



Graduate Course Syllabus

IT 660: Artificial Intelligence

Center: Online

Course Prerequisites

IT 500 or IT 510

Course Description

Students study the concepts, techniques, applications and implications of artificial intelligence theory and technology. The course also focuses on the applications of rule-based expert systems in business, industry and government. Topics include knowledge representation and acquisition, heuristic search in problem solving and game playing, genetic algorithms, fuzzy logic, neural networks, automatic deduction and logic programming. Students create expert systems using Prolog.

Course Outcomes

- Formulate strategies for effectively integrating various development steps into the design of artificial intelligent applications
- Differentiate among various artificial intelligence paradigms in terms of components, design, and technical specifications
- Analyze characteristics and attributes that differentiate artificial intelligence applications from other forms of applications such as databases and spreadsheets
- Adapt programming to improve the form and/or function of artificial intelligence systems using standard artificial intelligence software
- Analyze the impact of various processes on the successful completion of artificial intelligence projects both in terms of time to completion and preservation of the integrity of application design

Required Materials

Using your learning resources is critical to your success in this course. Please purchase directly through SNHU's online bookstore, [MBS Direct](#), rather than any other vendor. Purchasing directly from the bookstore ensures that you will obtain the correct materials and that the Help Desk, your advisor, and the instructor can provide you with support if you have problems.

Artificial Intelligence: Structures and Strategies for Complex Problem Solving

Luger, George F.

Addison-Wesley Longman, Inc.

6th Edition

2009

ISBN: 978-0-321-54589-3

Software

1. Knowledge management with Hugin Expert: www.hugin.com
2. Logic programming with Prolog: www.swi-prolog.org
3. Pandorabot: <http://pandorabots.com/botmaster/en/home>

Instructor Availability and Response Time

Your class interaction with the instructor and your classmates will take place on a regular, ongoing basis. Your instructor will be actively engaged within the course throughout the week. You will normally communicate with your instructor in the weekly discussions or the General Questions discussion topic so that your questions and the instructor's answers benefit the entire class. You should feel free, however, to communicate with your instructor via SNHU email at any time, particularly when you want to discuss something of a personal or sensitive nature. Your instructor will generally provide a response within 24 hours.

Grade Distribution

Assignment Category	Number of Graded Items	Point Value per Item	Total Points
Discussions	10	10	100
Assignments	9	50	450
Short Paper	1	50	50
Final Project			
Milestone Two	1	45	45
Milestone Three	1	45	45
Milestone Four	1	300	300
		Total Course Points:	990

This course may also contain practice activities. The purpose of these non-graded activities is to assist you in mastering the learning outcomes in the graded activity items listed above.

University Grading System: Graduate

Total Points. 990				
Grade	Numerical Equivalent	Points	Points Equivalent	
			Lower	Upper
A	93-100	4.00	921	990
A-	90-92	3.67	891	920
B+	87-89	3.33	861	890
B	83-86	3.00	822	860
B-	80-82	2.67	792	821
C+	77-79	2.33	762	791
C	73-76	2.00	723	761
F	0-72	0.00	0	722
I	Incomplete			
IF	Incomplete/Failure*			
W	Withdrawn			

* Please refer to the [policy page](#) for information on the incomplete grade process.

Grading Guides

Specific activity directions, grading guides, posting requirements, and additional deadlines can be found in the Assignment Guidelines and Rubrics section of the course.

Weekly Assignment Schedule

All reading and assignment information can be found within each module of the course. Assignments and discussion posts during the first week of each term are due by 11:59 p.m. Eastern Time. Assignments and discussion posts for the remainder of the term are due by 11:59 p.m. of the student's local time zone.

In addition to the textbook readings that are listed, there may be additional required resources within each module.

Module	Topics and Assignments
1	Introduction to Artificial Intelligence Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i> , Chapter 1 1-1 Discussion: Getting Started 1-2 Explore the AI Behind Avatars and Chatbots 1-3 Final Project Review 1-4 Short Paper: Create a Simple AI with a Pandorobot

2	<p>Rule-Based Expert Systems</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 2, 7.1, 8.1 and 8.2</p> <p>2-1 Discussion: Ordinary Behaviors and Decision Making in Rule-Based Expert Systems</p> <p>2-2 Assignment: Practical Rule-Based System</p> <p>2-3 Final Project Milestone 1: Group Formation and Topic Selection</p>
3	<p>Prolog: Programming in Logic</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 2, 7.1 and 14</p> <p>3-1 Discussion: Procedural Programming, Object-Oriented Programming, and Logic Programming</p> <p>3-2 Experiment with the “Likes” Program</p> <p>3-3 Create a “Tolls” Prolog Program</p> <p>3-4 Assignment: Backward-Chaining Inference in Prolog</p>
4	<p>Constraint Satisfaction</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 2.2, 2.3 and 6.1.2</p> <p>4-1 Discussion: Possible Applications of Constraint Satisfaction</p> <p>4-2 Experiment with Sample Programs that Implement Constraint Satisfaction</p> <p>4-3 Assignment: Constraint Satisfaction Solution</p> <p>4-4 Final Project Milestone 2: Project Proposal</p>
5	<p>Uncertainty Management</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 5.1, 5.2, 5.3, 9.2.1 and 9.2.3</p> <p>5-1 Discussion: Possible Applications of Uncertainty Management</p> <p>5-2 Certainty Factor Theory Example</p> <p>5-3 Assignment: Uncertainty Management with Certainty Factor Theory and Bayesian Reasoning</p>
6	<p>Fuzzy Expert Systems</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapter 9.2.2</p> <p>6-1 Discussion: Fuzzy Reasoning</p> <p>6-2 Fuzzy Reasoning Example</p> <p>6-3 Assignment: R Commonsense Reasoning with the Fuzzy Reasoning Paradigm</p> <p>6-4 Final Project: Continue Working</p>
7	<p>Frame-Based Expert Systems</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 7.1.3, 7.1.4 and 7.1.5</p> <p>7-1 Discussion: Frame-Based Reasoning</p> <p>7-2 Create a Pictorial Representation of a Frame-Based Reasoning Example</p> <p>7-3 Assignment: Commonsense Reasoning with the Frame-Based Paradigm</p>

8	<p>Case-Based Reasoning</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapter 8.3</p> <p>8-1 Discussion: Case-Based Reasoning</p> <p>8-2 Execute the Example Program of a Hybrid RBR/CBR System</p> <p>8-3 Assignment: Hybrid RBR/CBR System for a Domain</p> <p>8-4 Final Project: Continue Working</p>
9	<p>Artificial Neural Networks</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 11.1, 11.2 and 11.3</p> <p>9-1 Discussion: Neural Networks</p> <p>9-2 Create a Neural Network that Learns the Operator <i>and</i></p> <p>9-3 Assignment: Neural Network That Learns the Operator <i>or</i></p> <p>9-4 Final Project Milestone 3: Rough Draft of Final Project Report</p>
10	<p>Genetic Algorithms</p> <p>Reading: <i>Artificial Intelligence: Structures and Strategies for Complex Problem Solving</i>, Chapters 12.1 and 12.2</p> <p>10-1 Discussion: Possible Applications of Genetic Algorithms</p> <p>10-2 Create a Genetic Algorithm for the Map-Coloring Problem</p> <p>10-3 Assignment: Application of a Genetic Algorithm</p> <p>10-4 Final Project Milestone 4: Final Project Report</p>

Attendance Policy

Online students are required to submit a graded assignment/discussion during the first week of class. If a student does not submit a posting to the graded assignment/discussion during the first week of class, the student is automatically withdrawn from the course for non-participation. Review the [full attendance policy](#).

Late Assignments Policy

Meeting assigned due dates is critical for demonstrating progress and ensuring appropriate time for instructor feedback on assignments. Students are expected to submit their assignments on or before the due date. Review the [full late assignment policy](#).

SNHU College of Online and Continuing Education Student Handbook

Review the [student handbook](#).

ADA/504 Compliance Statement

Southern New Hampshire University is dedicated to providing equal access to individuals with disabilities, including intellectual disabilities, in accordance with Section 504 of the Rehabilitation Act of 1973, Title III of the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Act of 2008. The university prohibits unlawful discrimination on the basis of disability and takes action to prevent such discrimination by providing reasonable accommodations to eligible individuals with disabilities.

As soon as you become aware of a disability, we encourage you to contact the Online Accessibility Center (OAC) to discuss accommodations for which you may be qualified. Reasonable accommodations are established through an interactive process between the student and the OAC. Note that accommodations are not retroactive and that disability accommodations are not provided until an accommodation letter has been processed.

Contact Information:

Online Accessibility Center

Phone: 866-305-9430

Email: oad@snhu.edu

For questions concerning support services, documentation guidelines, or general disability issues, visit the [Online Accessibility Center](#) website.

If you feel you have been denied appropriate disability-related accommodations, including appropriate auxiliary aids and services, you may file a grievance as described in the ADA/504 Grievance Policy found on the [Disability Services](#) webpage.

Academic Honesty Policy

Southern New Hampshire University requires all students to adhere to high standards of integrity in their academic work. Activities such as plagiarism and cheating are not condoned by the university. Review the [full academic honesty policy](#).

Copyright Policy

Southern New Hampshire University abides by the provisions of United States Copyright Act (Title 17 of the United States Code). Any person who infringes the copyright law is liable. Review the [full copyright policy](#).

SNHU College of Online and Continuing Education Withdrawal Policy

Review the [full withdrawal policy](#).

Southern New Hampshire University Policies

More information about SNHU policies can be found on the [policy page](#).

Assessment Calibration and Student Work Samples

For the purpose of continuous improvement of our educational training, Southern New Hampshire University's College of Online and Continuing Education may, on occasion, utilize anonymous student work samples for internal professional development and staff training. If you have any questions or concerns, contact your advisor. If you would like to withdraw permission for use of your work, please contact the assessment calibration administrator at assessmentcalibration@snhu.edu. See [this document](#) for more information.