Department of Mathematics & Computer Science

COMPUTER SCIENCE

This document is meant as a planning guide only. Students are advised to consult with the Chair of the Department if they have specific questions about the program.

Program Objectives:

- Objective 1: Practice as effective computing professionals or secure admission to a high-quality graduate program.
- Objective 2: Communicate effectively, both orally and in writing, and work effectively in teams.
- Objective 3: Exhibit ethical and professional behavior.

Program Outcomes:

Students graduating with a BSc in computer science from Brandon University will be able to:

- Demonstrate Knowledge: Competently apply knowledge in a) software engineering, b) algorithms and data structures, c) systems software, d) computer elements and architectures, e) theoretical foundations of computing, f) discrete mathematics and g) probability and statistics.
- Analyse and Solve Problems: Use appropriate knowledge and skills, including background research and experimentation, to identify, investigate, abstract, conceptualize, analyse, and solve complex computing problems, in order to reach substantiated conclusions.
- Design Software and Systems: Design and evaluate solutions for complex open-ended computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, as well as economic, cultural, societal, and environmental considerations
- Use Appropriate Resources: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of their strengths and limitations.

- Work individually and in a Team: Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.
- Communicate Effectively: Communicate with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
- Act Professionally: Act appropriately with respect to ethical, societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and with regard to the consequential responsibilities relevant to professional computing practice.
- Be Prepared for Life-Long Learning: Learn new tools, computer languages, technologies, techniques, standards and practices, as well as be able to identify and address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.
- Demonstrate Breadth of Knowledge: Possess knowledge in areas other than computer science and mathematics so as to be able to communicate effectively with professionals in those fields.

4-YEAR MAJOR (HONOURS)

Formal application must be made to enter the Honours Degree in all departments in the Faculty of Science. Application forms are available through the Dean of Science Office or Financial and Registration Services.

Students considering a 4-Year (Honours) Computer Science Major must complete a minimum of **45 credit hours** consisting of:

Required Courses			**30**
62:160	Computer Science I	3	
62:161	Computer Science II	3	
62:206	Discrete Structures and Programming	6	
62:306	Systems Programming	6	
62:370	Information Systems	3	
62:371	Data Base Systems	3	
62:373	Design & Analysis of Computer Algorithms	3	
62:461	Theory of Computation	3	
Plus:	**one** of the following		**3**
62:364	Microprocessors	3	
62:367	Computer Organization I	3	
Plus:	**one** of the following		**3**

62.483	Senior Seminar in Computer Science	3	
62:499	Advanced Topics in Computer Science	3	
Plus:	**one** of the following		**3**
62:355	Operations Research	3	
62:359	Advanced C++ Programming	3	
62:365	Introduction to Combinatorics	3	
62:368	Graphical User Interfaces	3	
62:375	Systems Models in Mathematics	3	
62:376	Data Communications and Networking	3	
62:377	Introduction to Game Programming	3	
62:385	Ordinary Differential Equations	3	
62:386	Systems Design II	3	
62:399	Topics in Computer Science	3	
62:449	Advanced Thesis in Computer Science	6	
62:456	Computational Methods in Graph Theory	3	
62:462	Theory of Program Translation	3	
62:473	Analysis of Algorithms	3	
62:476	Theory of Communications and Networks	3	
62:480	Computer Graphics	3	
62:481	Digital Image Processing	3	
62:485	Expert Systems	3	
	Must achieve 3.0 gpa for Major requirement	**Major Total:**	**39**
Plus:	**Ancillary Courses**		
62:171	Introduction to Statistics	3	
62:172	Introduction to Statistical Inference	3	
62:181	Calculus I	3	
62:182	Linear Algebra	3	
62:191	Calculus II	3	
62:261	Introduction to Set Theory	3	
62:274	Course no longer exists		
62:290	Calculus III	3	
Plus:	Minor Requirement — **Must achieve 2.0 gpa for Minor requirement**		**Min. 18**
Plus:	Liberal Education requirement		
	Humanities (6 credit hours) and Social Sciences (6 credit hours)		
Plus:	Additional elective credit hours		
	Must achieve 2.5 gpa for Graduation requirement	**Degree Total:**	**120**

4-YEAR MAJOR

Students considering a 4-Year (Honours) Computer Science Major must complete a minimum of **45 credit hours** consisting of:

Required Courses				**30**
62:160	Computer Science I		3	
62:161	Computer Science II		3	
62:206	Discrete Structures and Programming		6	
62:306	Systems Programming		6	
62:370	Information Systems		3	
62:371	Data Base Systems		3	
62:373	Design & Analysis of Computer Algorithms		3	
62:461	Theory of Computation		3	
Plus:	**one** of the following			**3**
62/74:364	Digital Computer Fundamentals		3	
62:367	Computer Organization I		3	
Plus:	**6 credit hours** from courses with the prefix 62:COMP: and 62:M&CS:			**6**
	Must achieve 2.0 gpa for Major requirement		**Major Total:**	**39**
Plus:	**Ancillary Courses**			
62:171	Introduction to Statistics		3	
62:172	Introduction to Statistical Inference		3	
62:181	Calculus I		3	
62:182	Linear Algebra		3	
62:191	Calculus II		3	
62:261	Introduction to Set Theory		3	
62/74:274	Course no longer exists			
62:290	Calculus III		3	
Plus:	Minor Requirement	**Must achieve 2.0 gpa for Minor requirement**		**Min. 18**
Plus:	Liberal Education requirement			
	Humanities (6 credit hours) and Social Sciences (6 credit hours)			
Plus:	Additional elective credit hours			
	Must achieve 2.0 gpa for Graduation requirement		**Degree Total:**	**120**

3-YEAR MAJOR

Students considering a 3-Year Computer Science Major must complete a minimum of **30 credit hours** consisting of:

Required Courses				
62:160	Computer Science I		3	
62:161	Computer Science II		3	
62:206	Discrete Structures and Programming		6	
62:306	Systems Programming		6	
62:370	Information Systems		3	
62:371	Data Base Systems		3	
62:373	Design & Analysis of Computer Algorithms		3	
	Must achieve 2.0 gpa for Major requirement		**Major Total:**	**27**
Plus:	**Ancillary Courses**			
62:171	Introduction to Statistics		3	
62:181	Calculus I		3	
62:182	Linear Algebra I		3	
Plus:	Minor Requirement	**Must achieve 2.0 gpa for Minor requirement**		
Plus:	Liberal Education requirement			
	Humanities (6 credit hours) and Social Sciences (6 credit hours)			
Plus:	Additional elective credit hours			
	Must achieve 2.0 gpa for Graduation requirement		**Degree Total:**	**90**

MINOR

Students considering a Computer Science Minor must complete a minimum of **18 credit hours** consisting of:

Required Courses			
Choose:	A **maximum** of **9 credit hours** of the following		**9**
62:156	Finite Mathematics	3	
62:160	Computer Science I	3	
62:161	Computer Science II	3	
Plus:	**9 credit hours** from courses with the prefix 62:COMP: and 62:M&CS: (group C and B courses)		**9**
	Must achieve 2.0 gpa for Minor requirement	**Minor Total:**	**18**

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