

Artificial Intelligence and Physics, BS (Boston)

The artificial intelligence and physics combined major brings together computer science, artificial intelligence, physics, and mathematics. From hands-on experience with sophisticated physics instruments, to mathematical theory, to the latest computational innovations, our interdisciplinary approach is designed to prepare students for the myriad challenges in today's rapidly changing world.

Program Requirements

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

NUPath Requirements

All undergraduate students are required to complete the NUPath Requirements (<https://catalog.northeastern.edu/undergraduate/university-academics/general-education-requirements/#nupathtext>).

Artificial Intelligence Courses

Code	Title	Hours
Computer Science Overview		
Complete the following in alignment with your home college:		
CS 1200 or INPR 1000 or INSC 1000	First Year Seminar First-Year Interdisciplinary Seminar Science at Northeastern	1
CS 1210 or EESC 2000	Professional Development for Khoury Co-op Professional Development for Co-op	1
Fundamental Courses		
All students can take a self-assessment to attempt to place out of CS 2000 and CS 2001. Students who place out of CS 2000 and CS 2001 will instead substitute with 4-5 semester hours of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree.		
CS 2000 and CS 2001	Introduction to Program Design and Implementation and Lab for CS 2000	5
CS 2100 and CS 2101	Program Design and Implementation 1 and Lab for CS 2100	5
CS 3200	Introduction to Databases	4
DS 3500	Advanced Programming with Data	4
MATH 1365 or MATH 1465	Introduction to Mathematical Reasoning Intensive Mathematical Reasoning	4
Artificial Intelligence Foundations		
DS 3000	Mathematical Foundations of Artificial Intelligence	4
DS 4200	Information Presentation and Visualization	4
DS 4300	Large-Scale Information Storage and Retrieval	4
DS 4400	Machine Learning	4

Physics Courses

Code	Title	Hours
Introductory Physics		
<i>Physics 1</i>		
Complete one of the following:		5
PHYS 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161	
PHYS 1191 and PHYS 1192 and PHYS 1193	Foundations of Theoretical Physics and Lab for PHYS 1191 and Recitation for PHYS 1191	

Physics 2

PHYS 1165 and PHYS 1166 and PHYS 1167	Physics 2 and Lab for PHYS 1165 and Recitation for PHYS 1165	5
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Intermediate Physics

PHYS 2303	Modern Physics	4
PHYS 3601	Classical Dynamics	4
PHYS 3602	Electricity and Magnetism 1	4
PHYS 3603	Electricity and Magnetism 2	4

Advanced Physics

PHYS 3600	Advanced Physics Laboratory	4
PHYS 4115 or PHYS 5116	Quantum Mechanics Network Science 1	4
PHYS 4305	Thermodynamics and Statistical Mechanics	4

Electives

Code	Title	Hours
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Khoury Approved Electives

With adviser approval, directed study, research, project study, and appropriate graduate-level courses may also be taken as upper-division electives.

Complete 4 semester hours from within the following ranges: 4

CS 2300 or higher, except CS 5010

CY 2000 or higher, except CY 4930

DS 2500 or higher, except DS 4900

EECE 2160 Embedded Design: Enabling Robotics

EECE 2322
and EECE 2323 Fundamentals of Digital Design and Computer Organization
and Lab for EECE 2322

MKTG 4606 Digital, Analytics, Technology, and Automation Research Practicum

Physics Elective

Complete one course not already required from within the following range: 4

PHYS 3000 to PHYS 5999

Computer Science Writing Requirement

Code	Title	Hours
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College Writing

ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
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Advanced Writing in the Disciplines

ENGW 3302 or ENGW 3307 or ENGW 3315	Advanced Writing in the Technical Professions Advanced Writing in the Sciences Interdisciplinary Advanced Writing in the Disciplines	4
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Supporting Courses

Code	Title	Hours
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Calculus

MATH 1341	Calculus 1 for Science and Engineering	4
MATH 1342	Calculus 2 for Science and Engineering	4
MATH 2321	Calculus 3 for Science and Engineering	4

Additional Mathematics Requirements

MATH 2341	Differential Equations and Linear Algebra for Engineering	4
MATH 3081	Probability and Statistics	4

Integrative Course and Capstone

Code	Title	Hours
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PHYS 5318	Principles of Experimental Physics	4
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Required General Electives

Code	Title	Hours
Complete 16 semester hours of general electives.		16

Science GPA Requirement (Physics)

A minimum 2.000 GPA in PHYS courses is required.

NUpath Requirements Satisfied

- Advanced Writing in the Disciplines
- Analyzing and Using Data
- Conducting Formal and Quantitative Reasoning
- Demonstrating Thought and Action in a Capstone
- Engaging with the Natural and Designed World
- Writing in the First Year
- Writing-Intensive in the Major

Integrating Knowledge and Skills Through Experience is satisfied through co-op.

Program Requirement

132 total semester hours required