CSE 3521 (Approved): Survey of Artificial Intelligence I: Basic Techniques

Course Description
Survey of basic concepts and techniques in artificial intelligence, including problem solving, knowledge representation, and machine learning.

Prior Course Number: CSE 630
Transcript Abbreviation: Intr Artif Intell
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Junior
Course Offerings: Autumn, Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 6.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: CSE 2331 or (CSE 222 and Math 366) or senior standing
Exclusions: Not open to students with credit for CSE 5521 or CSE 630
Cross-Listings:

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: Baccalaureate Course

Programs

Abbreviation	Description
BS CSE	BS Computer Science and Engineering

Course Goals

Master basic search techniques for problem-solving, including systematic blind search, heuristically-guided search, and optimal search.
Be competent with game tree search methods and the requirements for expert-level game play.
Be familiar with using logic and proof as a basis for knowledge representation and automated reasoning.
Be familiar with multiple knowledge-representation formalisms.
Be exposed to problems in common sense reasoning and language understanding.
Be exposed to integrated AI architectures as a platform for building AI systems.

Be exposed to machine learning techniques and the kinds of problem they solve.
Be exposed to state-of-the-art AI applications related to robotics, machine vision, speech recognition, and computer games.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Basic representation and problem solving methods.	6.0							
Search techniques and game playing.	6.0							
Knowledge representation using logic, automated proof techniques.	6.0							
Machine learning, probabilistic inference.	6.0							
Planning and common sense reasoning.	3.0							
Perception and communication.	4.0							
Applications.	6.0							
AI & Games.	3.0							

Representative Assignments

Compare breadth-first, depth-first, and A* search on a problem domain.
Apply reinforcement learning to maze navigation.

Grades

Aspect	Percent
Homeworks and Labs	40%
Midterm	25%
Final	35%

Representative Textbooks and Other Course Materials

Title	Author
Artificial Intelligence, A Modern Approach (3rd edition)	Stuart Russell and Peter Norvig

ABET-EAC Criterion 3 Outcomes

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

Course Contribution		College Outcome
**	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.

Prepared by: James Davis