Date Submitted: 01/25/26 9:49 am

Viewing: BS-AI-1 ~~BS-AI~~ : Bachelor of Science in Artificial Intelligence

Last approved: 06/18/19 1:38 pm

Last edit: 01/25/26 9:49 am

Changes proposed by: dzikjac

Catalog Pages Using this Program
Bachelor of Science in Artificial Intelligence

Program Status	Active		
Requestor	Name Matthew Bauer ~~Sarah Pariseau~~	E-mail bauerm@iit.edu ~~sparisea@iit.edu~~	
Origination Date	2026-1-25 ~~2019-6-18~~		
Is this an interdisciplinary program?	No		
Is this stem-eligible?	Yes		
Available for direct application?	Yes		
Academic Unit	Computer Science		
College	College of Computing		
Program Title	Bachelor of Science in Artificial Intelligence		
Effective Academic Year	2020 ~~2019~~ - 2021 ~~2020~~	Effective Term	Spring 2021
Academic Level	Undergraduate		

In Workflow

1. CSCI Chair
2. Academic Affairs
3. Undergraduate Academic Affairs
4. CC Dean
5. Undergraduate Studies Committee Chair
6. Faculty Council Chair
7. Academic Affairs

Approval Path

1. 07/02/20 9:56 am Shlomo Argamon (argamon): Approved for CSCI Chair
2. 07/02/20 12:36 pm Patty Johnson Winston (winston): Approved for Academic Affairs
3. 07/13/20 4:50 pm Joseph Gorzkowski (jgorzkow): Approved for Undergraduate Academic Affairs
4. 07/13/20 4:57 pm Lance Fortnow (lfortnow): Approved for SI Dean
5. 10/30/20 12:30 pm Kathryn Spink (spink): Approved for Undergraduate Studies Committee Chair

6. 01/14/21 10:27 pm Nicholas Menhart (menhart): Rollback to Initiator

History

1. Feb 25, 2019 by Matthew Bauer (bauerm)
2. Jun 18, 2019 by Sarah Pariseau (sparisea)

If all courses in a subject in your department are required, please enter each subject followed by the number ranges in the "Quick Add" field in the pop up box when you click the green plus button below. For example: ARCH 100-499.

What courses will factor the major GPA?

Program Type	Degree
Degree Type	Bachelor of Science (BS)

CIP Code
11.0102 - Artificial Intelligence.

Is there more than one Academic Unit proposer?

No

Program Code	BS-AI-1 ~~BS-AI~~
Program Attribute	
Total Program Credit Hours	127

Please provide a summary and rationale for the requested program revision.

To allow more options for elective components in the program.

Program Narrative and Justification

Narrative description of how the institution determined the need for the program. For example, describe what need this program will address and how the institution became aware of that need. If the program is replacing a current program(s), identify the current program(s) that is being replaced by the new program(s) and provide details describing the benefits of the new program(s). If the program will be offered in connection with, or in response to, an initative by a governmental entity, provide details of that initiative.

Artificial intelligence is one of the top growth areas in tech industry, and is projected to continue growing in size and importance for the foreseeable future. Bureau of Labor Statistics doesn't break down employment categories sufficiently, but projects significant growth in computer science jobs at the master's level over the next ten years, which will include a large number of AI opportunities. AI is a fundamental component of four of Gartner's ten strategic technology trends in 2018 - AI Foundations, Intelligent Apps and Analytics, Intelligent Things, and Conversational Platform. They predict that "AI technologies will be the most disruptive class of technologies over the next 10 years due to radical computational power, near-endless amounts of data and unprecedented advances in deep neural networks," implying significant employment opportunities in the area. They predict growth of over 450% in global business value derived from AI over the next five years.

In the CS department, we have seen enormous growth in student interest in AI at both the undergraduate and the master's level, partly fueled by an understanding of the employment opportunities in AI. Courses in AI, machine learning, computer vision, natural language processing, and so on have garnered enormous enrollment - the demand for AI education is clearly there.

References:
https://www.gartner.com/smarterwithgartner/gartner-top-10-strategic-technology-trends-for-2018/
https://www.gartner.com/smarterwithgartner/top-trends-in-the-gartner-hype-cycle-for-emerging-technologies-2017/
https://www.gartner.com/newsroom/id/3872933

Narrative description of how the program was designed to meet local market needs, or for an online program, regional or national market needs. For example, indicate if Bureau of Labor Statistics data or State labor data systems information was used, and/or if State, regional, or local workforce agencies were consulted. Include how the course content, program length, academic level, admission requirements, and prerequisites were decided; including information received from potential employers about course content; and information regarding the target students and employers.

The program is designed to meet local and national needs for artificial intelligence professionals. The course of study teaches the foundational concepts, methods, and skills of artificial intelligence, machine learning, and big data analytics, as well as the mathematical foundations, ethics, and AI application areas needed for professional success in the area. The program was designed by a committee of AI experts in the CS department, with reference to the current and projected job market in AI, comparison with other similar programs at top universities, and consultation with industry representatives.

Narrative description of any wage analysis the institution may have performed, including any consideration of Bureau of Labor Statistics wage data related to the new program.

Salaries are high, with Indeed.Com giving an average national salary of $138K for Machine Learning Engineers. We also see other top universities opening bachelor's programs and specializations in AI, including Carnegie-Mellon, Stanford, University of Michigan, and others.

Narrative description of how the program was reviewed or approved by, or developed in conjunction with, one or more of the following: a) business advisory committees; b) program integrity boards; c) public or private oversight or regulatory agencies (not including the state licensing/authorization agency and accrediting agency); and d) businesses that would likely employ graduates of the program. For example, describe the steps taken to develop the program, identify when and with whom discussions were held, provide relevant details of any proposals or correspondence generated, and/or describe any process used to evaluate the program.

The program was developed by a committee in the CS department including faculty specializing in AI within the department, over a long period. The committee considered the fundamental knowledge required in the field, potential employers' recruiting requirements, and similar programs recently developed at top universities. The final proposal was discussed and approved by the CS undergraduate graduate committee and subsequently by the CS faculty.

Admission Entry Details

What are the enrollment estimates?

Year 1	5	Year 2	10	Year 3	20

Attach Additional Program Justification Document(s)

Academic Information

Advising

Since quality advising is a key component of good retention, graduation, and career placement, how will students be mentored? What student professional organizations will be formed? How will the department work with the Career Services office to develop industry connections?

Students will be advised in the same manner as our regular BS CS students, first year advised by CS Director of UG Programs, and then by CS faculty doing research in AI related fields (currently 4 full time faculty). CS faculty have between 15-20 undergraduate advisees each.Formation of a chapter of the Association for the Advancement of Artificial Intelligence (AAAI) will be encouraged, subject to student interest. The department will work with career services and the CS advisory board to develop and expand relevant industry connections and collaborations.

Program Resources

Which program resources are necessary to offer this program?

Proposed Catalog Entry

Admission Requirements

Course Requirements

Required Courses

Artificial Intelligence Requirements		**(42)**
CS 100	Introduction to the Profession	2
CS 115 & CS 116	Object-Oriented Programming I and Object-Oriented Programming II	4
or CS 201	Accelerated Introduction to Computer Science	
CS 330	Discrete Structures	3
CS 331	Data Structures and Algorithms	3
CS 340	Programming Paradigms and Patterns	3
or CS 440	Programming Languages and Translators	
or CS 445	Object Oriented Design and Programming	
CS 422	Data Mining	3
or CS 484	Introduction to Machine Learning	
or CS 584	Machine Learning	
CS 425	Database Organization	3
CS 430	Introduction to Algorithms	3
CS 480	Introduction to Artificial Intelligence	3
CS 481	Artificial Intelligence Language Understanding	3
or CS 585	Natural Language Processing	
CS 485	Computers and Society	3

CS 487	Software Engineering I	3
Select one Artificial Intelligence Depth Course:		3
CS 512	Computer Vision	3
CS 522	Advanced Data Mining	3
CS 577	Deep Learning	3
CS 578	Interactive and Transparent Machine Learning	3
CS 581	Advanced Artificial Intelligence	3
CS 583	Probabilistic Graphical Models	3
CS 584	Machine Learning	3
CS 585	Natural Language Processing	3
ECE 442	Internet of Things and Cyber Physical Systems	3
MATH 569	Statistical Learning	3
MATH 574	Bayesian Computational Statistics	3
Select one Artificial Intelligence Breadth Course:		3
COM 301	Introduction to Linguistics	3
PHIL 326	Philosophy of Language	3
PHIL 381	Artificial Intelligence, Philosophy and Ethics	3
PHIL 382	Bioethics	3
PHYS 407	Introduction to Quantum Computing	3
PSYC 423	Learning Theory	3
PSYC 426	Cognitive Science	3
Artificial Intelligence Technical Electives		**(9)**
Select a minimum of nine credit hours from the following:		9
CS 350	Computer Organization and Assembly Language Programming	3
CS 351	Systems Programming	3
CS 422	Data Mining	3
CS 429	Information Retrieval	3
CS 451	Introduction to Parallel and Distributed Computing	3
CS 458	Introduction to Information Security	3
Any CS 500-level course		3
DS 451	Data Science Life Cycle	3
DS 480	Data Science Projects	3

MATH 252	Introduction to Differential Equations	4
MATH 350	Introduction to Computational Mathematics	3
MATH 400	Real Analysis	3
MATH 402	Complex Analysis	3
MATH 481	Introduction to Stochastic Processes	3
MATH 483	Design and Analysis of Experiments	3
MATH 484	Regression	3
MATH 487	Mathematical Modeling II	3
Minor Requirement		**(15)**
Select 15 credit hours in an area outside of computer science		15
Mathematics Requirements		**(23)**
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Elementary Linear Algebra	3
MATH 474	Probability and Statistics	3
or MATH 475	Probability	
MATH 476	Statistics	3
or MATH 481	Introduction to Stochastic Processes	
or MATH 483	Design and Analysis of Experiments	
or MATH 486	Mathematical Modeling I	
Science Requirements		**(11)**
Select one of the following science sequences:		8
BIOL 107 & BIOL 109 & BIOL 115 & BIOL 117	General Biology Lectures and General Biology Laboratory and Human Biology and Human Biology Laboratory	8
CHEM 124 & CHEM 125	Principles of Chemistry I with Laboratory and Principles of Chemistry II with Laboratory	8
PHYS 123 & PHYS 221	General Physics I: Mechanics and General Physics II: Electricity and Magnetism	8
Select three credit hours of science electives [1]		3
Humanities and Social Sciences Requirements		**(21)**
See Illinois Tech Core Curriculum, sections B and C		21

Interprofessional Projects (IPRO)	(6)
See Illinois Tech Core Curriculum, section E	6
Total Credit Hours	127

1 Science electives (no lab required): Chosen from the natural sciences (biology, chemistry, material science, and physics), or courses marked with an (N) (natural science attribute) in the Undergraduate Bulletin. If the physics sequence is chosen, the remaining science elective cannot be a physics course. If the biology sequence is chosen, the remaining science elective cannot be a biology course.

Sample Curriculum/Program Requirements

Bachelor of Science in Artificial Intelligence Curriculum

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 100	2	CS 116[1]	2
CS 115[1]	2	MATH 152	5
MATH 151	5	PHYS 123[2]	4
Humanities 200-level Course	3	Humanities Elective (300+)	3
Social Sciences Elective	3	Social Sciences Elective (300+)	3
	15		17

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 330	3	CS 340, 440, or 445	3
CS 331	3	CS 430	3
MATH 251	4	MATH 332	3
PHYS 221[3]	4	Minor Elective	3
Social Sciences Elective (300+)	3	Humanities Elective (300+)	3
	17		15

Year 3

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 425	3	CS 481 or 585	3
CS 480	3	CS 487	3
MATH 474 or 475	3	AI Technical Elective[4]	3
Minor Elective	3	Science Elective[5]	3
Humanities or Social Sciences Elective	3	Minor Elective	3
		IPRO Elective I	3
	15		18

Year 4

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 422, 484, or 584	3	CS 485	3
AI Breadth Course[6]	3	AI Depth Course[7]	3
AI Technical Elective[4]	3	AI Technical Elective[4]	3
~~MATH 486~~	~~3~~	Minor Elective	3
MATH 476, 481, 483, or 486	3	IPRO Elective II	3
Minor Elective	3		
	15		15

Total Credit Hours: 127

1 CS 201 is a one-semester, accelerated course equivalent to the two-semester CS 115/CS 116 sequence.

2 If completing the biology science sequence, students will take BIOL 115 and BIOL 117. If completing the chemistry science sequence, students will take CHEM 124.

3 If completing the biology science sequence, students will take BIOL 107 and BIOL 109. If completing the chemistry science sequence, students will take CHEM 125.

4 AI technical electives may be chosen from the following: CS 350, CS 351, CS 422, CS 429, CS 451, CS 458, any CS 500-level course, DS 451, DS 480, MATH 252, MATH 350, MATH 400, MATH 402, MATH 481, MATH 483, MATH 484, or MATH 487.

5 Science electives (no lab required): Chosen from the natural sciences (biology, chemistry, material science, and physics), or courses marked with an (N) (natural science attribute) in the Undergraduate Bulletin. If the physics sequence is chosen, the remaining science elective cannot be a physics course. If the biology sequence is chosen, the remaining science elective cannot be a biology course.

6 AI breadth course must be COM 301, PHIL 326, PHIL 381, PHIL 382, PHYS 407 PSYC 423, or PSYC 426.

7 AI depth course must be: CS 512, CS 522, CS 577, CS 578, CS 581, CS 583, CS 584, CS 585, ECE 442, MATH 569, or MATH 574.

Specialization Requirements

Program Outcomes and Assessment Process

What are your learning objectives in this program? Please list each learning objective in the boxes below:

Note: These should be the same as described in your assessment plan at the bottom of this form.

Upload your assessment plan here:
BS-AI-1_Assessment Plan.xlsx

Undergraduate Program Requirements

What courses will factor the major GPA?

Undergraduate Degree Requirements

Minimum credit hours 127

Specialization required?
No

Minor required?
Yes

How many credit hours are required for the minor? 15

Details about the minor requirement
Any minor outside the Computer Science Department.

Proposed General Curriculum

List Major Course Requirements

CS 100	Introduction to the Profession	2

CS 115 & CS 116	Object-Oriented Programming I and Object-Oriented Programming II	4
or CS 201	Accelerated Introduction to Computer Science	
CS 330	Discrete Structures	3
CS 331	Data Structures and Algorithms	3
CS 340	Programming Paradigms and Patterns	3
or CS 440	Programming Languages and Translators	
or CS 445	Object Oriented Design and Programming	
CS 422	Data Mining	3
or CS 484	Introduction to Machine Learning	
or CS 584	Machine Learning	
CS 425	Database Organization	3
CS 430	Introduction to Algorithms	3
CS 480	Introduction to Artificial Intelligence	3
CS 481	Artificial Intelligence Language Understanding	3
or CS 585	Natural Language Processing	
CS 485	Computers and Society	3
CS 487	Software Engineering I	3
AI Depth Course:		
CS 512	Computer Vision	3
or CS 522	Advanced Data Mining	
or CS 577	Deep Learning	
or CS 578	Interactive and Transparent Machine Learning	
or CS 581	Advanced Artificial Intelligence	
or CS 583	Probabilistic Graphical Models	
or CS 584	Machine Learning	
or CS 585	Natural Language Processing	
or ECE 442	Internet of Things and Cyber Physical Systems	
or MATH 569	Statistical Learning	
or MATH 574	Bayesian Computational Statistics	
AI Breadth Course:		
PHIL 326	Philosophy of Language	3

or COM 301	Introduction to Linguistics	
or PHIL 342	Philosophy of Mind	
or PHIL 381	Artificial Intelligence, Philosophy and Ethics	
or PHIL 382	Bioethics	
or PSYC 423	Learning Theory	
or PSYC 426	Cognitive Science	
or PHYS 407	Introduction to Quantum Computing	
List Mathematics Requirements		
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Elementary Linear Algebra	3
MATH 474	Probability and Statistics	3
or MATH 475	Probability	
MATH 476	Statistics	3
or MATH 481	Introduction to Stochastic Processes	
or MATH 484	Regression	
or MATH 486	Mathematical Modeling I	
List Science Requirements		
Select one of the following science sequences:		8
BIOL 107 & BIOL 109 & BIOL 115 & BIOL 117	General Biology Lectures and General Biology Laboratory and Human Biology and Human Biology Laboratory	8
CHEM 124 & CHEM 125	Principles of Chemistry I with Laboratory and Principles of Chemistry II with Laboratory	8
PHYS 123 & PHYS 221	General Physics I: Mechanics and General Physics II: Electricity and Magnetism	8
Science elective (different field)		3
Total Credit Hours		11

List Computer Science Requirements		
Included in Major Course Requirements.		
List Humanities and Social Sciences Requirements		
HUM 200-level course		3
Human Sciences Module		18
List Interprofessional Project (IPRO) Requirements		
2 IPRO electives		
IPRO 397	Interprofessional (IPRO) Project Techniques in Creative Practice	6
or IPRO 497	Interprofessional (IPRO) Project	
List Technical Elective Course Options		
9 credits from the following:		
CS 350	Computer Organization and Assembly Language Programming	3
CS 351	Systems Programming	3
CS 422	Data Mining	3
CS 429	Information Retrieval	3
CS 451	Introduction to Parallel and Distributed Computing	3
CS 458	Introduction to Information Security	3
Any CS 500 level course		3
DS 451	Data Science Life Cycle	3
DS 480	Data Science Projects	3
MATH 252	Introduction to Differential Equations	4
MATH 350	Introduction to Computational Mathematics	3
MATH 400	Real Analysis	3
MATH 402	Complex Analysis	3
MATH 481	Introduction to Stochastic Processes	3
MATH 483	Design and Analysis of Experiments	3
MATH 484	Regression	3