اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Expert Systems
Course Code:	501585-3
Program:	Bachelor in Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University

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Table of Contents

A. Course Identification

1. Credit hours: 3	

2. Course type

a. University ☐   College ☐   Department ☑   Others ☐

b. Required ☐   Elective ☑

3. Level/year at which this course is offered: 12/4

4. Pre-requisites for this course (if any)**: 501481-3 Artificial Intelligence**

5. Co-requisites for this course (if any)**: None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	4	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	40
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	**40**

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces the principles of design, development, and operations of expert systems. Topics include different methods of knowledge representation and knowledge engineering techniques. Inference techniques, uncertainty handling, and the basics of computer programming for Expert Systems are introduced. Principles of Fuzzy Logic are covered as an approximate reasoning technique. Some Machine Learning techniques such Artificial Neural networks, Decision Tree and Association Rule Learning are introduced as recent trend in the field. Practical considerations of applying knowledge-based Systems in different Machine Learning applications are discussed.

2. Course Main Objective

- Students at the end of this course are able:
- Recognize the components of an expert system and understand the relation among these components
- Investigate different knowledge base systems' models and their applications

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize the basic components of expert system	K1
2	**Skills :**	
2.1	Acquire Experts' knowledge and to use different knowledge representation and knowledge engineering techniques	S1
2.2	Using different reasoning techniques and handle uncertainty	S2
2.3	Evaluate practical considerations of applying knowledge-based Systems in different Machine Learning applications	S1&S2
3	**Values:**	
3.1	Work in Team	V2

C. Course Content

No	List of Topics	Contact Hours
1	An overview of Expert System	**3**
2	Knowledge Representation & Engineering	**5**
3	Computer Programming for Expert Systems	**7**
4	Inference Techniques: Forward Chaining Backward Chaining & CBR	**3**
5	Inference Techniques: Conflict resolution strategies and algorithms-Rete Algorithm	**3**
6	Heuristic Classification and Constructive Problem Solving	**3**
7	Reasoning Under Uncertainty: Certainty Factors & Baye's Theorem	**3**
8	Approximate Reasoning: Fuzzy Logic	**3**
9	Machine Learning Approaches: Artificial Neural Networks and Association Rule Learning	**5**
10	Practical Applications & Project Presentations	**5**
	Total	**40**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Recognize the basic components of expert system	Lectures	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.0	**Skills**		
2.1	Acquire Experts' knowledge and to use different knowledge	Lectures Homework Project	**Direct Assessment Tool**

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	representation and knowledge engineering techniques		Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.2	Using different reasoning techniques and handle uncertainty	Lectures Homework Project	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
2.3	Evaluate practical considerations of applying knowledge based Systems in different Machine Learning applications	Lectures Project	**Direct Assessment Tool** Quizzes / Homework/Project/ Exams **Indirect Assessment Tool** Course Exit Survey
3.0	**Values**		
3.1			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Student Participation/Attendance	Every Week	5%
2	Project/Homework	Week 3 →9	20%
3	Quizzes	Week 4 & 8	15%
4	Midterm Exam	Week 5	20%
5	Final Exam	Week 10	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
- 6 hours per week in pre-determined office hours
- Consultation by appointment (as needed)
- Through emails
- Through Blackboard

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	*The Essence of Expert Systems*, K. Darlington, Pearson, 2011
Essential References Materials	*Principles of Expert Systems*, P. Lucas, Addison Wesley, 2014
Electronic Materials	• TBA during the course
Other Learning Materials	• TBA during the course

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classroom with 20-30 chairs
Technology Resources (AV, data show, Smart Board, software, etc.)	• Video projector / data show White board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	TBA during the course

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students	Students' surveys and Student's course evaluation
Improvement of Teaching	Course Coordinator	deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	• Review CAF (Course assessment file) • Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	CS council
Reference No.	Meeting #12
Date	23-10-1443