

# Statistics, MS (Boston)

The field of statistics plays a critical role in the support of nearly every industry including technology; business, management, and finance; healthcare and pharmaceuticals; and more. The Master of Science in Statistics develops a comprehensive and flexible skill set that allows graduates to adapt to an ever-changing job market in various occupations and industries. In an era of increasing automation of Big Data, the value of the rigor of statistical thinking and analysis by individuals grows with the rise of automated Big Data analysis (e.g., artificial intelligence and machine learning). This program in statistics is designed to provide learners with a solid foundation in applied, modern, and computational approaches to statistical analysis and exposure to the statistical thinking skills necessary to critically assess data and answer business and research questions across domains. Core courses integrate theory and application, enabling students to be ready for the job on day one. Upon application, each student selects an industry concentration (biostatistics, statistical machine learning, and statistical theory and modeling) to examine statistical theories and applied methodologies most relevant to specific career pathways. In this degree program, students are admitted to the college associated with their concentration, and their degree is awarded by that college. The concentrations are associated with the following colleges:

- Biostatistics—Bouv  College of Health Sciences
- Statistical machine learning—Khoury College of Computer Sciences
- Statistical theory and modeling—College of Science

Students will follow all policies associated with their home college. Each student finishes the program with experiential courses such as a thesis, capstone, or consulting project, where they gain hands-on, project-based experience addressing business problems and presenting and communicating the findings and recommendations.

## Program Requirements

Complete all courses and requirements listed below unless otherwise indicated.

### Required Courses

| Code         | Title                                             | Hours |
|--------------|---------------------------------------------------|-------|
| MATH 5010    | Foundations of Statistical Theory and Probability | 4     |
| MATH 6241    | Stochastic Processes                              | 2     |
| MATH 6243    | Statistical Learning                              | 4     |
| PHTH 6800    | Causal Inference in Public Health Research        | 3-4   |
| or PHTH 6801 | Causal Inference 1                                |       |
| PHTH 6830    | Generalized Linear Models                         | 4     |

### Concentrations

Complete one of the following concentrations:

- Biostatistics (p. 1)—Bouv  College of Health Sciences
- Statistical Machine Learning (p. 2)—Khoury College of Computer Sciences
- Statistical Theory and Modeling (p. 2)—College of Science

### Experiential Courses

| Code                                                                    | Title                   | Hours |
|-------------------------------------------------------------------------|-------------------------|-------|
| Complete 2 semester hours from the following (courses may be repeated): |                         | 2     |
| MATH 6910                                                               | Master's Project        |       |
| PHTH 6880                                                               | Statistical Consultancy |       |

### Program Credit/GPA Requirements

31 total semester hours required (32 for students who declare the Concentration in Statistical Theory and Modeling and also opt to participate in co-op)

Minimum 3.000 GPA required

### CONCENTRATION IN BIOSTATISTICS (BOUV  COLLEGE OF HEALTH SCIENCES)

| Code                                           | Title                               | Hours |
|------------------------------------------------|-------------------------------------|-------|
| Complete 12 semester hours from the following: |                                     | 12    |
| PHTH 5350                                      | Using SAS in Public Health Research |       |

|                       |                                        |   |
|-----------------------|----------------------------------------|---|
| PHTH 6440             | Advanced Methods in Biostatistics      |   |
| PHTH 6802             | Causal Inference 2                     |   |
| PHTH 6810             | Survival Analysis                      |   |
| PHTH 6820             | Design and Analysis of Clinical Trials |   |
| <b>Optional Co-op</b> |                                        |   |
| HLTH 6964             | Co-op Work Experience                  | 0 |

**CONCENTRATION IN STATISTICAL MACHINE LEARNING (KHOURY COLLEGE OF COMPUTER SCIENCES)**

| Code                  | Title                                  | Hours |
|-----------------------|----------------------------------------|-------|
| CS 5100               | Foundations of Artificial Intelligence | 4     |
| CS 6140               | Machine Learning                       | 4     |
| DS 5110               | Essentials of Data Science             | 4     |
| <b>Optional Co-op</b> |                                        |       |
| CS 6964               | Co-op Work Experience                  | 0     |

**CONCENTRATION IN STATISTICAL THEORY AND MODELING (COLLEGE OF SCIENCE)**

| Code                                           | Title                                              | Hours |
|------------------------------------------------|----------------------------------------------------|-------|
| Complete 12 semester hours from the following: |                                                    | 12    |
| MATH 7339                                      | Machine Learning and Statistical Learning Theory 2 |       |
| MATH 7340                                      | Statistics for Bioinformatics                      |       |
| MATH 7341                                      | Probability 2                                      |       |
| MATH 7342                                      | Mathematical Statistics                            |       |
| MATH 7343                                      | Applied Statistics                                 |       |
| MATH 7344                                      | Regression, ANOVA, and Design                      |       |
| <b>Optional Co-op</b>                          |                                                    |       |
| EESC 6500                                      | Pathways to Professional Success                   | 1     |
| EESC 6964                                      | Co-op Work Experience                              | 0     |