

# STATISTICS, B.SC. HONOURS

## Degree Requirements

### Honours (Including Co-operative Option if Selected) <sup>1</sup>

| Course  | Title   | Hours     |
|---|---|-----------|
| <b>Year 1</b>   |   |           |
| STAT 1150   | Introduction to Statistics and Computing <sup>2</sup>               | 3         |
| MATH 1220   | Linear Algebra <sup>1 2</sup>                                       | 3         |
| MATH 1230   | Differential Calculus <sup>2</sup>                                  | 3         |
| MATH 1232   | Integral Calculus <sup>2</sup>                                      | 3         |
| MATH 1240   | Elementary Discrete Mathematics                                     | 3         |
| <b>Hours</b>  |   | <b>15</b> |
| <b>Years 1-2</b>  |   |           |
| The following must be completed in Year 1 or Year 2:  |   |           |
| COMP 1010   | Introductory Computer Science 1 <sup>2</sup>                        | 3         |
| COMP 1020   | Introductory Computer Science 2                                     | 3         |
| STAT 2150   | Statistics and Computing (B)  | 3         |
| STAT 2300   | Principles of Data Collection                                       | 3         |
| 6 credit hours from the Faculty of Arts, which should include the required "W" course   |   | 6         |
| 6 credit hours from the lists of Mathematics and Computer Science options (Lists B and C below)   |   | 6         |
| 9 credit hours of elective courses <sup>3,4</sup>   |   | 9         |
| <b>Hours</b>  |   | <b>33</b> |
| <b>Year 2</b>   |   |           |
| STAT 2400   | Introduction to Probability 1                                       | 3         |
| STAT 2800   | Introduction to Probability 2                                       | 3         |
| MATH 2080   | Introduction to Analysis  | 3         |
| MATH 2150   | Multivariable Calculus <sup>2</sup>                                 | 3         |
| <b>Hours</b>  |   | <b>12</b> |
| <b>Year 3</b>   |   |           |
| STAT 3030   | Introduction to Stochastic Processes                                | 3         |
| STAT 3100   | Introduction to Statistical Inference                               | 3         |
| STAT 3150   | Statistical Computing   | 3         |
| STAT 3450   | Linear Models   | 3         |
| STAT 3690   | Multivariate Analysis   | 3         |
| <b>Hours</b>  |   | <b>15</b> |
| <b>Years 3-4</b>  |   |           |
| 24 credit hours from the list of Statistics options for the Honours program (List A below), with at least 15 credit hours at the 4000 level |   | 24        |
| 6 credit hours from the lists of Statistics, Mathematics and Computer Science options for the Honours program (Lists A, B and C below)      |   | 6         |
| 12 credit hours of elective courses <sup>3,4</sup>  |   | 12        |
| <b>Co-op Requirements (if selected): <sup>5</sup></b>   |   |           |
| SCI 3980  | Co-operative Education Work Term 1                                  | 0         |
| SCI 3990  | Co-operative Education Work Term 2                                  | 0         |
| SCI 4980  | Co-operative Education Work Term 3                                  | 0         |
| SCI 4990  | Co-operative Education Work Term 4 (if a 4th work term is selected) | 0         |
| <b>Hours</b>  |   | <b>42</b> |

### Year 4

|                    |                       |            |
|--------------------|-----------------------|------------|
| STAT 4100          | Statistical Inference | 3          |
| <b>Hours</b>       |                       | <b>3</b>   |
| <b>Total Hours</b> |                       | <b>120</b> |

<sup>1</sup> IMPORTANT: The four year Honours program need not be completed in the manner prescribed in the grid above. The grid indicates one possible arrangement of the required courses and is meant to be a guide around which students can plan their program.

<sup>2</sup> The following substitutes are allowed:

- COMP 1012 in place of COMP 1010;
- MATH 1210 (B) or MATH 1300 (C+) in place of MATH 1220;
- MATH 1500 (B) or MATH 1510 (B) in place of MATH 1230;
- MATH 1700 (B) or MATH 1710 (B) in place of MATH 1232;
- MATH 2720 in place of MATH 2150;
- STAT 1000 and STAT 2000 (B) in place of STAT 1150.

<sup>3</sup> Although not required, students are encouraged to select some of their electives from traditional fields of application in Statistics such as Biological Sciences, Microbiology, Actuarial Mathematics, Economics, Psychology, or Sociology.

<sup>4</sup> The following courses are not to be used for credit in this program: STAT 3000, STAT 4000.

<sup>5</sup> Students in the Co-operative Option are required to complete STAT 2300, STAT 3150, and STAT 3450 before their first employment term.

(Letters in brackets indicate minimum prerequisite standing for further study.)

## Optional Courses for Honours Program

| Course   | Title   | Hours |
|--|---|-------|
| <b>List A: Statistics Options for the Honours Program</b>  |   |       |
| STAT 3170  | Statistical Quality Control                       | 3     |
| STAT 3380  | Introduction to Nonparametric Statistics          | 3     |
| STAT 3490  | Time Series Analysis                              | 3     |
| STAT 3550  | Nonlinear Regression Models                       | 3     |
| STAT 3900  | Intermediate Topics in Statistics                 | 3     |
| STAT 3910  | Intermediate Topics in Statistics with Laboratory | 3     |
| STAT 4150  | Bayesian Analysis and Computing                   | 3     |
| STAT 4170  | Lifetime Data Analysis                            | 3     |
| STAT 4250  | Statistical Learning                              | 3     |
| STAT 4520  | Sampling Techniques                               | 3     |
| STAT 4530  | Design of Experiments                             | 3     |
| STAT 4630  | Stochastic Processes                              | 3     |
| STAT 4700  | Statistical Consulting                            | 3     |
| STAT 4900  | Advanced Topics in Statistics                     | 3     |
| STAT 4910  | Advanced Topics in Statistics with Laboratory     | 3     |
| STAT 4950  | Honours Thesis in Statistics                      | 6     |
| <b>List B: Mathematics Options for the Honours Program</b> |   |       |
| MATH 2030  | Combinatorics 1                                   | 3     |
| MATH 2070  | Graph Theory 1                                    | 3     |
| MATH 2090  | Linear Algebra 2                                  | 3     |
| MATH 2160  | Numerical Analysis 1                              | 3     |
| MATH 2180  | Real Analysis 1                                   | 3     |
| MATH 2740  | Mathematics of Data Science                       | 3     |

|           |  |   |
|-----------|--|---|
| MATH 3330 | Computational Algebra                  | 3 |
| MATH 3340 | Complex Analysis 1                     | 3 |
| MATH 3360 | Combinatorics 2                        | 3 |
| MATH 3440 | Ordinary Differential Equations        | 3 |
| MATH 3460 | Partial Differential Equations         | 3 |
| MATH 3470 | Real Analysis 2                        | 3 |
| MATH 3610 | Introduction to Mathematical Modelling | 3 |
| MATH 4370 | Linear Algebra and Matrix Analysis     | 3 |
| MATH 4390 | Numerical Approximation Theory         | 3 |
| MATH 4490 | Optimization                           | 3 |

**List C: Computer Science Options for the Honours Program**

|           |  |   |
|-----------|--|---|
| COMP 2080 | Analysis of Algorithms                         | 3 |
| COMP 2140 | Data Structures and Algorithms                 | 3 |
| COMP 2150 | Object Orientation                             | 3 |
| COMP 3170 | Analysis of Algorithms and Data Structures     | 3 |
| COMP 3190 | Introduction to Artificial Intelligence        | 3 |
| COMP 3380 | Databases Concepts and Usage                   | 3 |
| COMP 4140 | Introduction to Cryptography and Cryptosystems | 3 |
| COMP 4190 | Artificial Intelligence                        | 3 |
| COMP 4360 | Machine Learning                               | 3 |
| COMP 4380 | Database Implementation                        | 3 |
| COMP 4420 | Advanced Design and Analysis of Algorithms     | 3 |
| COMP 4710 | Introduction to Data Mining                    | 3 |
| COMP 4820 | Bioinformatics                                 | 3 |