COMPUTING SCIENCE

Department Website: https://www.smu.ca/math-cs/index.html (https://www.smu.ca/math-cs/)
Department Email: mathcs.admin@cs.smu.ca

Students can obtain a Bachelor of Science in Computing Science in one of two possible ways. A traditional degree in Computing Science involving an emphasis in Mathematics is offered as a minor, concentration, major, or honours. Alternatively, students interested in applying the technical aspects of Computing Science to business can obtain a major in Computing Science and Business Administration. Both of these degrees have a Co-op option.

The major and honours programs in Computing Science are accredited by the Computer Science Accreditation Council of the Canadian Information Processing Society (CIPS). Not only is this an assurance of program quality, but it also allows students to earn the Information Systems Professional (ISP) designation in less time.

Note: Students are advised that possession of the minimum qualifications does not guarantee admission to a particular academic program. Limits to the number of students who can be in a particular program at any one time exist and depend very much on the number of faculty members available in a particular academic unit.

Cooperative Education Program (Co-op)

This program is designed for students in the honours or major programs who wish to gain relevant work experience while attending university. The general requirements for the Cooperative Education program can be found in the Faculty of Science regulations, Cooperative Education (https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/cooperative-education-programs-major-honours/) Section, of this *Calendar*. Interested students should contact the Department of Mathematics and Computing Science Co-op Advisor before the end of their first year.

Credit for Duplicate Courses

No student who has received credit for an advanced mathematics or computing science course may later receive credit for a mathematics or computing science prerequisite to the course without permission of the Department. With renumbered or restructured courses, students are advised that they are not eligible to take a course for credit if they already have a credit for a comparable course, even if that course was taken at a different level or under a different number.

Important Notes

1. Students taking a concentration, major, or honours in Computing Science may receive credit for only one of Introduction to Mathematical Statistics (MATH 1216), Biostatistics (BIOL 3308), Psychological Statistics (formerly PSYC 2350) (Group C) (PSYC 2020), Statistical Methods in Geography (Group C) (GEOG 3326) and Introductory Statistics (MGSC 2207).
2. Related courses to a maximum of nine (9) credit hours offered by other Departments may be allowed for CSCI credit, with written approval of the Computing Science Program Coordinator.
3. Students must request a prerequisite waiver for Business Communication Essentials (COMM 2293) to get into Systems Analysis and Design (formerly CISY 4425) (MISA 4425) and Strategic Management (MGMT 4489).
1.

Programs

The Bachelor of Science (B.Sc.) is a well-established, foundational degree. Its specific requirements are listed below alongside general graduation requirements (https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science/).

Major in Computing Science

The requirements for the degree of Bachelor of Science with Major apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Major (https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science---major/). The specific list of sixty (60) credit hours required in the major subject area (specifically the following forty-five (45) credit hours in Computing Science and fifteen (15) credit hours in Mathematics) used to satisfy 6 (d) are as follows:

Code	Title	Credit Hours
CSCI 1226	Introduction to Computing Science and Programming	3
CSCI 1228	Advanced Computer Programming and Problem Solving	3
CSCI/MATH 2307	Theoretical Foundations of Computing Science	3
CSCI/MATH 2308	Introduction to Numerical Analysis	3
CSCI 2327	Digital Logic and Computer Architecture	3
CSCI 2341	Data Structures and Algorithms I	3
CSCI 3428	Software Engineering	3
CSCI 3430	Principles of Programming Languages	3
CSCI 3431	Operating Systems	3
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 1216	Introduction to Mathematical Statistics	3
MATH 2301	Applied Linear Algebra	3
MATH 2305	Survey of Discrete Mathematics	3
CSCI 2355	Introduction to Internet Technologies and Web Programming	3
or CSCI 2356	Mobile App Development	
CSCI 3461	Database Systems	3
or CSCI 4477	Data Mining	
Select three credit hours in CSCI numbered above 2306		3
Select nine credit hours in CSCI numbered 3000 level or above		9
Total Credit Hours		**60**

Note: Students should consult the Faculty of Science Program Requirement Tables (https://www.smu.ca/faculty-of-science/science-program-requirement-tables.html) available online for the complete list of program requirements, recommended Science Electives, and a suggested sequence of courses for Years 1 and 2. Students should consult with a Program Advisor or a Science Advisor to chart their courses, and to determine the best sequence of courses for Years 3 and 4.

Double Major in Computing Science and Mathematics

The requirements for the degree of Bachelor of Science with Double Major apply as listed in this *Academic Calendar* under the heading of *Faculty of Science, Bachelor of Science – Double Major*. The specific list of required courses in Computing Science and Mathematics used to satisfy 6 (b) and 7 (a) is as follows:

Code	Title	Credit Hours
CSCI 1226	Introduction to Computing Science and Programming	3
CSCI 1228	Advanced Computer Programming and Problem Solving	3
CSCI/MATH 2307	Theoretical Foundations of Computing Science	3
CSCI/MATH 2308	Introduction to Numerical Analysis	3
CSCI 2327	Digital Logic and Computer Architecture	3
CSCI 2341	Data Structures and Algorithms I	3
CSCI 3428	Software Engineering	3
CSCI 3430	Principles of Programming Languages	3
CSCI 3431	Operating Systems	3
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
MATH 1216	Introduction to Mathematical Statistics	3
MATH 2301	Applied Linear Algebra	3
MATH 2305	Survey of Discrete Mathematics	3
MATH 2310	Introductory Analysis	3
MATH 2311	Intermediate Calculus	3
MATH 2321	Linear Algebra II	3
MATH 3441	Real Analysis I	3
MATH 4420	Abstract Algebra I	3
CSCI 2355	Introduction to Internet Technologies and Web Programming	3
or CSCI 2356	Mobile App Development	
CSCI 3461	Database Systems	3
or CSCI 4477	Data Mining	
Select nine credit hours in CSCI numbered 3000 level or above		9
Select six credit hours in MATH numbered 3000 level or above		6
Total Credit Hours		**78**

Note: Students should consult the Faculty of Science Program Requirement Tables (https://www.smu.ca/faculty-of-science/science-program-requirement-tables.html) available online for the complete list of program requirements, recommended Science Electives, and a suggested sequence of courses for Years 1 and 2. Students should consult with a Program Advisor or a Science Advisor to chart their courses, and to determine the best sequence of courses for Years 3 and 4.

Double Major in Computing Science and Other Science (not Mathematics)

The requirements for the degree of Bachelor of Science with Double Major apply as listed in this *Academic Calendar* under the heading of *Faculty of Science, Bachelor of Science – Double Major*. To satisfy 7(a) for CSCI, students must fulfill requirements of the Computing Science major listed above.

Major in Computing Science and Business Administration

This is an interdisciplinary four year degree combining Computing Science courses, taught in the Department of Mathematics and Computing Science, with a selection of courses taught in the Sobey School of Business. This program is designed to meet the increasing demand for people with a solid technical knowledge of Computing Science who also understand the application of this technology to business problems.

To declare this program as a major, students should consult with the Computing Science Program Coordinator in the Department of Mathematics and Computing Science. The courses listed below are required. Due to restrictions associated with the prerequisite structure, it is strongly recommended that students consult with a Program Advisor or a Science Advisor to determine the sequence in which to take their courses. Students may consult the Faculty of Science Program Requirement Tables (https://www.smu.ca/faculty-of-science/science-program-requirement-tables.html) available online for the complete list of program requirements, recommended Science Electives, and a suggested sequence of courses for Years 1 and 2. Students need to have a minimum grade point average (GPA) of 2.20 in required CSCI and MATH courses, and a minimum GPA of 2.20 in the required Business courses.

Code	Title	Credit Hours
33 credit hours in Major Subject Area (Faculty of Science)		
CSCI 1226	Introduction to Computing Science and Programming [1,2]	3
CSCI 1228	Advanced Computer Programming and Problem Solving	3
CSCI 2327	Digital Logic and Computer Architecture	3
CSCI 2341	Data Structures and Algorithms I	3
CSCI 2355	Introduction to Internet Technologies and Web Programming [3]	3
or CSCI 2356	Mobile App Development	
Select 6 credit hours in CSCI numbered 2306 and higher [4]		6
Select 12 credit hours in CSCI numbered 3000 and higher [5, 6]		12
39 credit hours in Major Subject Area (Sobey School of Business)		
ACCT 2241	Introductory Financial Accounting	3
ACCT 2242	Introductory Managerial Accounting	3
ACCT 3323	Management Information Systems	3
ACCT 3332	Planning and Control	3
FINA 2360	Business Finance I	3
FINA 3361	Business Finance II	3
MGMT 1281	Introduction to Business Management	3
MGMT 2382	Introduction to Organizational Behaviour	3
MGMT 2385	Introduction to Human Resource Management	3
MGMT 4489	Strategic Management	3
MGSC 1205	Quantitative Methods I	3
MISA 4425	Systems Analysis and Design (formerly CISY 4425)	3
MKTG 2270	Introduction to Marketing	3
18 credit hours MATH and Science Breadth		

MATH 1210	Introductory Calculus I	3
MATH 1216	Introduction to Mathematical Statistics	3
MATH 2301	Applied Linear Algebra	3
MATH 2305	Survey of Discrete Mathematics	3
Select 12 credit hours in Science (not CSCI)		12
12 credit hours in Arts and Economics		
ECON 1201	Principles of Economics: Micro	3
ECON 1202	Principles of Economics: Macro	3
Select 6 credit hours in Arts		6
6 credit hours in Humanities		
Select 6 credit hours in Humanities		6
6 credit hours of free electives		
Select 6 credit hours of electives		6
Total Credit Hours		**120**

[1] For students in the Computing Science and Business Administration program, Introduction to Computing Science and Programming (CSCI 1226) can replace Introduction to Computer Applications (formerly CISY 1225) (MISA 1225) as a prerequisite for other business courses. However, a knowledge of the topics covered in Introduction to Computer Applications (formerly CISY 1225) (MISA 1225) will be assumed in other courses.

[2] Students may not receive credit for Introduction to Computer Applications (formerly CISY 1225) (MISA 1225) if taken concurrently with or subsequent to Introduction to Computing Science and Programming (CSCI 1226).

[3] Web Information Systems (formerly CISY 3327) (MISA 3327) may be acceptable in lieu of Introduction to Internet Technologies and Web Programming (CSCI 2355) with written permission of the Computing Science Program Coordinator. Students cannot receive credit for both Web Information Systems (formerly CISY 3327) (MISA 3327) and Introduction to Internet Technologies and Web Programming (CSCI 2355).

[4] Business Applications Programming (formerly CISY 2320) (MISA 2320) may be acceptable as a CSCI elective above 2306 and below 3000 level with written permission of the Computing Science Program Coordinator.

[5] Communication Networks and Security (formerly CISY 4436) (MISA 4436) may be acceptable in lieu of Data Communications and Networking (CSCI 3421) as credit for CSCI numbered 3000 and above, with written permission of the Computing Science Program Coordinator. Students cannot receive credit for both Communication Networks and Security (formerly CISY 4436) (MISA 4436) and Data Communications and Networking (CSCI 3421).

[6] Database Programming (formerly CISY 3326) (MISA 3326) may be acceptable in lieu of Database Systems (CSCI 3461) as credit for CSCI numbered 3000 and above, with written permission of the Computing Science Program Coordinator. Students cannot receive credit for both Database Programming (formerly CISY 3326) (MISA 3326) and Database Systems (CSCI 3461).

[7] Software Engineering (CSCI 3428) may be acceptable in lieu of Systems Analysis and Design (formerly CISY 4425) (MISA 4425) with written permission of the Computing Science Program Coordinator. Students cannot receive credit for both Systems Analysis and Design (formerly CISY 4425) (MISA 4425) and Software Engineering (CSCI 3428).

Concentration in Computing Science

The requirements for the degree of Bachelor of Science – General -with Concentration apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – General (with Concentration) *(*https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science---general-w-concentration*/).* The specific thirty-six (36) credit hours in courses required to satisfy 3(d) are as follows:

Code	Title	Credit Hours
CSCI 1226	Introduction to Computing Science and Programming	3
CSCI 1228	Advanced Computer Programming and Problem Solving	3
CSCI 2327	Digital Logic and Computer Architecture	3
CSCI 2341	Data Structures and Algorithms I	3
Select 18 credit hours in CSCI numbered 2306 or above		18
MATH 1210	Introductory Calculus I	3
MATH 1211	Introductory Calculus II	3
Total Credit Hours		**36**

Honours in Computing Science

The requirements for the degree of Bachelor of Science with Honours apply as listed in this *Academic Calendar* under the heading of *Faculty of Science, Bachelor of Science – Honours*. Students with a minimum CGPA of 3.00 are encouraged to apply for admission to the honours program. The specific list of credit hours required to satisfy 11(a) for a total of sixty-three (63) credit hours in CSCI and twenty-one (21) credit hours in MATH include:

Code	Title	Credit Hours
All the requirements for the Major		
CSCI 3451	Theory of Computation	3
Nine additional credit hours in CSCI numbered 2306 or above		9
Six additional credit hours in CSCI at the 3000-level or above [1]		6
Six additional credit hours in MATH numbered 2000 or above		6

1 It is recommended that Research Thesis (CSCI 4500) be used to satisfy this requirement.

Students must achieve a minimum DGPA of 3.00 on those courses presented in fulfillment of the Bachelor of Science with Honours in Computing Science requirements.

Note: The complete list of required credits for the program and the suggested sequence of courses for years 1 and 2 can be found on the Faculty of Science website listings for Program Requirement Tables (https://www.smu.ca/faculty-of-science/science-program-requirement-tables.html). (https://smu.ca/academics/science-program-requirement-tables.html) Students should consult with the Program Advisor or a Science Advisor for the suggested best sequence of courses for years 3 and 4.

Double Honours in Computing Science and Mathematics

The requirements for the degree of Bachelor of Science with Double Honours apply as listed in this *Academic Calendar* under the heading of *Faculty of Science, Bachelor of Science – Double Honours*. To satisfy 11(a) students must fulfill the following:

Code	Title	Credit Hours
All the requirements listed for the double major		
CSCI 3451	Theory of Computation	3
Three additional credit hours in MATH at the 3000 level or above		3
Select six credits of the following:		6
CSCI 4500	Research Thesis	
MATH 4500	Thesis MATH	
Three credit hours in CSCI numbered 3000 or above and three credit hours in MATH numbered 3000 or above		
Select 18 credit hours in CSCI numbered 2306 or above		18
Total Credit Hours		**30**

Note: The suggested sequence of courses for years 1 and 2 can be found on the Faculty of Science website listings for Program Requirement Tables. Students should consult with the Program Advisor or a Science Advisor for the suggested best sequence of courses for years 3 and 4.

Students must achieve a minimum DGPA of 3.00 on those courses presented in fulfillment of the Bachelor of Science with Double Honours in Computing Science and Mathematics requirements.

Double Honours in Computing Science and Other Science (not Mathematics)

The requirements for the degree of Bachelor of Science with Double Honours apply as listed in this *Academic Calendar* under the heading of Faculty of Science, Bachelor of Science – Double Honours (https://smu-ca-public.courseleaf.com/undergraduate/faculties/faculty-science/bachelor-science--honours-double-honours/). To satisfy the honours requirements 11(a) students must fulfill:

- All of the specified courses in CSCI and MATH required for majors in Computing Science
- Three (3) additional credit hours in MATH courses numbered 2306 or above
- Six (6) additional credit hours in CSCI courses numbered 2306 or above

Minor in Computing Science

It is possible to obtain a minor in Computing Science by completing thirty (30) credit hours in Computing Science as follows:

Code	Title	Credit Hours
CSCI 1226	Introduction to Computing Science and Programming	3
CSCI 1228	Advanced Computer Programming and Problem Solving	3
CSCI 2327	Digital Logic and Computer Architecture	3
CSCI 2341	Data Structures and Algorithms I	3