BACHELOR OF SCIENCE (BS) DEGREE WITH A MAJOR IN ARTIFICIAL INTELLIGENCE

Program Learning Outcomes for the BS Degree with a Major in Artificial Intelligence

Upon completing the BS degree with a major in Artificial Intelligence, students will be able to:

1. Demonstrate a strong understanding of the mathematical foundations of artificial intelligence, including calculus, linear algebra, probability, and statistics.
2. Understand, implement, and learn new AI methodologies, including machine learning, deep learning, and artificial intelligence algorithms.
3. Be capable of designing, building, and evaluating complex AI-centered systems to solve real-world problems.
4. Understand and apply ethical considerations and responsible AI practices, including fairness, transparency, and social responsibility, in the development and deployment of AI systems.
5. Be prepared to pursue technical careers implementing and improving AI systems or advanced research degrees in artificial intelligence, demonstrating adaptability to evolving technologies in the field.

Requirements for the BS Degree with a Major in Artificial Intelligence

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BS degree with a major in Artificial Intelligence must complete:

- A minimum of 20 courses (67-68 credit hours, depending on course selection) to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 9 courses (33 credit hours) taken at the 300-level or above.
- A maximum of 5 courses (20 credit hours) from study abroad or transfer credit ***after*** matriculation at Rice may be applied towards specific major requirements. For additional departmental guidelines regarding transfer credit, see the Policies (p. 2) tab.

The BS degree with a major in artificial intelligence is designed for students who are interested in an in-depth study of artificial intelligence. It is designed to provide students with a set of analytical and technical skills that will enable them to develop computational models that aim to replicate various aspects of human intelligence. The undergraduate program consists of required math courses; computer science core courses; artificial intelligence core courses; and artificial intelligence electives, which give students the freedom to explore specific interests within the domain of artificial intelligence.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor or, where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Artificial Intelligence		67-68
Total Credit Hours Required for the BS Degree with a Major in Artificial Intelligence		120

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
Mathematics		
MATH 101	SINGLE VARIABLE CALCULUS I	3
or MATH 105	AP/OTH CREDIT IN CALCULUS I	
MATH 102	SINGLE VARIABLE CALCULUS II	3
or MATH 106	AP/OTH CREDIT IN CALCULUS II	
Linear Algebra		
Select 1 course from the following:		*3*
CMOR 302	MATRIX ANALYSIS	
CMOR 303	MATRIX ANALYSIS FOR DATA SCIENCE	
MATH 221	HONORS CALCULUS III	
MATH 354	HONORS LINEAR ALGEBRA	
MATH 355	LINEAR ALGEBRA	
Statistics		
STAT 315 / DSCI 301	PROBABILITY AND STATISTICS FOR DATA SCIENCE	4
Computer Science		
COMP 140	COMPUTATIONAL THINKING	4
COMP 182	ALGORITHMIC THINKING	4
COMP 215	INTRODUCTION TO PROGRAM DESIGN	4
COMP 222	INTRODUCTION TO COMPUTER ORGANIZATION	4
COMP 282	COMPUTATIONAL OPTIMIZATION FOR AI	3
Artificial Intelligence		
COMP 329		
COMP 345		
COMP 346		
COMP 348		
COMP 456		
COMP 457		
PHIL 108	ETHICS OF ARTIFICIAL INTELLIGENCE	3
PSYC 203	INTRODUCTION TO COGNITIVE PSYCHOLOGY	3
Elective Requirements		
Select 1 course (3 credit hours) from 3 of the following 5 Artificial Intelligence Elective areas		*9-10*
Artificial Intelligence Theory		
COMP 409	LOGIC AND COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE	

	COMP 414	OPTIMIZATION: ALGORITHMS, COMPLEXITY AND APPROXIMATIONS
	COMP 480	PROBABILISTIC ALGORITHMS AND DATA STRUCTURE
	COMP 585	PROBABILISTIC TOOLKIT FOR LEARNING AND COMPUTING
Cognitive Psychology		
	PSYC 430	COMPUTATIONAL MODELING OF COGNITIVE PROCESSES
	PSYC 468	HUMAN FACTORS IN ARTIFICIAL INTELLIGENCE
Knowledge and Graphs		
	COMP 459	MACHINE LEARNING WITH GRAPHS
	COMP 631	INTRODUCTION TO INFORMATION RETRIEVAL
Perception and Language		
	COMP 447 / ELEC 447	INTRODUCTION TO COMPUTER VISION
	COMP 484	NATURAL LANGUAGE PROCESSING
Robotics and Autonomy		
	COMP 442	REINFORCEMENT LEARNING
	COMP 450 / ELEC 450 / MECH 450	ALGORITHMIC AND AI-DRIVEN ROBOTICS
	COMP 462	INTRODUCTION TO MODERN ROBOTICS
Total Credit Hours Required for the Major in Artificial Intelligence		**67-68**
Additional Credit Hours to Complete Degree Requirements *		21-22
University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) *		31
Total Credit Hours		**120**

Footnotes and Additional Information

* **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

Policies for the BS Degree with a Major in Artificial Intelligence

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). The Office of Academic Advising maintains the university's official list of transfer credit advisors (https://oaa.rice.edu/advising-network/transfer-credit-advisors/) on their website: https://oaa.rice.edu. Students are encouraged to meet with the applicable transfer credit advisor as well as their academic program director when considering transfer credit possibilities.

Program Transfer Credit Guidelines

Students pursuing the major in Artificial Intelligence should be aware of the following program-specific transfer credit guidelines:

- No more than 5 courses (20 credit hours) of transfer credit from U.S. or international universities of similar standing as Rice may apply towards specific major requirements ***after*** matriculation at Rice.

Additional Information

For additional information, please see the Computer Science website: https://www.cs.rice.edu/.

Opportunities for the BS Degree with a Major in Artificial Intelligence

Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (*summa cum laude*, *magna cum laude*, and *cum laude*) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Fifth-Year Master's Degree Option for Rice Undergraduate Students

In certain situations and with some terminal master's degree programs, Rice students have an option to pursue a master's degree by adding an additional fifth year to their four years of undergraduate studies.

Advanced Rice undergraduate students in good academic standing typically apply to the master's degree program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may then start taking some required courses of the master's degree program. A plan of study will need to be approved by the student's undergraduate major advisor and the master's degree program director.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for a bachelor's degree and the master's degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware there could be financial aid implications if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).
- more information on this *Undergraduate - Graduate Concurrent Enrollment* opportunity, including specific information on the registration process can be found here (https://ga.rice.edu/undergraduate-students/academic-opportunities/undergraduate-graduate-concurrent-enrollment/).

Additional Information

For additional information, please see the Computer Science website: https://www.cs.rice.edu/.