restricted to those students who have honours standing. The Honours dissertation will be assessed by a committee comprising the supervisor and one other faculty member.

4. Students completing first year requirements for any of Chemistry, Mathematics or Physics via the three course options (e.g., Chemistry 1010, 1050 and 1051 or 1010, 1011; the former 1031, Mathematics 1090, 1090, 1001, Physics 1020, 1021, 1051) instead of the two course options (Chemistry 1020, 1061, Mathematics 1060, 1001, Physics 1050, 1051) will require the corresponding number of extra credits to obtain an Honours degree.

5. Arrangements for subsequent years will depend on the other science subjects being studied and should be made in consultation with the Faculty Advisor.

6. Certain advanced courses may only be offered in alternate years. Candidates therefore should consult the Head of the Department before registration.

7. Certain of the Graduate courses may be taken in the final year of the Honours Program with the permission of the Head of the Department.

9.3.8 Course Restrictions

Students should be aware of a number of credit restrictions. For further information see the Chemistry course descriptions section found at the end of the Faculty of Science section under Course Descriptions, Chemistry.

9.4 Computer Science

www.mun.ca/computer-science

The following undergraduate programs are available in the Department:

1. Applied Mathematics and Computer Science Joint Major (B.Sc. only)
2. Computer Science Internship Option (CIO)
3. Computer Science Honours (B.A., B.Sc.)
4. Computer Science and Economics Joint Major (B.Sc. only)
5. Computer Science and Geography Joint Honours (B.Sc. only)
6. Computer Science and Geography Joint Major (B.Sc. only)
7. Computer Science and Physics Joint Honours
8. Computer Science and Statistics Joint Honours
9. Computer Science and Pure Mathematics Joint Honours (B.Sc. only)
10. Computer Science and Pure Mathematics Joint Major (B.Sc. only)
11. Computer Science Honours (B.A., B.Sc.)
12. Major in Computer Science (B.A., B.Sc.)
13. Computer Science (Software Engineering) Honours (B.Sc. only)
14. Computer Science (Network--centric Computing) Major (B.Sc. only)
15. Computer Science (Smart Systems) Major (B.Sc. only)
16. Computer Science (Visual Computing and Games) Major (B.Sc. only)
17. Computer Science (Data Science) Major (B.Sc. only)
18. Computer Science (Scientific Computing) Major (B.Sc. only)
19. Computer Science (Theory of Computation) Major (B.Sc. only)
20. Computer Internship Option (CIO)
21. Minor in Computer Science (B.A., B.Sc.)

Details of our joint program offerings in the Faculties of Arts and Science may be found under the heading Joint Programs following the heading Regulations for the Honours Degree of Bachelor of Science.

Students are recommended to declare their chosen major in Computer Science by the end of their first year or when they have taken 10 courses, including at least 2 courses in Computer Science.

Computer Science course descriptions are found at the end of the Faculty of Science section under Course Descriptions, Computer Science.

9.4.1 Major in Computer Science

See Regulations for the General Degree of Bachelor of Arts or Regulations for the General Degree of Bachelor of Science (as appropriate).

1. Forty-five credit hours in Computer Science courses are required for a major in Computer Science:
   a. Computer Science 4340, 4341, 4342, 4343, 4350, 4376, 4378, 4379, 4384, 4385, 4386, 4387, 4388, 4389, 4390, 4391, 4392, 4393, 4394, 4395, 4396, 4397, 4398, 4399, 4400, 4401, 4402, 4403, 4404, 4405, 4406, 4407, 4408, 4409, 4410, 4411, 4412, 4413, 4414, 4415, 4416, 4417, 4418, 4419, 4420, 4421, 4422, 4423, 4424, 4425, 4426, 4427, 4428, 4429, 4430, 4431, 4432, 4433, 4434, 4435, 4436, 4437, 4438, 4439, 4440, 4441, 4442, 4443, 4444, 4445, 4446, 4447, 4448, 4449, 4450, 4451, 4452, 4453, 4454, 4455, 4456, 4457, 4458, 4459, 4460, 4461, 4462, 4463, and 4464.
   b. At least 3 additional credit hours at the 4000 level in Computer Science courses.
   c. Three Twelve additional credit hours in Computer Science courses at the 3000 level or beyond.

2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, 2050, 2330, and Statistics 1510 or 2550.

Note: Students are encouraged to take Business 2000, Mathematics 3000, and Statistics 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.
9.4.2 Major in Computer Science (Network-centric Computing) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science

All students majoring in Computer Science (Network-centric Computing) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 2100, 3100, 4100 and 4101.
   c. Six additional credit hours in Computer Science courses selected from Computer Science 3202, 3400, 4400, 4759, 4767, 4768.

2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, and Statistics 1510 or 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.3 Major in Computer Science (Smart Systems) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science

All students majoring in Computer Science (Smart Systems) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 3200, 3201, 3202 and 3301.
   c. Six additional credit hours in Computer Science courses selected from Computer Science 3550, 4301, 4203, 4400, 4802, 4759, 4766.

2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, and Statistics 1510 or 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.4 Major in Computer Science (Visual Computing and Games) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science

All students majoring in Computer Science (Visual Computing and Games) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 3300, 3301 and 4300.
   c. Six additional credit hours in Computer Science courses selected from Computer Science 2300, 4301, 4302, 4303, 4767.
   d. Three additional credit hours in Computer Science courses selected from Computer Science 2100, 4766, 4768.

2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, and Statistics 1510 or 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.5 Major in Computer Science (Data Science) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science

All students majoring in Computer Science (Data Science) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 3202, 3400, 3401 and 4405.
   c. Six additional credit hours selected from Computer Science 3200, 3301, 4401, 4754 and Statistics 3585.
2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, and Statistics 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.6 Major in Computer Science (Scientific Computing) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science.

All students majoring in Computer Science (Scientific Computing) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 3701, 3753, 4734, and 4736.
   c. Six additional credit hours in courses selected from Computer Science 3550, 3710, 3754, 4550, 4735, 4745, 4746, 4766, 4767, and MATH 4140.
2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, 2260, 3202, 4160, 4162 and Statistics 1510 or 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.7 Major in Computer Science (Theory of Computation) (B.Sc. only)

See Regulations for the General Degree of Bachelor of Science.

All students majoring in Computer Science (Theory of Computation) are required to complete a minimum of 45 credit hours from the Department of Computer Science offerings.

   b. Computer Science 3600, 3601, and 3602.
   c. Nine additional credit hours in courses selected from Computer Science 4405, 4711, 4712, 4742, 4743, 4745, and 4746.
2. Additional courses required of the Majors are: Mathematics 1000, 1001, 2000, 2050, and Statistics 1510 or 2550.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.
9.4.78 Honours in Computer Science

1. See Regulations for the Honours Degree of Bachelor of Arts or Regulations for the Honours Degree of Bachelor of Science (as appropriate).

2. Sixty-three credit hours in Computer Science courses are required for the Honours Degree in Computer Science, including:
   a. Computer Science 4740, 2740, 2744, 2742, 2760, 3745, 3746, 3748, 3749, 3724, 3726, 3754, 4770, and 4780.
   b. Eighteen additional credit hours in Computer Science at the 4000 level.
   c. Six additional credit hours in Computer Science courses at the 3000 level or beyond.

3. Additional courses required are: Mathematics 1000, 1001, 2000, 2050, 2330, and Statistics 1510 or 2550.
   Note: Students are encouraged to take Business 2000, Mathematics 3000, and Statistics 2560.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.89 Honours in Computer Science (Software Engineering) (B.Sc. Only)

Completion of the Honours in Computer Science (Software Engineering) Program does not qualify persons to hold the designation "Professional Engineer" as defined by various Provincial Acts governing the Engineering Profession.

1. See Regulations for the Honours Degree of Bachelor of Science.

2. Sixty-three credit hours in Computer Science courses are required for the Honours Degree in Computer Science (Software Engineering), including:
   a. Computer Science 4740, 2740, 2744, 2742, 2760, 3745, 3746, 3748, 3749, 3724, 3726, 3754, 4770, and 4780.
   b. Nine additional credit hours in Computer Science courses chosen from 4718, 4749, 4721, 4723, 4751, 4753, 4756, 4759, 4765, and 4769.
   c. Twelve additional credit hours in Computer Science courses at the 4000 level.
   d. Twelve additional credit hours in Computer Science courses at the 3000 level or beyond.

3. Additional courses required are: Mathematics 1000, 1001, 2000, 2050, 2330, and Statistics 1510 or 2550.
   Note: The Honours project (4760) must be in the area of Software Engineering.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.

9.4.910 Minor in Computer Science

For a Minor in Computer Science, a student must complete at least 24 credit hours in Computer Science courses, including:


2. At least 6 credit hours selected from Computer Science 3745, 3746, 3749, 3724, 3726, and 3754.

3. Three additional credit hours at the 3000 level or above.

Note: Courses marked with an asterisk (*) are 1 credit-hour courses.
9.4.101 Computer Industry Internship Option (CIIo):

The Computer Industry Internship Option (CIIo) provides an opportunity for qualified students to obtain rewarding placements that help them develop practical skills in a real work setting before graduation. The CIIo is available to Computer Science Majors who will typically apply between their third and fourth year of studies.

9.4.101.1 Admission Requirements

In order to be considered for admission to the CIIo, an applicant:

1. must be a declared Computer Science Major;
3. must have at least 15 credit hours remaining after the internship in order to satisfy degree requirements, 3 of which must be in Computer Science; and
4. is expected to return to University as a full-time student after the internship.

Note: Courses marked with an asterisk (*) count as the 1 credit-hour course.

In addition to meeting the above applicants are also subject to academic performance.

9.4.101.2 Internship Duration:

Subject to the availability of job openings, a student may choose either an 8, 12 or 16 consecutive month internship period.

9.4.101.3 Internship Guidelines:

1. Internship employment is normally organized by Co-operative Education; however, students who have been accepted to the CIIo may also obtain their own internship placements. All placements are subject to the approval of Co-operative Education and of the Head of the Department of Computer Science.
2. Students who have applied to the internship program give permission to Co-operative Education to supply prospective employers with copies of their resume and transcript.
3. After being placed with an employer, students are not permitted to drop their internship without prior approval from Co-operative Education and the Head of the Department of Computer Science. Students who drop an internship without permission, who fail to honour an agreement to work with an employer, or who conduct themselves in such a manner as to cause his discharge from the placements, will normally be awarded a fail grade for the internship period and may not be permitted to reapply.

Note: Students should also refer to the UNIVERSITY REGULATIONS - General Academic Regulations (Undergraduate).

9.4.101.4 Expectation of Work

Within two weeks of starting the internship, students are required to submit a list of their internship objectives to Co-operative Education. They are also required to submit a report to Co-operative Education the last day of classes of each semester in which they are working. A progress report is required in semesters where the internship is continuing into the next semester. The progress report need only discuss the activities in that particular semester. A final report is required in the student's final internship semester. The final report must discuss the entire internship. Both reports will include a description of the student's internship projects and activities as well as the student's internship objectives and accomplishments. A completed Employer Evaluation Form should be submitted to Co-operative Education at the end of each semester.

9.4.101.5 Registration, Assessment of Performance, and Assignment of Grades:

Students must register for the course Computer Science 3700 every semester during their internship.

Computer Science 3700 is a non-credit course open only to students who have been accepted into the Internship Program.

During the internship, the employer and intern will complete student performance evaluations every four months and will submit them to Co-operative Education. The final assessment of total work performed is the responsibility of Co-operative Education, and will be based upon both input from the employer and the intern's final internship report.

The Internship evaluation shall consist of two components:

1. On-the-job Student Performance: Job performance shall be assessed by Co-operative Education in consultation with the employer. Evaluation of the on-the-job student performance will result in one of the following classifications: PASS WITH DISTINCTION, PASS, FAIL.
2. The Final Internship Report: Evaluation of the final internship report will result in one of the following classifications: PASS WITH DISTINCTION, PASS, FAIL.

The evaluation of the on-the-job student performance and the final internship report are recorded separately on the transcript. Overall evaluation of the internship will result in one of the following final grades being awarded:

1. PASS WITH DISTINCTION: indicates outstanding performance in both the final internship report and the on-the-job student performance. PASS WITH DISTINCTION has been awarded to each of the final internship report and the on-the-job student performance.
2. PASS: indicates that performance meets expectations in both the final internship report and on-the-job student performance. The student meets the requirements of a passing mark in the final internship report and on-the-job student performance.
3. FAIL: indicates failing performance in either the final internship report or on-the-job student performance or both.

Also, the following will be noted in the transcript of the intern:

1. Requirements for the Computer Industry Internship Option have been completed. Internship Duration: - months.
2. A grade of NC (No Credit) for Computer Science 3700 will be awarded in all semesters of the Internship Option prior to the final Semester.
9.4.10.5 CIIQ and Honours Program:
In case a student is enrolled in both the Honours program and the CIIQ, the requirements of both must be met. Upon approval from the honours project supervisor, within the Department, the employer and the Head of the Department of Computer Science, an internship project may be submitted as a component of an honours project. These arrangements must be made within the first semester of the internship placement.

9.4.16 Course-Numbering Scheme
There are five areas of Computer Science offered in the 3000- and 4000-level courses. The meaning of the third digit of a course number is as follows:
1. Programming Languages
2. Computer Systems
3. Numerical Computations
4. Theoretical Aspects
5. Applications (e.g., Artificial Intelligence, Computer Graphics, Database, Robotics, Computational Geometry, Image Processing, Computer Networking, Computer-Aided Design)
6. Project Course
7. Honours Project
8. Directed Readings

9.4.142 Supplementary Examinations
Supplementary examinations will be allowed in certain Computer Science courses which have written final examinations. Students should refer to the Faculty of Science degree regulations for details.

9.4.123 Faculty Advisors
The Department has an Undergraduate Advisor for Computer Science majors to consult with on academic matters.

9.4.134 Undergraduate Handbook
Additional information about the undergraduate Computer Science programs and courses can be found in the Computer Science Undergraduate Handbook available from the General Office, Department of Computer Science or from www.mun.ca/computerscience/