts expert systems and main theory used in logic. (K1)
B. Knowledge - Practical Application
a.2 Apply AI techniques to the problem of acquisition and representation of expert knowledge. (K2)
a.3 Apply theories that have been devised to deal with uncertainty. (K3)
C. Skills - Generic Problem Solving and Analytical Skills
b.1 Explore and analyze different methods and rules of inference. (S1)
b.2 Ability to use different methodologies for analyzing and design a small problem as an expert system. (S2)
D. Skills - Communication, ICT, and Numeracy
b.3 Work effectively as teams to allow students to present oral and written reports. (S3)
E. Competence: Autonomy, Responsibility, and Context
Teaching and Learning Methods
Lecture, lab, Group work, and discussion
Assessment Methods
<ul style="list-style-type: none"> - Lecture, Group work, and discussion - Midterm exam, Final exam, Class Assignment and Project - Observation of student contribution in team work and project presentation

Course Contents					
Week	Hours	CLOs	Topics	Teaching & Learning Methods	Assessment Methods
1,2	6	a1	Chapter 1: Introduction to Expert Systems	Lectures& discussions	Quizzes
3,4	6	a1,b3	Chapter 1: Introduction to Expert Systems (cont.)	Lectures& discussions UML2.5 tools	Quizzes Homework
5,6,7	9	a1,a2	Chapter 2 The Representation of Knowledge.	Lectures& discussions	Assignment and Quizzes
8,9	6	a3,b3	Chapter 3 Methods of Inference	Lectures& discussions	Quizzes
MIDTERM EXAM					
10,11	6	a3,b2	Chapter 4 Reasoning under uncertainty.	Lectures& discussions UML2.5 tools	Case problem
12,13	6	a1,a3,b2	Chapter 5 Inexact Reasoning	Lectures& discussions	Quizzes
14	3	b2	Chapter 6 Design of Expert Systems.	Lectures& discussions	Case problem
15	3	b1,b2	Chapter 7 Introduction to Prolog	Lectures& discussions Using SWI-Prolog interface and interpreter.	Case problems

16	3	a1,a3,b2	Chapter 8 Advanced Pattern Matching	Lectures& discussions	Quizzes
FINAL EXAM					

Infrastructure	
Textbook	<ul style="list-style-type: none"> - Expert Systems: Principles and Programming, Fourth Edition. Joseph C. Giarratano, Gary D. Riley, 2004, ISBN-10: 0534384471 - Peter Jackson, Introduction to Expert Systems, Addison Wesley Longman, 1999. - Engineering of Knowledge-Based Systems. Avelino J. Gonzalez, Douglas D. Dankel, Prentice Hall (2000), ISBN-10: 0130189731.
References	"Logic Programming with Prolog", Max Bramer, Springer-Verlag London, 2005
Required reading	
Electronic materials	Electronic material placed on JADARA University E-learning system for this course: Syllabus, PowerPoint slides, exercises, assignments..
Other	

Course Assessment Plan								
Assessment Method		Grade	CLOs					
			a1	a2	a3	b1	b2	b3
First (Midterm)		30	8	8	8	6		
Second (if applicable)								
Final Exam		50	10	5	5	10	10	10
Coursework								
Coursework assessment methods	Assignments	5	1	1	2	1		
	Case study							
	Discussion and interaction	5	1	1	1	2		
	Group work activities							
	Lab tests and assignments							
	Presentations							
	Quizzes	10	3	3	2	2		
Total		100	23	18	18	21	10	10

Plagiarism
<p>Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).</p> <p>Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.</p>