

# Artificial Intelligence and Linguistics, BS (Boston)

The artificial intelligence and linguistics combined major provides students with extensive background in the formal structures of natural (human) languages and in the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms. The program covers the methods and applications of linguistic and psycholinguistic analyses of human language data combined with skills in Big Data analysis, machine learning, and data analytics. The major provides excellent preparation for work or more advanced degrees focusing on computational linguistics, natural language processing, machine learning, and a wide array of related fields.

## 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 Requirements

| Code                                                                                                                                                                                                                                                                          | Title                                                                                 | Hours |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|
| <b>Computer Science Overview</b>                                                                                                                                                                                                                                              |                                                                                       |       |
| Complete the following in alignment with your home college:                                                                                                                                                                                                                   |                                                                                       |       |
| CS 1200<br>or INPR 1000<br>or INSC 1000                                                                                                                                                                                                                                       | First Year Seminar<br>First-Year Interdisciplinary Seminar<br>Science at Northeastern | 1     |
| CS 1210<br>or EESC 2000                                                                                                                                                                                                                                                       | Professional Development for Khoury Co-op<br>Professional Development for Co-op       | 1     |
| <b>Fundamental Courses</b>                                                                                                                                                                                                                                                    |                                                                                       |       |
| 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 4-5 semester hour of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree. |                                                                                       |       |
| CS 2000<br>and CS 2001                                                                                                                                                                                                                                                        | Introduction to Program Design and Implementation<br>and Lab for CS 2000              | 5     |
| CS 2100<br>and CS 2101                                                                                                                                                                                                                                                        | Program Design and Implementation 1<br>and Lab for CS 2100                            | 5     |
| CS 3200                                                                                                                                                                                                                                                                       | Introduction to Databases                                                             | 4     |
| DS 3500                                                                                                                                                                                                                                                                       | Advanced Programming with Data                                                        | 4     |
| MATH 1365<br>or MATH 1465                                                                                                                                                                                                                                                     | Introduction to Mathematical Reasoning<br>Intensive Mathematical Reasoning            | 4     |
| <b>Artificial Intelligence Foundations</b>                                                                                                                                                                                                                                    |                                                                                       |       |
| 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     |
| DS 4420                                                                                                                                                                                                                                                                       | Advanced Machine Learning                                                             | 4     |
| <b>Khoury Approved Electives</b>                                                                                                                                                                                                                                              |                                                                                       |       |
| With advisor 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<br>and EECE 2323 | Fundamentals of Digital Design and Computer Organization<br>and Lab for EECE 2322 |
| MKTG 4606                  | Digital, Analytics, Technology, and Automation Research Practicum                 |

## Linguistics Requirements

| Code                                                                                           | Title                                                  | Hours |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------|
| <b>Linguistics Foundations</b>                                                                 |                                                        |       |
| LING 1150                                                                                      | Introduction to Linguistics                            | 4     |
| LING 2350                                                                                      | Linguistic Analysis                                    | 4     |
| LING 3412                                                                                      | Language and Culture                                   | 4     |
| <b>Linguistic Structure</b>                                                                    |                                                        |       |
| Complete four of the following:                                                                |                                                        | 16    |
| LING 3420                                                                                      | Phonetics                                              |       |
| LING 3422                                                                                      | Phonology                                              |       |
| LING 3424                                                                                      | Morphology                                             |       |
| LING 3450                                                                                      | Syntax                                                 |       |
| LING 3452                                                                                      | Semantics                                              |       |
| <b>Laboratory/Directed Study</b>                                                               |                                                        |       |
| Complete one of the following:                                                                 |                                                        | 4     |
| LING 4891                                                                                      | Research Seminar in Linguistics                        |       |
| LING 4991                                                                                      | Directed Study Research                                |       |
| PSYC 4610                                                                                      | Laboratory in Psycholinguistics                        |       |
| <b>Seminar Requirement</b>                                                                     |                                                        |       |
| LING 4654<br>or PSYC 4658                                                                      | Seminar in Linguistics<br>Seminar in Psycholinguistics | 4     |
| <b>Linguistics Electives</b>                                                                   |                                                        |       |
| Complete two courses not used to fulfill other degree requirements from the following options: |                                                        | 8     |
| DEAF 2700                                                                                      | ASL Linguistics                                        |       |
| LING 3000 to LING 4999 <sup>1</sup>                                                            |                                                        |       |

<sup>1</sup> Please visit the Linguistics Courses page (<https://catalog.northeastern.edu/course-descriptions/ling/>) within this catalog to review the list of courses in the LING 3000-LING 4999 range.

## Supporting Courses

| Code                           | Title                                  | Hours |
|--------------------------------|----------------------------------------|-------|
| <b>Mathematics Requirement</b> |                                        |       |
| MATH 1341                      | Calculus 1 for Science and Engineering | 4     |
| PSYC 1101                      | Foundations of Psychology              | 4     |
| PSYC 2320                      | Statistics in Psychological Research   | 4     |

## Integrative Requirement

| Code                      | Title                       | Hours |
|---------------------------|-----------------------------|-------|
| <b>Integrative Course</b> |                             |       |
| CS 4120                   | Natural Language Processing | 4     |

## Writing Requirement

| Code                                       | Title                                                                                                                                      | Hours |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>College Writing</b>                     |                                                                                                                                            |       |
| ENGW 1111<br>or ENGW 1102                  | First-Year Writing<br>First-Year Writing for Multilingual Writers                                                                          | 4     |
| <b>Advanced Writing in the Disciplines</b> |                                                                                                                                            |       |
| ENGW 3302<br>or ENGW 3307<br>or ENGW 3315  | Advanced Writing in the Technical Professions<br>Advanced Writing in the Sciences<br>Interdisciplinary Advanced Writing in the Disciplines | 4     |

**Required General Electives**

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

**Science GPA Requirement (Linguistics)**

A minimum 2.000 GPA in LING 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 Differences and Diversity
- Engaging with the Natural and Designed World
- Interpreting Culture
- Understanding Societies and Institutions
- Writing in the First Year
- Writing-Intensive in the Major

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

**Program Requirement**

130 total semester hours required