

Data Science and Linguistics, BS (Boston)

The data science 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 teaches the methods and applications of linguistic and psycholinguistic analyses of human language data combined with skills in big data analysis, data science, 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/nupath/>).

Data Science Requirements

| Code | Title | Hours |
|---|---|-------|
| Computer Science Overview | | |
| Must be taken in alignment with your home college: | | |
| CS 1200 or LING 1000 | First Year Seminar Linguistics at Northeastern | 1 |
| CS 1210 or EESC 2000 | Professional Development for Khoury Co-op Professional Development for Co-op | 1 |
| Computer Science Required 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 4-5 semester hour of CS, CY, or DS coursework at the 3000 level or higher not otherwise required in the degree. | | |
| CS 1800 and CS 1802 | Discrete Structures and Seminar for CS 1800 | 5 |
| CS 2000 and CS 2001 | Introduction to Program Design and Implementation and Lab for CS 2000 | 5 |
| CS 3200 | Introduction to Databases | 4 |
| Programming Sequence Pathways | | |
| Choose one of two options: | | 9 |
| <i>Computer Science Option</i> | | |
| CS 2100 and CS 2101 | Program Design and Implementation 1 and Lab for CS 2100 | |
| CS 3100 and CS 3101 | Program Design and Implementation 2 and Lab for CS 3100 | |
| <i>Data Science Option</i> | | |
| DS 2500 and DS 2501 | Intermediate Programming with Data and Lab for DS 2500 | |
| DS 3500 | Advanced Programming with Data | |
| Data Science Foundations | | |
| DS 3000 | Foundations of Data Science | 4 |
| DS 4200 | Information Presentation and Visualization | 4 |
| DS 4300 | Large-Scale Information Storage and Retrieval | 4 |
| DS 4400 | Machine Learning and Data Mining 1 | 4 |
| DS 4420 | Machine Learning and Data Mining 2 | 4 |
| Khoury Approved Electives | | |

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 options: 4

CS 2500 or higher, except CS 5010

CY 2000 or higher, except CY 4930

DS 2500 or higher, except DS 4900

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

Linguistics Requirements

| Code | Title | Hours |
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Linguistics Foundations

| | | |
|-----------|-----------------------------|---|
| LING 1150 | Introduction to Linguistics | 4 |
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|-----------|---------------------|---|
| LING 2350 | Linguistic Analysis | 4 |
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|-----------|----------------------|---|
| LING 3412 | Language and Culture | 4 |
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Linguistic Structure

Complete four of the following: 16

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|-----------|-----------|
| LING 3420 | Phonetics |
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|-----------|-----------|
| LING 3422 | Phonology |
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| LING 3424 | Morphology |
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| LING 3450 | Syntax |
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| LING 3452 | Semantics |
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Laboratory/Directed Study

Complete one of the following: 4

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| LING 4891 | Research Seminar in Linguistics |
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| LING 4991 | Directed Study Research |
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| PSYC 4610 | Laboratory in Psycholinguistics |
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Seminar Requirement

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| LING 4654 | Seminar in Linguistics | 4 |
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|--------------|------------------------------|
| or PSYC 4658 | Seminar in Psycholinguistics |
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Linguistics Electives

Complete two courses not used to fulfill other degree requirements from the following options: 8

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| DEAF 2700 | ASL Linguistics |
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| LING 3000 to LING 4999 ¹ |
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¹ 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 |
|------|-------|-------|
|------|-------|-------|

Mathematics Requirement

| | | |
|-----------|--|---|
| MATH 1341 | Calculus 1 for Science and Engineering | 4 |
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|-----------|---------------------------|---|
| PSYC 1101 | Foundations of Psychology | 4 |
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| PSYC 2320 | Statistics in Psychological Research | 4 |
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Integrative Requirement

| Code | Title | Hours |
|------|-------|-------|
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Integrative Course

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|---------|-----------------------------|---|
| CS 4120 | Natural Language Processing | 4 |
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Data Science Writing Requirement

| Code | Title | Hours |
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College Writing

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

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

Required General Electives

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

Khoury College GPA Requirement

Minimum cumulative 2.000 GPA required in all CS, CY, DS, and IS courses

Science GPA Requirement (Linguistics)

A minimum 2.000 GPA in the following course codes is required: LING.

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

Plan of Study

Sample Plan of Study

FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/FALL

Year 1

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|------------------------|-------|--------------------------|-------|--------------------|-------|--------------------|-------|
| CS 1200 | | 1 DS 2500 and DS 2501 | | 5 DS 4200 | | 4 General Elective | 4 |
| CS 1800 and CS 1802 | | 5 LING 2350 | | 4 General Elective | | 4 General Elective | 4 |
| CS 2000 and CS 2001 | | 5 MATH 1341 | | 4 | | | |
| ENGW 1111 | | 4 LING Elective | | 4 | | | |
| LING 1150 | | 4 | | | | | |
| | 19 | | 17 | | 8 | | 8 |

Year 2

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|----------------|-------|-------------------|-------|--------------------|-------|----------|-------|
| CS 3200 | | 4 CS 1210 | | 1 Khoury Elective | | 4 Co-op | 0 |
| DS 3000 | | 4 DS 3500 | | 4 General Elective | | 4 | |
| LING 3412 | | 4 PSYC 1101 | | 4 | | | |
| LING Structure | | 4 LING Elective 2 | | 4 | | | |
| | | LING Structure | | 4 | | | |
| | 16 | | 17 | | 8 | | 0 |

Year 3

| Fall | Hours | Spring | Hours | Summer 1 | Hours | Summer 2 | Hours |
|-------|-------|-----------|-------|---------------------|-------|----------|-------|
| Co-op | | 0 CS 4120 | | 4 ENGW 3302 or 3315 | | 4 Co-op | 0 |

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|--------|-------|------------------------------|-------|-----------|---|---|
| | | DS 4300 | 4 | PSYC 2320 | 4 | |
| | | DS 4400 | 4 | | | |
| | | LING Structure | 4 | | | |
| | | 0 | 16 | | 8 | 0 |
| Year 4 | | | | | | |
| Fall | Hours | Spring | Hours | | | |
| Co-op | 0 | DS 4420 | 4 | | | |
| | | LING Lab (or directed study) | 4 | | | |
| | | LING Seminar | 4 | | | |
| | | LING Structure | 4 | | | |
| | | 0 | 16 | | | |

Total Hours: 133