# BACHELOR OF SCIENCE IN ARTIFICIAL INTELLIGENCE

## Required Courses

| Code | Title | | Credit Hours |
|---|---|---|---|
| **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 |
| CS 422 | Data Mining | | 3 |
| 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 |
| 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 578 | Interactive and Transparent Machine Learning | 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 | |
| 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 | |
| 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 | |

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|---|---|---|
| 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 486 | Mathematical Modeling I | |
| **Science Requirements** | | **(11)** |
| Select one of the following science sequences: | | 8 |
| PHYS 123<br>& PHYS 221 | General Physics I: Mechanics<br>and General Physics II: Electricity and Magnetism | 8 |
| BIOL 107<br>& BIOL 109<br>& BIOL 115<br>& BIOL 117 | General Biology Lectures<br>and General Biology Laboratory<br>and Human Biology<br>and Human Biology Laboratory | 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.

# 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 | 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 | 3 |
| CS 480 | 3 | CS 487 | 3 |
| MATH 474 | 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 | 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 |
| Minor Elective | 3 | IPRO Elective II | 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.
[3] If completing the biology science sequence, students will take BIOL 107 and BIOL 109.
[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, 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 342, PSYC 423, or PSYC 426.
[7] AI depth course must be: CS 512, CS 522, CS 578, CS 583, CS 584, CS 585, ECE 442, MATH 569, or MATH 574.