The Faculty of Engineering offers undergraduate programs in the fields of Engineering and Computer Science. Programs leading to the degree of Bachelor of Engineering are in the fields of Biomedical, Civil, Computer, Electrical, and Mechanical Engineering and a Bachelor of Software Engineering is offered. Programs leading to a Bachelor of Science are in Computer Science and can be combined with programs in Geography, Health Information Science, Mathematics, Music, Physics, Psychology, Statistics, and Visual Arts. Co-operative Education is mandatory for all Engineering degree programs, Health Information Science and Computer Science combined program and optional for the other Computer Science programs.

Peter M. Wild, BASc (Brit Col), PhD (Victoria), PEng, Acting Dean of the Faculty and Professor
LilliAnne Jackson, BSc (Alberta), MSc (Lethbridge), PhD (Calgary), Associate Dean (Undergraduate Programs) and Assistant Teaching Professor
Hausi A. Müller, Dipl El Eng (ETH Zürich), MSc, PhD (Rice), PEng, Associate Dean (Research) and Professor

Student Information:
Bachelor of Engineering and Bachelor of Software Engineering 250-721-6023
Bachelor of Science 250-472-5700

Website: www.uvic.ca/engineering
**General Information**

**DEGREES AND PROGRAMS OFFERED**

See the table below for a listing of the Faculty of Engineering undergraduate degree offerings. The Co-operative Education Program is mandatory for all Bachelor of Engineering and Software Engineering programs and the Combined program in Health Information Science and Computer Science and optional for other Computer Science programs. All students in these programs graduate with the Coop designation on their academic documents. The Co-operative Education Programs within the Faculty of Engineering are described in "Engineering Co-operative Education Programs" (page 126).

### Faculty of Engineering Undergraduate Programs

<table>
<thead>
<tr>
<th>Degree</th>
<th>Program</th>
<th>Specialization Areas and Combined Programs</th>
<th>Combined Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc²</td>
<td>Computer Science</td>
<td>Honours:</td>
<td>Combined Programs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Computer Science and Mathematics</td>
<td>• Computer Science and Mathematics</td>
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<td>• Computer Science and Statistics</td>
<td>• Computer Science and Statistics</td>
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<td>• Physics and Computer Science</td>
<td>• Geography and Computer Science (Geomatics)</td>
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<td></td>
<td>• Software Engineering Option</td>
<td>• Health Information Science and Computer Science</td>
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<td>Options:</td>
<td>• Music and Computer Science²</td>
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<td>• Computer Communications and</td>
<td>• Physics and Computer Science</td>
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<td></td>
<td>• Networks ¹</td>
<td>• Psychology and Computer Science</td>
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<td>• Computer Graphics &amp; Gaming ¹</td>
<td>• Visual Arts and Computer Science</td>
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<td>• Software Engineering</td>
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<td>• Theory ¹</td>
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<td>• Electrical</td>
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<td>• Communications</td>
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<td>• Computational Intelligence</td>
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<td>• Computer Systems</td>
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<td>• Digital &amp; Embedded Systems</td>
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<td>• Digital Signal Processing</td>
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<td>• Electrical Energy Systems</td>
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<td>• Electromagnetics &amp; Photonics</td>
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<td>• Network Security &amp; Privacy</td>
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<tr>
<td>BEng</td>
<td>Mechanical Engineering</td>
<td>Specialization Areas:</td>
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<td>• Advanced Materials</td>
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<td>• Biomedical Engineering</td>
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<td>• Computer Aided Engineering &amp; Advanced Manufacturing</td>
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<td>• Energy Systems</td>
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<td>• Thermo-Fluids &amp; Aerodynamics</td>
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<td>• Mechatronics</td>
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<td>BEng</td>
<td>Software Engineering</td>
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<td>Options:</td>
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</tbody>
</table>

1. Major programs only
2. General may be BA or BSc. Combined Visual Arts and Computer Science, Combined Music & Computer Science may be BFA or BSc
3. See program website for current specializations and details.

### AVAILABILITY OF COURSES

Generally, courses offered in the Faculty of Engineering are open to students in other faculties who have satisfied any prerequisite courses. However some courses or sections are open only to students in the Faculty of Engineering or to students in specific programs. Faculty of Engineering program students are given registration priority in some
Students in other faculties who propose to take courses offered in the Faculty of Engineering are responsible for determining if the courses can be used for credit in their degree program. Students undertaking a General degree in Computer Science normally register in the faculty offering the second specialization area of their degree in their first year. Students may also complete a Minor in Computer Science.

Computer Science Co-operative Education Programs
Please refer to “Computer Science Co-op Program” (page 109).

Computer Science Work Experience Program
Please refer to the “Computer Science Work Experience Program” (page 110).

Graduate Programs
The Department of Computer Science offers the following graduate degrees: MA, MSc, PhD. For information, please see the UVic Graduate Calendar.

ADMISSION REQUIREMENTS
All applicants are advised to carefully review the section on "Undergraduate Admission" (page 29).

Graduates of Secondary Schools
Applicants who are seeking admission to the Faculty of Engineering to follow a BSc in Computer Science program based on graduation from a BC/Yukon secondary school should refer to "Undergraduate Admission" (page 29).

Applications seeking admission based on graduation from secondary schools elsewhere in Canada or abroad require equivalent qualifications to those specified as admission requirements for BC/Yukon secondary school graduates (see "Year 1 Admission Requirements: BC/Yukon Secondary School Graduate", page 32). Applicants are advised to contact Admission Services for further information regarding requirements.

Transfers from Other Faculties
A student in another faculty who wishes to transfer into a BSc program in the Faculty of Engineering must have completed 12 units of courses including CSC 110 and MATH 100 or MATH 109. Transfer applicants must also have completed the equivalent of CSC 110 and MATH 109. Transfer applicants must have a minimum C+ average on the most recent 12 units of courses at the time of transfer. A student in another faculty who has completed one or more sessions at the University must also have satisfactory standing as defined by the University at the time of transfer.

Transfers from Other Institutions
To be eligible for admission to a BSc program in the Faculty of Engineering on the basis of work completed at another postsecondary institution, a student must be eligible for transfer credit for at least 12 units of courses and have at least a C+ average on their most recent 12 units of courses. Transfer students must also have completed the equivalent of CSC 110 and MATH 100 or MATH 109.

Admission to Specific Computer Science Programs
On admission, students are normally placed in the BSc Major Program. Applications for admission to Computer Science Co-op programs are normally completed at the end of the student’s first term of studies but are accepted until the beginning of a student’s third year. Application deadlines are September 15 and January 15. Detailed information is available at the Computer Science Co-op Office.

Applications for admission to the Honours Program in Computer Science are normally made at the end of the student’s second year of studies. On admission to a Major or Honours Program in Computer Science, a student from outside the faculty must register in the Faculty of Engineering.
Credit for Courses Offered at the University or Other Institutions

All courses in other faculties are acceptable for use as elective credit for Major and Honours Programs in Computer Science, if the regulations of the department offering the courses permit and prerequisites are met.

Students already enrolled in a BSc degree program who plan to undertake work at another institution must receive prior written approval from the department of Computer Science if they wish such courses to be credited towards the BSc degree. A Letter of Permission to take courses elsewhere is provided by the Computer Science Advising Office.

Credit for Math, Computer Science, Software Engineering, Statistics and English courses completed at the university or elsewhere will only be permitted in the program for courses in which a grade of "C", or the equivalent, was achieved. For some courses a higher minimum grade may be required as specified in the letter of permission.

Students authorized to attend another university who accept a degree from that institution give up the right to a University of Victoria degree until they have satisfied the University's requirements for a second bachelor's degree (see "Second Bachelor's Degrees", page 54).

Interfaculty Programs

Students planning to complete a Double Major or Double Honours Program in Computer Science and another discipline may choose to register in the Faculty of Engineering or the faculty of the other discipline. Students can arrange for an Interfaculty Double Honours or Major program through the Computer Science Advising Office. Such programs involve satisfying the Honours or Major requirements of two disciplines in two different faculties. Agreement to details of all such programs must be signed by the student and by representatives of the academic units involved. Students undertaking an interfaculty program will be subject to the regulations of the faculty in which they are registered.

Only one BSc degree with a Double Major or a Double Honours or a Joint Major/Honours will be awarded on the recommendation of the faculty in which the student is registered.

Students in a Major or Honours Program may also arrange to undertake a Minor offered in another discipline.

ACADEMIC REGULATIONS

Academic Performance

Students in a BSc degree program are subject to the University regulations on academic performance (see "Standing" page 51).

Graduation Standing

The graduation standing for students in a BSc Major or Honours Program is determined in accordance with University regulations (see "Standing" page 51).

BSc PROGRAM REQUIREMENTS

Requirements Common to All BSc Degrees

Each candidate for a BSc degree is required:

1. to have satisfied the "Academic Writing Requirement" (page 40)
2. to include in the first 15 units presented for the degree not more than 9 units in Computer Science and at least 3 units from each of two other departments
3. to include in the next 15 units presented for the degree at least 3 units of courses other than Computer Science and Software Engineering
4. to include in the remaining units presented for the degree at least 21 units of courses numbered at the 300 or 400 level (this is a general University regulation); 18 of these units must be taken at UVic including

• at least 13.5 of the 19.5 units at the 300 or 400 level required for the Honours Program; or
• at least 12 of the 15 units at the 300 or 400 level required for the Major Program
5. to satisfy the requirements of a Major or Honours program in Computer Science as specified below
6. to present credit in a minimum of 60 units of university-level courses numbered 100 and above; at least 30 of these 60 units must normally be completed at UVic

Academic Advice

Students considering or enrolled in a Major or Honours Program in Computer Science should seek academic advice through the Computer Science Advising Office. Students considering or enrolled in a combined BSc in Computer Science should seek academic advice from the Computer Science Advising Office and advisers for the second discipline.

Availability of Courses to Students in Other Faculties

All undergraduate courses offered by the department of Computer Science are open to all undergraduate students at the university if the regulations of their degree program permit and prerequisites are met.

Academic Writing Requirement

Students taking a Major or Honours degree program in Computer Science must take ENGL 135. Please see Academic Writing Requirements (AWR) for Combined programs on pages 104-109. See "Academic Writing Requirement" (page 40) for more information.

Limitation of Enrolment

Students are advised that because of limited staff and facilities, it may be necessary to limit enrolment in certain courses. Course enrolment limits will be listed during registration.

Advanced Placement

Students who demonstrate to the department that they have mastered the material of a course may be granted advanced placement.

Course Challenge for CSC 110

The CSC 110 course challenge exam is intended to allow registered undergraduate students to receive credit on the basis of knowledge or experience acquired outside the University. A student may challenge CSC 110 one time only by taking this special examination. The grade received will be entered into the student’s academic record, further determining the student’s sessional standing. See "Credit by Course Challenge" (page 41) for regulations about taking a challenge exam.

In order to take the exam, the student must first apply through Undergraduate Records using the Course Challenge form <www.uvic.ca/registrar/assets/docs/record-forms/course-challenge.pdf>, which will be forwarded to the Department of Computer Science for approval, and the student will be informed of the time of the exam, held once a term, normally within the first week of the term. The Course Challenge fee must be paid before the challenge examination is undertaken. Once the results have been approved by the Chair, a report of the grade awarded will be sent to both the student and to Undergraduate Records, and become part of the student’s academic record.

Course Credit Restriction

Students may obtain credit for only one Computer Science course in each of the following pairs:

<table>
<thead>
<tr>
<th>CSC 110 or CSC 111</th>
<th>CSC 106 or CSC 212</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 115 or CSC 160</td>
<td>CSC 250 or CSC 355</td>
</tr>
<tr>
<td>CSC 370 or CSC 470</td>
<td>CSC 425 or CSC 420</td>
</tr>
</tbody>
</table>
### Major and Honours Programs

Students planning to complete a Major or Honours program in Computer Science register in the Faculty of Engineering. Students registered in another faculty may transfer into a BSc program in the Faculty of Engineering (see “Transfers from Other Faculties” (page 99)).

All students planning to complete a Major or Honours Program in Computer Science must file a Degree Declaration form before registering for third year in the Faculty of Engineering. Computer Science Degree Declaration forms are submitted to the Computer Science Advising Office.

### Admission to the Honours Program

Students who wish to be admitted to the Honours Program should apply to the Honours Adviser on completion of their second year. Entry requires a GPA of at least 6.0 calculated over all required second-year CSC, SENG, MATH and STAT courses.

Students may be admitted to the Honours Program upon completion of their third year provided they have a GPA of at least 6.0 calculated over all CSC and SENG courses taken in their third year based on a minimum of 12 units of course work for that year.

A GPA of 6.0 in third year is needed to progress to fourth year in the Honours Program. Students who do not achieve this GPA will be required to transfer to the Major Program.

### BSc Honours: Course Requirements

#### Year 1
- CSC 106, 110, 115 ................................................................. 4.5
- MATH 100 or 109, 101, 122 ............................................. 4.5
- ENGL 135, 146 or 147 ..................................................... 1.5
- Electives ........................................................................... 4.5
- **Total** ........................................................................... 15.0

#### Year 2
- CSC 225, 226, 230 ................................................................. 4.5
- MATH 101 or 201 or 204 ................................................ 1.5
- ENGR 240\(^1\) ..................................................................... 1.5
- STAT 252 or 255 or 260\(^2\) ........................................ 1.5
- Electives\(^3\) ........................................................................ 3.0
- **Total** ........................................................................... 15.0

#### Year 3
- CSC 320, 330, 355, 360, 370 .................................................. 7.5
- MATH 201 or 222 or 225 ................................................ 1.5
- SENG 310 and 321 ......................................................... 3.0
- 1.5 units of SENG 300-level ........................................... 1.5
- Electives ........................................................................... 1.5
- **Total** ........................................................................... 15.0

#### Year 4
- CSC 499 ........................................................................... 1.5
- 4.5 units of CSC 400-level ............................................... 4.5
- Electives ........................................................................... 4.5
- **Total** ........................................................................... 15.0

1. ENGL 225 can be substituted for ENGR 240.
2. The statistics course can be taken as early as the second term of the first year.
3. MATH 222 and SENG 275 a strongly recommended.

### BSc Honours with Software Engineering Option: Course Requirements

#### Year 1
- CSC 106, 110, 115 ................................................................. 4.5
- MATH 100 or 109, 101, 122 ............................................. 4.5
- ENGL 135, 146 or 147 ..................................................... 1.5
- Electives ........................................................................... 4.5
- **Total** ........................................................................... 15.0

#### Year 2
- CSC 225, 226, 230 ................................................................. 4.5
- MATH 201 or 202 or 204 ................................................ 1.5
- MATH 211 .......................................................................... 1.5
- ENGR 240\(^1\) ..................................................................... 1.5
- STAT 252 or 255 or 260\(^2\) ........................................ 1.5
- Electives\(^3\) ........................................................................ 3.0
- **Total** ........................................................................... 15.0

#### Year 3
- CSC 320, 330, 355, 360, 370 .................................................. 7.5
- MATH 201 or 222 or 225 ................................................ 1.5
- SENG 310 and 321 ......................................................... 3.0
- 1.5 units of SENG 300-level ........................................... 1.5
- Electives ........................................................................... 1.5
- **Total** ........................................................................... 15.0

#### Year 4
- CSC 499 ........................................................................... 1.5
- 4.5 units of CSC 400-level ............................................... 4.5
- Electives ........................................................................... 4.5
- **Total** ........................................................................... 15.0

### BSc Major: Course Requirements

#### Year 1
- CSC 106, 110, 115 ................................................................. 4.5
- MATH 100 or 109, 101, 122 ............................................. 4.5
- ENGL 135, 146 or 147 ..................................................... 1.5
- Electives ........................................................................... 4.5
- **Total** ........................................................................... 15.0

#### Year 2
- CSC 225, 226, 230 ................................................................. 4.5
- MATH 101 or 201 or 204 ................................................ 1.5
- ENGR 240\(^1\) ..................................................................... 1.5
- STAT 252 or 255 or 260\(^2\) ........................................ 1.5
- Electives........................................................................... 1.5
- **Total** ........................................................................... 15.0

1. ENGL 225 can be substituted for ENGR 240.
2. The statistics course can be taken as early as the second term of the first year.
3. MATH 222 and SENG 275 a strongly recommended.
### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>MATH 201 or 202 or 204</td>
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<tr>
<td>MATH 211</td>
<td>1.5</td>
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<td>ENGR 240(^1)</td>
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<td>STAT 252 or 255 or 260(^2)</td>
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<tr>
<td>Electives</td>
<td>3.0</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
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### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CSC 320, 360, 370</td>
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<tr>
<td>6.0 units of CSC 300-level (1.5 units may be SENG)</td>
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<td>Electives</td>
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### Year 4

<table>
<thead>
<tr>
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<td>4.5 units of CSC 400-level (1.5 units may be SENG)</td>
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<td><strong>15.0</strong></td>
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</table>

### Major in Computer Science (Computer Communications & Networks Option)

This program is for students who wish to acquire a strong background in Communications and Networks. The Co-op option or the work experience option is strongly recommended.

### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>ENGL 135, 146 or 147</td>
<td>1.5</td>
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<tr>
<td>MATH 100 or 109, 101, 122</td>
<td>4.5</td>
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<tr>
<td>Electives</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Year 2

<table>
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<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>CSC 225, 226, 230</td>
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<tr>
<td>SENG 265</td>
<td>1.5</td>
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<tr>
<td>MATH 201 or 202 or 204</td>
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<tr>
<td>MATH 211</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 240(^1)</td>
<td>1.5</td>
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<tr>
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<td><strong>Total</strong></td>
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### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>CSC 320, 360, 370</td>
<td>4.5</td>
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<tr>
<td>CSC 361</td>
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<tr>
<td>6.0 units of CSC 300-level (1.5 units may be SENG)</td>
<td>6.0</td>
</tr>
<tr>
<td>Electives</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 units from CSC 446, 463, 466, 467</td>
<td>3.0</td>
</tr>
<tr>
<td>1.5 units of CSC or SENG 400-level(^3)</td>
<td>1.5</td>
</tr>
<tr>
<td>Electives(^3)</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

1. ENGL 225 can be substituted for ENGR 240.
2. The statistics course can be taken as early as the second term of the first year.
3. MATH 222 is strongly recommended.

### Major in Computer Science (Computer Graphics and Gaming Option)

This program is for students who wish to acquire a strong background in graphics. The Co-op option or the work experience option is recommended.

### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CSC 106, 110, 115</td>
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<tr>
<td>MATH 100 or 109, 101, 122</td>
<td>4.5</td>
</tr>
<tr>
<td>ENGL 135, 146 or 147</td>
<td>1.5</td>
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<tr>
<td>Electives</td>
<td>4.5</td>
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### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 225, 226, 230</td>
<td>4.5</td>
</tr>
<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 201 or 202 or 204</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 211</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 240(^2)</td>
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<tr>
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<tr>
<td>Electives(^3)</td>
<td>3.0</td>
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<tr>
<td><strong>Total</strong></td>
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### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 320, 360, 370</td>
<td>4.5</td>
</tr>
<tr>
<td>CSC 305, 349A</td>
<td>3.0</td>
</tr>
<tr>
<td>4.5 units of CSC 300-level (1.5 units may be SENG)(^5)</td>
<td>4.5</td>
</tr>
<tr>
<td>Electives(^6)</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
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### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>3.0 units of CSC 471, 472, 473, 486A-D</td>
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</tr>
<tr>
<td>1.5 units of CSC or SENG 400-level</td>
<td>1.5</td>
</tr>
<tr>
<td>Electives(^6)</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

1. Recommend PSYC 100A and B or PHYS 120 and ART 100-level.
2. ENGL 225 can be substituted for ENGR 240.
3. Strongly recommend CSC 205.
4. The statistics course can be taken as early as the second term of the first year.
5. Recommend SENG 310, CSC 350.
6. Recommend CSC 426.
Major in Computer Science (Software Engineering Option)

Year 1
CSC 106, 110, 115 ................................................................. 4.5
MATH 100 or 109, 101, 122 ............................................... 4.5
ENGL 135, 146 or 147 ........................................................ 1.5
Electives ............................................................................ 4.5
Total ..................................................................................... 15.0

Year 2
CSC 225, 226, 230 ................................................................. 4.5
SENG 265 ............................................................................. 1.5
MATH 201 or 202 or 204 .................................................. 1.5
MATH 211 ............................................................................. 1.5
ENGR 2401 ........................................................................... 1.5
STAT 252 or 255 or 2602 .................................................. 1.5
Electives3 ............................................................................. 3.0
Total ..................................................................................... 15.0

Year 3
CSC 320, 360, 370 ................................................................. 4.5
SENG 310 and 321 ............................................................. 3.0
6.0 units of CSC 300-level (1.5 units may be SENG) ........ 6.0
Electives ............................................................................. 1.5
Total ..................................................................................... 15.0

Year 4
4.5 units of SENG 400-level4 .............................................. 4.5
Electives ............................................................................. 10.5
Total ..................................................................................... 15.0

Year 5

5.0 units of CSC 400-level ................................................. 5.0
Electives5 ............................................................................. 5.0
Total ..................................................................................... 10.0

1. ENGL 225 can be substituted for ENGR 240.
2. The statistics course can be taken as early as the second term of the first year.
4. Strongly recommend SENG 401.

Major in Computer Science (Theory Option)

This program is for students who wish to acquire a strong background in the Theory of Computer Science.

Year 1
CSC 106, 110, 115 ................................................................. 4.5
MATH 100 or 109, 101, 122 ............................................... 4.5
ENGL 135, 146 or 147 ........................................................ 1.5
Electives ............................................................................ 4.5
Total ..................................................................................... 15.0

Year 2
CSC 225, 226, 230 ................................................................. 4.5
SENG 265 ............................................................................. 1.5
MATH 201 or 202 or 204 .................................................. 1.5
MATH 211 ............................................................................. 1.5
ENGR 2401 ........................................................................... 1.5

Combined Computer Science and Mathematics, and Computer Science and Statistics Program Requirements

For a BSc degree in Combined Computer Science and Mathematics, or Computer Science and Statistics, students may take a Major or Honours Program. These programs are not joint degrees in Computer Science and Mathematics, but a single degree program composed of a selected combination of courses from each of the departments. These combined programs are offered through the Faculty of Science. Students should contact an adviser in Computer Science for advice regarding CSC or SENG courses, and an adviser in Mathematics and Statistics for advice regarding MATH or STAT courses, and for advice regarding the programs. Students considering future graduate work in Computer Science, Mathematics or Statistics should consult with their advisers prior to making their choice of elective courses.

Math/Computer Science Co-op

Students in the Math/Computer Science or Statistics/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in both Co-op programs or may, if eligible, enrol and undertake work terms in only one Co-op program. They must successfully complete four work terms in order to complete their Co-op degree requirements. Students who complete at least two work terms in each area will have the combined nature of their program noted as part of the Co-op designation on their official records.

Admission to the Combined Honours Programs in Computer Science and Mathematics or Computer Science and Statistics

Admissions to the Honours program is done through Mathematics and Statistics, in consultation with Computer Science. Students who wish to be admitted to one of the Combined Honours programs should apply in writing to the Honours Advisers of both departments on completion of their second year. Normally a student will be admitted to the Combined Honours program only if the student meets the following conditions:

1. completion of CSC 106 (formerly 212), 110, 115, 225, 230, and SENG 265
2. completion of at least 10.5 units of the Mathematics and Statistics courses required for the degree
3. a grade of at least B+ in all 200-level CSC and SENG courses
4. a GPA of at least 6.5 in all 200-level Mathematics and Statistics courses

Students may also be admitted to one of the Combined Honours Programs upon completion of their third year providing they have at least 4.5 units of 300- or 400-level credit from each department with a minimum GPA of 6.0 in all courses completed at the 300- or 400-level in the two departments.

Honours students are expected to maintain a GPA of at least 5.0 in their third year to remain in the program.

**BSc Honours: Combined Program in Computer Science and Mathematics**

| Year 1 |  |  |
|--------|  |  |
| Year 2 |  |  |
| Year 3 |  |  |
| Year 4 |  |  |

**BSc Major: Combined Program in Computer Science and Mathematics**

| Year 1 |  |  |
|--------|  |  |
| Year 2 |  |  |
| Year 3 |  |  |
| Year 4 |  |  |

1. Students who have not satisfied the Academic Writing Requirement must choose 1.5 units from ENGL 135, 146, 147.
2. MATH 211 can be replaced by MATH 110.
3. Students planning to take STAT 350 in third year should register for STAT 261.
4. Electives should include at least 4.5 units of 300/400 level courses to be chosen with at least 1.5 units from each department.

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**FACULTY OF ENGINEERING**
### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
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<tr>
<td>MATH 200, 204, 222</td>
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<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
<tr>
<td>STAT 260, 261</td>
<td>3.0</td>
</tr>
<tr>
<td>Electives&lt;sup&gt;1&lt;/sup&gt;</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tr>
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<tr>
<td>CSC 370</td>
<td>1.5</td>
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<tr>
<td>MATH 348 or CSC 349A</td>
<td>1.5</td>
</tr>
<tr>
<td>STAT 350, 353, 359</td>
<td>4.5</td>
</tr>
<tr>
<td>3.0 units of CSC, SENG or STAT courses numbered 300 or higher&lt;sup&gt;3&lt;/sup&gt;</td>
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</tr>
<tr>
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<tr>
<td><strong>Total</strong></td>
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### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 446, SENG 474</td>
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</tr>
<tr>
<td>STAT 450</td>
<td>1.5</td>
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<tr>
<td>CSC 499 or STAT 498</td>
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</tr>
<tr>
<td>One of CSC 421, 425, 429, 445, 446, 449, 462</td>
<td>1.5</td>
</tr>
<tr>
<td>One of SENG 401, 460</td>
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</tr>
<tr>
<td>One of STAT 453, 454, 455, 456, 457, 458, 459</td>
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<td>Electives&lt;sup&gt;4&lt;/sup&gt;</td>
<td>6.0</td>
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<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

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### Combined Program in Geography and Computer Science (Geomatics)

The Department of Geography and Computer Science have designed a program leading to a combined BSc Major Degree. The Geomatics Program is aimed at students whose interests span the fields of cartography, Computer Science, Geographic Information Systems, remote sensing, spatial analysis and surveying. Students intending to pursue this combined program must consult the Undergraduate Adviser in either Geography or Computer Science after completing all of the first-year requirements.

### Geography/Computer Science Co-op

Students in the Geography/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in one or both of the Geography and/or Computer Science Co-op programs. The Co-op degree requires successful completion of three Co-op work terms. Completion of a minimum of one work term in each area adds the combined nature of their Co-op degree to the official record.

### Geography and Computer Science (Geomatics) Program Requirements

#### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>MATH 100 or 109, 101, 122, 211&lt;sup&gt;2&lt;/sup&gt;</td>
<td>6.0</td>
</tr>
<tr>
<td>STAT 123</td>
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<td>Electives&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

#### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 225, 226, 230</td>
<td>4.5</td>
</tr>
<tr>
<td>MATH 200, 204, 222</td>
<td>4.5</td>
</tr>
<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
<tr>
<td>STAT 260, 261</td>
<td>3.0</td>
</tr>
<tr>
<td>Electives&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>
### Year 1

<table>
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<th>Units</th>
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</thead>
<tbody>
<tr>
<td>HINF 130, 140</td>
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<tr>
<td>MATH 100 or 109, 101, 112</td>
<td>4.5</td>
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<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>ENGL 135, 146 or 147</td>
<td>1.5</td>
</tr>
<tr>
<td>Elective¹</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15.0</strong></td>
</tr>
</tbody>
</table>

1. Students can replace MATH 102 with MATH 100 or MATH 109.
2. "Academic Writing Requirement" (page 40) must be completed.
3. Recommended courses include CSC 423, 426, 446, 471, 472, 473, SENG 474.
4. Electives may also include ECE 470

### Combined Major Program in Health Information Science and Computer Science

Students must apply for the combined program through the School of Health Information Science office. This is a mandatory Co-op program.

Students with a previous degree in Computer Science or a related degree are not eligible for this combined program (see Second Bachelor's Degree). Students who have failed a work term or do not maintain a GPA of 4.0 or better in each academic term will normally be required to withdraw from the School for at least one calendar year. This is a full-time program only.

### Health Information Science/Computer Science Co-op

Health Information Science/Computer Science Students admitted to the Combined Program in Health Information Science and Computer Science are required to take part in the Co-op Program. In addition to their academic requirements, they must successfully complete a minimum of three work terms with at least one in each area, and be enrolled in a minimum of 6.0 units of course work each campus term. The granting of work term credit by challenge is not permitted in this program.

#### Year 2

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CSC 360, 370</td>
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<tr>
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</tr>
<tr>
<td>GEOG 328 or 329</td>
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</tr>
<tr>
<td>GEOG 319 or 322 or 323 or 325 or 328 or 329</td>
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</tr>
<tr>
<td>CSC 205 or 305</td>
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<tr>
<td>SENG 310 or 321 or 360 or CSC 375</td>
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<td>Electives</td>
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<tr>
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#### Year 3

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Three of GEOG 319, 322, 323, 325, 328, 329, 418, 420, 422, 428</td>
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</tr>
<tr>
<td>Three CSC or SENG 400-level electives³, ⁴</td>
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<tr>
<td>CSC 497</td>
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<tr>
<td>Electives</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

1. Students can replace MATH 102 with MATH 100 or MATH 109.
2. "Academic Writing Requirement" (page 40) must be completed.
3. Recommended courses include CSC 423, 426, 446, 471, 472, 473, SENG 474.
4. Electives may also include ECE 470

### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>1.5 units of HINF at the 200 level</td>
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</tr>
<tr>
<td>One of STAT 252, 255 or 260</td>
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<tr>
<td>CSC 225, 226, 230</td>
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<tr>
<td>SENG 265</td>
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<tr>
<td>ENGR 240²</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

#### Combined Major in Music and Computer Science

The School of Music and the Department of Computer Science have designed a combined program leading to either a Bachelor of Fine Arts or a Bachelor of Science degree.

Enrolment in this program is limited. Applicants must complete the usual procedures for admission to the University. See "Undergraduate Admission" (page 29). The application deadline for September entry is March 31. The School requires applicants to also submit a supplemental form. See <finearts.uvic.ca/music/cscmusic/form/>.

### Music/Computer Science Co-op

Students in the Music/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in one or both of the Music and/or Computer Science Co-op programs. The Co-op degree requires successful completion of three Co-op work terms. Completion of a minimum of one work term in each area adds the combined nature of their Co-op degree to the official record.

#### Year 1

<table>
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<tr>
<th>Course</th>
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</thead>
<tbody>
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<td>MUS 101A¹, 101B</td>
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</tr>
<tr>
<td>MUS 170A, 170B</td>
<td>2.0</td>
</tr>
<tr>
<td>MUS 207</td>
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</tr>
<tr>
<td>MATH 100 or 109, 101, 122</td>
<td>4.5</td>
</tr>
<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>Electives²</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>
Combined Programs in Physics and Computer Science

For a Combined BSc degree in Computer Science and Physics, students may take a Major or Honours Program. These programs are not joint degrees in Computer Science and Physics, but a single degree program composed of a selected combination of courses from each of the departments. Students opting for any of these combined programs are registered in the Faculty of Science and must contact the Computer Science and Physics departments.

Physics/Computer Science Co-op

Students in the Physics/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in both Co-op programs or may, if eligible, enrol and undertake work terms in only one Co-op program. They must successfully complete four work terms in order to complete their Co-op degree requirements. Students who complete at least two work terms in each area will have the combined nature of their program noted as part of the Co-op designation on their official records.

BSc Honours: Combined Program in Physics and Computer Science

Admission to the Honours Program requires permission of both the Department of Physics and Astronomy and the Department of Computer Science. Students should apply upon completion of second year.

Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 106; 110 or 111; 115</td>
<td>4.5</td>
</tr>
<tr>
<td>MATH 100 or 109, 110, 122</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 120 and 130; or 110 and 111</td>
<td>3.0</td>
</tr>
<tr>
<td>ENGL 135, 146 or 147</td>
<td>1.5</td>
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<tr>
<td>Electives</td>
<td>1.5</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 225, 226, 230</td>
<td>4.5</td>
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<td>MATH 200; 201 or 204; 211</td>
<td>4.5</td>
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<td>PHYS 215, 216, 229, 248</td>
<td>6.0</td>
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</tbody>
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Year 3

<table>
<thead>
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<th>Course</th>
<th>Units</th>
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<tbody>
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<td>MUS 301A, 301B, 306, 307</td>
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<td>CSC 230</td>
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<td>ECE 310</td>
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</tr>
<tr>
<td>6.0 units of CSC 330, 360, 370, SENG 310, ECE 407</td>
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<tr>
<td><strong>Total</strong></td>
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Year 4

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>7.5 units of MUS 401C, 406A, 406B, 407, CSC 475, ECE 484</td>
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<td>CSC 497</td>
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<tr>
<td>1.5 units of MUS at the 300/400 level</td>
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<td>1.5 units of CSC or SENG at the 400 level</td>
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<td>Electives 5</td>
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<td><strong>Total Units for Degree</strong></td>
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</tbody>
</table>

1. Upon acceptance to the School of Music, students will also be required to pass a theory entrance exam covering rudimentary skills. Students who do not pass this exam will be required to take MUS 111 prior to advancing to MUS 101A. MUS 111 will replace the elective in the first year.
2. Students who have not satisfied the "Academic Writing Requirement" (AWR) should choose 1.5 units from ENGL 135, 146, 147.
3. MUS 270A/B must be taken concurrently with MUS 201A/B.
4. ECE 470 and 484 are only offered in the summer term. Strongly recommend CSC 475 and ECE 484.
5. May include 300- or 400-level music courses, with permission of the instructor. Recommend ECE 459, 486, SENG 474.

Work Terms in order to complete their Co-op degree requirements. Students who complete at least two work terms in each area will have the combined nature of their program noted as part of the Co-op designation on their official records.
### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electives</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 225, 226, 230</td>
<td>4.5</td>
</tr>
<tr>
<td>MATH 200; 201 or 204; 211</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 215, 216, 229, 248</td>
<td>6.0</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 349A, 360</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 342, 346</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 317, 321A, 325, 326</td>
<td>6.0</td>
</tr>
<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
<tr>
<td>Elective</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 320, 497</td>
<td>3.0</td>
</tr>
<tr>
<td>CSC 445 or 446</td>
<td>1.5</td>
</tr>
<tr>
<td>PHYS 323</td>
<td>1.5</td>
</tr>
<tr>
<td>CSC electives</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS electives</td>
<td>6.0</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

1. It is recommended that students consider the upper-level PHYS courses they wish to take when choosing the order in which to take PHYS 317, 321A, 323, 325, 326.
2. These Computer Science electives must be at the 400 level. 1.5 units may be 400 level SENG courses.
3. These Physics electives must be at the 300 or higher level and must be chosen in consultation with the Department of Physics and Astronomy. PHYS 460A and PHYS 460B are recommended for third- and fourth-year students.

### Combined Major in Psychology and Computer Science

The Department of Psychology and the Department of Computer Science have designed a program leading to a combined BSc Major Degree. Students intending to pursue this combined program must consult the Undergraduate Adviser in either Psychology or Computer Science at the latest after completing all of the first-year requirements.

### Psychology/Computer Science Co-op

Students in the Psychology/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in one or both of the Psychology and/or Computer Science Co-op programs. The Co-op degree requires successful completion of three Co-op work terms. Completion of a minimum of one work term in each area adds the combined nature of their Co-op degree to the official record.

### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 186 or 190A; and BIOL 184 or 1908</td>
<td>3.0</td>
</tr>
<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>ENGL 135, 146 or 147</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 151, 122</td>
<td>3.0</td>
</tr>
<tr>
<td>PSYC 100A, 100B</td>
<td>3.0</td>
</tr>
<tr>
<td>Elective</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 225, 226, 230</td>
<td>4.5</td>
</tr>
<tr>
<td>MATH 102</td>
<td>1.5</td>
</tr>
<tr>
<td>PSYC 201, 251</td>
<td>3.0</td>
</tr>
<tr>
<td>One of PSYC 231, 243, 260</td>
<td>1.5</td>
</tr>
<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
<tr>
<td>Electives</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of CSC 322, 360, 370</td>
<td>1.5</td>
</tr>
<tr>
<td>PSYC 300A and 300B; or STAT 255 and 256;</td>
<td>3.0</td>
</tr>
<tr>
<td>or STAT 260 and 261</td>
<td></td>
</tr>
<tr>
<td>PSYC 300-level</td>
<td>3.0</td>
</tr>
<tr>
<td>SENG 310 and CSC 320</td>
<td>3.0</td>
</tr>
<tr>
<td>Electives</td>
<td>4.5</td>
</tr>
<tr>
<td>Total</td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Combined Major Program in Visual Arts and Computer Science

The Department of Visual Arts and the Department of Computer Science have designed a combined program leading to either a Bachelor of Fine Arts or a Bachelor of Science degree.

Enrolment in the program is limited. Students may be admitted directly to the program. Please see "Program Admissions" or the website <finearts.uvic.ca/visualarts/prospective_students/undergrad>.

**Visual Arts/Computer Science Co-op**

Students in the Visual Arts/Computer Science Combined Program who wish to participate in Co-op may, if eligible, enrol in and undertake work terms in one or both of the Visual Arts and/or Computer Science Co-op programs. The Co-op degree requires successful completion of three Co-op work terms. Completion of a minimum of one work term in each area adds the combined nature of their Co-op degree to the official record.

### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART 103, 104, 105, 106</td>
<td>6.0</td>
</tr>
<tr>
<td>MATH 100 or 109, 101, 122</td>
<td>4.5</td>
</tr>
<tr>
<td>CSC 106, 110, 115</td>
<td>4.5</td>
</tr>
<tr>
<td>Elective</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>16.5</td>
</tr>
</tbody>
</table>
### MINOR IN COMPUTER SCIENCE

Students in other departments may complete a Minor in Computer Science by completing the Major or Honours requirements of that department, in conjunction with either the Computer Science General Program requirement or by completing the set of courses listed below.

#### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 110, 115</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 100 or 102 or 109</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 122</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 151 or any Statistics 200 level (or equivalent) course</td>
<td>1.5</td>
</tr>
</tbody>
</table>

#### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 106, 225, 226, 230</td>
<td>6.0</td>
</tr>
<tr>
<td>SENG 265</td>
<td>1.5</td>
</tr>
</tbody>
</table>

#### Years 3 and 4

4.5 units of additional CSC courses numbered 300 or higher (one of these can be replaced by a SENG course at a similar level) ........................................................................................................................................... 4.5

Note that 200-level and higher courses that fulfill requirement for a Minor cannot form part of the requirements for the Major or Honours degree. Any such course in the Minor program may be replaced by another Computer Science course at the same level or higher.

### COMPUTER SCIENCE CO-OP PROGRAM

Co-operative Education is optional in Computer Science Co-op programs with the exception of the combined Health Information and Science program, for which it is mandatory. Students who successfully complete four work terms will receive the Co-op designation for their degree. Admission into these programs requires a separate application.

Additionally, work experience is optional in the Computer Science programs. Students who successfully complete two or three work terms will receive the work experience designation for their degree. Admission to this program requires a separate application.

### Co-op Admission and Retention

Students are normally admitted to a program in January after their first term on campus; application for admission should be made before the end of the first term. However, a student may be admitted to a program up to the end of his or her second year. A student will be admitted to a Co-op Program only if there is a satisfactory schedule of academic terms and work terms that will enable the student to complete all Co-op requirements.

The normal requirements for admission of students to a Computer Science Co-op Program are the completion of CSC 110, MATH 100 or MATH 109 and the following:

- the completion of at least 4.5 units on their last academic term
- a minimum grade of C+ in any Computer Science courses and a minimum grade of C in any Mathematics or Statistics courses taken on their last academic term
- no grades of F, E or N in courses taken on their last academic term

Students registered in a Co-op Program must normally be enrolled in at least 6.0 units of course work during each academic term. Students who fail to achieve satisfactory completion of a work term may be required to withdraw from the program. Each work term is recorded on the student’s academic record and transcript. Please refer to the general regulations pertaining to Undergraduate Co-operative Education Programs (page 60) of the University of Victoria governing all co-operative education students.
**Computer Science Co-op**

Students admitted to this program who wish to participate in Co-op must successfully complete four work terms in order to complete their Co-op degree requirements, and satisfy the course requirements of their specific degree program.

**Work Term Sequence**

CSC students’ work terms are normally of four months’ duration and alternate with academic terms. Upon approval, work terms of 4 months can be combined to 8-, 12-, or 16-month periods of employment.

**Work term prerequisite**

The CSC Work Placement Preparatory Course is a mandatory requirement for Computer Science Co-op and Work Experience students. Students normally must have completed the preparatory course before undertaking their first work term but in all cases must complete it before taking the second work term.

Students with significant work experience may complete a “Prior Learning Assessment.” Advance placements or waivers for a course will be considered on this basis only.

Students normally must complete the “Academic Writing Requirement” (page 40) before undertaking their first work term but in all cases must complete it before taking the second work term.

**Co-op Program Fee**

The university assesses a Co-op Program Fee for each work term, which is non-refundable, that is due in the first month of each work term and is subject to the University’s general fee regulations.

A fee is also assessed for work term challenges but no fee is assessed for work term transfer credits.

**Work Term Credit/Reduction**

Students must pass four work terms in order to qualify for the CSC Co-op degree and two work terms to qualify for the CSC Work Experience degree.

There are, however, several clearly defined situations where this requirement may be reduced by one term. A student with extensive technical work experience completed prior to admission to the program may apply to challenge for credit one work term. No challenge credit will be granted in the combined CSC/Health Information Science programs.

**Computer Science Work Experience Program**

The Computer Science Work Experience program is intended for students who are enrolled in, or have completed, at least 3 units of 300- or 400-level courses in Computer Science or Software Engineering, in any Major, Honours or Option degree program in the department of Computer Science, or in any combined degree program offered within the Computer Science department. Students participating in the Work Experience program must pass two Co-op work experience terms, that is, a total of eight months of full-time, discipline related work under the supervision of the Engineering and Computer Science Co-op Program.

These work experience terms are subject to the General Regulations: Undergraduate Co-op, with the exception that work experience credit by challenge is not permitted. Students passing the required two work experience terms will receive a designation of Work Experience on their academic record and transcript.

Students should contact the Engineering and Computer Science Co-op Office to discuss entry into this program.

**Engineering Programs**

**Program Admissions**

Students admitted to the BEng or BSEng degree program normally begin first-year Engineering courses in the September-December term each year. Students who wish extended time to complete first year can begin in the May to August term.

Completed applications must be submitted to Undergraduate Admissions and Undergraduate Records. For September admission, the application must be submitted by the preceding April 30 and all documentation, including in-progress transcripts, must be received by April 30. Final transcripts for courses registered January - April must be received by May 31. Qualified applicants who are completing courses after April 30 may receive conditional offers and must supply official transcripts to the Office of the Registrar by the specified deadline. For May admission, the application must be submitted by the preceding December 31 and all documentation must be received by January 31.

**Graduates of Secondary Schools**

Requirements for admission to the BEng and BSEng degree program for graduates of BC Secondary Schools are presented in "Year 1 Admission Requirements: BC/Yukon Secondary School Graduate" (page 32).

Graduates of secondary schools other than British Columbia’s and Yukon’s require qualifications in mathematics, physics and chemistry equivalent to those specified as admission requirements for BC and Yukon secondary school graduates (see "Year 1 Admission Requirements: BC/Yukon Secondary School Graduate", page 32). Applicants are advised to contact Undergraduate Admissions and Undergraduate Records for further information regarding requirements.

**Engineering Transfer Programs**

Institutions throughout British Columbia offer first-year engineering transfer programs. Students who successfully complete one of these programs are eligible for admission to second year engineering at UVic if they have attained an overall standing of at least C+ with no individual grades less than C. In programs that are oversubscribed, offers will be given based on competitive average grades. In cases where the first choice of program is not available, alternate program choices are considered. Transfer applicants are encouraged to inquire with the Engineering Undergraduate Office regarding the program declaration process.

**Applicants Transferring from Post-Secondary**

Applicants who have completed transferable studies while registered in other faculties at UVic or other post-secondary institutions are eligible to be considered for admission. Applicants will be evaluated on a course-by-course and student-by-student basis. In all cases, transfer applicants must present Physics, Mathematics and Chemistry prerequisites (or equivalent) to meet minimum program requirements. In addition, any post-secondary record requires a minimum C+ average with no individual course grades less than C.

Transfer applicants are required to have completed the following applicable courses (or transferable equivalents): CHEM 101 or 150, MATH 100 or 109, 101, 110 or 211, CSC 110 or 111, ENGL 135, PHYS 110 and 111.

- Applicants with 12.0 or more units including the applicable course work will be considered for the specific program admissions. Admission requires a minimum GPA of 3.0 (C+) with no grades less than C. Courses that contribute to any program requirements, except electives, will be used in competitive average grade calculations that allocate seats in oversubscribed programs.

Students having already completed some first-year courses who work ahead on second year course requirements are encouraged to contact the Engineering Undergraduate Office for planning.
Undergraduate requirements for re-admission to the University, it is expected that before re-applying to the program, students will successfully complete transferable courses that demonstrate improved academics (with all grades C+ (65%) or higher) in relevant subject areas. A student who was required to withdraw will be placed on academic probation upon re-admission to the BEng or BSEng program and must obtain Satisfactory Standing at the next standing review (See “Standing”, page 51).

Applicants from a Technology Diploma

On successful completion of the Engineering Bridge Program offered at Camosun College, students with two-year diplomas in Electronics or Mechanical or Computer Engineering Technology may be admitted to the third year of a BEng program. Acceptance into the Bridge and BEng Programs is decided on an individual basis and must be obtained from the Faculty of Engineering before registration in any of the bridge courses or senior-level courses will be approved.

2 Year Transfer Agreements

Thompson Rivers University offers a two-year transfer program where students transfer to Computer or Electrical Engineering and begin at the University of Victoria in 3rd year. Successful completion of this program requires an overall average of at least 3.0 (C+) and no individual course grade less than C, and completion of one or two work terms. Application deadline is September 30.

Approved Substitutions for Courses Taken at UVic

Substitutions may be permitted, on a course-by-course basis, for students in the BEng and BSEng program, when the substitute course is taken at the University of Victoria. See the table “Substitutions for BEng and BSEng”.

### Substitutions for BEng and BSEng

<table>
<thead>
<tr>
<th>CHEM 150</th>
<th>CHEM 101</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 115</td>
<td>CSC 116</td>
</tr>
<tr>
<td>ECE 216 or ELEC 216</td>
<td>PHYS 216</td>
</tr>
<tr>
<td>ENGR 240</td>
<td>ENGL 225</td>
</tr>
<tr>
<td>MATH 110</td>
<td>MATH 211</td>
</tr>
<tr>
<td>MATH 201</td>
<td>MATH 204</td>
</tr>
<tr>
<td>PHYS 110</td>
<td>PHYS 120</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>PHYS 130</td>
</tr>
<tr>
<td>STAT 254</td>
<td>STAT 260</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substitutions for BEng Biomedical, Civil, and Mechanical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 111</td>
</tr>
</tbody>
</table>

### Readmission to the BEng or BSEng program

Students who have withdrawn from the BEng or BSEng degree programs must reapply for admission by the deadlines listed in “Undergraduate Application and Documentation Deadlines” (page 8) and will be considered in competition with all other applicants at the time of re-application.

Applications from students who were required to withdraw for academic reasons will not be considered until the required withdrawal period has been completed (see Undergraduate Information under “Requirement to Withdraw from the University” (page 52). In addition to satisfying the Undergraduate requirements for re-admission to the University, it is expected that before re-applying to the program, students will successfully complete transferable courses that demonstrate improved academics (with all grades C+ (65%) or higher) in relevant subject areas. A student who was required to withdraw will be placed on academic probation upon re-admission to the BEng or BSEng program and must obtain Satisfactory Standing at the next standing review (See “Standing”, page 51).

### Academic Regulations

#### Common 1st Year

All students with less than 12 units of applicable (i.e., courses in BEng/ BSEng 1st year) credit are admitted as undeclared students to the common 1st year of the program.

#### Declaration into Programs

Undeclared students (with at least 12 units of applicable coursework, including transfer credit) are given the opportunity to declare their chosen Engineering program (discipline). All students with a minimum GPA of C+ and no applicable courses with grades less than C will be considered for available seats in the disciplines. Students with grades below this threshold can contact an admissions advisor to create a plan, improve grades, and re-apply for program declaration at a future date.

#### Academic Terms and Co-operative Education

The academic schedule for the BEng and BSEng degree programs consists of eight academic terms and six work/other terms.

The academic terms are scheduled from September to December, January to April, and May to August. After the start of second year, students normally alternate between academic terms and co-operative work terms. The typical path through the programs is shown in the table “Academic and Work/Other Term Schedule.” Four of the six work/other terms are normally used to satisfy the co-operative education requirements. The remaining two terms (8 months) may be used for other academic work (completion of an option or a Minor), gaining additional work experience, or any other activity. In some programs it is possible to interchange the two terms of 4th year. Please refer to the appropriate program entry for more information.

Each student in a BEng or BSEng degree program will be assigned to a graduating class, which at any point in time will determine the student’s current academic term or work/other term for the purposes of other regulations.

#### Co-op Work Term Requirement

The Co-operative Education requirement of the BEng/BSEng degree programs is a minimum of 4 terms of guided (co-operative) work. Students work with the Engineering and Computer Science Co-operative Education office to apply for, obtain, complete, and assess 4 work terms in order to graduate from the programs. This requirement cannot be avoided or replaced.

#### Program Change Requests

Students who have completed at least one term of full-time studies in the BEng or BSEng programs who wish to alter their program or take a leave of absence should meet with their program adviser to map out plans for program completion. Although every effort will be made to detect problems during this review process, students are solely responsible for difficulties resulting from prerequisite and timetable conflicts.

Readmission to the program after a leave will depend on a seat being available at the time of re-entry and the student’s academic status at the time of the readmission request. Approval of a leave does not guarantee the absence of timetable conflicts upon the student’s re-registration. The faculty reserves the right to require that relevant course work be repeated if deemed necessary.
Maximum Time for Degree Completion

Students must complete their programs within the specified time limits below or must have an extension approved by the Associate Dean, Undergraduate Programs.

<table>
<thead>
<tr>
<th>Year of Entry into BEng or BSEng</th>
<th>Normal Time to Complete (months)</th>
<th>Maximum Time to Complete (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>44</td>
<td>68</td>
</tr>
<tr>
<td>3</td>
<td>28-36</td>
<td>48</td>
</tr>
</tbody>
</table>

Academic Performance

Students in the BEng and BSEng programs are subject to the University regulations on academic performance (See "Standing", page 51).

In addition, declared students on probation are normally undeclared from the disciplines and must re-qualify for available seats. These students will be moved into the general "Engineering B.Eng. Undeclared" group and will work with Advisors to re-qualify for program declaration. See "Declaration into Programs" (page 111).

Grading

The grading system used for the BEng and BSEng degree programs is the same as that specified by the University (see "Grading", page 49).

Academic Concessions

A student whose academic performance is affected by injury, family or personal affliction, or illness may qualify for "Academic Concessions" (page 46).

Requests for academic concessions for Extended Deferred Exams should normally be submitted prior to the scheduled Deferred Exam and in no instance later than 10 working days after that date.

Review of an Assigned Grade in BEng and BSEng Program Courses, Work Terms, and Work Term Modules

- Any request for a review of a final grade must normally reach the Engineering Undergraduate Office within 21 days after the release of assigned grades.
- The review of a final grade is restricted to grade components contributed by a final examination and to any other grade components released to the student within the last 21 days before the end of classes.
- In the case of a work term or work term module evaluation, the review will be restricted to the component on which a failing grade was assigned.
- The grade determined by means of a review will be recorded as the final official grade, regardless of whether it is identical to or higher or lower than the original grade.
- Before requesting a review, students should make every reasonable effort to discuss the assigned grade with the instructor. Mathematical marking errors will be rectified without recourse to the review procedures.

Course Equivalents and Course Withdrawals

Approval may be given, at the discretion of the Associate Dean, Undergraduate Programs for a student to replace one or more BEng or BSEng degree program courses with other acceptable courses. Written approval must be obtained in advance. Normally, such replacement courses will be taken at UVic. When a replacement course is to be taken at another institution, the student must obtain a Letter of Permission from the Engineering Undergraduate Office prior to undertaking the studies (see "Letters of Permission for UVic Students to Undertake Studies Elsewhere", page 39).

Students will not be permitted to withdraw from a given course more than once.

Examinations

Deferred Examinations

- Where a student has been unable to write an examination owing to illness, family crisis or other similar circumstances, the faculty may authorize a deferred examination.
- For academic regulations regarding deferred status, please see "Deferred Status" (page 48).
- Requests for Academic Concessions for Extended Deferred Exams should normally be submitted prior to the scheduled exam and in no instance later than 10 working days after the scheduled date of the Deferred Exam.

Supplemental Examinations

- The Faculty of Engineering does not usually offer supplemental examinations. If it is offered, information will be provided on the course outline that the students will receive at the beginning of the course.
- For academic regulations regarding undergraduate supplementary examinations, students may refer to "Undergraduate Supplemental Examinations" (page 49).

Credit for Courses Offered by Other Faculties or Institutions

The Faculty of Engineering may grant credit to applicants to the BEng or BSEng degree program for courses taken at UVic or at other post-secondary educational institutions. A Letter of Permission must be obtained from the Engineering Undergraduate Office prior to undertaking studies at another institution for credit towards the UVic undergraduate degree program (see "Letters of Permission for UVic Students to Undertake Studies Elsewhere", page 39). Credit will be considered only for courses that are equivalent to courses in the BEng or BSEng degree program and in which satisfactory performance has been achieved. For courses with prefixes BME, CIVE, ECE, ENGR, MECH and SENG, detailed documentation supporting the credit request may be required; students should contact the Engineering Undergraduate Office for specific instructions before beginning studies in the faculty. Credit for courses completed while outside the Faculty of Engineering will only be granted for courses in which a grade of C (60%) or higher has been awarded on the official transcript. For some courses a higher minimum grade may be
required. For courses taken prior to admission to the program, the student must initiate all requests for course credit in the first term (four months) of registration in the BEng or BSEng program.

Course Challenges
The Faculty of Engineering does not offer course challenges with the exception of CSC 110.

Graduation Requirements
Students must meet the normal University "Minimum Degree Requirements for Graduation" (page 53) including a graduating average of at least 2.0, as well as:

1. Successful completion of the full set of courses specified for the degree program.
2. Successful completion of four work terms (as defined by the student’s registered program) as specified below.

The graduating average of a student in the BEng or BSEng program will be the weighted average of the grade values (other than COM, N, F and E) assigned to 300- and 400-level courses taken or challenged at UVic and used within the student’s degree program. Courses taken at the 500 level may be included in the graduating average if they are used to meet degree requirements. If the total unit value of such courses does not exceed 30 units, then all such courses will be included in the average. If the total exceeds 30 units, then the average will be taken on a maximum of 30 units of such courses, chosen so as to give the highest average. In the case where those 30 units include a fraction of a course, then the calculation will be based on the 30 units plus the remaining fraction of that same course. A course that has been used to satisfy the requirements for one degree or in the calculation of the student’s graduating average for one degree cannot be used for credit towards another degree. Senior level courses used to complete a Minor in some other area are excluded from the graduating average computation.

First Year Schedule
All Bachelor of Engineering and Software Engineering programs have their first year courses in common which are typically completed in fall and Spring terms. Alternative schedules are available at <www.uvic.ca/current-students/home/planning/program-outlines/index.php>.

Students seek admission to specific programs prior to second year.

Biomedical Engineering
This program is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Association of Professional Engineers.

Consistent with all BEng programs, the curriculum consists of the common set of first year courses, six terms unique to the degree and four Co-operative Education terms.

Program Requirements
Many courses are offered only one time per year. Refer to the Faculty web site for course scheduling information. Consult with a program adviser for schedule planning advice.

Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 150</td>
<td>1.5</td>
</tr>
<tr>
<td>CSC 111</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 130, 110, 120, 141</td>
<td>7.0</td>
</tr>
<tr>
<td>MATH 100 or 109, 101, 110</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 110, 111</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 297, 446, 498</td>
<td>4.0</td>
</tr>
<tr>
<td>BME 499</td>
<td>1.5</td>
</tr>
<tr>
<td>Two Biomedical Engineering electives (list below)</td>
<td>3.0</td>
</tr>
<tr>
<td>Two Biological Science electives (list below)</td>
<td>3.0</td>
</tr>
<tr>
<td>Three Technical electives (list below)</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only the <strong>1.5 units in the BSEng program are offered</strong>.</td>
<td></td>
</tr>
<tr>
<td>CSC 349A</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 297, 446, 498</td>
<td>4.0</td>
</tr>
<tr>
<td>BME 499</td>
<td>1.5</td>
</tr>
<tr>
<td>Two Biomedical Engineering electives (list below)</td>
<td>3.0</td>
</tr>
<tr>
<td>Two Biological Science electives (list below)</td>
<td>3.0</td>
</tr>
<tr>
<td>Three Technical electives (list below)</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 210</td>
<td>3.0</td>
</tr>
<tr>
<td>CHEM 231</td>
<td>1.5</td>
</tr>
<tr>
<td>CSC 116</td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 216, 250</td>
<td>3.0</td>
</tr>
<tr>
<td>ECE 260</td>
<td>1.5</td>
</tr>
<tr>
<td>MECH 242</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 200, 204</td>
<td>3.0</td>
</tr>
<tr>
<td>MECH 220, 240</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Unit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 320</td>
<td>1.5</td>
</tr>
<tr>
<td>BME 335, 350</td>
<td>3.5</td>
</tr>
<tr>
<td>ECE 330 or 365</td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 360 or MECH 380</td>
<td>1.5</td>
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<tr>
<td>ECON 180</td>
<td>1.5</td>
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<tr>
<td>MECH 345</td>
<td>1.5</td>
</tr>
<tr>
<td>STAT 254 or 260</td>
<td>1.5</td>
</tr>
<tr>
<td>Two of ECE 300, 310, 320, 340, MECH 320 or 335</td>
<td>3.0</td>
</tr>
<tr>
<td>One of ECE 350, 370, 380, MECH 330, 360, or 395</td>
<td>1.5</td>
</tr>
<tr>
<td>One Complementary Studies elective</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

In addition, students must complete four Co-op work terms (ENGR 001, 002, 003, 004) as per the Faculty of Engineering “Academic and Work/Other Term Schedule” (page 112).

1. Not acceptable if student presents credit in ECE 365 or ELEC 365.
2. A Complementary Studies Elective course deals with central issues in humanities or social sciences. The chosen course must be approved, prior to registration, by the Faculty of Engineering. Consult the Faculty website for a current list of approved courses.
3. CSC 115 may be substituted in a term when CSC 116 is not offered. CSC 116 is strongly recommended.

Biomedical Engineering Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 401</td>
<td>Special Topics in Biomedical Engineering</td>
</tr>
<tr>
<td>BME 403</td>
<td>Medical Image Processing</td>
</tr>
<tr>
<td>BME 434</td>
<td>Biophotonics</td>
</tr>
<tr>
<td>BME 481</td>
<td>Biomedical Engineering Electives</td>
</tr>
<tr>
<td>BME 401</td>
<td>Biophotonics</td>
</tr>
<tr>
<td>BME 403</td>
<td>Medical Image Processing</td>
</tr>
<tr>
<td>BME 434</td>
<td>Biophotonics</td>
</tr>
<tr>
<td>BME 481</td>
<td>Biomedical Engineering Electives</td>
</tr>
</tbody>
</table>
**Biological Science Electives**

CHM 232 Organic Chemistry with Biological Applications  
BIOC 299 Biochemistry for Non-Majors  
BIOC 300A General Biochemistry I  
BIOI 360 Cell Biology  
BIOI 367 Neurobiology: Molecules to Behaviour

**Technical Electives**

BME 498 Honours Thesis  
ECE 455** Real Time Computer Systems Design Project  
ECE 404 Microwaves and Fiber Optics  
ECE 412 Electronic Devices II  
ECE 420 Nanotechnology  
ECE 450 Communications Theory and Systems II  
ECE 453 Antennas and Propagation  
ECE 484 Audio Signal Processing  
ECE 485 Data Analysis and Pattern Recognition  
ECE 466 System on a Chip Engineering for Signal Processing  
MECH 410 Computer Aided Design  
MECH 420 Finite Element Applications  
MECH 430 Robotics  
MECH 458 Mechatronics  
MECH 466 MEMS  
MECH 495 Computational Fluid Dynamics and Heat Transfer  
MECH 499 Technical Project

*One of these electives may be replaced by a 300-level CSC, ECE, MECH or SENG course if the course is a prerequisite for a 400-level technical elective. Additional prerequisites required.

**Electrical Systems Minor**

An Electrical Systems Minor provides additional electrical engineering knowledge and skills, and is open to BME students. See “Minor in Electrical Systems” (page 119) for requirements.

**Mechanical Systems Minor**

A Mechanical Systems Minor provides additional mechanical engineering knowledge and skills, and is open to BME students. See “Minor in Mechanical Systems” (page 123) for requirements.

**Business Minor**

A Business Minor develops business skills that are frequently required by practicing Engineers. See “Business Minor Program” (page 327) for requirements.

**Civil Engineering**

This program is accredited by the Canadian Engineering Accreditation Board of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Associations of Professional Engineers.

Consistent with all BEng programs, the curriculum consists of the common set of first year courses, six terms unique to the degree and four Co-operative Education terms.

**Program Requirements**

Many courses are offered only one time per year. Refer to the Faculty website for course scheduling information. Consult with a program adviser for schedule planning advice.

**Year 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 150</td>
<td>1.5</td>
</tr>
<tr>
<td>CSC 111</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 130, 110, 120, 141</td>
<td>7.0</td>
</tr>
<tr>
<td>MATH 100 or 109, 101, 110</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 110, 111</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

**Year 2**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 200, 210, 285, 299</td>
<td>6.0</td>
</tr>
<tr>
<td>GEOG 103</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 200, 204</td>
<td>3.0</td>
</tr>
<tr>
<td>CIVE 220, 242, 295</td>
<td>4.5</td>
</tr>
<tr>
<td>STAT 254</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16.5</strong></td>
</tr>
</tbody>
</table>

**Year 3**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 349A</td>
<td>1.5</td>
</tr>
<tr>
<td>CIVE 310, 315, 340, 345, 350, 351, 352, 360, 370, 385</td>
<td>16.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

**Year 4**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 400</td>
<td>2.0</td>
</tr>
<tr>
<td>ENGR 498</td>
<td>1.5</td>
</tr>
<tr>
<td>Two Complementary Studies Electives</td>
<td>3.0</td>
</tr>
<tr>
<td>Eight Technical Electives</td>
<td>12.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.5</strong></td>
</tr>
</tbody>
</table>

In addition, students must complete four Co-op work terms (ENGR 001, 002, 003, 004), as per the Faculty of Engineering “Academic and Work/Other Term Schedule” (page 112).

1. A Complementary Studies Elective course deals with central issues in humanities or social sciences. The chosen courses must be approved, prior to registration, by the Faculty of Engineering. Consult the Faculty website for a current list of approved courses.

**List of Fourth Year Technical Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 410</td>
<td>Solid Waste, Air, and Water Pollution</td>
</tr>
<tr>
<td>CIVE 411</td>
<td>Resilient Smart Cities</td>
</tr>
<tr>
<td>CIVE 412</td>
<td>Infrastructure Engineering for Indigenous Communities</td>
</tr>
<tr>
<td>CIVE 420</td>
<td>Advanced Mechanics of Solids</td>
</tr>
<tr>
<td>CIVE 421</td>
<td>Advanced Structural Analysis</td>
</tr>
<tr>
<td>CIVE 440</td>
<td>Hydrology and Hydraulics</td>
</tr>
<tr>
<td>CIVE 444</td>
<td>Water and Sanitation for Developing Countries</td>
</tr>
<tr>
<td>CIVE 445</td>
<td>Groundwater Hydrology</td>
</tr>
<tr>
<td>CIVE 450</td>
<td>Green Building Design</td>
</tr>
<tr>
<td>CIVE 451</td>
<td>Sustainable Buildings: Retrofitting, Repairs and Recycling</td>
</tr>
<tr>
<td>CIVE 452</td>
<td>Engineering for Earthquakes and Extreme Events</td>
</tr>
</tbody>
</table>
**List of Fourth Year Technical Electives*\**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 453</td>
<td>Building and District Energy Simulation</td>
</tr>
<tr>
<td>CIVE 456</td>
<td>Sustainability and Advanced Concrete Technology</td>
</tr>
<tr>
<td>CIVE 457</td>
<td>Behaviour and Design of Steel Structures</td>
</tr>
<tr>
<td>CIVE 460</td>
<td>Intelligent Transportation Systems &amp; Safety</td>
</tr>
<tr>
<td>CIVE 480A</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 480B</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 480C</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 480D</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 480E</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 480F</td>
<td>Special Topics</td>
</tr>
<tr>
<td>CIVE 485</td>
<td>Foundation Engineering</td>
</tr>
<tr>
<td>CIVE 499</td>
<td>Research Project</td>
</tr>
<tr>
<td>MECH 446</td>
<td>Introduction to Ocean Engineering</td>
</tr>
</tbody>
</table>

*Not all technical electives listed may be available.

**Business Minor**

A Business Minor develops business skills that are frequently required by practicing Engineers. See "Business Minor Program" (page 327) for requirements.

**Computer Engineering**

This BEng program is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Association of Professional Engineers.

**Program Requirements**

Many courses are offered only one time per year. Refer to the Department web site for course scheduling information. Consult with the program adviser for schedule planning advice.

**Year 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 150</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>CSC 111</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 110, 120, 130, 141</td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>MATH 100 or 109, 110</td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 110, 111, or 122, 125</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

**Year 2**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 241, 242, 255, 299</td>
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<td>6.0</td>
</tr>
<tr>
<td>CSC 1163</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 216, 220, 250, 260</td>
<td></td>
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</tr>
<tr>
<td>MATH 200, 204</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 254</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

**Year 3**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 355, 356, 399, 458</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>ECE 300, 310, 320, 330, 340</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>Two of ECE 350, 360, 370, 380</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>One Natural Science Elective</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

**Year 4**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 349A</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 499</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>ECON 180, ENGR 297, 446</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>One Complementary Studies Elective5</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>Seven Technical Electives</td>
<td></td>
<td>10.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>19.0</strong></td>
</tr>
</tbody>
</table>

In addition, students must complete four Co-op work terms (ENGR 001, 002, 003, 004), as per the Faculty of Engineering "Academic and Work/Other Term Schedule" (page 112).

**Computer Engineering (Biomedical Option)**

Students are admitted to the Biomedical Option at the completion of their 1B term. Enrolment is limited and students are cautioned that they must apply for admission and be admitted before registering in any of the option-required courses. In addition to the standard Computer Engineering program courses, the Biomedical Option requires completion of the following four courses:

- BME 200 (1.5) Molecular and Cellular Physiology
- BME 201 (1.5) Quantitative Human Physiology
- ECE 335 (1.5) Biosensors and Instrumentation
- ECE 435 (1.5) Medical Image Processing

This option also requires completion of one of the following courses as one of the Technical Electives:

- ECE 434 (1.5) Biophotonics
- PHYS 432 (1.5) Medical Physics

Notes: Students in this option may take EPHE 141 and BIOL 225 in lieu of BME 200 and 201, but must then take BIOL 190A as their Science Elective. BIOL 190A and BIOL 225 cover prerequisite material necessary for admission to the medical program at UBC. Please refer to the UBC medical program requirements at <mdprogram.med.ubc.ca/admissions/admission-requirements>.

- This option is offered subject to resources
- A course in this option may be replaced with another course relevant to this option with the permission of the Department.

**Computer Engineering (Computer Music Option)**

Enrolment in the Computer Music Option is limited. Students must apply for admission before registering in any of its required courses. In addition to the standard Computer Engineering program courses, the Computer Music Option requires completion of the following courses:

- MUS 306 Recording Techniques
- MUS 307 Introduction to Computer Music
- Plus a total of 3.0 units from the following list:
  - CSC 475 (1.5) Music Retrieval Techniques
  - ECE 484a (1.5) Audio Signal Processing
  - MUS 401C (1.5) Acoustics
  - MUS 406A (1.5) Advanced Sound Recording Techniques
  - MUS 406B (1.5) Sound Recording Seminar
Note: A course in this option may be replaced with another course relevant to this option with the permission of the Department.

Computer Engineering (Quantum Physics Option)

Enrolment in the Quantum Physics Option is limited. Students must apply for admission before registering in any of its required courses. Students interested in this option should notify the Department before the Term 3A. Bridging students may also be able to take this option with appropriate scheduling. Students will be required to have a minimum cumulative GPA of 6 to enrol in the program and obtain a grade of B+ in PHYS 323. In addition to courses required for Computer Engineering, the Quantum Physics Option requires completion of the following courses:

- PHYS 215: Introductory Quantum Physics
- PHYS 323: Quantum Mechanics I
- PHYS 423: Quantum Mechanics II
- Plus any one of:
  - PHYS 321A: Classical Mechanics
  - PHYS 328: Solid State Physics I
  - MATH 342: Intermediate Ordinary Differential Equations

Note: A course in this option may be replaced with another course relevant to this option with the permission of the Department.

Fast Track Master's Option

The department of Electrical and Computer Engineering offers outstanding undergraduate students an opportunity for a head start in a master's program. Qualified students will be permitted to enrol in graduate-level courses during their fourth year. These courses will be in addition to any undergraduate requirements and thus can be transferred to the MASc or MEng degree program. All of the admission and transfer credit regulations of the Faculty of Graduate Studies must be met. For more information, please contact the Chair or the Graduate Adviser of the department.

Business Minor

A Business Minor develops business skills that are frequently required by practicing Engineers. See "Business Minor Program" (page 327) for requirements.

Minor in Computer Systems

A Computer Systems Minor is open to students outside of the programs in Electrical Engineering and Computer Engineering. Students must have a minimum cumulative GPA of 5. The minor requires 9 units of ECE designated courses with a minimum of 4.5 units at the 300 level or above. In addition, 3 or more of these units at the 300 level or above must be part of the Computer Engineering Program.

Graduate Programs

For information on studies leading to the MEng, MASc and PhD degrees, see the UVic Graduate Calendar.

Program Requirement Notes

Refer to the "Academic Schedules Notes" on page 118.

Technical Electives

The program requires completion of seven technical electives (10.5 units) to be chosen from the lists below. Students who complete three courses (4.5 units) in one of the specialization areas listed below can request a letter from the Electrical and Computer Engineering office confirming this; the area will not be shown on the transcript.

Students who entered the program via a bridge program must take at least two courses (i.e., 3.0 units) from the Special Bridge Students' Elective List. A printable PDF version of the electives is available at <www.uvic.ca/engineering/ece/current/undergraduate/advising/bridge-electives>.

### Communications

- ECE 404: Microwaves and Fiber Optics
- ECE 405: Error Control Coding and Sequences
- ECE 417: Software Defined Radio
- ECE 450: Communications Theory and Systems II
- ECE 456: Mobile Communications
- ECE 458: Communication Networks
  - Directed studies, selected topics, or thesis courses

### Computational Intelligence

- ECE 403: Optimization for Machine Learning
- ECE 435: Medical Image Processing
- ECE 470: Artificial Intelligence
- ECE 471: Computer Vision
- ECE 485: Data Analysis and Pattern Recognition
  - Directed studies, selected topics, or thesis courses

### Computer Systems

- ECE 448: Cyber-System Security
- ECE 449: Computer Systems and Architecture
- ECE 455: Real Time Computer Systems Design Project
- ECE 457: Parallel and Cluster Computing
- SENG 422: Advanced Software Architecture
- SENG 426: Software Quality Engineering
  - Directed studies, selected topics, or thesis courses

### Digital and Embedded Systems

- ECE 441: Design of Digital and VLSI Systems
- ECE 448: Cyber-System Security
- ECE 449: Computer Systems and Architecture
- ECE 455: Real Time Computer Systems Design Project
- ECE 466: System-on-Chip Engineering for Signal Processing
- SENG 440: Embedded Systems
  - Directed studies, selected topics, or thesis courses

### Digital Signal Processing

- ECE 403: Optimization for Machine Learning
- ECE 407: Digital Signal Processing II
- ECE 417: Software Defined Radio
- ECE 435: Medical Image Processing
- ECE 459: Applications of Digital Signal Processing Techniques
- ECE 483: Digital Video Processing: Algorithms and Applications in Media
- ECE 484: Audio Signal Processing
Technical Elective Notes

1. Not all technical electives will be offered every year. Please check the department course schedule website for planning.

2. Other 400-level or graduate courses may be considered as a Technical Elective with the permission of the department and Dean of Graduate Studies as required, refer to "Registration in Graduate Courses by Undergraduates" (page 39).

3. Courses other than those listed may be counted for credit towards a specialization with the permission of the Department.

4. Can be used for only one specialization letter, when deemed related to the specialization area by the course instructor.

Academic Schedule: Computer Engineering

<table>
<thead>
<tr>
<th>Term 1A</th>
<th>Term 1B</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 111</td>
<td>CHEM 150</td>
</tr>
<tr>
<td>ENGR 110</td>
<td>ENGR 120</td>
</tr>
<tr>
<td>ENGR 130</td>
<td>ENGR 141</td>
</tr>
<tr>
<td>MATH 100 or 109</td>
<td>MATH 101</td>
</tr>
</tbody>
</table>
2. Students normally must successfully complete ENGR 130 (Introduction to Professional Practice) before undertaking their first work term.
3. CSC 115 may be substituted in a term when CSC 116 is not offered. CSC 116 is strongly recommended.
4. A course in nature science as required by CEAB guidelines and as approved by the Faculty of Engineering. Students may choose a course from a pre-approved list: https://www.uvic.ca/engineering/current-students/planning/index.php or seek permission from the Engineering Undergraduate Office (EUI).
5. A Complementary Studies Elective course dealing with central issues in humanities or social sciences, as required by CEAB guidelines for complementary studies, and as approved by the Faculty of Engineering. Students may choose a course from a pre-approved list: https://www.uvic.ca/engineering/current-students/planning/index.php or seek permission from the Engineering Undergraduate Office (EUI).
6. Or acceptable replacement.
7. MUS 407 is a two-term course taken in the fall and spring.
8. Alternate first year schedules for spreading the first year course load over three terms may be available. For more information, visit the following URL: https://www.uvic.ca/engineering/current-students/new/index.php
9. Students normally take ENGR 446 in the term preceding the final term of their academic programme (academic or work term.)
10. ENGR 297 may also be offered in other terms.

**Electrical Engineering**

This BEng program is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Association of Professional Engineers.

**Program Requirements**

Many courses are offered only one time per year. Refer to the Department website for course scheduling information. Consult with the program adviser for schedule planning advice.

### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHEM 150</td>
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<tr>
<td>CSC 111</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 110, 120, 130</td>
<td>7.0</td>
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<tr>
<td>MATH 100 or 109, 101, 110</td>
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<tr>
<td>PHYS 110, 111, or 122, 125</td>
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<tr>
<td><strong>Total</strong></td>
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### Year 2

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<td>ECE 241, 255</td>
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<tr>
<td>CSC 116</td>
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<tr>
<td>ECE 216, 220, 250, 260, 299</td>
<td>7.5</td>
</tr>
<tr>
<td>MATH 200, 204</td>
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### Year 3

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<tr>
<td>CSC 349A</td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 300, 310, 320, 330, 340</td>
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</tr>
<tr>
<td>ECE 350, 360, 370, 380, 399</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

* Students in Computer Engineering must take a total of seven Technical electives.

**Academic Schedule: Computer Engineering Technical Elective Courses**

A list of available courses, and the terms in which they are normally offered, can be found at: <www.uvic.ca/engineering/ece/current/undergraduate/advising/schedule>.

Not all technical electives will be offered every year. Not all courses are offered in the terms listed. Please check the department course schedule website for planning: <www.uvic.ca/engineering/ece/current/undergraduate/courses>.

**Academic Schedules Notes**

1. Students are responsible for confirming and satisfying course prerequisites and resolving timetable conflicts that result from following a nonstandard schedule.
Year 4

ECE 499 .................................................. 1.5
ECON 180, ENGR 297, 446 ........................................... 4.0
One Complementary Studies Elective ................................. 1.5
One Natural Science Elective .............................................. 1.5
Seven Technical Electives .............................................. 10.5

Total ...................................................................................... 19.0

In addition, students must complete four Co-op work terms (ENGR 001, 002, 003, 004), as per the Faculty of Engineering “Academic and Work/Other Term Schedule” (page 112).

Electrical Engineering (Biomedical Option)

Students are admitted to the Biomedical Option at the completion of their 1B term. Enrolment is limited and students are cautioned that they must apply for admission and be admitted before registering in any of the option-required courses. In addition to the standard Electrical Engineering program courses, the Biomedical Option requires completion of the following courses:

BME 200 (1.5) Molecular and Cellular Physiology for Engineers
BME 201 (1.5) Quantitative Human Physiology
ECE 335 (1.5) Biosensors and Instrumentation
ECE 435 (1.5) Medical Image Processing

This option also requires completion of one of the following courses as one of the Technical Electives:

ECE 434 (1.5) Biophotonics
PHYS 432 (1.5) Medical Physics

Notes: - Students in this option may take EPHE 141 and BIOL 225 in lieu of BME 200 and 201, but must then take BIOL 190A as their Science Elective. BIOL 190A and BIOL 225 cover prerequisite material necessary for admission to the medical program at UBC. Please refer to the UBC medical program requirements at <mdprogram.med.ubc.ca/admissions/admission-requirements>.

- This option is offered subject to resources.

- A course in this option may be replaced with another course relevant to this option with the permission of the Department.

Electrical Engineering (Computer Music Option)

Enrolment in the Computer Music Option is limited. Students must apply for admission before registering in any of its required courses. In addition to the standard Electrical Engineering program courses, the Computer Music Option requires completion of the following courses:

MUS 306 Recording Techniques
MUS 307 Introduction to Computer Music

Plus a total of 3.0 units from the following list:

CSC 475 (1.5) Music Retrieval Techniques
ECE 484* (1.5) Audio Signal Processing
MUS 401C (1.5) Acoustics
MUS 406A (1.5) Advanced Sound Recording Techniques
MUS 406B (1.5) Sound Recording Seminar
MUS 407* (3.0) Computer Music Seminar

Note: A course in this option may be replaced with another course relevant to this option with the permission of the Department.

Electrical Engineering (Quantum Physics Option)

Enrolment in the Quantum Physics Option is limited. Students must apply for admission before registering in any of its required courses. Students interested in this option should notify the Department before the Term 3A. Bridging students may also be able to take this option with appropriate scheduling. Students will be required to have a minimum cumulative GPA of 6 to enrol in the program and obtain a grade of B+ in PHYS 323. In addition to courses required for Electrical Engineering, the Quantum Physics Option requires completion of the following courses:

PHYS 215 Introductory Quantum Physics
PHYS 323 Quantum Mechanics I
PHYS 423 Quantum Mechanics II

Plus any one of:

PHYS 321A Classical Mechanics
PHYS 328 Solid State Physics I
MATH 342 Intermediate Ordinary Differential Equations

Note: A course in this option may be replaced with another course relevant to this option with the permission of the Department.

Fast Track Master’s Option

The department of Electrical and Computer Engineering offers outstanding undergraduate students an opportunity for a head start in a master’s program. Qualified students will be permitted to enrol in graduate-level courses during their fourth year. These courses will be in addition to any undergraduate requirements and thus can be transferred to the MASc or MEng degree program. All of the admission and transfer credit regulations of the Faculty of Graduate Studies must be met. For more information, please contact the Chair or the Graduate Adviser of the department.

Business Minor

A Business Minor develops business skills that are frequently required by practicing Engineers. See “Business Minor Program” (page 327) for requirements.

Minor in Electrical Systems

An Electrical Systems Minor is open to students outside of the programs in Electrical Engineering and Computer Engineering. Students must have a minimum cumulative GPA of 5. The minor requires 9 units of ECE and CENG designated courses with a minimum of 4.5 units at the 300 level or above.

Graduate Programs

For information on studies leading to the MEng, MASc and PhD degrees, see the UVic Graduate Calendar.

Program Requirement Notes

Refer to the “Academic Schedules Notes” on page 121.

Technical Electives 2

The program requires completion of seven technical electives (10.5 units) to be chosen from the lists 2 below. Students who complete three courses (4.5 units) in one of the specialization areas listed below can request a letter from the Electrical and Computer Engineering office confirming this; the area will not be shown on the transcript.

Students who entered the program via a bridge program must take at least two courses (i.e., 3.0 units) from the Special Bridge Students’ Elective List. A printable PDF version of the electives is available here: <www.uvic.ca/engineering/ece/current/undergraduate/advising/bridge-electives>.
Note that some courses appear under more than one category. Not all technical elective courses will be offered every year. Please check the department course schedule website for planning.

### Communications

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>ECE 404</td>
<td>Microwaves and Fiber Optics</td>
</tr>
<tr>
<td>ECE 405</td>
<td>Error Control Coding and Sequences</td>
</tr>
<tr>
<td>ECE 417</td>
<td>Software Defined Radio</td>
</tr>
<tr>
<td>ECE 450</td>
<td>Communications Theory and Systems II</td>
</tr>
<tr>
<td>ECE 456</td>
<td>Mobile Communications</td>
</tr>
<tr>
<td>ECE 458</td>
<td>Communication Networks</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Computational Intelligence

<table>
<thead>
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<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>ECE 403</td>
<td>Optimization for Machine Learning</td>
</tr>
<tr>
<td>ECE 435</td>
<td>Medical Image Processing</td>
</tr>
<tr>
<td>ECE 470</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>ECE 471</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>ECE 485</td>
<td>Data Analysis and Pattern Recognition</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Computer Systems

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ECE 448</td>
<td>Cyber-System Security</td>
</tr>
<tr>
<td>ECE 449</td>
<td>Computer Systems and Architecture</td>
</tr>
<tr>
<td>ECE 455</td>
<td>Real Time Computer Systems Design Project</td>
</tr>
<tr>
<td>ECE 457</td>
<td>Parallel and Cluster Computing</td>
</tr>
<tr>
<td>SENG 422</td>
<td>Advanced Software Architecture</td>
</tr>
<tr>
<td>SENG 426</td>
<td>Software Quality Engineering</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Digital and Embedded Systems

<table>
<thead>
<tr>
<th>Course Code</th>
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<td>Design of Digital and VLSI Systems</td>
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<td>Real Time Computer Systems Design Project</td>
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<tr>
<td>ECE 466</td>
<td>System-on-Chip Engineering for Signal Processing</td>
</tr>
<tr>
<td>SENG 440</td>
<td>Embedded Systems</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Digital Signal Processing

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<tbody>
<tr>
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<tr>
<td>ECE 435</td>
<td>Medical Image Processing</td>
</tr>
<tr>
<td>ECE 459</td>
<td>Applications of Digital Signal Processing Techniques</td>
</tr>
<tr>
<td>ECE 483</td>
<td>Digital Video Processing: Algorithms and Applications in Media</td>
</tr>
<tr>
<td>ECE 484</td>
<td>Audio Signal Processing</td>
</tr>
<tr>
<td>ECE 486</td>
<td>Multiresolution Signal and Geometry Processing with C++</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Electrical Energy Systems

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>ECE 410</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>ECE 482</td>
<td>Electrical Drive Systems</td>
</tr>
<tr>
<td>ECE 488</td>
<td>Electrical Power Systems</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Electromagnetics and Photonics

<table>
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<tr>
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<td>Biophotonics</td>
</tr>
<tr>
<td>ECE 452</td>
<td>Optical Communication Technology</td>
</tr>
<tr>
<td>ECE 453</td>
<td>Antennas and Propagation</td>
</tr>
<tr>
<td>ECE 454</td>
<td>Engineering Components for Wireless Systems</td>
</tr>
</tbody>
</table>

Directed studies, selected topics, or thesis courses

### Electronics

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<tbody>
<tr>
<td>ECE 410</td>
<td>Power Electronics</td>
</tr>
<tr>
<td>ECE 412</td>
<td>Electronic Devices II</td>
</tr>
<tr>
<td>ECE 420</td>
<td>Nanotechnology</td>
</tr>
<tr>
<td>ECE 441</td>
<td>Design of Digital and VLSI Systems</td>
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<tr>
<td>ECE 481</td>
<td>Analog VLSI Systems</td>
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</table>

Directed studies, selected topics, or thesis courses

### Mechatronics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>ECE 426</td>
<td>Robotics</td>
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<tr>
<td>ECE 455</td>
<td>Real Time Computer Systems Design Project</td>
</tr>
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<td>ECE 460</td>
<td>Control Theory and Systems II</td>
</tr>
<tr>
<td>ECE 482</td>
<td>Electrical Drive Systems</td>
</tr>
</tbody>
</table>

### Networks, Security, and Privacy

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<tbody>
<tr>
<td>ECE 448</td>
<td>Cyber-System Security</td>
</tr>
<tr>
<td>ECE 456</td>
<td>Mobile Communications</td>
</tr>
<tr>
<td>ECE 463</td>
<td>Design and Analysis of Computer Networks</td>
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<tr>
<td>SENG 460</td>
<td>Practice of Information Security and Privacy</td>
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<tr>
<td>SENG 461</td>
<td>Network Security</td>
</tr>
<tr>
<td>SENG 468</td>
<td>Software System Scalability</td>
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Directed studies, selected topics, or thesis courses

### Other Technical Electives

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ECE 440</td>
<td>Human Factors in Engineering</td>
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</table>

Digital Signal Processing

Directed studies, selected topics, or thesis courses

Electrical Energy Systems

Directed studies, selected topics, or thesis courses

Electromagnetics and Photonics

Directed studies, selected topics, or thesis courses

Electronics

Directed studies, selected topics, or thesis courses

Mechatronics

Directed studies, selected topics, or thesis courses

Networks, Security, and Privacy

Directed studies, selected topics, or thesis courses

Other Technical Electives

Directed studies, selected topics, or thesis courses
### Other Technical Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ECE 461</td>
<td>Dynamics and Control of Switched Mode Power Supplies</td>
</tr>
<tr>
<td>ECE 462</td>
<td>Motor Drive Dynamics</td>
</tr>
<tr>
<td>ECE 496A</td>
<td>Selected Topics in Electrical and Computer Engineering</td>
</tr>
<tr>
<td>ECE 496B</td>
<td>Selected Topics in Electrical and Computer Engineering</td>
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<tr>
<td>ECE 496C</td>
<td>Selected Topics in Electrical and Computer Engineering</td>
</tr>
<tr>
<td>ECE 496D</td>
<td>Selected Topics in Electrical and Computer Engineering</td>
</tr>
<tr>
<td>SENG 410</td>
<td>Media Applications</td>
</tr>
<tr>
<td>SENG 475</td>
<td>Advanced Programming Techniques for Robust and Efficient Computing</td>
</tr>
</tbody>
</table>

Each of the following courses, which will require additional prerequisites and permission from the offering department:

- MECH 410: Computer Aided Design
- MECH 460: Computer Aided Manufacture

Directed studies, selected topics, or thesis courses

### Topics and Thesis Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ECE 490</td>
<td>Directed Studies</td>
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<tr>
<td>ECE 498</td>
<td>Honours Thesis</td>
</tr>
<tr>
<td>ECE 499</td>
<td>Directed Studies</td>
</tr>
<tr>
<td>ECE 496A</td>
<td>Selected Topics in Electrical and Computer Engineering</td>
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<tr>
<td>ECE 496B</td>
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<tr>
<td>ECE 496D</td>
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</tr>
<tr>
<td>ECE 498</td>
<td>Honours Thesis</td>
</tr>
</tbody>
</table>

### Technical Elective Notes:

1. Not all technical electives will be offered every year. Please check the department course schedule website for planning.
2. Other 400-level or graduate courses may be considered as a Technical Elective with the permission of the department and Dean of Graduate Studies as required. Refer to "Registration in Graduate Courses by Undergraduates" (page 39).
3. Courses other than those listed may be counted for credit towards a specialization with the permission of the Department.
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<td>MATH 110</td>
<td>PHYS 111</td>
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</table>

### Term 2A | Term 2B

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</thead>
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</tr>
<tr>
<td>ECE 255</td>
<td>ECE 220</td>
</tr>
<tr>
<td>CSC 116</td>
<td>ECE 260</td>
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<td>ECE 250</td>
<td>ECE 299</td>
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<tr>
<td>MATH 200</td>
<td>MECH 295</td>
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### Term 3A | Term 3B

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<th>Course Title</th>
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<td>ECE 350</td>
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<tr>
<td>ECE 310</td>
<td>ECE 360</td>
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<td>ECE 320</td>
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<td>ECE 330</td>
<td>ECE 380</td>
</tr>
<tr>
<td>ECE 340</td>
<td>ECE 399</td>
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</table>

### Term 4A | Term 4B

<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>ECE 499</td>
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<tr>
<td>ECON 180</td>
<td>ENGR 446</td>
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<tr>
<td>Technical Electives*</td>
<td>1 Natural Science Elective</td>
</tr>
<tr>
<td>Technical Electives*</td>
<td>1 Complementary Studies Elective</td>
</tr>
</tbody>
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### Academic Schedules Notes

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### Footnotes:

- Complementary Studies Elective
- Natural Science Elective
- Technical Electives
- Additional prerequisites and permission from the offering department are required for these courses.
- Students in Electrical Engineering are required to take a total of seven Technical Electives.
2. Students normally must successfully complete ENGR 130 (Introduction to Professional Practice) before undertaking their first work term.
3. CSC 115 may be substituted in a term when CSC 116 is not offered. CSC 116 is strongly recommended.
4. A course in natural science as required by CEAB guidelines and as approved by the Faculty of Engineering. Students may choose a course from a pre-approved list: https://www.uvic.ca/engineering/current-students/planning/index.php or seek permission from the Engineering Undergraduate Office (EUO).
5. A Complementary Studies Elective course dealing with central issues in humanities or social sciences, as required by CEAB guidelines for complementary studies, and as approved by the Faculty of Engineering. Students may choose a course from a pre-approved list: https://www.uvic.ca/engineering/current-students/planning/index.php or seek permission from the Engineering Undergraduate Office (EUO).
6. Or acceptable replacement.
7. MUS 407 is a two-term course taken in the fall and spring.
8. Alternate first year schedules for spreading the first year course load over three terms may be available. For more information, visit the following URL: https://www.uvic.ca/engineering/current-students/new/index.php
9. Students entering the Electrical Engineering program through the Engineering Bridge program must take ENGR 297 as their Natural Science Elective.
10. Students normally take ENGR 446 in the term preceding the final term of their academic programme (academic or work term.)
11. ENGR 297 may also be offered in other terms.

### Mechanical Engineering

This program is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Association of Professional Engineers.

**Program Requirements**

#### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 150</td>
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</tr>
<tr>
<td>CSC 111</td>
<td>1.5</td>
</tr>
<tr>
<td>ENGR 110, 120, 130, 141</td>
<td>7.0</td>
</tr>
<tr>
<td>MATH 100 or 109, 101, 110</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 110 or 122, 111 or 125</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.5</strong></td>
</tr>
</tbody>
</table>

#### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CSC 116¹</td>
<td>1.5</td>
</tr>
<tr>
<td>ECE 216, 250</td>
<td>3.0</td>
</tr>
<tr>
<td>ENGR 297</td>
<td>1.5</td>
</tr>
<tr>
<td>MATH 200, 204</td>
<td>3.0</td>
</tr>
<tr>
<td>MECH 200, 220, 240, 242, 285</td>
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<tr>
<td>STAT 254</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

#### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 349A</td>
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</tr>
<tr>
<td>ECE 365</td>
<td>1.5</td>
</tr>
<tr>
<td>ECON 180</td>
<td>1.5</td>
</tr>
<tr>
<td>MECH 320, 330, 335, 345, 350, 360, 380, 390, 395</td>
<td>13.5</td>
</tr>
</tbody>
</table>

### Mechanical Engineering Technical Electives

The Department of Mechanical Engineering offers a large number of technical electives; the program requires completion of eight technical electives (12.0 units) to be chosen from the lists below. Students who complete 6 units in one of the specializations listed below can request a letter from the Mechanical Engineering undergraduate office confirming this; the specialization will not be shown on the transcript.

#### Computer Aided Engineering and Advanced Manufacturing

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH 410</td>
<td></td>
</tr>
<tr>
<td>MECH 411</td>
<td></td>
</tr>
<tr>
<td>MECH 420</td>
<td></td>
</tr>
<tr>
<td>MECH 450-F</td>
<td></td>
</tr>
<tr>
<td>MECH 455</td>
<td></td>
</tr>
<tr>
<td>MECH 459</td>
<td></td>
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<tr>
<td>MECH 460</td>
<td></td>
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<tr>
<td>MECH 462</td>
<td></td>
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<tr>
<td>MECH 466</td>
<td></td>
</tr>
<tr>
<td>MECH 495</td>
<td></td>
</tr>
<tr>
<td>MECH 497</td>
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<tr>
<td>MECH 498</td>
<td></td>
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<tr>
<td>MECH 499</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19.0</strong></td>
</tr>
</tbody>
</table>

### Advanced Materials

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH 423</td>
<td></td>
</tr>
<tr>
<td>MECH 472</td>
<td></td>
</tr>
<tr>
<td>MECH 473</td>
<td></td>
</tr>
<tr>
<td>MECH 481</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

### Biomedical Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 434</td>
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</tr>
<tr>
<td>ECE 435</td>
<td></td>
</tr>
<tr>
<td>MECH 472</td>
<td></td>
</tr>
</tbody>
</table>

¹ Students entering the Electrical Engineering program through the Engineering Bridge program must take ENGR 297 as their Natural Science Elective.

Note that some courses appear under more than one category and can be used for more than one specialization; with a maximum of 3.0 units shared between specializations. Up to two specializations will be acknowledged by the Department of Mechanical Engineering.
Courses from Other departments

With the permission of the involved departments, students may take a limited number of upper-level courses as technical electives from other departments.

Biomedical Engineering

MECH 481   Bio Materials & Tissue Engineering
MECH 483   Mechanics and Energy Conversion for Living Cells
Topic, thesis or project courses *

Energy Systems

MECH 443   Advanced Thermodynamics
MECH 444   Wind Power Systems
MECH 445   Cryogenic Engineering
MECH 446   Introduction to Ocean Engineering
MECH 447   Energy Systems
MECH 449   Fuel Cell Technology
MECH 459   Fundamentals of Hybrid Vehicles
MECH 493   Design of Thermo-Fluid Systems
MECH 494   Thermofluids and Introduction to Mass Transfer
MECH 497   Green Vehicle Technology Project
Topic, thesis or project courses *

Thermo-Fluids and Aerodynamics

MECH 443   Advanced Thermodynamics
MECH 444   Wind Power Systems
MECH 446   Introduction to Ocean Engineering
MECH 447   Energy Systems
MECH 475   Aircraft Design
MECH 492   Transport Phenomena
MECH 493   Design of Thermo-Fluid Systems
MECH 494   Thermofluids and Introduction to Mass Transfer
MECH 495   Computational Fluid Dynamics and Heat Transfer
Topic, thesis or project courses *

Mechatronics

MECH 421   Mechanical Vibrations
MECH 430   Robotics
MECH 455   Instrumentation
MECH 458   Mechatronics
MECH 459   Fundamentals of Hybrid Vehicles
MECH 466   Microelectromechanical Systems
MECH 485   Mechanism and Manipulator Synthesis
Topic, thesis or project courses *

Topics, Thesis or Projects Courses

* Can be used for only one specialization letter, when deemed related to the specialization area by the course instructor.
MECH 450A-F   Special Topics
MECH 498   Honours Thesis (3.0 units)
MECH 499   Technical Project (1.5 units)

Courses from Other departments

With the permission of the involved departments, students may take a limited number of upper-level courses as technical electives from other departments.

MECH 500-level Courses

With the permission of the department, students may select courses as technical electives, from the list of 500-level Mechanical Engineering graduate courses.

Business Minor

The Faculty of Engineering in conjunction with the Peter B. Gustavson School of Business offers a Business Minor. See “Business Minor Program” (page 327) for requirements.

Minor in Mechanical Systems

A Mechanical Systems Minor is open to all students outside the Mechanical Engineering program. It requires 9 units of MECH-designated courses, with a minimum of 4.5 units at the 300 level or above. Permission of the department is required. Courses that fulfill requirements for a Minor cannot form part of the requirements for the degree. In order to accommodate students from different backgrounds, as much flexibility as possible is given in course selection (consistent with course prerequisites). A suitable choice of fourth-year courses can lead to any areas of specialization given above in the Mechanical Engineering Technical Elective list.

Academic Schedule: BEng in Mechanical Engineering

| Term 1A | Term 1B
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 111</td>
<td>CHEM 150</td>
</tr>
<tr>
<td>ENGR 130</td>
<td>ENGR 120</td>
</tr>
<tr>
<td>ENGR 110</td>
<td>ENGR 141</td>
</tr>
<tr>
<td>MATH 100 or 109</td>
<td>MATH 101</td>
</tr>
<tr>
<td>MATH 110</td>
<td>PHYS 110 or 125</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 2A</th>
<th>Term 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 116</td>
<td>ECE 250</td>
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<tr>
<td>ECE 216</td>
<td>ENGR 297</td>
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<tr>
<td>MATH 200</td>
<td>MATH 204</td>
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<td>MECH 220</td>
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<tr>
<td>MECH 200</td>
<td>MECH 242</td>
</tr>
<tr>
<td>MECH 240</td>
<td>MECH 285</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 3A</th>
<th>Term 3B</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 349A</td>
<td>ECE 365</td>
</tr>
<tr>
<td>MECH 320</td>
<td>ECON 180</td>
</tr>
<tr>
<td>MECH 335</td>
<td>MECH 330</td>
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<tr>
<td>MECH 345</td>
<td>MECH 360</td>
</tr>
</tbody>
</table>
MECH 350  MECH 380  MECH 390  MECH 395

Technical Elective Courses

Technical Electives are normally offered as follows:

<table>
<thead>
<tr>
<th>Term 4A</th>
<th>Term 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH 400</td>
<td>ENGR 446</td>
</tr>
<tr>
<td>4 Technical Electives</td>
<td>ENGR 498</td>
</tr>
<tr>
<td></td>
<td>Complementary Studies Elective (1.5)</td>
</tr>
<tr>
<td></td>
<td>4 Technical Electives</td>
</tr>
</tbody>
</table>

### Technical Elective Courses

Technical Electives are normally offered as follows:

#### May-August Term

- MECH 420
- MECH 430
- MECH 447
- MECH 460
- MECH 483
- MECH 498

- MECH 421
- MECH 444
- MECH 450A-F
- MECH 462
- MECH 494
- MECH 499

- MECH 423
- MECH 445
- MECH 455
- MECH 466
- MECH 497
- MECH 499

#### January-April Term

- MECH 410
- MECH 446
- MECH 458
- MECH 475
- MECH 493
- MECH 498

- MECH 411
- MECH 449
- MECH 450A-F
- MECH 481
- MECH 495
- MECH 499

- MECH 443
- MECH 455
- MECH 466
- MECH 485
- MECH 497
- MECH 499

#### September-December Term

- MECH 459
- MECH 497
- MECH 498

- MECH 499

### Academic Schedules Notes

1. Deviation from the standard program schedule requires submission of a Program Change Form and approval by the Department before commencement of term. Students with third- and fourth-year standing will have registration priority for 300- and 400-level courses.
2. Alternate first year schedules for spreading the first year course load over three terms may be available. See “First Year Schedule” (page 113).
3. ENGR 130 (Introduction to Professional Practice) is mandatory for BEng students. Students normally must successfully complete ENGR 130 before undertaking their first work term.
4. Students entering Mechanical Engineering through the Engineering Bridge Program must take ENGR 297 in place of one technical elective.
5. Students normally register in this course in the term preceding the final term of their academic program (academic or work term).
6. Must be a course dealing with central issues in humanities or social sciences, as required by CEAB guidelines for complementary studies, and as approved by the BEng Programs Committee. A current list of acceptable replacement courses is available from the Engineering Undergraduate Office (EUO).
7. Depending on student interest and faculty availability, courses from the Technical Electives lists will be offered by the department.
8. CSC 115 may be accepted as a substitute; students need to see Mechanical Department for approval.

### Software Engineering

This program is accredited by the Canadian Engineering Accreditation Board (CEAB) of the Canadian Council of Professional Engineers. Accreditation ensures that graduates of the program satisfy the academic requirements for registration with the provincial Association of Professional Engineers.

Co-operative Education is mandatory in the BEng degree program. Please refer to the Faculty of Engineering Co-operative Education Programs General Regulations (page 126).

**BEng Program Requirements**

Many courses are offered only one time per year. Refer to the Faculty website for course scheduling information. Consult with a program adviser for schedule planning advice.

Please refer to the table under “Academic and Work/Other Term Schedule” (page 112) for information on standard academic term and work term sequencing. Please refer to the table under “Approved Substitutions for Courses Taken at UVic” (page 111) for information on acceptable course substitutions for BEng students.

#### Year 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 111, 115</td>
<td>3.0</td>
</tr>
<tr>
<td>ENGR 110, 120, 130, 141</td>
<td>7.0</td>
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<tr>
<td>MATH 100 or 109, 101, 110</td>
<td>4.5</td>
</tr>
<tr>
<td>PHYS 110, 111</td>
<td>3.0</td>
</tr>
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</table>

**Total** 17.5

#### Year 2

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 255 or CSC 230</td>
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<tr>
<td>CHEM 101</td>
<td>1.5</td>
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<tr>
<td>CSC 225</td>
<td>1.5</td>
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<tr>
<td>ECE 260, 310</td>
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<tr>
<td>ECON 180</td>
<td>1.5</td>
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<tr>
<td>MATH 122</td>
<td>1.5</td>
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<tr>
<td>SENG 265, 275, 310</td>
<td>4.5</td>
</tr>
<tr>
<td>STAT 260</td>
<td>1.5</td>
</tr>
<tr>
<td>One Complementary Studies Elective</td>
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</table>

**Total** 18.0

#### Year 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECE 355 or CSC 355</td>
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</tr>
<tr>
<td>ECE 458 or CSC 361</td>
<td>1.5</td>
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<tr>
<td>CSC 226, 320, 360, 370</td>
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<tr>
<td>ECE 360</td>
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<td>SENG 321, 350, 360, 371</td>
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<tr>
<td>One Natural Science Elective</td>
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**Total** 18.0

#### Year 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECE 455 or CSC 460</td>
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</tr>
<tr>
<td>SENG 401, 426, 440, 499</td>
<td>6.0</td>
</tr>
</tbody>
</table>

9. Also offered in 4B (Spring) term.
### Year 4

<table>
<thead>
<tr>
<th>Course Category</th>
<th>Units</th>
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<tbody>
<tr>
<td>Five Technical Electives</td>
<td>7.5</td>
</tr>
<tr>
<td>One Complementary Studies Elective</td>
<td>1.5</td>
</tr>
<tr>
<td>One Natural Science Elective</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18.0</strong></td>
</tr>
</tbody>
</table>

In addition, students must complete four Co-op work terms (ENGR 001, 002, 003, 004), as per the Faculty of Engineering “Academic and Work/Other Term Schedule” (page 112).

1. Deviation from the standard program schedule requires submission of a Program Planning Worksheet and approval by the BSEng Program before commencement of term. See your program adviser for more information.

2. Students who transferred from other programs or post-secondary institutions must choose their electives in consultation with a program adviser. Their choice of electives requires pre-approval by the BSEng Program.

3. Not all technical elective courses are offered every year. Refer to the CSC Program website for course scheduling information. Students who transferred from other programs or post-secondary institutions must choose their electives in consultation with a program adviser. Their choice of electives requires pre-approval by the BSEng Program.

4. Other courses that may qualify as technical electives are topic courses, directed studies, technical projects and other courses offered by the Faculty of Engineering.

5. See the section titled “BSEng 4th Year Technical Electives”.

### BSEng 4th Year Technical Electives

Students in the BSEng Program must complete five technical electives (7.5 units) from the list below.

- CSC 305: Introduction to Computer Graphics
- CSC 322: Logic and Programming
- CSC 330: Programming Languages
- CSC 349A: Numerical Analysis
- CSC 421: Introduction to Artificial Intelligence
- CSC 470: Artificial Intelligence
- CSC 422: Graph Algorithms
- CSC 423: Randomized Algorithms
- CSC 425: Analysis of Algorithms
- CSC 426: Computational Geometry
- CSC 428A: Combinatorial Algorithms
- CSC 429: Cryptography
- CSC 435: Compiler Construction
- CSC 445: Operations Research: Linear Programming
- CSC 446: Operations Research: Simulation
- CSC 449: Numerical Linear Algebra
- CSC 454: Fault Tolerant Computing
- CSC 461: Multimedia Systems
- CSC 462: Distributed Computing
- CSC 463: Wireless and Mobile Networks
- CSC 464: Concurrency
- CSC 466: Overlay and Peer-to-Peer Networking
- CSC 467: Switching, Network Traffic and Quality Service
- CSC 471: Fundamentals of Computer Rendering
- CSC 472: Fundamentals of Computer Modelling
- CSC 473: Fundamentals of Computer Animation
- CSC 475: Music Retrieval Techniques
- CSC 498: Bioinformatics Project
- ECE 403: Optimization for Machine Learning
- ECE 407: Digital Signal Processing II
- ECE 426: Robotics
- ECE 435: Medical Image Processing
- ECE 440: Human Factors in Engineering
- ECE 449: Computer Systems and Architecture
- ECE 455: Real Time Computer Systems Design Project
- ECE 457: Parallel and Cluster Computing
- ECE 459: Applications of Digital Signal Processing Techniques
- ECE 460: Control Theory and Systems II
- ECE 463: Design and Analysis of Computer Networks
- ECE 466: System-on-chip Engineering for Signal Processing
- ECE 469: Introduction to Artificial Intelligence
- ECE 470: Artificial Intelligence
- ECE 471: Computer Vision
- ECE 483: Digital Video Processing
- ECE 484: Audio Signal Processing
- ECE 485: Data Analysis and Pattern Recognition
- ECE 486: Multiresolution Signal and Geometry Processing
- MECH 458: Mechatronics
- MECH 459: Fundamentals of Hybrid Vehicles
- MECH 466: Microelectromechanical Systems
- MECH 497: Green Vehicle Technology Project
- SENG 380: Software Process and Management
- SENG 411: Advanced Methods for Human Computer Interaction
- SENG 421: Global Software Engineering
- SENG 422: Advanced Software Architecture
- SENG 423: Computer Supported Collaborative Work
- SENG 460: Practice of Information Security and Privacy
- SENG 461: Network Security
- SENG 466: Software for Embedded and Mechatronic Systems
- SENG 468: Software System Scalability
- SENG 474: Data Mining
- SENG 475: Advanced Programming Techniques for Robust and Efficient Computing
- SENG 480A: Topics in Software Engineering
- SENG 480B: Topics in Software Engineering
- SENG 480C: Topics in Software Engineering
- SENG 480D: Topics in Software Engineering

1. Other courses that may qualify as technical electives are topic courses, directed studies, technical projects and other courses offered by the Faculty of Engineering.
Engineering Co-operative Education Programs

Engineering students are automatically admitted to the Engineering Co-op program. See general Engineering program regulations for retention.

Work Term Sequence

Work terms are normally of four months’ duration and alternate with academic terms. Upon approval, work terms of 4 months can be combined to 8-, 12-, or 16-month periods of employment. Bachelor of Engineering and Bachelor of Software Engineering students need to submit a modified program request to their respective departmental office for approval of work terms longer than 4 months.

Work term prerequisite

ENGR 130 (Introduction to Professional Practice) is prerequisite to ENGR 001. See Engineering course listing for work term prerequisite sequencing.

Co-op Program Fee

The university assesses a Co-op Program Fee for each work term, which is non-refundable, that is due in the first month of each term for eight (8) terms and is subject to the University’s general fee regulations.

Note: students admitted to BEng/BSEng programs prior to September 2012 will be assessed a work term fee upon registration in each work term as per tuition regulations under “Engineering Tuition”.

Advance Credit

Students must pass four work terms in order to qualify for the BEng or BSEng Co-op degree. There are, however, several clearly defined situations where this requirement may be reduced by one or at most two work terms. Please note that the total work term credits/reductions that can be accumulated under this section is limited to a maximum of two. A student with extensive technical work experience completed prior to admission to the program may apply to challenge for credit one or two work terms.

Minor in Software Development

A Software Development Minor is open to students outside of the Bachelor of Software Engineering Program and Computer Science Programs.

The minor requires 10.5 units of courses as follows:

CSC 110 or 111 ................................................................. 1.5
CSC 115 or 116 ................................................................. 1.5
SENG 265, 275 and 350 ..................................................... 4.5
Two SENG courses at 300 or 400 level ................................ 3.0

Note that 200 level and higher courses that fulfill requirements for a Minor cannot form part of the requirements for the Major or Honours degree. Any such course in the Minor program may be replaced by another suitable course at the same level or higher after consultation with the Software Engineering Program Office.

ENGINEERING AND COMPUTER SCIENCE CO-OPERATIVE EDUCATION PROGRAMS GENERAL REGULATIONS

The University regulations with respect to “Undergraduate Co-operative Education” (page 60) are applicable to the BEng, BSEng and Computer Science degree program students except to the extent that they are modified by regulations adopted by the BEng, BSEng or Computer Science Co-op programs.

The faculty and departments will endeavour to inform students who appear to be at risk of violating any of these requirements. Failure to do so, however, in no way obligates the faculty or the departments to waive a requirement at a later date.

The Engineering and Computer Science Co-op office is responsible for overseeing and evaluating work placements, and the assignment of the work term grades.

Students must sign a current Terms and Conditions document as provided by the Engineering and Computer Science Co-op Program in order to be eligible to participate in the placement process.

Work Term Credits/Reductions

A student with Co-op work terms from another post-secondary institution may apply for transfer credit (to a maximum of two) toward the four required work terms if they have at least 12 units of academic credit which transfers from that institution towards the CSC Co-op degree. Detailed documentation supporting the credit request may be required.

A student with at least four months related work experience may apply for Work term credit by challenge. Students must apply in writing to the Engineering and Computer Science Co-op office for challenges and transfer credits. Applications must be made within the first four months of attendance in the BEng, BSEng or CSC programs at the University of Victoria. Complete documentation in accordance with University of Victoria guidelines must be submitted within four months after making the application.

A student undertaking continuous Co-op work experience longer than four months must be registered in a separate work term for each 4 month period and may be granted credit for additional work terms provided the basic requirements for each individual work term are met. Additional work terms should incorporate increased responsibility. For any period of work beyond 4 months for which there are no additional registrations, the student will lose Co-op status and full-time standing at UVic.

Work Term Application and Registration

Students must be registered for the work term by completing the Work Term Registration Form.

Students are expected to participate fully in the placement process. While every attempt will be made to ensure that all eligible students are placed, the Engineering and Computer Science Co-op office is under no obligation to guarantee placement.

Students should be aware that they may be required to spend work terms outside the greater Victoria area.

The Engineering and Computer Science Co-op Program reserves the right to approve any employer that provides placements for students and to withdraw a student from any placement assigned to a student. The student, however, has the right to be informed in writing of the reasons for any withdrawal and can follow the student appeal procedures as outlined in the Co-operative Education Program section.

Students must be registered for the entire duration of the work term placement and, once registered, are not permitted to withdraw from the placement without penalty of failure, unless specific written permission has been granted by the Dean. Where permission is granted, an entry of WNF (Withdraw No Fault) will be entered on the transcript.
Work Term Assessment

Students are required to write a report for each four-month work term. The report is expected to follow the guidelines as outlined by the Engineering and Computer Science Co-op program.

Students must mail or hand-deliver a hard copy of the report directly to the Engineering and Computer Science Co-op office. Due dates and other administrative details are stipulated in the course outline for each work term. Failing grades are submitted for work term reports not handed in by the due date.

Each work term is evaluated on the basis of the student’s performance of assigned work term tasks and a final work term submission as defined by the individual department. The work term period and evaluation (grading: COM, F/X, or N/X) are recorded on the student’s official academic record. A failing grade (F/X or N/X) will be assigned if a student fails to complete satisfactorily the requirements for the work term.

The requirements for a pass grade in a Co-op work term include:

- the Co-op program’s satisfactory assessment of the work term,
- the employer’s satisfactory competency assessment of the student,
- the satisfactory completion of the final work term submission (such as work term report, competency assessment) as submitted according to the deadlines defined by the Engineering and Computer Science Co-op Office.

Students who are assigned a grade of F/X or N/X for a work term that carries 4.5 units will have a 0 grade point assigned for that work term; however, the grade is excluded from the calculations of all grade point averages. For the minimum sessional grade-point average regulations however, the grade is excluded from the calculations of all grade point averages.

Students registered for work terms are considered to be enrolled in a full-time course of studies and may not take university-level credit courses without the permission of the Program Manager of the Engineering and Computer Science Co-op program.

Students who are not registered in academic terms or in work terms should make themselves aware of the implications of their lack of full-time status.

Status of Students on Work Terms

Students registered for work terms are considered to be enrolled in a full-time course of studies and may not take university-level credit courses without the permission of the Program Manager of the Engineering and Computer Science Co-op program for BEng/BSEng and CSC students.

Faculty Members

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Erin Robinson, Administrative Officer
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Maria Hoeberechts, BSc, PhD (West. Ont.), Adjunct Professor (2018-21)
Baljeet Malhotra, BSc, MSc, PhD (Alberta), Adjunct Professor (2018-21)
Dimistris Marinakis, BSc (UVic), PhD (McGill), Adjunct Professor (2012-18)
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James S. Collins, BSc (Dal), BEng, MEng (Dal/NSSTC), PhD (Wash), PEng, (2018-21)
M. Watheq El-Kharashi, BSc, MSc (Ain Shams), PhD (UVic), (2018-21)
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Morteza Esmaeili, MSc (Teacher Training University, Tehran), PhD (Carleton), (2018-21)
Mazen O. Hasna, BSc (Qatar), MSc (USC), PhD (Minn), (2016-19)
Atef A. Ibrahim, PhD (Cairo) (2017-20)
T. Ilamparithi, BE (Anna), MTech (Indian Institute of Technology), PhD (UVic) (2017-19)
Frank Nianhua Jiang, BEng, MEng (U. of Electronics Science and Technology, Chengdu), PhD (Tokohoku), (2018-21)
Wei Li, BEng, MEng (Beijing U of Posts and Telecom), PhD (UVic), (2017-20)
Yanguo Liu, BE (Harbin Institute of Technology), MASC, PhD (UVic) (2016-19)
Darshaka Perera, BSc, MSc (Royal Institute of Technology), PhD (UVic), (2017-20)
Hari C. Reddy, BE (Sri Venkateswara), ME (Baroda), PhD (Osmania), LFEIEEE, (2016-19)
Dale J. Shpak, BSc, MEng (Calg), PhD (UVic), PEng, (2017-20)
Isaac Woungang, MSc in Mathematics (Aix-Marseille II), MSc in Telecommunications (Quebec at Montreal), PhD (Toulon & Var, Toulon, France), (2016-19)
Wei Xu, BS, MS, PhD (Southeast University), (2017-20)
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DEPARTMENT OF MECHANICAL ENGINEERING
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Barbara Sawicki, BSc, MSc, PhD, DSc (Jagiellonian)
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BIOMEDICAL ENGINEERING PROGRAM - OFFERED BY THE DEPARTMENTS OF ELECTRICAL & COMPUTER ENGINEERING AND MECHANICAL ENGINEERING
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Belinda de Jong, BA (UVic), Academic Advisor
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BACHELOR OF SOFTWARE ENGINEERING (BSENG)
Program - Offered by the Departments of Computer Science and Electrical & Computer Engineering
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Cassandra Petrachenko, Program Coordinator
Belinda de Jong, BA (UVic), Academic Advisor
Imen Bourguiba, BSc (McMaster), Co-operative Education Coordinator
Ahmad Salman, BSc (UET, Pakistan), PMP, MBA (IBA, Pakistan), MGM (Queen’s)
ENGINEERING AND COMPUTER SCIENCE CO-OPERATIVE EDUCATION PROGRAMS

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Cheryl Beaumont, BSc Eng(Queens), Vancouver, Co-operative Education Coordinator
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Kelly Brooks, PhD (Uvic), Software Engineering Co-operative Education Coordinator