



General Information

Date:	3/18/21	*Effective Term:	Fall 2021
College/Department:	Engineering/Computer Science		
Course Designator and Number (Cross-listed Course Designator and Number):	CS 5804		
Title of Course:	Introductio to Artificial Intelligence		
Instructor and/or Department Contact:	Trey Mayo/Director of Graduate Programs		
Contact Phone:		Contact E-mail:	treymayo@vt.edu

Prerequisite Enforced

Enable prerequisite enforcement? Yes No

Add the following Prerequisite/Corequisites:

Graduate standing in the CSA program

Attach department letter of support to include a non-departmental course as a prerequisite/corequisite.

Drop the Following Prerequisites/Corequisites:

CS 2604 (UG) OR CS 2604

List Course Prerequisites/Corequisites after change:

Graduate standing in the CSA program

Justification (Justify prerequisite/corequisite changes and remaining prerequisites/corequisites after change)

Student must be admitted to the graduate program in CSA in order to take the course.

If adding a minimum grade as a prerequisite for a course, data must be provided to clearly show the need for that minimum grade in order to be successful in the course. Minimum grade requirements may not be used as a way to limit enrollment.

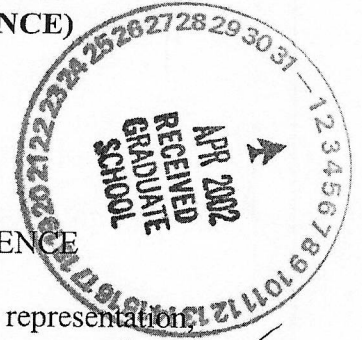
*If request is being processed for the upcoming effective term:

- Requests to **ADD** prerequisite requirements (i.e., turn enforcement **ON**, add grade restriction, add course) must be processed prior to the opening of "course request" for the applicable effective term.
- Requests to **REMOVE** prerequisite requirements (i.e., turn enforcement **OFF**, remove a grade restriction, drop course) may be completed at any time, unless the removal causes the course to be more restrictive.

Approval Signatures

Department Head/Chair		Date	3/18/2021
College Curriculum Committee Representative		Date	3/19/21
College Dean		Date	3/19/21

**COMPUTER SCIENCE 5804
INTRODUCTION TO ARTIFICIAL INTELLIGENCE
(ADP TITLE: INTRO ARTIFICIAL INTELLIGENCE)**



I. CATALOG DESCRIPTION

5804 INTRODUCTION TO ARTIFICIAL INTELLIGENCE

A graduate level overview of the areas of search, knowledge representation, logic and deduction, learning, planning, and artificial intelligence applications. ✓

Pre: 2604 (3H,3C). ✓

II. LEARNING OBJECTIVES

Having successfully completed this course, the student will be able to:

- Encode problems in a presentation suitable for automatic problem solving
- Describe and evaluate search techniques and program search algorithms
- Program in a high-level symbolic manipulation language for deduction and reasoning
- Design algorithms for learning and planning
- Identify opportunities for applying artificial intelligence techniques in natural language processing, vision, robotics, cognitive modeling, and automated deduction.

III. JUSTIFICATION

Artificial Intelligence (AI) is a strong, central area of computer science, taught at most universities and now in use at many companies, as well. The purpose of this course is to provide an introductory graduate level course to students that will be able to explore each of the areas in AI in more depth than is possible in an advanced undergraduate course.

The field of AI has witnessed a major renaissance in the last few years, with successful applications and a more mature understanding of its connections to other branches of computer science. Accordingly, the topical content of the course is organized according to the functional goal of designing and building intelligent agents. The book by Russell and Norvig, published in 1994, has emerged as the defacto standard for AI and is being incorporated as the required textbook for this course. The syllabus has also been updated to reflect the emerging areas of AI. In particular, a major portion of the syllabus is devoted to learning systems.

IV. PREREQUISITES AND COREQUISITES

It is expected that the students taking this course will be well grounded in basic knowledge of data structures. This knowledge is necessary for understanding the material on knowledge representation, Lisp and Prolog. Experience with large programming projects is highly recommended.

V. TEXTS AND SPECIAL TEACHING AIDS

Required text:

Russell, Stuart and Peter Norvig. ARTIFICIAL INTELLIGENCE: A MODERN APPROACH. Englewood Cliffs, NJ, Prentice Hall, 1994.

Other Teaching Aids:

Online material including code and datasets are available from the Web supplement for the textbook at:

<http://www.cs.berkeley.edu/~russell/aima.html>

VI. SYLLABUS

	Percent of Course
1. Overview of AI and Intelligent Agents	5
2. Problem Solving by Searching	20
a. Search Strategies	
b. Informed Search Methods	
c. Game Playing	
3. Knowledge and Representation	10
4. Inference and Logical Reasoning Systems	10
5. Planning and Acting	10
6. Learning	30
a. Learning from Observations	
b. Learning in Neural and Belief Networks	
c. Reinforcement Learning	
d. Knowledge in Learning	
7. Applications, including brief mention of Vision, Robotics, and handling Uncertainty	15

100

VII. OLD (CURRENT) SYLLABUS:

	Percent of Course
1. Overview of AI	6
2. Intro to Lisp or Prolog	7
3. Vision	6
4. Search Strategies	7
5. Search Domains, GPS	7
6. Logic and Theorem Proving	7
7. Data dependencies, Non-monotonic logic	7
8. Memory Organization and Deduction	7
9. Expert Systems	7
10. Natural Language: Syntax	6
11. Natural Language: Semantics	7
12. Situation-based and least-commitment planners	7
13. Other planning strategies	6
14. Learning and Connectionism	<u>13</u>
	100

VII. CORE CURRICULUM GUIDELINES

NA.