DEPARTMENT OF COMPUTER SCIENCE

Computer Science Approved Elective Courses for Graduate Students – *April 2023*

1. <u>Ph. D. Program</u> – Requires completion of at least 4 CS courses (within these four, a maximum of one course can be from this list of CS-approved electives).

2. <u>M.Sc. Thesis Route</u> - Requires completion of 5 CS courses (a maximum of two courses can be from this list of CS-approved electives).

3. <u>M.Sc. Work-Term Route</u> - Requires completion of 9 CS courses (including COMP601W, a maximum of two courses can be from this list of CS-approved electives).

4. <u>M.Sc. Course-based Route</u> - Requires completion of 10 CS courses (a maximum of three courses can be from this list of CS-approved electives).

5. <u>Master of Artificial Intelligence</u> - Requires completion of 10 courses, including 3 of these electives, with the option to take other the courses from this list of CS-approved electives.

Procedure to register for the CS-approved electives mentioned below:

1- If the course can be registered through self-service, self-registration is sufficient.

2- If the course cannot be added using self-service, the student will need to obtain permission from the <u>course instructor</u> and then from the Graduate Officer (or Dept Head) of the <u>Department or Faculty which is offering the course</u>, not the Computer Science graduate officer. This is done by filling out a course change form, having it signed by the professor of the course teaching the course, and then having it signed by the Graduate officer of the corresponding Department or Faculty. For Engineering courses, the Graduate Officer assistant is Sarah Teo tteo@mun.ca. For other units, check here: https://www.mun.ca/sgs/about/graduate-officers/. The rest of courses being offered at MUN and the instructors for those courses are found here: https://www.mun.ca/regoff/registration-and-final-exams/course-offerings/

3- After both signatures are obtained, please send an email with the form to the Graduate Officer (cs-gradofficer@mun.ca). He will verify the form, add it to the CS records, and send it to Registrar's office.

4- Using self-service, the student should verify the registration has taken place, 2-3 working days after the form has been submitted. You should be registered for a maximum of 3

courses each term in total. If you have registered for more, you will be asked to drop the extra courses.

Please note that not all courses below are offered with the same frequency, and they are not offered every term. They may be offered only in Fall, Winter or Spring, sometimes twice a year, or only every other year.

To find out the list of courses that are offered each term, check here before the start of the term:

https://www.mun.ca/regoff/registration-and-final-exams/course-offerings/

Artificial Intelligence Courses
AI-6000 Artificial Intelligence Foundations (*MAI priority*)
AI-6001 Topics in Artificial Intelligence (*MAI priority*)

MAI priority: These are required courses for the MAI program. Students in that program will have priority to register first. Seat availability might be clear right up to the end of the first week of classes.

Biology Courses
BIOL-7941 Introduction to Bioinformatics

Business Courses
BUSI-9903 Quantitative Methods in Management Research
BUSI-9910 Optimization
BUSI-9911 Data and Process Models in Information Systems Development
BUSI-9912 Probabilistic Models
BUSI-9913 Human-Computer Interaction and Decision Support Systems
BUSI-9915 Electronic Commerce
BUSI-9918 Special Topics in Information Systems
BUSI-8103 Statistical Applications in Management (*MBA priority*)
BUSI-8107 Managing Ethics and Responsibility (*MBA priority*)
BUSI-8205 Information Systems (*MBA priority*)
BUSI-8207 Operations Management (*MBA priority*)
BUSI-9021 Data Management (*MBA priority*)
BUSI-9022 Information Systems Analysis & Design (*MBA priority*)

MBA priority: Interested students must meet the specific courses named as prerequisites (BUSI 8103 and 8107 have no prerequisites), and the [Faculty of Business English language requirements](#). Seat availability will be clear right up to the moment before the term starts.

Data Science Courses
DSCI-6601 Practical Machine Learning (*DSCI priority, restricted w COMP6915 *)
DSCI-6602/MATH 6205 Deep Learning and Artificial Intelligence (*DSCI priority*)
DSCI-6607 Programmatic data analysis using Python and R (*DSCI priority*)
DSCI-6650 Reinforcement Learning (*DSCI priority, has pre-requisites*)
DSCI-6659/STAT-6559 Statistical Exploration of Data (*DSCI priority*)
DSCI-6619/STAT-6519 Regression Models (*DSCI priority*)

DSCI priority: These are required courses for the Data Science program. Students in that program will have priority to register first.
*Restricted w COMP-6915 *: Students cannot receive credit for DSCI-6601 if they have previously successfully completed, or are currently registered for, COMP 6915.
Has pre-requisites: instructor & DSCI chair approval, or DSCI 6619 and DSCI-6601 or COMP 6915.

Engineering Courses
ENGI-9081 Human Factors and System Safety
ENGI-9098 Human Factors in Engineering
ENGI-9560 Applied Remote Sensing
ENGI-9804 Industrial Machine Vision
ENGI-9805 Advanced Topics in Computer Vision
ENGI-9807 Computer Security
ENGI 9818 - Software Fundamentals (*MASSE priority*)
ENGI 9819 – Computer Hardware Foundations (*MASSE priority*)
ENGI-9821 Digital Signal Processing
ENGI-9826 Advanced Control Systems
ENGI-9827 Continuous & Discrete-Event Systems
ENGI 9839 Software Verification and Validation (*MASSE priority*)
ENGI-9861 High-Performance Computer Architecture (*MASCE priority*)
ENGI-9865 Advanced Digital Systems
ENGI-9866 Fault-Tolerant Computing (formerly 9846)
ENGI-9867 Advanced Computing Concepts for Engineering
ENGI-9868 ASIC Design
ENGI-9869 Advanced Concurrent Programming
ENGI-9871 Information Theory & Coding (*MASCE priority*)
ENGI-9872 Digital Communications

ENGI-9873 Image Communications
ENGI-9874 Software Design & Specification (credit restricted with COMP 6713/6905)
ENGI-9875 Embedded & Real-Time Systems Design
ENGI-9876 Advanced Data Networks
ENGI-9877 Computer & Communications Security
ENGI-9878 Wireless & Mobile Communications
ENGI-9879 Formal Specification & Development
ENGI-9940 Advanced Robotics

MASCE priority: These are required courses for the MASCE program. Students in that program will have priority to register first. Seat availability will be clear right up to the moment before the term starts.
MASSE priority: These are required courses for the MASSE program. Students in that program will have priority to register first. Seat availability will be clear right up to the moment before the term starts.

Here is the list of courses and their instructors in Engineering:

https://www.mun.ca/engineering/graduate/current-student-resources/courses-and-schedules/

Mathematics Courses
MATH-6202 Nonlinear & Linear Optimization (Credit Restricted with COMP-6933)
MATH-6205/DSCI-6602 Deep Learning and Deep Reinforcement Learning
MATH-6340 Graph Theory
MATH-6341 Combinatorial Design Theory
MATH-6342 Advanced Enumeration

Scientific Computing Courses
CMSC-6910 Matrix Computations and Applications (Credit Restricted with COMP-6732/6931)
CMSC-6920 Applied Scientific Programming
CMSC-6925 Tools of the Trade for Programming High Performance Computers (2 credit hours)
CMSC-6930 Algorithms for Distributed & Shared Memory Computers
CMSC-6950 Computer Based Tools and Applications (Credit Restricted with CMSC-6940)

Statistics Courses
STAT-6500 Probability (Credit Restricted with former 6586)
STAT-6503 Stochastic Processes
STAT-6530 Longitudinal Data Analysis
STAT-6540 Time Series Analysis
STAT-6545 Computational Statistics

STAT-6561 Categorical Data Analysis
STAT-6519/DSCI-6619 Regression Models (*DSCI priority*)
STAT-6559/ DSCI-6659 Statistical Exploration of Data (*DSCI priority*)

DSCI priority: These are required courses for the Data Science program. Students in that program will have priority to register first.