Hours

# Data Science and Biology, BS

The data science and biology major provides a strong foundation in biology, chemistry, and mathematics, as well as software development and algorithms. Students study the collection, manipulation, storage, retrieval, and computational analysis of data in its various forms, including numeric, textual, image, and video data from small to large volumes. Students also explore the organization and processes of life across broad areas of the field, from molecules and cells through organs and organ systems to populations, ecosystems, and evolution.

#### **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 (http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/).

#### **NUpath Requirements**

upper-division electives.

ranges:

All undergraduate students are required to complete the NUpath Requirements (http://catalog.northeastern.edu/undergraduate/university-academics/nupath/).

| <b>Data Science Requirements</b> |       |  |
|----------------------------------|-------|--|
| Code                             | Title |  |

| Computer Science Overview                    |   |    |
|--|---|----|
| CS 1200                                      | First Year Seminar  | 1  |
| or BIOL 1000                                 | Biology at Northeastern   |    |
| or INSC 1000                                 | Science at Northeastern   |    |
| CS 1210                                      | Professional Development for Khoury Co-op                                       | 1  |
| or EESC 2000                                 | Professional Development for Co-op  |    |
| Programming Sequence Pathways                |   |    |
| Choose one of the two options.               |   | 12 |
| Computer Science Option                      |   |    |
| CS 2500<br>and CS 2501                       | Fundamentals of Computer Science 1 and Lab for CS 2500                          |    |
| CS 2510<br>and CS 2511                       | Fundamentals of Computer Science 2 and Lab for CS 2510                          |    |
| CS 3500<br>and CS 3501                       | Object-Oriented Design<br>and Lab for CS 3500                                   |    |
| Data Science Option                          |   |    |
| DS 2000<br>and DS 2001                       | Programming with Data and Data Science Programming Practicum                    |    |
| DS 2500<br>and DS 2501                       | Intermediate Programming with Data and Lab for DS 2500                          |    |
| DS 3500                                      | Advanced Programming with Data  |    |
| Computer Science Required Courses            |   |    |
| CS 1800<br>and CS 1802                       | Discrete Structures and Seminar for CS 1800                                     | 5  |
| CS 3200                                      | Database Design   | 4  |
| 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  |
| Khoury Elective                              |   |    |
| With adviser approval, directed study, resea | rch, project study, and appropriate graduate-level courses may also be taken as |    |
|  |   |    |

Complete four semester hours of CS, CY, DS, or IS classes that are not already required. Choose courses within the following

| CS 2500 or higher, except CS 4930     CS 2500 or higher, except DS 4900     IS 2000 or higher, except DS 4900     IS 2000 or higher, except IS 4   |
|--|
| CY 2000 or higher, except CY 4930     DS 2500 or higher, except IS 4900     S 2000 or higher, except IS 4900     S 2000 or higher, except IS 4900     Satistics Foundations     ENYR 2500   and ENYR 2501     S and ENYR 2501      |
| DS 2500 or higher, except DS 4900   IS 2000 or higher, except DS 4900   Statistics Poundations   |
| Natistice Foundations  |
| Statistics Foundations  ENYR 2500 and ENYR 2501 and Lab for ENYR 2500  Computer Science Writing Requirements  Code Title Mours  ENGW 1110 First-Year Writing for Multilingual Writers  ENGW 1110 First-Year Writing for Multilingual Writers  ENGW 3110 Advanced Writing in the Disciplines  or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines  or ENGW 3315 Advanced Writing in the Sciences  Biology Requirements  Code Title Mours Advanced Writing in the Sciences  Biology Requirements  ENGW 3302 Advanced Writing in the Sciences  Biology Requirements  First Year Writing in the Sciences  Biology Requirements  Code Title Mours Advanced Writing in the Disciplines  or ENGW 3307 Advanced Writing in the Sciences  Biology Requirements  ENGW 3307 Advanced Writing in the Sciences  Biology Requirements  First Year Writing in the Sciences  Advanced Writing in the Sciences  Biology Foundations  Biology Foundations  Biology Foundations  First Year Writing in the Sciences  Advanced Writing in the Disciplines  or ENGW 3307 Advanced Writing in the Sciences  Biology Foundations  First Year Writing for Multilingual Writers  Advanced Writing in the Disciplines  or ENGW 3307 Advanced Writing in the Sciences  Biology Foundations  First Year Writing for Multilingual Writers  Advanced Writing in the Chein 1107  Foundations of Biology Advanced Writing in the Disciplines  or ENGW 3307 Advanced Writing in the Sciences  Biology Foundations  First Year Writing for Biology Advanced Writing in the Disciplines  or ENGW 3307 Advanced Writing in the Sciences  Biology Foundations  First Year Writing for Biology Advanced Writing in the Endmand Advanced Biology Advanced Writing in the Echnical Professions  Advanced Writing in the Chein 1161  Advanced Writing in the Echnical Professions  Advanced Writing in the Chein 1161  Advanced Writing in the Echnical Professions  Advanced Writing in the Echnical Professions  Advanced Writing in the Disciplines  Advanced Writing in the Echnical Professions  Advanced Writing in the Echnical Professions  Adva |
| ENVR 2500 and ENVR 2501 and Lab for ENVR 2500  Computer Science Writing Requirements  Code Title Mriting Frest-Year Writing for Multilingual Writers  ENGW 1111 or ENGW 1102 first-Year Writing for Multilingual Writers  Advanced Writing in the Disciplines  ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines or ENGW 3315 Advanced Writing in the Sciences  Biology Requirements  ENGW 302 Advanced Writing in the Sciences  Biology Requirements  ENGW 3015 Advanced Writing in the Sciences  Biology Requirements  Biology Foundations  Biology Foundations  Biology Foundations of Biology and Lab for BIOL 1107  Biolog 29 Inquires in Biological Sciences 4  Biol. 2301 Genetics and Molecular Biology and Biol. 2302 and Lab for BIOL 2301  Biology Foundations  Biology Foundations  ENGU 309 Biology Project Lab 4  Biol. 3611 Biochemistry and Lab for BIOL 3611  Chemistry Foundations  Chemistry Fo |
| Computer Science Writing Requirements           Code         Title         Hours           College Writing           ENGW 11111         First-Year Writing         4           or ENGW 11102         First-Year Writing for Multilingual Writers         4           Advanced Writing in the Disciplines           ENGW 3302         Advanced Writing in the Technical Professions         4           or ENGW 3315         Interdisciplinary Advanced Writing in the Disciplines         4           or ENGW 3307         Advanced Writing in the Sciences         8           Biology Requirements           Title Ti  |
| Code         Title         Hours           College Writing           ENGW 11101         First-Year Writing         4           A first-Year Writing for Multilingual Writers           Advanced Writing in the Disciplines           ENGW 3302         Advanced Writing in the Technical Professions         4           A day anced Writing in the Technical Professions         4           A day anced Writing in the Disciplines           Driving 3315         Advanced Writing in the Sciences           Biology Requirements           Expenditions           Biology Foundations           Biology Foundations           Biology Foundations           Biology Foundations           Biology Foundations           Biology Project Lab         4           Biology Project Lab   |
| Code         Title         Hours           College Writing           ENGW 11101         First-Year Writing         4           A first-Year Writing for Multilingual Writers           Advanced Writing in the Disciplines           ENGW 3302         Advanced Writing in the Technical Professions         4           A day anced Writing in the Technical Professions         4           A day anced Writing in the Disciplines           Driving 3315         Advanced Writing in the Sciences           Biology Requirements           Expenditions           Biology Foundations           Biology Foundations           Biology Foundations           Biology Foundations           Biology Foundations           Biology Project Lab         4           Biology Project Lab   |
| College Writing   First-Year   |
| ENGW 1111 or ENGW 1102 First-Year Writing for Multilingual Writers  Advanced Writing in the Disciplines  ENGW 3302 Advanced Writing in the Technical Professions or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines or ENGW 3307 Advanced Writing in the Sciences  Biology Requirements  Code Title House Hous |
| or ENGW 1102 First-Year Writing for Multilingual Writers  Advanced Writing in the Disciplines  ENGW 3302 Advanced Writing in the Technical Professions or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines or ENGW 3307 Advanced Writing in the Disciplines or ENGW 3307 Advanced Writing in the Sciences  Biology Requirements  Code Title Hours  Biology Foundations  BIOL 1107 Foundations of Biology and BIOL 1107  BIOL 2299 Inquiries in Biological Sciences 4  BIOL 2301 Genetics and Molecular Biology and Lab for BIOL 2301  BIOL 3020 and BIOL 3020 and Lab for BIOL 301  BIOL 3611 Biochemistry and Lab for BIOL 3611  Chemistry Foundations  CHEM 1161 General Chemistry for Science Majors and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and Lab for CHEM 2313  And CHEM 2314 Organic Chemistry 2 and Lab for CHEM 2313  Chemister Advanced Biology Elective  Complete one of the following:  BIOL 4705 to BIOL 5999   |
| Advanced Writing in the Disciplines  ENGW 3302 Advanced Writing in the Technical Professions or ENGW 3307 Interdisciplinary Advanced Writing in the Disciplines or ENGW 3307 Advanced Writing in the Disciplines or ENGW 3307 Title Wather Sciences  Biology Requirements  Code Title Hours BIOL 1107 Foundations BIOL 1107 Foundations of Biology and Lab for BIOL 1107 BIOL 2299 Inquiries in Biological Sciences 4 BIOL 2301 Genetics and Molecular Biology and Lab for BIOL 2301 BIOL 2302 and Lab for BIOL 2301 BIOL 3019 Biology Project Lab 4 BIOL 3611 Biochemistry and Lab for BIOL 3611 CHemistry Foundations  CHEM 1161 General Chemistry for Science Majors and Lab for CHEM 1161 CHEM 2311 and Lab for CHEM 1161 CHEM 2312 and Lab for CHEM 2311 CHEM 2313 and CHEM 2314 and Lab for CHEM 2313 Intermediate and Advanced Biology Elective  Intermediate and Advanced Biology Elective BIOL 2327 to BIOL 3999 BIOL 4705 to BIOL 5999   |
| ENGW 3302 Advanced Writing in the Technical Professions or ENGW 3315 Interdisciplinary Advanced Writing in the Disciplines or ENGW 3307 Advanced Writing in the Disciplines Bull of ENGW 3307 Advanced Writing in the Sciences  Foliology Requirements  Foliology Foundations  BIOL 1107 Foundations  BIOL 1108 Foundations of Biology and Lab for BIOL 1107  BIOL 2299 Inquiries in Biological Sciences 4  BIOL 2301 Genetics and Molecular Biology and Lab for BIOL 2301  BIOL 2302 And Lab for BIOL 2301  BIOL 2309 Biology Project Lab 4  BIOL 3611 Biochemistry and Lab for BIOL 3611  Chemistry Foundations  CHEM 1161 General Chemistry for Science Majors and Lab for BIOL 3611  CHEM 2311 Organic Chemistry for Science Majors and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and Lab for CHEM 2313  RICHEM 2314 Organic Chemistry 2 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective Underwrited and Lab for CHEM 2313  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999   |
| or ENGW 3315         Interdisciplinary Advanced Writing in the Disciplines           or ENGW 3307         Advanced Writing in the Sciences           Biology Requirements           Code         Title         Hours           Biol 1107           BIOL 1107         Foundations of Biology           BIOL 1108         and Lab for BIOL 1107           BIOL 2399         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology         5           and BIOL 2302         and Lab for BIOL 2301         5           BIOL 2309         Biology Project Lab         4           BIOL 3611         Biochemistry           and BIOL 3612         and Lab for BIOL 3611           Chemistry Foundations         5           CHEM 1161         General Chemistry of Science Majors         5           AID 1162         Chemistry 2         5           AID 2311         Chemistry 2         6         Chemistry 2   |
| Biology Requirements           Code         Title         Hours           Biology Foundations         Foundations of Biology         5           BIOL 1107         Foundations of Biology and Lab for BIOL 1107         5           BIOL 2299         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology         5           and BIOL 2302         and Lab for BIOL 2301         5           BIOL 2309         Biology Project Lab         4           BIOL 3611         Biochemistry         5           and BIOL 3612         and Lab for BIOL 3611         5           CHEM 1161         General Chemistry for Science Majors         5           AIR MIT AND  |
| Biology Requirements         Title         Hours           Biology Foundations         Hours           BIOL 1107         Foundations of Biology         5           and BIOL 1108         and Lab for BIOL 1107           BIOL 2299         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology         5           and BIOL 2302         and Lab for BIOL 2301         5           BIOL 2309         Biology Project Lab         4           BIOL 3611         Biochemistry         5           and BIOL 3612         and Lab for BIOL 3611         5           CHEM 1161         General Chemistry for Science Majors         5           and CHEM 1162         and Lab for CHEM 1161         5           CHEM 2311         Organic Chemistry 1         5           and CHEM 2312         and Lab for CHEM 2311         5           CHEM 2313         Organic Chemistry 2         5           and CHEM 2314         Organic Chemistry 2         5           and CHEM 2314         and Lab for CHEM 2313           Intermediate and Advanced Biology Elective           Complete one of the following:         4           BIOL 2327 to BIOL 3999         4   |
| Code         Title         Hours           Biology Foundations         Biolum 1107         Foundations of Biology and Lab for BIOL 1107         5           BIOL 1209         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology and Lab for BIOL 2301         5           BIOL 2302         Biology Project Lab         4           BIOL 3611         Biochemistry         5           and BIOL 3612         Biochemistry         5           and BIOL 3613         Biochemistry         5           and CHEM 1161         General Chemistry for Science Majors         5           and CHEM 1162         and Lab for CHEM 1161         5           CHEM 2311         Organic Chemistry 1         5           and CHEM 2312         and Lab for CHEM 2311         5           CHEM 2313         Organic Chemistry 2         5           and CHEM 2314         and Lab for CHEM 2313         5           Intermediate and Advanced Biology Elective         4           BIOL 2327 to BIOL 3999         BIOL 4705 to BIOL 5999   |
| Code         Title         Hours           Biology Foundations         Biolum 1107         Foundations of Biology and Lab for BIOL 1107         5           BIOL 1209         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology and Lab for BIOL 2301         5           BIOL 2302         Biology Project Lab         4           BIOL 3611         Biochemistry         5           and BIOL 3612         Biochemistry         5           and BIOL 3613         Biochemistry         5           and CHEM 1161         General Chemistry for Science Majors         5           and CHEM 1162         and Lab for CHEM 1161         5           CHEM 2311         Organic Chemistry 1         5           and CHEM 2312         and Lab for CHEM 2311         5           CHEM 2313         Organic Chemistry 2         5           and CHEM 2314         and Lab for CHEM 2313         5           Intermediate and Advanced Biology Elective         4           BIOL 2327 to BIOL 3999         BIOL 4705 to BIOL 5999   |
| BIOL 1107         Foundations of Biology         5           and BIOL 1108         and Lab for BIOL 1107           BIOL 2299         Inquiries in Biological Sciences         4           BIOL 2301         Genetics and Molecular Biology         5           and BIOL 2302         and Lab for BIOL 2301           BIOL 2309         Biology Project Lab         4           BIOL 3611         Biochemistry         5           and BIOL 3612         and Lab for BIOL 3611         5           Chemistry Foundations         5           CHEM 1161         General Chemistry for Science Majors         5           and CHEM 1162         and Lab for CHEM 1161         5           CHEM 2311         Organic Chemistry 1         5           and CHEM 2312         and Lab for CHEM 2311         5           CHEM 2313         Organic Chemistry 2         5           and CHEM 2314         and Lab for CHEM 2313         5           Intermediate and Advanced Biology Elective           Complete one of the following:         4           BIOL 2327 to BIOL 3999         BIOL 4705 to BIOL 5999   |
| and BIOL 1108       and Lab for BIOL 1107         BIOL 2299       Inquiries in Biological Sciences       4         BIOL 2301       Genetics and Molecular Biology       5         and BIOL 2302       and Lab for BIOL 2301         BIOL 2309       Biology Project Lab       4         BIOL 3611       Biochemistry       5         and BIOL 3612       and Lab for BIOL 3611       5         Chemistry Foundations       5         CHEM 1161       General Chemistry for Science Majors       5         and CHEM 1162       and Lab for CHEM 1161       5         CHEM 2311       Organic Chemistry 1       5         and CHEM 2312       and Lab for CHEM 2311       5         CHEM 2313       Organic Chemistry 2       5         and CHEM 2314       Organic Chemistry 2       5         and Lab for CHEM 2313         Intermediate and Advanced Biology Elective         Complete one of the following:       4         BIOL 2327 to BIOL 3999       BIOL 4705 to BIOL 5999  |
| BIOL 2299   Inquiries in Biological Sciences   4   |
| BIOL 2301       Genetics and Molecular Biology       5         and BIOL 2302       and Lab for BIOL 2301         BIOL 2309       Biology Project Lab       4         BIOL 3611       Biochemistry       5         and BIOL 3612       and Lab for BIOL 3611         Chemistry Foundations         CHEM 1161       General Chemistry for Science Majors       5         and CHEM 1162       and Lab for CHEM 1161         CHEM 2311       Organic Chemistry 1       5         and CHEM 2312       and Lab for CHEM 2311       5         CHEM 2313       Organic Chemistry 2       5         and CHEM 2314       and Lab for CHEM 2313         Intermediate and Advanced Biology Elective         Complete one of the following:       4         BIOL 2327 to BIOL 3999       BIOL 4705 to BIOL 5999   |
| and BIOL 2302       and Lab for BIOL 2301         BIOL 2309       Biology Project Lab       4         BIOL 3611       Biochemistry       5         and BIOL 3612       and Lab for BIOL 3611       5         Chemistry Foundations         CHEM 1161       General Chemistry for Science Majors       5         and CHEM 1162       and Lab for CHEM 1161       5         CHEM 2311       Organic Chemistry 1       5         and CHEM 2312       and Lab for CHEM 2311       5         CHEM 2313       Organic Chemistry 2       5         and CHEM 2314       and Lab for CHEM 2313         Intermediate and Advanced Biology Elective         Complete one of the following:       4         BIOL 2327 to BIOL 3999       BIOL 4705 to BIOL 5999  |
| BIOL 2309       Biology Project Lab       4         BIOL 3611       Biochemistry       5         and BIOL 3612       and Lab for BIOL 3611       5         Chemistry Foundations         CHEM 1161       General Chemistry for Science Majors       5         and CHEM 1162       and Lab for CHEM 1161       5         CHEM 2311       Organic Chemistry 1       5         and CHEM 2312       and Lab for CHEM 2311       5         CHEM 2313       Organic Chemistry 2       5         and CHEM 2314       and Lab for CHEM 2313       5         Intermediate and Advanced Biology Elective         Complete one of the following:       4         BIOL 2327 to BIOL 3999         BIOL 4705 to BIOL 5999  |
| BIOL 3611  |
| and BIOL 3612 and Lab for BIOL 3611  Chemistry Foundations  CHEM 1161 General Chemistry for Science Majors and CHEM 1162 and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 5 and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and Lab for CHEM 2313  CHEM 2314 Organic Chemistry 2 5 and CHEM 2314  Intermediate and Advanced Biology Elective  Complete one of the following: 4  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999  |
| CHEM 1161 General Chemistry for Science Majors and CHEM 1162 and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 5 and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999   |
| CHEM 1161 General Chemistry for Science Majors and CHEM 1162 and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 5 and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 5 and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4 BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999  |
| and CHEM 1162 and Lab for CHEM 1161  CHEM 2311 Organic Chemistry 1 and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999  |
| CHEM 2311 Organic Chemistry 1 and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999   |
| and CHEM 2312 and Lab for CHEM 2311  CHEM 2313 Organic Chemistry 2 5 and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4 BIOL 2327 to BIOL 3999 BIOL 4705 to BIOL 5999   |
| and CHEM 2314 and Lab for CHEM 2313  Intermediate and Advanced Biology Elective  Complete one of the following: 4  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999  |
| Intermediate and Advanced Biology Elective  Complete one of the following:  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999   |
| Complete one of the following:  BIOL 2327 to BIOL 3999  BIOL 4705 to BIOL 5999   |
| BIOL 2327 to BIOL 3999 BIOL 4705 to BIOL 5999  |
| BIOL 4705 to BIOL 5999   |
|  |
| FEMB 2290 to FEMB 5515   |
| LLIND 2230 to LLIND 0010   |
| EEMB 5520 to EEMB5534  |
| EEMB 5548 to EEMB 5569   |
| ENVR 5242 Ancient Marine Life  |
| Research:  |
| BIOL 4991 Research   |
| BIOL 4970 Junior/Senior Honors Project 1   |
| BIOL 4971 Junior/Senior Honors Project 2   |
| BIOL 4994 Internship   |
| Organismal and Evolutionary Biology Elective   |
| Complete one course and its corresponding lab, if indicated: 4-5   |
| BIOL 2327 Human Parasitology   |
| BIOL 3401 Comparative Vertebrate Anatomy   |
| BIOL 3403 Animal Behavior  |
| BIOL 3413 Current Topics in Organismal and Population Biology  |

| EEMB 2302                           | Ecology   |       |
|-------------------------------------|---|-------|
| and EEMB 2303                       | and Lab for EEMB 2302                             |       |
| EEMB 2400                           | Introduction to Evolution                         |       |
| EEMB 2700<br>and EEMB 2701          | Marine Biology<br>and Lab for EEMB 2700           |       |
| EEMB 3460                           | Conservation Biology                              |       |
| EEMB 3466                           | Disease Ecology                                   |       |
| Physics Requirement                 |   |       |
| Complete one of the following lectu | re/lab pairs. PHYS 1145/PHYS 1146 is recommended: | 5     |
| PHYS 1145<br>and PHYS 1146          | Physics for Life Sciences 1 and Lab for PHYS 1145 |       |
| PHYS 1151<br>and PHYS 1152          | Physics for Engineering 1 and Lab for PHYS 1151   |       |
| PHYS 1161<br>and PHYS 1162          | Physics 1<br>and Lab for PHYS 1161                |       |
| Mathematics Foundations             |   |       |
| MATH 1251                           | Calculus and Differential Equations for Biology 1 | 4     |
| Integrative Requirements            |   |       |
| Code                                | Title   | Hours |
| Integrative Course                  |   |       |
| Complete one of the following:      |   | 4     |
| BIOL 5569                           | Advanced Microbiology                             |       |
| BINF 6308                           | Bioinformatics Computational Methods 1            |       |
| BIOL 4707                           | Cell and Molecular Biology                        |       |
| BIOL 5581                           | Biological Imaging                                |       |
| BIOL 5587                           | Comparative Neurobiology                          |       |
| BIOL 5591                           | Advanced Genomics                                 |       |
| Capstone                            |   |       |
| Choose one:                         |   | 4     |
| CHOOSE OHE.                         |   |       |
| BIOL 4701                           | Biology Capstone                                  |       |
|                                     | Biology Capstone<br>Biology Research Capstone     |       |
| BIOL 4701                           |   |       |

# **Required General Electives**

CodeTitleHoursComplete 20 semester hours of general electives.20

# **Khoury College GPA Requirement**

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

#### **NUpath Requirements Satisfied**

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

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

# **Program Requirement**

138 total semester hours required

# 4 Data Science and Biology, BS

# Plan of Study Sample Plan of Study: Four Years, Two Co-ops

| Year 1                     |       |  |       |                              |       |                              |       |   |
|----------------------------|-------|--|-------|------------------------------|-------|------------------------------|-------|---|
| Fall                       | Hours | Spring                                     | Hours | Summer 1                     | Hours | Summer 2                     | Hours |   |
| CS 1200                    |       | 1 CS 2510<br>and CS 2511                   |       | 5 CS 3500                    |       | 4 BIOL 2301<br>and BIOL 2302 |       | 5 |
| CS 1800<br>and CS 1802     |       | 5 BIOL 2299                                |       | 4 General Elective           |       | 4 General Elective           |       | 4 |
| CS 2500<br>and CS 2501     |       | 5 MATH 1251                                |       | 4                            |       |                              |       |   |
| BIOL 1107<br>and BIOL 1108 |       | 5 CHEM 1161<br>and CHEM 1162               |       | 5                            |       |                              |       |   |
| ENGW 1111                  |       | 4  |       |                              |       |                              |       |   |
|                            |       | 20   |       | 18                           |       | 8                            |       | 9 |
| Year 2                     |       |  |       |                              |       |                              |       |   |
| Fall                       | Hours | Spring                                     | Hours | Summer 1                     | Hours | Summer 2                     | Hours |   |
| DS 3000                    |       | 4 CS 1210                                  |       | 1 BIOL 3611<br>and BIOL 3612 |       | 5 Co-op                      |       |   |
| PHYS 1145<br>and PHYS 1146 |       | 5 DS 4200                                  |       | 4 General Elective           |       | 4                            |       |   |
| CHEM 2311<br>and CHEM 2312 |       | 5 CHEM 2313<br>and CHEM 2314               |       | 5                            |       |                              |       |   |
| ENVR 2500<br>and ENVR 2501 |       | 5 CS 3200                                  |       | 4                            |       |                              |       |   |
|                            |       | BIOL 2309                                  |       | 4                            |       |                              |       |   |
|                            |       | 19   |       | 18                           |       | 9                            |       | 0 |
| Year 3                     |       |  |       |                              |       |                              |       |   |
| Fall                       | Hours | Spring                                     | Hours | Summer 1                     | Hours | Summer 2                     | Hours |   |
| Со-ор                      |       | DS 4300                                    |       | 4 ENGW 3302                  |       | 4 Co-op                      |       |   |
|                            |       | General Elective                           |       | 4 General Elective           |       | 4                            |       |   |
|                            |       | Khoury Elective                            |       | 4                            |       |                              |       |   |
|                            |       | Organismal and Populatior<br>BIOL Elective | 1     | 4                            |       |                              |       |   |
|                            |       | 0  |       | 16                           |       | 8                            |       | 0 |
| Year 4                     |       |  |       |                              |       |                              |       |   |
| Fall                       | Hours | Spring                                     | Hours |                              |       |                              |       |   |
| Со-ор                      |       | BIOL 4701                                  |       | 4                            |       |                              |       |   |
|                            |       | DS 4400                                    |       | 4                            |       |                              |       |   |
|                            |       | Integrative course                         |       | 4                            |       |                              |       |   |
|                            |       | BIOL Intermediate/                         |       | 4                            |       |                              |       |   |

16

Total Hours: 141

Advanced Science

0