Philadelphia University
Course Outline

Course Title	:	**INTELLIGENT SYSTEMS DESIGN**		**630423**
Prerequisite	:	**Discrete Mathematics**		**630260**
Text Book	:	**Artificial Intelligence: A Guide to Intelligent Systems, By: Michael Negnevitsky, Addison Wesley, UK, 2002, ISBN:0-201-71159-1,*www.pearsonedu.com*, *www.booksites.net/negnevitsky***		
Credit Hours	:	3	**Level**	**4th year**

Course Goals:

To cover the principles of artificial intelligence, knowledge acquisition, representation and processing. It covers the design and implementation of intelligent systems and their engineering applications.

Time Schedule:

Duration:	**16 weeks**	**Lectures:**	**3 hours / week**
Tutorial:	**None**	**Laboratories:**	**None**

Objectives:

At Completing this module the student should be able to :

1-	**Understand the principles of artificial intelligence**
2-	**Design and implement microprocessor-based real-time systems**
3-	**Deal with uncertainty and vague information**

Course Contents

	Week
Chapter 1: An Overview of Artificial Intelligence: **What is AI, Expert systems, Intelligent systems? History of AI. Knowledge representation techniques**	2
Chapter 2: Rule-based Expert Systems: **Structure of a rule-base expert system, Characteristics of an ES, Forward & backward chaining inference techniques, Conflict resolution.**	2
Chapter 3: Uncertainty Management in Rule-Based Systems: **Probability theory, Bayesian reasoning, Certainty factors, Fuzzy logic.**	1
Chapter 4: Fuzzy Expert Systems: **Fuzzy sets, Linguistic variables and hedges, Fuzzy rules, Fuzzy inference, Building a fuzzy expert system.**	4
Chapter5: Frame-Based Expert Systems: **Frame-based system structure, Inheritance in frame-based systems, Methods and demons, Interaction of frames & rules.**	1
Chapter 6: Artificial Neural Networks: **What is NN, Multi-layer neural networks, Learning of NNs, Self-organizing NNs.**	4
Chapter 8: Hybrid Intelligent Systems: **Neural expert systems, Neuro-fuzzy systems, Adaptive neuro-fuzzy inference system.**	1
Chapter 9: Knowledge Engineering & Data Mining: **What is knowledge engineering? Data mining and knowledge discovery.**	1

Mode of Assessment

1-	**First Exam**	**20%**
2-	**Second Exam**	**20%**
3-	**Quizzes\Homework\ and or Projects**	**20%**
4-	**Final Exam**	**40%**

References

1-	**Peter Jackson, "Introduction to Expert Systems", 3rd edition, Addison-Wesley, USA 1999, ISBN: 0-201-87686-8**
2-	**Edmund C. Payne, & Ropert C. McArthur, "Developing Expert Systems: A Knowledge Engineer's Handbook for Rules & Objects", John Wiley & Sons, USA, 1990.**
3-	**Alison Cawsey, "The Essence of Artificial Intelligence", Prentice Hall, USA, 1998.**
4-	**Jeffrey johnson & Philip Picton, "Concepts in Artificial Intelligence", Butterworth-HeinemannLtd, UK, 1995.**
5-	**John Durkin, "Expert Systems Design & Development", Macmillan Publishing Co, USA, 1994.**
6-	**M. Chadwick & J.A. Hannah, "Expert Systems for Personal Computers: an Introduction to Artificial Intelligence", Galgotia Publications Ltd, India, 1997.**
7-	**Microcomputer Systems: Real-Time Interfacing, Brooks-Cole Publisher, 2000.**