CSE 5914: Capstone Design: Knowledge-Based Systems

Course Description
Capstone design project; conceptual and technical design; theory and practice of knowledge-based systems; teamwork, written and oral communication skills.

Prior Course Number: CSE 731
Transcript Abbreviation: Cpstn: Knowl Sys
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad, Graduate
Student Ranks: Senior, Masters, Doctoral
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 4.0
Repeatable: No
Time Distribution: 1.0 hr Lec, 3.0 hr Lab
Expected out-of-class hours per week: 8.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: (CSE 2501 or CSE 5501 or CSE 601) and (CSE 3901 or CSE 3902 or CSE 4901 or CSE 4902 or CSE 560) and (CSE 3521 or CSE 5521 or CSE 630)
Exclusions: Not open to students with credit for CSE 731
Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.0901
Subsidy Level: Doctoral Course

Programs

Abbreviation	Description
BS CSE	BS Computer Science and Engineering
MS CSE	MS Computer Science and Engineering
PhD CSE	PhD Computer Science and Engineering

Course Goals

Master task-level analysis and problem solving methods for configuration (design) problems.
Be competent with methods for representing and reasoning with uncertain knowledge.
Be familiar with the analysis and methods of diagnosis problems.

Master synthesizing and applying prior knowledge to designing and implementing solutions to open-ended computational problems while considering multiple realistic constraints.
Be competent in evaluating design alternatives.
Be competent with software design and development practices and standards.
Be familiar with researching and evaluating computing tools and practices for solving given problems.
Be competent with deadline driven projects in a team setting.
Be competent with issues of project management, such as teamwork, project scheduling, individual and group time management.
Be competent with presenting work to a group of peers.
Be familiar with presenting work to a range of audiences.
Be competent with techniques for effective written communication for a range of purposes (user guides, design documentation, storyboards etc.).
Be familiar with analyzing professional issues, including ethical, legal and security issues, related to computing projects.
Master task-level analysis and problem solving methods for classification problems.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction and overview	1.0							
Production system languages, CLIPS	2.0		3.0					
Classification and diagnosis	2.0		3.0					
Configuration and design	2.0		3.0					
Reasoning with uncertain knowledge	2.0		3.0					
Generic tasks and architectures; abduction methods	2.0		3.0					
Current trends: Expert systems in industry	1.0							
Design meetings, team work			18.0					
Presentations			8.0					

Representative Assignments

Final Project: Design and implement an expert system for a real-world problem.

Grades

Aspect	Percent
Midterm exam	35%
Final project	60%
Attendance	5%

Representative Textbooks and Other Course Materials

Title	Author
Introduction to Knowledge Systems	Stefik, M

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.

Course Contribution		College Outcome
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
**	f	An understanding of professional and ethical responsibility.
***	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
***	i	A recognition of the need for, and an ability to engage in life-long learning.
***	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

BS CSE Program Outcomes

Course Contribution		Program Outcome
***	a	an ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering;
*	b	an ability to design and conduct experiments, as well as to analyze and interpret data;
***	c	an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;
***	d	an ability to function on multi-disciplinary teams;
***	e	an ability to identify, formulate, and solve engineering problems;
**	f	an understanding of professional, ethical, legal, security and social issues and responsibilities;
***	g	an ability to communicate effectively with a range of audiences;
*	h	an ability to analyze the local and global impact of computing on individuals, organizations, and society;
***	i	a recognition of the need for, and an ability to engage in life-long learning and continuing professional development;
***	j	a knowledge of contemporary issues;
***	k	an ability to use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;
***	l	an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
***	m	an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
***	n	an ability to apply design and development principles in the construction of software systems of varying complexity.

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