



<p><b>1.0 Degree Title</b> Please specify the two degrees for concurrent degree programs</p> <input type="text" value="B.Sc."/>	<p><b>2.0 Administering Faculty/Unit</b></p> <input type="text" value="Science"/>
<p><b>1.1 Major (Legacy= Subject)(30-char. max.)</b></p> <input type="text" value="Physics and Computer Science"/>	<p><b>Offering Faculty/Department</b></p> <input type="text" value="Science/Physics"/>
<p><b>1.2 Concentration (Legacy = Concentration/Option)</b> If applicable to Majors only (30 char. max.)</p> <input type="text"/>	<p><b>3.0 Effective Term of Implementation</b> (Ex. Sept. 2004 = 200409) Term</p> <input type="text" value="201809"/>
<p><b>1.3 Minor (with Concentration, if Applicable) (30 char. max.)</b></p> <input type="text"/>	

**4.0 Rationale and Admission Requirements for New Proposal**

This proposed program would address a number of requests from undergraduates to create an advanced joint degree between Physics and Computer Science (currently, only a joint Major is available). Two surveys have been conducted by undergraduates in Physics and Computer Science (one in 2013, another in 2016). Both surveys showed support for such a program. The goal of this program is to provide a set of required courses that would give essential background in physics and computer science, at a level sufficient to pursue courses at the 400- and 500- level in either discipline. The program is intended to be sufficiently flexible to allow students to take either more physics or more computer science courses at the advanced level. The Department of Physics has recently conducted a review of programs and is satisfied that there are no programs that need to be revised or retired due to low enrollment.

**5.0 Program Information**  
Please check appropriate box(es)

<p><b>5.1 Program Type</b></p> <input checked="" type="checkbox"/> Bachelor's Program Master's M.Sc. (Applied) Program Dual Degree/Concurrent Program Certificate Diploma Graduate Certificate Graduate Diploma Ph.D. Program Doctorate Program (Other than Ph.D.) Private Program Off-Campus Program Distance Education Program (By Correspondence) Other (Please specify)	<p><b>5.2 Category</b></p> Faculty Program (FP) Major Joint Major Major Concentration (CON) Minor Minor Concentration (CON) <input checked="" type="checkbox"/> Honours (HON) [Joint Honours] Joint Honours Component (HC) Internship/Co-op Thesis (T) Non-Thesis (N) Other Please specify <input type="text"/>	<p><b>5.3 Level</b></p> <input checked="" type="checkbox"/> Undergraduate Dentistry/Law/Medicine Continuing Studies (Non-Credit) Collegial Masters & Grad Dips & Certs Doctorate Post-Graduate Medicine/Dentistry Graduate Qualifying Postdoctoral Fellows <b>5.4 FQRSC (Research) Indicator</b> (for GPS) Yes No
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**6.0 Total Credits**

**7.0 Consultation with Related Units**

Yes	No
Yes	No <input checked="" type="checkbox"/>

Financial Consult

Attach list of consultations.

## 8.0 Program Description (Maximum 150 words)

Students entering this joint Honours program should have high standing in mathematics, physics, and computer science. A student who has not completed the equivalent of MATH 222 on entering the program must take MATH 222 in the first semester, increasing the total number of required credits from 78 to 81. In addition, a student who has not completed the equivalent of COMP 202 must take this course (or an equivalent course) in the first term in addition to the 78 or 81 required credits.

To continue in this Honours program, an average GPA of 3.00 in the required and complementary courses is required. For Honours standing, the CGPA at graduation must be at least 3.00 and for First-Class Honours, the CGPA must be above 3.50.

## 9.0 List of proposed program for the New Program/Major or Minor/Concentration.

If new concentration (option) of existing Major/Minor (program), please attach a program layout (list of all courses) of existing Major/Minor.

Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit weight under the headings of: Required Courses, Complementary Courses, Elective Courses)

### Required Courses (63 credits)

MATH 240	Discrete Structures	(3 cr.)
MATH 247	Honours Applied Linear Algebra	(3 cr.)
MATH 248	Honours Advanced Calculus	(3 cr.)
<i>(note: MATH 314 may be substituted for MATH 248 if MATH 222 had to be taken in the first semester)</i>		
MATH 249	Honours Complex Variables	(3 cr.)
MATH 325	Honours Ordinary Differential Equations	(3 cr.)
PHYS 241	Signal Processing	(3 cr.)
PHYS 251	Honours Classical Mechanics 1	(3 cr.)
PHYS 253	Thermal Physics	(3 cr.)
PHYS 257	Experimental Methods 1	(3 cr.)
PHYS 258	Experimental Methods 2	(3 cr.)
PHYS 350	Honours Electricity and Magnetism	(3 cr.)
PHYS 352	Honours Electromagnetic Waves	(3 cr.)
PHYS 357	Honours Quantum Physics 1	(3 cr.)
PHYS 362	Statistical Mechanics	(3 cr.)
PHYS 457	Honours Quantum Physics 2	(3 cr.)
COMP 206	Introduction to Software Systems	(3 cr.)
COMP 250	Introduction to Computer Science	(3 cr.)
COMP 252	Honours Algorithms and Data Structures	(3 cr.)
COMP 273	Introduction to Computer Systems	(3 cr.)
COMP 302	Programming Languages and Paradigms	(3 cr.)
COMP 350	Numerical Computing	(3 cr.)

### Complementary Courses (15 credits)

*At least 6 of the 15 complementary credits must come from a course at the 400- or 500-level (excluding COMP 400 and PHYS 479), and of these at least 3 must be from a COMP course.*

#### 3 or 4 credits selected from:

PHYS 479	Honours Research Project	(3 cr.)
COMP 400	Project in Computer Science	(4 cr.)

#### 6 or 7 credits selected from:

COMP 303	Software Design	(3 cr.)
COMP 310	Operating Systems	(3 cr.)
COMP 330	Theory of Computation	(3 cr.)
COMP 362	Honours Algorithm Design	(3 cr.)
Any COMP course at the 400- or 500-level (excluding COMP 400)		(3 or 4 cr.)

#### At least 4 credits selected from:

MATH 323	Probability	(3 cr.)
MATH 340	Discrete Structures 2	(3 cr.)
PHYS 351	Honours Classical Mechanics 2	(3 cr.)
PHYS 359	Honours Laboratory in Modern Physics 1	(3 cr.)
PHYS 432	Physics of Fluids	(3 cr.)
PHYS 434	Optics	(3 cr.)
Any number of PHYS courses at the 500 level		(3 cr. each)
Any number of COMP courses at the 400- or 500-level (excluding COMP 400)		(3 or 4 cr. each)

10.0 Approvals

Routing Sequence	Name	Signature	Date
Department	<input type="text"/>	<input type="text"/>	<input type="text"/>
Curric/Acad Committee	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 3	<input type="text"/>	<input type="text"/>	<input type="text"/>
CGPS	<input type="text"/>	<input type="text"/>	<input type="text"/>
SCTP	<input type="text"/>	<input type="text"/>	<input type="text"/>
APC	<input type="text"/>	<input type="text"/>	<input type="text"/>
Senate	<input type="text"/>	<input type="text"/>	<input type="text"/>

Submitted by

Name

Phone

Email

Submission Date

To be completed by ARR:

CIP Code

## Major Physics and Computer Science (66 credits)

Offered by: Physics Degree: Bachelor of Science

### Program Requirements

The Major Physics and Computer Science is designed to give motivated students the opportunity to combine the two fields in a way that will distinguish them from the graduates of either field by itself. The two disciplines complement each other, with physics providing an analytic problem-solving outlook and basic understanding of nature, while computer science enhances the ability to make practical and marketable applications, in addition to having its own theoretical interest. Graduates of this program may be able to present themselves as being more immediately useful than a pure physics major, but with more breadth than just a programmer. They will be able to demonstrate their combined expertise in the Special Project course which is the centrepiece of the final year of the program.

### Program Prerequisites

Students entering Physics programs from the Freshman program must have successfully completed the courses below or their equivalents. Quebec students must have completed the DEC with appropriate science and mathematics courses.

- [CHEM 110 General Chemistry 1 \(4 credits\)](#)
- [CHEM 120 General Chemistry 2 \(4 credits\)](#)
- [PHYS 131 Mechanics and Waves \(4 credits\)](#)
- [PHYS 142 Electromagnetism and Optics \(4 credits\)](#)

One of:

- [BIOL 111 Principles: Organismal Biology \(3 credits\)](#)
- [BIOL 112 Cell and Molecular Biology \(3 credits\)](#)
- [MATH 133](#) and either [MATH 140/141](#) or [MATH 150/151](#).
- [MATH 133 Linear Algebra and Geometry \(3 credits\)](#)
- [MATH 140 Calculus 1 \(3 credits\)](#)
- [MATH 141 Calculus 2 \(4 credits\)](#)
- [MATH 150 Calculus A \(4 credits\)](#)
- [MATH 151 Calculus B \(4 credits\)](#)

### U1 Required Courses (21 credits)

- [COMP 250 Introduction to Computer Science \(3 credits\)](#)
- [MATH 222 Calculus 3 \(3 credits\)](#)
- [MATH 223 Linear Algebra \(3 credits\)](#)
- [MATH 240 Discrete Structures 1 \(3 credits\)](#)
- [PHYS 230 Dynamics of Simple Systems \(3 credits\)](#)
- [PHYS 257 Experimental Methods 1 \(3 credits\)](#)
- [PHYS 258 Experimental Methods 2 \(3 credits\)](#)

### U2 Required Courses (24 credits)

- [COMP 206 Introduction to Software Systems \(3 credits\)](#)
- [COMP 251 Algorithms and Data Structures \(3 credits\)](#)
- [COMP 302 Programming Languages and Paradigms \(3 credits\)](#)
- [COMP 350 Numerical Computing \(3 credits\)](#)
- [MATH 314 Advanced Calculus \(3 credits\)](#)
- [MATH 315 Ordinary Differential Equations \(3 credits\)](#)
- [PHYS 232 Heat and Waves \(3 credits\)](#)
- [PHYS 241 Signal Processing \(3 credits\)](#)

### U3 Required Courses (21 credits)

- [COMP 360 Algorithm Design \(3 credits\)](#)
  - [MATH 323 Probability \(3 credits\)](#)
  - [PHYS 331 Topics in Classical Mechanics \(3 credits\)](#)
  - [PHYS 339 Measurements Laboratory in General Physics \(3 credits\)](#)
  - [PHYS 340 Majors Electricity and Magnetism \(3 credits\)](#)
  - [PHYS 446 Majors Quantum Physics \(3 credits\)](#)
  - [PHYS 489 Special Project \(3 credits\)](#)

## Josie D'Amico

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**From:** Kenneth Ragan <ragan@physics.mcgill.ca>  
**Sent:** October-23-17 8:29 PM  
**To:** Josie D'Amico  
**Cc:** Ken Ragan  
**Subject:** Re: Honours in Physics & Computer Science

Hi Josie,

We suspect the suspected enrollment is 5 to 10 in a steady state (which might take a few years).

We don't have a consultation report from Math and Stats, although I guess we could get one (the question has simply never come up). But the math courses are not appreciably different from our Honours and Joint Honours, so is this really necessary?

Ken

On Mon, 23 Oct 2017, Josie D'Amico wrote:

>  
> Hi Ken,  
>  
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>  
> (1) Re the Math courses included in the new Honours Program in  
> Physics & Computer Science, could you please let me have a  
> consultation report from the Department of Mathematics & Statistics.  
>  
>  
>  
> (2) What is the projected enrolment?  
>  
>  
>  
> Thank you.  
>  
>  
>  
> Josie  
>  
>  
>

APPENDIX 1

CONSULTATION REPORT FORM  
RE PROGRAM PROPOSAL

DATE: OCT 26, 2017

TO: Johanna Neslehova, Math & Stats

FROM: Ken Ragan, Physics

The attached proposal ~~has been~~ will be submitted to the Curriculum Academic Committee, and it has been decided that your department should be consulted.

Complete Program Title: Joint Honours in Physics and Computer Science

Would you be good enough to review this proposal and let me know as soon as possible, on this form, whether or not your department has any objections to, or comments regarding, the proposal. Specifically, a course [or courses] taught by your department that has [have] been included in the program's list of courses.

NO OBJECTIONS  SOME OBJECTIONS

COMMENTS:

In case you would like to add VO courses as program prerequisites, these should include MATH 133, 140, 141

Signature: Johanna J. Neslehova  
Date: 27.10.2017