Planning and Quality Assurance Affairs

Course Specifications

General Information

Course name	Artificial Intelligence
Course number	ITCS4319
Faculty	
Department	
Course type	College Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Introducing the basic concepts and techniques of Artificial Intelligence

2 - Developing skills of using Artificial Intelligence algorithms for solving practical problems

3 - Understanding of both the achievements of AI and the theory underlying those achievements

4 - A basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language

5 - A basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning

Intended Learning Outcomes

Knowledge and Understanding	* a1) Identify the notions of rational behavior and intelligent agents
	* a2) Explain the basic issues of knowledge representation and heuristic search
	* a3) Define major concepts and approaches in knowledge representation, planning, learning, robotics and other AI areas.
	* a4) Explain the principles and techniques of a number of application areas informed by the research directions of artificial intelligence
	* a5) Describe the principles of AI and pattern recognition
	* a6) Identify core of analysis, applied mathematics and statistics
	* a7) Explain selected advanced topics to provide a deeper understanding of some aspects of artificial intelligence
Intellectual Skills	* b1) Define traditional and nontraditional problems in artificial inelegant
	* b2) Perform comparisons between : algorithms, methods, techniques
	* b3) Perform classifications of : data, results, methods, techniques, algorithms
	* b4) Identify attributes, components, relationships, patterns, main ideas, and errors
	* b5) Summarize the proposed solutions and their results
	* b6) Restrict solution methodologies upon their results
	* b7) Establish criteria, and verify solutions
	* b8) Generate an innovative design to solve a problem containing a range of commercial and industrial constraints
Professional Skills	* c1) Develop a general appreciation of the goals, subareas, achievements and difficulties of AI
	* c2) Developing programming skills for AI applications
	* c3) Exposure to logic programming with Prolog and Lisp
	* c4) Apply the principles of human-computer interaction to the evaluation and construction of a wide range of application
	* c5) Specify, design, and implement computer-based systems
	* c6) Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem
General Skill	* d1) Communicate effectively by oral, written and visual means
	* d2) Work effectively as an individual and as a member of a team
	* d3) Demonstrate efficient IT capabilities
	* d4) Lead and motivate individuals
	* d5) Manage tasks and resources
	* d6) Acquire entrepreneurial skills
	* d7) Develop strong problem-solving and decision-making skills, and will be able to apply those skills effectively in all aspects of their future lives
	* d8) Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability

Course Contents

1 - Artificial and human intelligence: domains of AI-symbolic processing: semantic nets, modeling model based reasoning, frames
2 - Inference techniques: implication, forward and backward chaining, inference nets, predicate logic, quantifiers, tautology, resolution, and unification
3 - Rule based systems: inference engine, production systems, problem solving, planning, decomposition, and basic search techniques
4 - AI languages: symbolic and coupled processing prolog: objects and relations, compound goals, backtracking, search mechanism, dynamic databases, lisp, program structure and operations, functions, unification, memory models
5 - Fields of AI: heuristics and game plying, automated reasoning, problem solving, computational linguistics and natural language processing, computer vision, robotics AI based computer systems: sequential and parallel inference machines, relation between AI and artificial neural nets, fuzzy systems

Teaching and Learning Methods

1 - Lectures
2 - Tutorial Exercises
3 - Projects

Teaching and Learning Methods for the Disabled Students

1 - ----

Students Assessment

Assessment Method	TIME	MARKS
Mid-Term Exam I	6th week	20
Project and/or Assignments	12th week	20
Class Work	During the 16 weeks	10
Final exam	16th week	50

Books and References

Course note	Lecture Course Notes
Essential books	S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, 2nd ed., Prentice Hall, 2007
Recommended books	G. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th ed., Addison Wesley, 2009
	G. Luger and W. Stubblefield, AI Algorithms, Data Structures, and Idioms in Prolog, Lisp and Java, Addison Wesley, 2009

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Artificial and human intelligence: domains of AI-symbolic, processing: semantic nets, modeling model based reasoning, frames.	1-3	a1, a2	b1	c3	d1, d2, d3, d4, d5, d6, d7, d8
Inference techniques: implication, forward and backward chaining, inference nets, predicate logic, quantifiers, tautology, resolution, and unification	4-6	a2	b2	c5	d1, d2, d3, d4, d5, d6, d7, d8
Rule based systems: inference engine, production systems, problem solving, planning, decomposition, and basic search techniques	7-9	a3	b2, b3, b4, b7	c2	d1, d2, d3, d4, d5
AI languages, Prolog: objects and relations, compound goals, backtracking, search mechanism, dynamic databases, lisp, program structure and operations, functions, unification, memory models	10-12	a6	b5	c2, c3, c5	d1, d3, d5, d7, d8
Fields of AI: heuristics and game plying, automated reasoning, problem solving, computational linguistics and natural language processing, computer vision, robotics AI based computer systems	13-15	a4, a5, a7	b6, b8	c1, c4, c6	d1, d3, d5, d8