



**Lakehead University**  
**Faculty of Science and Environmental Studies**

**REQUEST REPORT**

**Request Tracking Number:** 2013-SCI-2719  
**Request Title:** HBScCompSciRemoveApprenticeship&InternshipOptions

**Request Effective Date:** F-W 2014-15  
**Request Status:** In Workflow  
 Request can't be split

**Request Contents**

Type	Title
1. New Version of a Degree	Honours BSc (Computer Science) Co-operative Program

**Request History**

Workflow Step	Workflow Action	User	Change Made	Comments	Date
Initiator	Approved	Maurice Benson	Yes	Submitted to workflow	10/25/2013
Dean and Faculty Council Review Stage	Approved	Christina Maenpaa	No	The proposal was approved at the SES Faculty Council on October 15, 2013. It was approved by Andy Dean at this meeting as well.	10/25/2013

**Supporting Documents**

File Name	Uploaded By	Upload Date	Size
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**Supporting Documents Audit Trail**

File Name	User	Date	Action
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**Notes**

Date	User	Note
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10/25/2013	Maurice Benson	Delete the out of date Apprenticeship and Internship features.
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1.	New Version of a Degree	HBSC.COMP.CP - Honours BSc (Computer Science) Co-operative Program
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**Justification**

These features are out of date and have not been used for some time. Students wanting a formal work term can proceed under the current co-op process. These features were implemented as co-op work terms and the names internship & apprenticeship are misleading.

**Degree Details**

CURRENT VERSION	PROPOSED VERSION
HBSC.COMP.CP - Honours BSc (Computer Science) Co-operative Program <b>Start Term:</b> Fall 2013 <b>End Term:</b> No Specified End Date	HBSC.COMP.CP - Honours BSc (Computer Science) Co-operative Program <b>Start Term:</b> <del>Fall 2013</del> F-W 2014-15 <b>End Term:</b> No Specified End Date

<u>Required Information</u>	
CURRENT VERSION	PROPOSED VERSION
<b>Institution Unit</b> Faculty of Science and Environmental Studies	<b>Institution Unit</b> Faculty of Science and Environmental Studies
<b>Degree Type</b> HBSC	<b>Degree Type</b> HBSC
<b>Major</b> COMP	<b>Major</b> COMP
<b>Minor</b>	<b>Minor</b>
<b>Specialization</b>	<b>Specialization</b>
<b>Rationale</b> #2012-SCI-417 Split PHYS 1101. Associated program changes for Department of Computer Science not included in original proposal. Authorized to change by 19June2013 e-mail from M. Benson and verbal approval from Registrar.	<b>Rationale</b> #2012-SCI-417 Split PHYS 1101. Associated program changes for Department of Computer Science not <del>included in original proposal. Authorized to change by 19June2013 e-mail from M. Benson and verbal approval from Registrar.</del> <i>inc</i>
<b>Requirements</b>  There are three options in this program, Business, Scientific and Hardware. Students must choose one at the time of initial registration. For help in making this choice, contact the Chair of the Department.  <b>Note:</b> Students in this program are required to take at least 5 FCEs outside the Departments of Computer Science and Mathematical Sciences.  (a) Business Option	<b>Requirements</b>  There are three options in this program, Business, Scientific and Hardware. Students must choose one at the time of initial registration. For help in making this choice, contact the Chair of the Department.  <b>Note:</b> Students in this program are required to take at least 5 FCEs outside the Departments of Computer Science and Mathematical Sciences.  (a) Business Option

<p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p> <p><b>First Year (Fall and Winter):</b>  (a) Mathematics 1171, 1172, 1271 and 1272; Computer Science 1411, 1431  (b) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112  (c) Business 1511, 1512</p> <p><b>First Year (Spring/Summer):</b>  At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b>  (a) Mathematics 2255, 2275  (b) Computer Science 2412, 2453, 2476 and 2477  (c) Business 2012 and 2033  (d) Sociology 2455  (e) One half-course elective</p> <p><b>Note:</b>  Students interested in the Physics selections from the list of electives should take Mathematics 2131 and Physics 2211.</p> <p><b>Second Year (Spring/Summer):</b>  Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b>  (a) Computer Science 3413, 3415, 3473  (b) Business 3213  (c) Mathematics 3332</p> <p><b>Third Year (Winter):</b>  Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b>  Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall and Winter):</b>  (a) Computer Science 4411, 4433 and 4453  (b) Business 4253 or 4273  (c) Mathematics 3334  (d) One FCE from List of Program Electives below</p>	<p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p> <p><b>First Year (Fall and Winter):</b>  (a) Mathematics 1171, 1172, 1271 and 1272; Computer Science 1411, 1431  (b) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112  (c) Business 1511, 1512</p> <p><b>First Year (Spring/Summer):</b>  At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b>  (a) Mathematics 2255, 2275  (b) Computer Science 2412, 2453, 2476 and 2477  (c) Business 2012 and 2033  (d) Sociology 2455  (e) One half-course elective</p> <p><b>Note:</b>  Students interested in the Physics selections from the list of electives should take Mathematics 2131 and Physics 2211.</p> <p><b>Second Year (Spring/Summer):</b>  Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b>  (a) Computer Science 3413, 3415, 3473  (b) Business 3213  (c) Mathematics 3332</p> <p><b>Third Year (Winter):</b>  Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b>  Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall and Winter):</b>  (a) Computer Science 4411, 4433 and 4453  (b) Business 4253 or 4273</p>
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<p>(e) Three half-course electives</p> <p><b>Fourth Year (Spring/Summer):</b> Formal work period assignment (Computer Science 4990)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fifth Year (Fall):</b> Formal work period assignment (Computer Science 4992)</p> <p><b>Fifth Year (Winter):</b> (a) Computer Science 4413 and either Computer Science 4431 or 4432 (b) One half-course elective from List of Mathematics Electives for Computer Science (c) One half-course elective from List of Program Electives below (d) One half-course elective</p> <p>(b) Science Option</p> <p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p> <p><b>First Year (Fall and Winter):</b> (a) Mathematics 1171, 1172, 1271 and 1272; Computer Science 1411, 1431 (b) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112 (c) Physics 1211 and Physics 1212, or one FCE electives (not from Computer Science or Mathematics) approved by the Department</p> <p><b>First Year (Spring/Summer):</b> At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b> (a) Mathematics 2111, 2255 and 2275 (b) Computer Science 2412, 2453, 2476 and 2477 (c) Sociology 2455 (d) One FCE electives</p> <p><b>Note:</b> Students interested in the Physics selections from the list of electives should take Mathematics 2131 and Physics 2211. Science option students interested in expanding their business background may take Business 1511, 1512,</p>	<p>(c) Mathematics 3334 (d) One FCE from List of Program Electives below (e) Three half-course electives</p> <p><b>Fourth Year (Spring/Summer):</b> Formal work period assignment (Computer Science 4990)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fifth Year (Fall):</b> Formal work period assignment (Computer Science 4992)</p> <p><b>Fifth Year (Winter):</b> (a) Computer Science 4413 and either Computer Science 4431 or 4432 (b) One half-course elective from List of Mathematics Electives for Computer Science (c) One half-course elective from List of Program Electives below (d) One half-course elective</p> <p>(b) Science Option</p> <p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p> <p><b>First Year (Fall and Winter):</b> (a) Mathematics 1171, 1172, 1271 and 1272; Computer Science 1411, 1431 (b) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112 (c) Physics 1211 and Physics 1212, or one FCE electives (not from Computer Science or Mathematics) approved by the Department</p> <p><b>First Year (Spring/Summer):</b> At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b> (a) Mathematics 2111, 2255 and 2275 (b) Computer Science 2412, 2453, 2476 and 2477 (c) Sociology 2455 (d) One FCE electives</p> <p><b>Note:</b> Students interested in the Physics selections from the</p>
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<p>or another Business course with permission of the Faculty of Business Administration.</p> <p><b>Second Year (Spring/Summer):</b> Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b> (a) Computer Science 3413, 3415, 3473 (b) Mathematics 3332 (c) One half-course elective</p> <p><b>Third Year (Winter):</b> Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b> Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall and Winter):</b> (a) Computer Science 4411, 4433 and 4453 (b) Mathematics 3334 (c) One half-course elective from List of Mathematics Electives for Computer Science (d) Three half-courses from List of Program Electives below (e) One FCE electives</p> <p><b>Fourth Year (Spring/Summer):</b> Formal work period assignment (Computer Science 4990)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fifth Year (Fall):</b> Formal work period assignment (Computer Science 4992)</p> <p><b>Fifth Year (Winter):</b> (a) Computer Science 4413, 4451 and either Computer Science 4431 or 4432 (b) One half-course from List of Program Electives below (c) One half-course elective</p> <p>(c) Hardware Option</p> <p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p>	<p>list of electives should take Mathematics 2131 and Physics 2211. Science option students interested in expanding their business background may take Business 1511, 1512, or another Business course with permission of the Faculty of Business Administration.</p> <p><b>Second Year (Spring/Summer):</b> Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b> (a) Computer Science 3413, 3415, 3473 (b) Mathematics 3332 (c) One half-course elective</p> <p><b>Third Year (Winter):</b> Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b> Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall and Winter):</b> (a) Computer Science 4411, 4433 and 4453 (b) Mathematics 3334 (c) One half-course elective from List of Mathematics Electives for Computer Science (d) Three half-courses from List of Program Electives below (e) One FCE electives</p> <p><b>Fourth Year (Spring/Summer):</b> Formal work period assignment (Computer Science 4990)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fifth Year (Fall):</b> Formal work period assignment (Computer Science 4992)</p> <p><b>Fifth Year (Winter):</b> (a) Computer Science 4413, 4451 and either Computer Science 4431 or 4432 (b) One half-course from List of Program Electives below (c) One half-course elective</p> <p>(c) Hardware Option</p>
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<p><b>First Year (Fall and Winter):</b>  (a) Mathematics 1171 and 1172; Computer Science 1411, 1431; Physics 1211, 1212  (b) Mathematics 1271, 1272 or Chemistry 1110, 1130  (c) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112</p> <p><b>First Year (Spring/Summer):</b>  At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b>  (a) Mathematics 2111 and 2131  (b) Computer Science 2412, 2453, 2476 and 2477  (c) Physics 2211, 2311, 2331, 2332</p> <p><b>Second Year (Spring/Summer):</b>  Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b>  (a) Mathematics 2255  (b) Computer Science 3415, 3473  (c) Physics 3231  (d) Sociology 2455</p> <p><b>Third Year (Winter):</b>  Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b>  Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall):</b>  (a) Computer Science 4411 and a half-course Computer Science elective  (b) Physics 3211 and a half-course Physics elective  (c) One half-course elective</p> <p><b>Fourth Year (Winter):</b>  (a) Mathematics 2275  (b) Computer Science 4475 and a half-course Computer Science elective  (c) Physics 3611  (d) One half-course elective</p>	<p>Year-to-year continuation in the program requires an average of at least 70% in all Computer Science courses, and satisfactory completion of the work period assignments.</p> <p><b>First Year (Fall and Winter):</b>  (a) Mathematics 1171 and 1172; Computer Science 1411, 1431; Physics 1211, 1212  (b) Mathematics 1271, 1272 or Chemistry 1110, 1130  (c) One FCE elective in Humanities or Social Sciences chosen from: History 1100, Philosophy 1100, or any combination of English 1011, 1031, 1111, 1112</p> <p><b>First Year (Spring/Summer):</b>  At the discretion of the Chair of the Department, some students may have the opportunity of a formal work period assignment (Computer Science 1990).</p> <p><b>Second Year (Fall and Winter):</b>  (a) Mathematics 2111 and 2131  (b) Computer Science 2412, 2453, 2476 and 2477  (c) Physics 2211, 2311, 2331, 2332</p> <p><b>Second Year (Spring/Summer):</b>  Optional formal work period assignment (Computer Science 2990)</p> <p><b>Third Year (Fall):</b>  (a) Mathematics 2255  (b) Computer Science 3415, 3473  (c) Physics 3231  (d) Sociology 2455</p> <p><b>Third Year (Winter):</b>  Formal work period assignment (Computer Science 3990)</p> <p><b>Third Year (Spring/Summer):</b>  Formal work period assignment (Computer Science 3992)</p> <p>Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.</p> <p><b>Fourth Year (Fall):</b>  (a) Computer Science 4411 and a half-course Computer Science elective  (b) Physics 3211 and a half-course Physics elective  (c) One half-course elective</p>
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**Fourth Year (Spring/Summer):**

Formal work period assignment (Computer Science 4990)

Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.

**Fifth Year (Fall):**

Formal work period assignment (Computer Science 4992)

**Fifth Year (Winter):**

- (a) Computer Science 4453 and one half-course Computer Science elective
- (b) Physics 3311
- (c) Two half-course electives

**BSc (Physics)**

Students wishing to complete the requirements for a BSc in Physics following the HBSc (Computer Science) Hardware Option program must complete Chemistry 1110/1130 and Physics 2111 and 3113 and have a total of at least 6 FCEs in Physics.

**List of Program Electives**

## Applied Mathematics:

Mathematics 3331 - Optimization  
 Mathematics 3333 - Operations Research  
 Mathematics 3373 - Combinatorics and Graph Theory

## Computer Science:

Computer Science 4451 - Theory of Computing  
 Computer Science 4471 - Computer Graphics  
 Computer Science 4475 - Topics in Artificial Intelligence  
 Computer Science 4476 - Cryptography and Network Security  
 Computer Science 4478 - Games Design Patterns  
 Computer Science 4479 - Reading and Research in Computer Science

## Numerical Analysis:

Mathematics 3351 - Applied Numerical Methods  
 Mathematics 3371 - Computational Linear Algebra and Numerical Approximation I

## Physics:

Physics 2211 - Intermediate Electricity and Magnetism  
 Physics 3231 - Introductory Electronics  
 Physics 3611 - Computer Acquisition and Control

## Engineering (with permission of the instructor):

Engineering 4559 - Signal Processing for Software Engineers

**Fourth Year (Winter):**

- (a) Mathematics 2275
- (b) Computer Science 4475 and a half-course Computer Science elective
- (c) Physics 3611
- (d) One half-course elective

**Fourth Year (Spring/Summer):**

Formal work period assignment (Computer Science 4990)

Departmental approval must be obtained at the time of registration (co-operative) by all students at or beyond the third year level.

**Fifth Year (Fall):**

Formal work period assignment (Computer Science 4992)

**Fifth Year (Winter):**

- (a) Computer Science 4453 and one half-course Computer Science elective
- (b) Physics 3311
- (c) Two half-course electives

**BSc (Physics)**

Students wishing to complete the requirements for a BSc in Physics following the HBSc (Computer Science) Hardware Option program must complete Chemistry 1110/1130 and Physics 2111 and 3113 and have a total of at least 6 FCEs in Physics.

**List of Program Electives**

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## Numerical Analysis:

Mathematics 3351 - Applied Numerical Methods  
 Mathematics 3371 - Computational Linear Algebra and Numerical Approximation I

## Physics:

Physics 2211 - Intermediate Electricity and



**List of Mathematics Electives for Computer Science**

Mathematics 2111 - Differential Equations  
Mathematics 2131 - Vector Calculus  
Mathematics 3331 - Linear Programming and Applications  
Mathematics 3333 - Operations Research  
Mathematics 3351 - Applied Numerical Methods  
Mathematics 3371 - Computational Linear Algebra and Numerical Approximation I  
Mathematics 3373 - Combinatorics and Graph Theory

**Apprenticeship and Internship Options**

**Apprenticeship**

This option is available for the first year Computer Science Co-op students (as the optional Spring/Summer work term). Computer Science 1990 is offered throughout the year as an entry level work term for Computer Science students and qualified students who wish to gain on-the-job training in Computer Science.

**Internship**

This option offers an extended work term (normally 8 months) for senior level students (Fourth or Fifth Year). This is suitable for Computer Science students who wish to gain extensive and in-depth experience in applications of Computer Science. The work terms are made of two or more consecutive work terms Computer Science 3990, 3992 (or 4990), 4992 (Winter, Spring/Summer, Fall).

Applications must be made through the Office of Admissions and Recruitment as detailed in the Requirements for Admission to Undergraduate Degree Programs. The application will be carefully examined by the Department and Career and Co-operative Education Services. The acceptance of a student in these options depends highly on the demands from the employers as well as the student's academic qualifications and communication skills.

Magnetism  
Physics 3231 - Introductory Electronics  
Physics 3611 - Computer Acquisition and Control

Engineering (with permission of the instructor):  
Engineering 4559 - Signal Processing for Software Engineers

**List of Mathematics Electives for Computer Science**

Mathematics 2111 - Differential Equations  
Mathematics 2131 - Vector Calculus  
Mathematics 3331 - Linear Programming and Applications  
Mathematics 3333 - Operations Research  
Mathematics 3351 - Applied Numerical Methods  
Mathematics 3371 - Computational Linear Algebra and Numerical Approximation I  
Mathematics 3373 - Combinatorics and Graph Theory

~~Apprenticeship and Internship Options~~

~~Apprenticeship~~ This option is available for the first year Computer Science Co-op students (as the optional Spring/Summer work term). Computer Science 1990 is offered throughout the year as an entry level work term for Computer Science students and qualified students who wish to gain on-the-job training in Computer Science. ~~Internship~~ This option offers an extended work term (normally 8 months) for senior level students (Fourth or Fifth Year). This is suitable for Computer Science students who wish to gain extensive and in-depth experience in applications of Computer Science. The work terms are made of two or more consecutive work terms Computer Science 3990, 3992 (or 4990), 4992 (Winter, Spring/Summer, Fall).

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<b><u>Budgetary Considerations</u></b>	
<b>CURRENT VERSION</b>	<b>PROPOSED VERSION</b>
<b>Student Enrolment</b>	<b>Student Enrolment</b> <i>No. Updating the language since internship &amp; apprenticeship are misleading.</i>
<b>Student Enrolment Other Units</b>	<b>Student Enrolment Other Units</b> <i>No. Simply updating the language.</i>
<b>Additional Resources</b>	<b>Additional Resources</b> <i>No. Simply updating the language.</i>
<b>Teaching Loads</b>	<b>Teaching Loads</b> <i>No. Simply updating the language.</i>
<b>TeachingSupport Services</b>	<b>TeachingSupport Services</b> <i>No. Simply updating the language.</i>
<b>Outside Support</b>	<b>Outside Support</b> <i>No. Simply updating the language.</i>