The Faculty of Applied Science

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Academic Staff

  Department of Chemical and Biological Engineering
  Department of Civil Engineering
  Department of Electrical and Computer Engineering
  Engineering Physics Program
  Geological Engineering Program
  Integrated Engineering Program
  Department of Materials Engineering
  Department of Mechanical Engineering
  Department of Mining Engineering
  Dean's Office
Introduction

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Fax: 604.822.7006
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Faculty of Applied Science (http://www.apsc.ubc.ca)

The Faculty of Applied Science offers undergraduate and graduate programs in engineering, architecture, and nursing. The Faculty offers engineering programs through the Departments of Chemical and Biological Engineering, Civil Engineering, Electrical and Computer Engineering, Materials Engineering, Mechanical Engineering, and Mining Engineering, as well as through three boards of study: Engineering Physics, Geological Engineering, and Integrated Engineering. The two schools in the Faculty offer programs in their respective disciplines, as described in the School of Architecture and Landscape Architecture and The School of Nursing.

Extension of engineering studies to the graduate level is becoming increasingly important. The Faculty offers graduate programs leading to the degrees of Master of Applied Science (M.A.Sc.), Master of Engineering (http://www.engineering.ubc.ca/prospective_student/index.php) (M.Eng.), and Doctor of Philosophy (Ph.D.), and provides research facilities in many areas of engineering. The Faculty of Graduate and Postdoctoral Studies lists requirements for admission (http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,204,340,0) to the M.A.Sc. and Ph.D. programs, while the Faculty of Applied Science lists requirements for admission to the M.Eng program.

Bachelor of Applied Science

Bachelor of Applied Science > Introduction

The Faculty offers programs of undergraduate study leading to the Bachelor of Applied Science in the following areas of engineering: Biomedical Engineering, Chemical Engineering, Chemical and Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Geological Engineering, Integrated Engineering, Materials Engineering, Mechanical Engineering, and Mining Engineering. It also offers the Bachelor of Applied Science in Environmental Engineering as a joint program with the University of Northern British Columbia.

The Faculty of Applied Science admits suitably qualified applicants directly from secondary school into first-year engineering. These students will normally complete the Bachelor of Applied Science in four years of academic study, except in the case of the Engineering Physics program which requires five years' study. Students may also enter the engineering program after spending one or more years in the Faculty of Science, either because they wish to avail themselves of a broader range of electives or because they do not meet the entrance requirements for admission directly from secondary school (Admission from BC/Yukon Grade 12 or equivalent). Depending on the transfer credit in engineering received from first-year Science (see Admission from Science), such students may be able to complete an engineering degree with three further years of study, otherwise they will require four further years.
Scheduled field trips, and the activities of professional and technical societies all contribute to the rounding out of the undergraduate programs and students are expected to participate in them as fully as circumstances permit.

The Faculty will consider proposals from qualified applicants for part-time study towards the Bachelor of Applied Science. Since the flexibility for such study may be limited, approval must be obtained from the Dean's Office.

**Bachelor of Applied Science > Academic Advising**

Academic advising duties are shared between the Engineering Student Services Office and department or program advisors. The Engineering Student Services Office is located at 2332 Main Mall, Room 1100. Department offices have the names of the department advisors. The Engineering Student Services Office handles advising for all first-year students and for courses given by other faculties. Department advisors deal with questions regarding courses taken within the student's own department.

**Bachelor of Applied Science > Admission**

Application for admission to the Engineering program must be made through an online application form (http://you.ubc.ca/applying-ubc/) no later than January 15. The applicant is responsible for ensuring that all supporting documents, including official transcripts, are submitted to Enrolment Services by the deadlines provided following the submission of an application, otherwise the application will not be considered.

Due to limited resources, the Faculty has been authorized to restrict enrolment in first-year engineering, and within individual engineering programs at the second-year level. Attainment of the minimum academic requirements listed below means that the applicant is eligible for selection, but does not provide assurance of admission. The selection is based on academic standing. For most engineering programs, the competition for places is such that standing above the minimum prescribed requirements is necessary to ensure admission.

The attention of applicants is drawn to the importance of mathematics as a preparation for engineering courses. Experience has shown that UBC students with grades below 65% in mathematics (below B at a college) are likely to have difficulty with many engineering courses.

**Admission from BC/Yukon Grade 12 (or equivalent)**

In addition to satisfying university admission requirements, applicants must have completed mathematics, physics, and chemistry at the BC Grade 12-level, or the equivalent. Students applying to the Biomedical Engineering program must also have completed Grade 12 Biology or equivalent. Students will be selected on the basis of their standing in Grade 12 courses in mathematics, chemistry, physics, and English. Applicants from schools where either Physics 12 or Chemistry 12 is not available may petition to be excused this deficiency. Candidates not having grade 12 Physics may still apply. A strong background in alternative grade 12 science courses1 and/or additional preparation in mathematics2 will be considered an asset in such cases, and will be used by the Faculty in conjunction with the personal profile statement to assess the candidate's preparedness for an engineering program. Candidates deemed outstanding by the Faculty may be admitted. Successful candidates lacking an admissions requirement would need to address any such deficiencies, either in the summer before commencing at UBC or by completing a modified first year program extending into the summer following first year, before proceeding with a second year program.

UBC is prepared to offer early admission to secondary school students graduating in June based on interim or projected final grades submitted by the schools.

In addition to high academic standards, the Faculty recognizes the benefits of previous technical work, advanced academic preparation1,2, and extracurricular activities. The UBC application process includes a personal profile statement in which the applicant will have the opportunity to provide additional information. For the most up-to-date information on the application process,
The personal profile statement, in conjunction with academic records, will be used by the Faculty in selecting a portion of the students entering engineering.

1 e.g., Biology 12, Geography 12, Computer Science 12, or equivalent
2 e.g., Calculus 12

**Admission from a Post-Secondary Institution**

Applicants from another faculty at UBC or another post-secondary institution may be considered for admission to the engineering program of the Faculty of Applied Science. An overall average of at least 65%, including any failed courses, is required. The overall average is calculated in accordance with the general admission requirement for undergraduate applicants from a college or university (Calendar page: [http://www.calendar.ubc.ca/vancouver/index.cfm?tree=2,25,73,0#139](http://www.calendar.ubc.ca/vancouver/index.cfm?tree=2,25,73,0#139)).

Applicants must also have an average of at least 70% in all chemistry, mathematics, and physics courses which transfer to the first-year engineering program. Courses to be considered in this average of mathematics, chemistry, and physics courses are not limited to the last 30 credits only. Where two courses, or one repeated course, have been taken which transfer to one of the courses of the first-year engineering program, only the grade of the latest course will be used in calculating this average.

Admission to the engineering program is competitive. Applicants who meet all of these criteria are not guaranteed admission.

Applicants with less than 24 transferable credits from a post-secondary institution are evaluated against both secondary and post-secondary admission criteria.

Applicants with more than 26 credits of transfer credit in first-year engineering may be eligible for second-year engineering. Advice on transfer credit is available from the Dean's Office, Engineering Student Services. Deficiencies from first-year must be completed prior to graduation.

Students admitted to second year must complete a Second Year Program Preference Form by June 15.

Exemptions are given for courses in first-year Applied Science for the following courses normally taken in first-year Science at UBC:

**Exemptions for Applied Science**

<table>
<thead>
<tr>
<th>Course</th>
<th>Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 121 and 123</td>
<td>CHEM 154</td>
</tr>
<tr>
<td>PHYS 101 and 102</td>
<td>PHYS 157, PHYS 158, PHYS 159</td>
</tr>
</tbody>
</table>

The following courses, which can be taken as electives in first-year Science, also give the exemptions indicated:

**Exemptions for Science**

<table>
<thead>
<tr>
<th>Course</th>
<th>Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 221 or 223</td>
<td>MATH 152</td>
</tr>
<tr>
<td>PHYS 216</td>
<td>PHYS 170</td>
</tr>
</tbody>
</table>
MATH 221, or equivalent, is required for students wishing to enter the Departments of Electrical and Computer Engineering or Mechanical Engineering.

Successful completion of UBC Science One (http://www.scienceone.ubc.ca) provides transfer credit for first-year engineering for CHEM 154, MATH 100, MATH 101, and PHYS 157, PHYS 158, and PHYS 159.

Applicants with less than 25 transfer credits in engineering will normally enter first-year engineering and take a program similar to the one described in the table, Typical Transfer Program Following First-Year Science. They will normally require four years following first-year Science to complete their engineering programs.

**Transition from UBC Vantage College Engineering Stream**

The Faculty of Applied Science delivers engineering programs at both UBC campuses: Okanagan and Vancouver. The Faculty has reserved space for all UBC Vantage College Engineering stream students to be able to transition to a second year program. Half of the reserved spaces are located on the Okanagan campus, and the other half are located at the Vancouver campus.

UBC Vantage College students who pass all courses in the Engineering stream with an average of at least 60% will be eligible for year two of the B.A.Sc. degree program.

Program selection is competitive, and all students will be asked to rank both their preferred campus and their eligible program. Academic performance at the end of the Winter Session and a personal statement are considered in placing students into programs in second year.

Students who do not successfully complete the full UBC Vantage College Engineering stream or who achieve an average lower than 60% in the full program can apply to be reviewed on a case-by-case basis for evidence of academic promise for continued study in Engineering at UBC.

The UBC Vantage College Engineering stream is not equivalent to the direct entry B.A.Sc. first year program. Therefore, while successful completion of the Vantage College Engineering stream will result in eligibility for second year standing, there are program requirements normally completed in first year that will not have been met and that must be completed prior to graduation. Please consult here for details of Vantage College Engineering programs and here (http://www.calendar.ubc.ca/okanagan/index.cfm?tree=18,317,989,1184) for details on Okanagan Engineering programs.

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1 Eligible programs include: Okanagan Campus: Electrical, Mechanical, and Civil Engineering. Vancouver Campus: Chemical, Chemical and Biological, Computer, Electrical, Environmental, Geological, Integrated, Materials, and Mining Engineering.

**Admission from UBC Engineering Transfer Programs**

Students who have completed first-year engineering at a college offering a UBC transfer program are eligible to be considered for admission to second-year engineering provided that they have obtained an overall grade point average of at least 2.8. Students transferring into the second year of the Biomedical Engineering program who have not completed all required first year BME courses may be required to complete first year course work during second year.

**Admission Following Two-Year Technology Diploma Programs**

Students are eligible to be considered for admission if they have completed an appropriate two-year technology diploma program with an overall average of at least 70%. Admission is normally into first-year engineering.
Camosun Bridging Program

Students with a two-year diploma in Civil, Mechanical or Mining Technology will be admitted to third year of the B.A.Sc. program in Civil Engineering, Mechanical Engineering, or Mining Engineering upon successful completion of the Engineering Bridging program offered by Camosun College. Applications for entry into the Bridging program are considered on an individual basis and approval for admission must be obtained from both the Faculty of Applied Science and Camosun College before registering in any of the bridging courses. Students may be required to take additional first- or second-year UBC courses to make up deficiencies.

UBC-Langara Aboriginal Transfer Partnership (ATP)

To be eligible to transfer to UBC through this partnership (http://transfer.aboriginal.ubc.ca/admissions/), Aboriginal students must meet the general requirements for admission as a post-secondary transfer student (above) as well as the following specific requirements:

- Successful completion of the Engineering Transfer Program with a GPA of 2.8 or better over a 24-month period ending no later than April 30 preceding September entry.
- Successful completion of the ATP Transition Plan offered by Langara in collaboration with UBC.

Bachelor of Applied Science > Academic Regulations

Dean's Honour List

Students in any Winter Session with a sessional average of at least 80% while taking 30 or more credits will receive the notation 'Dean's Honour List' on their record.

Degree with Distinction

A student will be granted a degree with distinction upon graduation if he or she achieves an overall average of at least 80% on all 200-level and higher courses while registered in the B.A.Sc. program.

Student Classification

The required courses and electives for the Winter Session are shown in the following sections. Historically, the average credit load taken by students is 33 per session, and normal completion time is four to five years. Students may take higher loads than those shown below with the approval of the Dean's Office.

Regular students are considered to be "full-time" or "part-time" as follows:

In order to be considered as full-time, a student must carry a credit load in the Winter Session which is equal to at least 80% of the standard credit load for the year and program in which the student is registered. Note that the Faculty’s definition of full-time status may not be the same as that used by Enrolment Services (http://students.ubc.ca/about/enrolment-services) in determining eligibility for financial assistance. Students wishing to ensure that they are eligible for consideration for scholarships or other forms of award should check with an Enrolment Services Professional.

A student who has approval for a credit load in a Winter Session which is less than that required for full-time status shall be considered as a part-time student. A part-time student will not normally be eligible for scholarships or for a Degree with Distinction.
Examinations

Examinations are held in December and in April. In any course which includes both lecture and laboratory work, a student must complete the laboratory assignments with satisfactory standing before being admitted to the written examination of the course and must pass in the material of both components before standing will be granted in the subject. The minimum passing mark in each course is 50%.

Applications for special consideration for examinations missed on account of illness or domestic affliction must be submitted to the Dean before or immediately after the missed examination(s). For information regarding medical certificates see Academic Concession (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,48,0,0#255).

Academic Standing and Promotion Requirements

Academic Standing will be determined by the student’s Sessional Academic Average at the end of each Winter Session and Summer Session. One of three Academic Standings is assigned as a result of a Sessional Academic Evaluation: Good Standing, Academic Probation, or Failed Year. All students are in Good Standing when first admitted to the Faculty.

Academic Standings and progression requirements are listed in the table below.

<table>
<thead>
<tr>
<th>Year Level</th>
<th>Sessional Average</th>
<th>Academic Standing at the Time of Evaluation</th>
<th>Resulting Academic Standing</th>
<th>Promotion Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60% or more</td>
<td>Any standing</td>
<td>Good Standing</td>
<td>Eligible to continue; eligible for Year 2</td>
</tr>
<tr>
<td>1</td>
<td>50% - 54.9%</td>
<td>Not Probation</td>
<td>Academic Probation</td>
<td>Eligible to continue; not eligible for Year 2</td>
</tr>
<tr>
<td>1</td>
<td>55% - 59.9%</td>
<td>Not Probation</td>
<td>Academic Probation</td>
<td>Eligible to continue; eligible for Year 2</td>
</tr>
<tr>
<td>1</td>
<td>50% - 59.9%</td>
<td>Probation</td>
<td>Failed Year</td>
<td>Required to discontinue</td>
</tr>
<tr>
<td>1</td>
<td>Less than 50%</td>
<td>Any Standing</td>
<td>Failed Year</td>
<td>Required to discontinue</td>
</tr>
<tr>
<td>2-5</td>
<td>55% or more</td>
<td>Any Standing</td>
<td>Good Standing</td>
<td>Eligible to continue 2,3</td>
</tr>
<tr>
<td>2-5</td>
<td>50% - 54.9%</td>
<td>Not Probation</td>
<td>Academic Probation</td>
<td>Eligible to continue 2,3</td>
</tr>
<tr>
<td>2-5</td>
<td>50% - 54.9%</td>
<td>Probation</td>
<td>Failed Year</td>
<td>Required to discontinue</td>
</tr>
<tr>
<td>2-5</td>
<td>Less than 50%</td>
<td>Any Standing</td>
<td>Failed Year</td>
<td>Required to discontinue</td>
</tr>
</tbody>
</table>

1 Students must successfully complete a minimum of 27 credits of the first year program and satisfy the Language Proficiency Index (LPI) requirement before being permitted to continue to Year 2.

2 Students must successfully complete a minimum of 80% of the credits required for year levels 2 and higher before being permitted to continue to the next year level.

3 Note that additional registration restrictions may apply. See Communication Requirement.

A student with a second assigned Failed Standing will be required to withdraw from the University. See Advancement Regulations (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,43,0,0#234).

1 Students in their 2nd year of the Engineering Physics program will be evaluated at the end of the Summer Session, in place of regular Winter Session evaluations.
Returning to Good Standing from Probation

Students who are on Probation in Year 1, i.e., with a sessional average between 50% and 59.9%, must achieve a sessional average of 60% or greater in an approved schedule of courses during their next registered Winter Session in order to return to Good Standing. Students must meet with an Engineering Student Services Advisor to establish an appropriate schedule of courses, which must be approved by the Director of Engineering Student Services or designate.

Students who are on Probation in Year 2 or higher, i.e., with a sessional average between 50% and 54.9%, must achieve a sessional average of 55% or greater in an approved schedule of courses during their next registered Winter Session in order to return to Good Standing. Students must meet with a Program/Department Advisor to establish an appropriate schedule of courses, which must be approved by the Program Director/Department Head or designate.

Returning after a Failed Year

Students who have been required to withdraw because of a failed year must apply in order to be readmitted to the program. The earliest a student may be readmitted is 12 months after being required to withdraw due to a Failed Year. Readmission is not guaranteed. For details, see Readmission After a Failed Year below.

Readmission After a Failed Year

Readmission after a Failed Year is not guaranteed. Readmission decisions take into account the amount of space available as well as the size and strength of the applicant pool in a given year. All students seeking to return after a Failed Year must submit an application for readmission by the stated deadline (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=2,295,0,0#189). The earliest a student may be readmitted is one full year (12 months) following the requirement to withdraw.

Requirements for readmission depend on the year level a student was in when they left. Minimum requirements by year level are stated below. Additional information regarding applying for readmission can be found under Readmission (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=2,273,0,0#1399).

Readmission After a Failed Year in First Year

Students seeking to return after a Failed Year in year one of the Engineering program will be considered for readmission based on a combination of:

- Performance in a minimum of 24 transferrable credits from another recognized post-secondary institution; and
- A letter of appeal outlining how the student has prepared to succeed in further studies at UBC.

Students should meet with an Engineering Student Services Advisor at UBC to develop a plan for applying for readmission.

Readmission After a Failed Year in Second Year or Higher

Students seeking to return after a Failed Year in year two or higher of an Engineering program will be considered for readmission based on a combination of:

- Further academics in a related field at another post-secondary institution and/or work experience related to their field of study;
- A letter of appeal outlining how the student has prepared to succeed in further studies at UBC; and
- Two reference letters pertaining to the student's academic and/or work experience.
Students should meet with an advisor in their program or department to develop a plan for applying for readmission.

**Communication Requirement**

The Faculty recognizes that good communication skills in English are essential to the understanding of course material and to the successful practice of engineering. Term essays and examination papers may be refused a passing mark if they are poorly written.

Students must obtain a Language Proficiency Index Requirement for First-Year English (LPI) score of 5, unless exempt, prior to taking a first-year English course.

Students must have the LPI requirement before being permitted to continue with the second year of their programs.

Students must pass ENGL 112 or its equivalent before being permitted to continue with the third year of their programs.

Students must pass an approved technical communication course before being permitted to continue with the fourth year of their programs. Consult the program requirements in the Academic Calendar for the appropriate course for your program.

Any student who does not meet one of these timing requirements will be permitted to take up to 12 credits in the first term after the requirement is not met, but will not be allowed to take any courses, other than ENGL 112 or the prescribed technical communication course as appropriate, after that time.

**Supplemental Examinations**

Supplemental exams are generally restricted to 400-level courses within the Faculty. However, supplemental examinations may not be available in all 400-level courses or in all cases. At the discretion of the Faculty, a supplemental exam may be granted to a student for a 300-level course provided that the course is either a published requirement in the final year of a student's program or is the last remaining course required for degree completion. Supplemental examinations are only available to students who are in good standing for the Winter Session just completed. In order to be eligible to write a supplemental examination for a course, the final grade received for the course must be between 40% and 49.9%. Supplemental examinations are only offered during the deferred/supplemental examination period of July to August. All applications for supplemental exams must be made through Enrolment Services.

Supplemental examinations for courses which terminate in December will normally be made available to students only during the supplemental examination period in July to August.

**Appeals**

Current students may appeal year standing decisions to the Faculty of Applied Science Committee on Admissions, Standing, and Courses.

Applications for readmission from non-current students should be directed to Enrolment Services.

**Field Trips**

Students who are required to participate in field trips will be responsible for expenses incurred in such trips.
Credit/D/Fail Standing

Students in the Bachelor of Applied Science program will not be eligible to take courses on a Credit/D/Fail basis. Exceptions may be made if it is determined that the course(s) is not required for the student's degree program. Students may seek approval from the Dean's Office, Engineering Student Services.

For students pursuing a B.A./B.A.Sc. dual degree, this exclusion applies only to the engineering degree; courses which apply only toward the B.A. degree must follow the requirements of the Faculty of Arts.

Students transferring into engineering may not apply any of the courses previously taken using Credit/D/Fail grading toward their engineering degree. The student must change the course to a percentage grade upon entry into the engineering program or must retake the course once admitted into the engineering program.

Bachelor of Applied Science > Degree Requirements

A student will be granted a Bachelor of Applied Science only after obtaining credit for all courses listed in the program of study for a given engineering program. This requirement will normally be met by completing four Winter Sessions with full credit load (five Winter Sessions for the Engineering Physics Program, and nine academic terms for the Biomedical Engineering Program). With the approval of the Dean's Office, a student may be allowed to study on a part-time basis. Credit will be granted for courses completed during the Summer Session.

A student transferring from an engineering program at another university or from a science faculty may be granted transfer credit for courses if the student has completed courses of equivalent content.

Elective Courses in Engineering

Students are advised that enrolment in elective courses offered within the Faculty may be restricted.

English Requirement

The Faculty of Applied Science recognizes that good communication skills in English are essential to the understanding of course material and to the successful practice of engineering. To qualify for the B.A.Sc., a student must complete ENGL 112 (or equivalent) and an approved technical communication course. Students admitted directly from secondary schools are required to take English in their first year if eligible to do so. To be eligible, students must have met the Language Proficiency Index Requirement for First-Year English. Once admitted to UBC, students will not normally be permitted to satisfy the English requirements at another institution. Students should take particular notice of the English requirements for advancement in the Faculty (see Advancement). Students in the Biomedical Engineering program who plan on applying to medical school should take an additional English course.

Note that students who plan on applying to medical school will need 6 credits in ENGL in order to apply. Students should confirm application requirements with the medical schools of their choice and may need to take an additional ENGL course as one of their humanities and social sciences electives.

Complementary Studies Courses

In order to satisfy accreditation requirements, all students must complete seven elements of complementary studies, including a minimum of 20 credits of complementary studies courses as follows:

1. Engineering economics: minimum 3 credits
2. Impact of technology on society: minimum 3 credits
3. Humanities and social sciences electives: minimum 6 credits
4. Communication: minimum 6 credits
5. Health and safety
6. Professional ethics, equity and law: minimum 2 credits
7. Sustainable development and environmental stewardship

Students need 6 credits in ENG in order to apply to medical school. Students should confirm application requirements with the medical schools of their choice and may need to take an additional ENGL course as one of their humanities and social sciences electives if they intend to apply to medical school.

Some of the 20 credits of course requirements shown above may be integrated into core courses of some programs. For up to date lists of acceptable courses in each area of study, as well as program specific information on complementary studies requirements, please consult the Applied Science Engineering Student Services Electives web page.

Bachelor of Applied Science > Minor in Arts

A student in an engineering program may undertake a minor in Arts:

- An acceptable minor program must comprise courses in the Faculty of Arts that are for credit toward a B.A. degree and must consist of 18 upper-level credits in a single subject or field of specialization.
- Students should design a coherent and academically sound course of studies for the proposed minor.
- The program must be approved by an advisor in Engineering Student Services on the recommendation of an advisor from the appropriate department or program office within the Faculty of Arts.
- All courses must be acceptable for a B.A. major in the proposed subject area or field, although the student is not bound by other requirements of the Faculty of Arts.

A minor in Mathematics, Computer Systems, Cognitive Systems, or where there is significant overlap between the student's engineering program and the proposed subject or field for the minor is not permitted. A dual degree and a minor in Arts cannot be combined, although a student may pursue a minor within the B.A. degree.

Upon successful completion of the minor program, the notation "Minor in Arts" will be added to the student's transcript.

Students wanting a subject-specific minor may also undertake a minor in a specific Arts discipline's minor program, which requires the completion of at least 30 credits in a single subject field of specialization, of which at least 18 credits must be numbered 300 or higher.

Bachelor of Applied Science > Minor in Commerce

Students desiring a stronger foundation in business are encouraged to consider the Minor in Commerce. Upon successful completion of this minor program, the notation "Minor in Commerce" will be placed on the student's transcript.

Enrolment in the program is limited. Applications for admission must be made through Engineering Student Services by May 15. For an application to be considered, the student must be eligible for at least third-year standing in the Faculty of Applied Science with a cumulative average of at least 68% in the previous two years. Meeting the stated minimum requirements does not guarantee admission into the minor. Preference will be given to students who have already completed ECON 310 and 311 (or ECON 101 and 102). The program will consist of the following:
ECON 310 and 311 (or 101 and 102
d)  
COMM 457  
COMM 465  
One of COMM 329, 458 or 473  
An engineering economics course appropriate for the department in which the student is enrolled

1 Students who have completed ECON 101 and 102 prior to entry into the program may use this course in lieu of ECON 310 and 311. Either Economics course may be used as the humanities and social sciences elective component of the complementary studies courses. Some programs will allow a maximum of 3 credits of Commerce courses to count towards the technical electives requirement.

Minor in Commerce students will take two years to obtain the necessary course requirements due to prerequisites.

**Bachelor of Applied Science > Minor in Entrepreneurship**

Students desiring foundations in the knowledge and practical skills related to the formation of an entrepreneurial enterprise are encouraged to consider the Minor in Entrepreneurship. Upon successful completion of this minor program, the notation "Minor in Entrepreneurship" will be placed on the student's transcript.

Enrolment in the program is limited. Applications for admission must be made through Engineering Student Services by May 15. For an application to be considered, the student must be in good standing and eligible for at least third-year standing in the Faculty of Applied Science with a cumulative average of at least 68% in the previous two years. Meeting the stated minimum requirements does not guarantee admission into the minor. Preference will be given to students who have completed COMM 280.

The program will consist of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 280</td>
<td>3</td>
</tr>
<tr>
<td>COMM 382</td>
<td>3</td>
</tr>
<tr>
<td>COMM 387</td>
<td>3</td>
</tr>
<tr>
<td>And either</td>
<td></td>
</tr>
<tr>
<td>APSC 486</td>
<td>6</td>
</tr>
<tr>
<td>Plus 1 Entrepreneurship Elective*</td>
<td>3</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>COMM 497</td>
<td>3</td>
</tr>
<tr>
<td>Plus 2 Entrepreneurship Elective*</td>
<td>6</td>
</tr>
</tbody>
</table>

Enrolment in the minor program does not change the requirements for the major program of study. Students may be required to take all 5-6 courses in addition to the requirements of their major program. Each major program reserves the right to determine if any of the courses constituting the minor will qualify as credits within the major. Students will be required to consult their program advisor/director regarding how many/if any of the courses in the minor can be used as electives or as a capstone in their program.

All courses constituting the minor program must be taken at the Vancouver campus of UBC.

* The course(s) will be chosen from a list of approved electives, which will be published annually by the program.

**Bachelor of Applied Science > Minor in Honours Mathematics**
Students wanting a stronger foundation in mathematics are encouraged to consider the Minor in Honours Mathematics. Upon successful completion of this Minor, the notation "Minor in Honours Mathematics" will be placed on the student's transcript.

The Minor in Honours Mathematics consists of two components: 200-level MATH courses, and 300- and 400-level MATH courses. An overall average of at least 68% must be obtained in each of the two components of the Minor.

A minimum of 9 credits of 200-level MATH courses are required in the first component.

- 200-level MATH courses from a student's engineering program (excluding MATH 221 and 223) may be included in this total.
- Students must include at least one of MATH 217, 227, 263, 264, or 317 (students who have successfully completed MECH 222 are exempt from this requirement).
- Additional eligible courses are MATH 220 and 257.

The 300- and 400-level MATH courses required in the second component are:

MATH 300 or 305 3
MATH 320\(^1\) 3
Two of MATH 301, 321, 322, and 400 6
Elective 300- and 400-level MATH courses\(^2\) 12

\(^1\) The prerequisites for MATH 320 will be waived for students who earn an overall average of at least 80% on the best 5 or more credits of 200-level MATH courses from the first component. Other students must obtain at least 80% in MATH 220.

\(^2\) Eligible elective 300- and 400-level MATH courses are: MATH 301, 257/316, 318, 321, 322, 331, 345, 400-406, 412, 416-440, 443, and 449.

Bachelor of Applied Science > Minor in Science

Enrolment in the Minor in Science is limited to students eligible for third-year standing with an average of at least 68% in each of the previous two years.

Courses taken for the Minor in Science must be courses in the Faculty of Science that are acceptable for a B.Sc. major or honours in the proposed subject area or field. The minor consists of at least 18 upper-level credits either in a single subject area or area of specialization, together with any necessary prerequisites. The following subject areas have additional constraints or requirements in the selection of courses for the minor in Astronomy, Biochemistry, Chemistry, Environmental Sciences, Oceanography, and Physics. Note that there is a separate Minor in Honours Mathematics that is distinct from the Minor in Science in Mathematics. Please refer to the hyperlinked Calendar entry for each of these subject areas for additional minor requirements. For some programs, course planning as early as first year may be advisable in order to complete pre-requisite courses for some minor subject areas in a timely fashion.

Students are strongly advised to design a coherent and academically sound course of studies for their proposed minor, which must be approved by the Applied Science Engineering Student Services office at the beginning of third year.

Applications for admission must be made through Engineering Student Services by May 15.

Entry into and continuation in the Minor requires that the student remains in Good Standing. Where space in courses required for the Minor is limited, students may be required to maintain a sessional average higher than the minimum for Good Standing. Upon successful completion of the Minor program, the notation “Minor in [Subject]” will be denoted on the student’s transcript.
Students might encounter difficulty fitting the courses for the Minor into their program timetable; careful planning is essential, and completion of the Minor program might require an additional term or terms beyond that required to complete the B.A.Sc. degree alone.

No more than six upper-level credits that count toward the restricted elective requirements for the B.A.Sc. degree may be double-counted to fulfill requirements for the Science minor.

Note: Students who wish to pursue a Minor in Science should be aware of the pre-requisites of many of the upper-level science courses. Space in many courses is limited. Admission to a science minor does not guarantee access to courses agreed upon for the minor.

Bachelor of Applied Science > Dual Degree Program in Arts and Applied Science

This program offers capable students the opportunity to earn a Bachelor of Arts and a Bachelor of Applied Science degree in five years of study, in most combinations of one Arts degree program and one Engineering degree program. A board of studies administers and oversees admission to the program. Please contact Arts Advising or Engineering Student Services for more information.

Admission

Application for admission to the program is made to the board of studies through either the Arts Advising Office or Engineering Student Services. Applicants may be registered in either faculty but must be admissible to the other faculty at the time of admission to the program. Acceptance into the program will be determined based on a review of the applicant's transcript, an interview, and on a review of a portfolio or other such material that the applicant wishes to submit. Normally, application for admission will be made immediately upon acceptance into either faculty. Admission to the program at a later date is also possible but may imply a longer time to complete the program.

Requirements

Students must satisfy all of the program requirements for both the Bachelor of Arts and Bachelor of Applied Science degrees in their chosen programs. Individual courses may be considered to satisfy program requirements for both degrees. Courses taken within the Faculty of Applied Science will have the same standing as courses taken within the Faculty of Science for the purpose of satisfying requirements for a Bachelor of Arts for students enrolled in this program. The regulations governing the granting of a second degree apply to this program, with either of the two degrees being considered as the 'second' degree even though both are being taken simultaneously. Where possible, students should meet with an advisor from the board of studies prior to enrolling in their first year of courses.

Bachelor of Applied Science > Pre-Med Alternative Path

This alternative path is intended for students with an engineering background wishing to apply to medical schools. It provides access to courses required by many medical schools for students to be considered for admission. Registration in this alternative path is very competitive and is limited.

Students in this path follow the same requirements for first year engineering with the following modifications, in which they take:

- CHEM 121 and 123 instead of CHEM 154
- a first-year English course (ENGL 110, 111, 120, or 121) in place of a humanities elective (this is in addition to the required ENGL 112)

The following courses are also strongly recommended after first year:
Special standard timetables are available for first-year courses.

Given the additional courses taken over and above the engineering degree, students should on the average expect an additional term to complete these course requirements along with their engineering degree requirements. Some courses may be offered in the summer term. Some programs may accept selected courses above as part of their degree requirements, thus reducing the additional time needed. Consult the specific programs for details.

Different medical schools have different course requirements. Students are strongly advised to verify the course requirements with prospective medical schools. It should also be noted that the course requirement is only one of the criteria used by medical schools to assess applications. It is the student's responsibility to be informed of the applicable criteria.

The Biomedical Engineering Program

The Biomedical Engineering Program is another Pre-Med path available to UBC engineering students. Students who wish to apply to medical school who are enrolled in the Biomedical Engineering Program should take one additional English course as one of their complementary studies electives. Other courses in the Biomedical Engineering program are accepted as meeting the UBC Faculty of Medicine recommendations. Students are advised to consult with other Medical programs if they plan on applying to other schools.

Bachelor of Applied Science > Curriculum and First Year

First Year

Students admitted into the Engineering program directly from secondary school will take the first-year curriculum. Students identified as being eligible to take Biomedical Engineering Program content in first year will receive a modified first year timetable.

The typical transfer program is appropriate for most students transferring into the Faculty from the first year of a science program at UBC or another university or college. Applicants with more than 26 credits of engineering transfer credit may be eligible for second-year engineering. See Admission from a Post-Secondary Institution.

For information about the first year curriculum and transferring into the Biomedical Engineering Program, refer to the UBC calendar page for the Biomedical Engineering program.

Other students will need to contact Engineering Student Services for advice on their first-year program.

First-Year Curriculum

<table>
<thead>
<tr>
<th>First Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 100</td>
<td>3</td>
</tr>
<tr>
<td>APSC 101(^1)</td>
<td>3</td>
</tr>
<tr>
<td>APSC 160</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 154(^1)</td>
<td>3</td>
</tr>
</tbody>
</table>
ENGL 112² 3
MATH 100 3
MATH 101 3
MATH 152 3
PHYS 157 3
PHYS 158 3
PHYS 159 1
PHYS 170 3
Complementary Studies electives³ 3
Total Credits 37

¹ Students transferring into Engineering with CHEM 121 and 123 will not be required to take APSC 101 or CHEM 154, but will be required to take APSC 100.
² Or another first-year English course.
³ See Complementary Studies Courses.

Typical Transfer Program Following First-Year Science

<table>
<thead>
<tr>
<th>First Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 100</td>
<td>3</td>
</tr>
<tr>
<td>APSC 160</td>
<td>3</td>
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<tr>
<td>APSC 201</td>
<td>3</td>
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<tr>
<td>MATH 152</td>
<td>3</td>
</tr>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td>MATH 255</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 170</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td>Complementary Studies electives¹</td>
<td>6</td>
</tr>
<tr>
<td>Total Credits</td>
<td>30</td>
</tr>
</tbody>
</table>

¹ See Complementary Studies Courses.

Options in Third and Fourth Years

In some departments selected groups of courses are offered as options which represent different areas of interest. High-quality performance in any option or field qualifies the student to continue his studies at the graduate level if he chooses to do so. Students entering third year should consult representatives of the departments concerned before registering for the courses offered.

Bachelor of Applied Science > Biomedical Engineering

Program Overview

The Faculty of Applied Science offers a program leading to the Bachelor of Applied Science (B.A.Sc.) in Biomedical Engineering. Biomedical Engineering (BME) addresses fundamental problems where human biology and physical design principles intersect. The program gives biomedical engineers the skills required to make scientific discoveries and inventions that promote health.

Typically, UBC engineering programs begin with a common first year after which students apply for registration in second year in a
specific engineering discipline. The BME program allows students to take introductory material core to the program in first year through registration in a modified first year timetable. Students wishing to study in the BME program apply for registration in a modified first year timetable when they apply to UBC’s first year Engineering Program. Selection for the modified timetable is limited and competitive.

Transfer into second year BME for students who have completed the standard first year in the UBC engineering program (or a comparable program at another university or college) is limited to students with high academic standing, and requires approval of the BME program advisor. Students who transfer into BME will have to complete any missing course requirements. Students wishing to transfer into BME at second year should consult the program website and their academic advisor.

Students completing their first year of the BME modified first year timetable will be eligible to transfer into other Engineering programs at UBC for their second year.

The program is designed with four streams of technical electives to allow students to focus on particular areas of Biomedical Engineering: Cellular Bioengineering; Biomedical Informatics; Biomedical Systems and Signals; and Biomechanics and Biomaterials. After their second year, BME students indicate their prioritized stream preferences. Prospective students should be aware that a maximum enrolment limit may apply to each stream. If student preferences for a stream exceed capacity for that stream, the program Director will select students for the stream based on academic standing and demonstrated interest and ability in that specific stream.

Consult the program website for technical elective selection for each stream.

The program is designed to align with admissions criteria for medical school. Students intending to apply to medical school after their biomedical engineering program must take a first year English course as a complementary study. Other courses within the program are considered equivalent for the purposes of the Biology content recommended by the UBC Faculty of Medicine.

Program Requirements

<table>
<thead>
<tr>
<th>First Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 100</td>
<td>3</td>
</tr>
<tr>
<td>APSC 160</td>
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</tr>
<tr>
<td>BMEG 150</td>
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</tr>
<tr>
<td>CHEM 121</td>
<td>4</td>
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<tr>
<td>CHEM 123</td>
<td>4</td>
</tr>
<tr>
<td>MATH 100</td>
<td>3</td>
</tr>
<tr>
<td>MATH 101</td>
<td>3</td>
</tr>
<tr>
<td>MATH 152</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 157</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 158</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 170</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First Summer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 112</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 101</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 102</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>8</td>
</tr>
</tbody>
</table>
### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 253 or 226</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 201</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 210</td>
<td>2</td>
</tr>
<tr>
<td>BMEG 220</td>
<td>4</td>
</tr>
<tr>
<td>BMEG 230</td>
<td>4</td>
</tr>
<tr>
<td>BMEG 250</td>
<td>4</td>
</tr>
<tr>
<td>BMEG 257</td>
<td>4</td>
</tr>
<tr>
<td>CHBE 251</td>
<td>3</td>
</tr>
<tr>
<td>CPEN 221</td>
<td>4</td>
</tr>
<tr>
<td>MATH 256</td>
<td>3</td>
</tr>
<tr>
<td>MATH 264</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>35</strong></td>
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</tbody>
</table>

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 202</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 310</td>
<td>3</td>
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<tr>
<td>BMEG 350</td>
<td>4</td>
</tr>
<tr>
<td>BMEG 357</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 351</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 233</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 235</td>
<td>1</td>
</tr>
<tr>
<td>ELEC 371</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td><strong>Stream-based Technical Electives</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>Complementary Studies Electives</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEG 430</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 450</td>
<td>6</td>
</tr>
<tr>
<td>BMEG 456</td>
<td>3</td>
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<tr>
<td>STAT 300</td>
<td>3</td>
</tr>
<tr>
<td><strong>Stream-based Technical Electives</strong></td>
<td><strong>18</strong></td>
</tr>
<tr>
<td><strong>Complementary Studies Electives</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

1 See Complementary Studies Courses ([http://calendar.ubc.ca/vancouver/index.cfm?tree=12,195,272,30#1116](http://calendar.ubc.ca/vancouver/index.cfm?tree=12,195,272,30#1116)). Students planning to apply to Medical School should take a first year English course as their complementary studies elective. Students should confirm the specific pre-requisite courses for the Medical School(s) to which they will apply.

### Stream Based Technical Electives

Students completing the **Cellular Bioengineering Stream** must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 302</td>
<td>3</td>
</tr>
</tbody>
</table>
BMEG 410 4
CHBE 381 3
CHEM 211 4
Additional technical electives\(^2\) 13

Students completing the **Biomedical Informatics Stream** must complete the following:
BIOC 302 3
CPSC 221 4
CPSC 340 3
Either MATH 220 4
Or CPSC 121 3
Additional technical electives\(^2\) 13 (if taking CPSC 121)
14 (if taking MATH 220)

Students completing the **Biomedical Systems and Signals Stream** must complete the following:
BMEG 320 3
ELEC 221 4
Additional technical electives\(^2\) 20

Students completing the **Biomaterials Biomechanics Stream** must complete the following:
APSC 278 3
BMEG 330 3
MECH 260 3
Additional technical electives\(^2\) 18

\(^2\) To be chosen from a course list available on the program website and in consultation with an undergraduate advisor.

---

**Cooperative Education Experiential Work Terms**

Cooperative education experiential learning placements are an integral part of the Bachelor of Applied Science in Biomedical Engineering program. Students will typically complete four 4-month experiential learning placements coordinated through the Applied Science Co-op Program. Work terms can take place during the Winter or Summer terms. Students should refer to the program website for the current schedule. Students unable to complete one or more co-op terms should consult with a departmental advisor.

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**Contact Information**

The Faculty of Applied Science
Dean's Office
5000-2332 Main Mall
Vancouver, BC V6T 1Z4
Email:
www.apsc.ubc.ca (http://www.apsc.ubc.ca)

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**Bachelor of Applied Science > Chemical and Biological Engineering**

The Department of Chemical and Biological Engineering offers programs leading to the Bachelor of Applied Science in Chemical Engineering and to the Bachelor of Applied Science in Chemical and Biological Engineering. Interested students should apply for
the Chemical Engineering or Chemical and Biological Engineering program after completing first year engineering, or after second year if applying from another institution. Prospective students should be aware that the number of available spaces in any of the programs of study may be limited.

### Chemical Engineering or Chemical and Biological Engineering

#### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 112</td>
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</tr>
<tr>
<td>CHBE 201</td>
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</tr>
<tr>
<td>CHBE 230</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 241</td>
<td>3</td>
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<tr>
<td>CHBE 243</td>
<td>1</td>
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<tr>
<td>CHBE 244</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 251</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 262</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 250</td>
<td>2</td>
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<tr>
<td>CHEM 251</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 260</td>
<td>3</td>
</tr>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td>MATH 256</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>37</strong></td>
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</table>

#### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<td>CHBE 346</td>
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<td>CHBE 351</td>
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<td>CHBE 356</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 362</td>
<td>2</td>
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<tr>
<td>CHBE 373</td>
<td>3</td>
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<tr>
<td>CHBE 376</td>
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<td>CHBE 455</td>
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<td>STAT 251</td>
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<tr>
<td><strong>Complementary Studies electives</strong></td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>38</strong></td>
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#### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>APSC 450</td>
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</tbody>
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Information in this Calendar is subject to change. Visit [www.calendar.ubc.ca/vancouver](http://www.calendar.ubc.ca/vancouver) for current details.
This document was generated on 22 Mar 2018 at 11:01 AM.
Technical Electives

Complementary Studies electives

Plus one of the programs listed below:

### Chemical Engineering
- CHBE 454
- CHBE 474

### Chemical and Biological Engineering
- CHBE 453
- CHBE 481

Total Credits: 36

1 See Complementary Studies Courses.

2 To be chosen from a list of electives available from the Department.

---

**Bachelor of Applied Science > Civil Engineering**

The Department of Civil Engineering offers a program leading to the Bachelor of Applied Science in Civil Engineering. Interested students should apply for the Civil Engineering program after completing first year engineering, or after second year if applying from another institution.

Prospective students should be aware that an enrolment limit may apply, and that, without the successful completion of ENGL 112 or equivalent prior to entry, the program will require an additional year for completion. Therefore, prospective students are advised to have completed ENGL 112 or equivalent prior to the second term of the summer session. For further information visit Civil Engineering.

The second-year program in Civil Engineering requires all students to take the course CIVL 201 (Introduction to Civil Engineering) in the first term following entry to the program. The course commences with a communication skills module that is delivered over the two weeks before the normal start of Term 1 classes at UBC. Attendance during the two-week period is mandatory for those students who do not meet specified requirements relating to marks in ENGL 112 or equivalent: visit CIVL 201 for additional information and instructions. Due to the early start date, affected students who plan to live on-campus in UBC Housing are required to apply for early arrival.

**NOTE:** The intake of students into the Environmental Engineering Option has been suspended effective 2016.

Prospective students should be aware that an enrolment limit may apply to the program, and to the option. For further information visit Civil Engineering.

Civil Engineering

**Second Year**
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 278</td>
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<tr>
<td>APSC 279</td>
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<tr>
<td>CIVL 201</td>
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<td>CIVL 203</td>
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</tr>
<tr>
<td>CIVL 204</td>
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<tr>
<td>CIVL 210</td>
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<td>CIVL 215</td>
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</tr>
<tr>
<td>CIVL 230</td>
<td>4</td>
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<tr>
<td>CIVL 231</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 235(^2)</td>
<td>4</td>
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<tr>
<td>EOSC 210</td>
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<td>MATH 253</td>
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<td>MATH 255</td>
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**Third Year**

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<td>CIVL 311</td>
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</tr>
<tr>
<td>CIVL 316</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 320</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 332</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 340</td>
<td>3</td>
</tr>
<tr>
<td>MATH 257</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td>One of CIVL 304(^3), CIVL 331</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>39</td>
</tr>
</tbody>
</table>

**Fourth Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 402(^4)</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 403</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 409</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 430</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 445</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 446</td>
<td>2</td>
</tr>
<tr>
<td>Technical electives(^5)</td>
<td>15</td>
</tr>
<tr>
<td>Complementary Studies Electives(^6)</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>36</td>
</tr>
</tbody>
</table>

1. This course satisfies the impact of technology on society requirement within the Complementary Studies Courses.
2. End of Term 2, second year.
3. CIVL 304 is required by students intending to take the environmental engineering elective stream.
This course counts towards the professional development requirements within the Complementary Studies Courses.

To be chosen in consultation with departmental advisors; several elective streams are possible.

See Complementary Studies Courses.

**NOTE:** The intake of students into the Environmental Engineering Option has been suspended effective 2016.

Environmental Engineering Option (enrollment suspended)

<table>
<thead>
<tr>
<th>Third Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 301</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 300</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 301</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 304</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 305</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 311</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 315</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 316</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 320</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 332</td>
<td>3</td>
</tr>
<tr>
<td>MATH 257</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 340</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 402(^1)</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 403</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 406</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 407</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 408</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 416</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 445</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 446</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 429</td>
<td>3</td>
</tr>
<tr>
<td>Technical electives(^2)</td>
<td>6</td>
</tr>
<tr>
<td>Complementary Studies Elective(^3)</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>38</td>
</tr>
</tbody>
</table>

\(^1\) This course counts towards the professional development requirements within the Complementary Studies Courses.

\(^2\) To be chosen in consultation with departmental advisors.

\(^3\) See Complementary Studies Courses.
Bachelor of Applied Science > Electrical and Computer Engineering

The Department of Electrical and Computer Engineering offers programs leading to the Bachelor of Applied Science in Electrical Engineering and to the Bachelor of Applied Science in Computer Engineering. A minor in Honours Mathematics option is available in both programs.

Three options are available in Electrical Engineering: Biomedical Engineering, Electrical Energy Systems, and Nanotechnology and Microsystems. An option in Software Engineering is available in Computer Engineering.

Students choosing Biomedical Engineering must apply prior to second year; students opting for other options enter at the third year level (refer to website below for application information pertinent to the individual Options). Students should be aware that enrolment restrictions in the Options may apply.

NOTE: The intake of students into the Electrical Energy Systems, Nanotechnology and Microsystems, and Software Engineering options has been suspended effective 2015.

For further information visit Electrical and Computer Engineering (http://www.ece.ubc.ca).

Second Year

(For Electrical Engineering)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 211</td>
<td>5</td>
</tr>
<tr>
<td>CPSC 259</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 201</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 202</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 211</td>
<td>2</td>
</tr>
<tr>
<td>ELEC 221</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 281</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 291</td>
<td>1</td>
</tr>
<tr>
<td>MATH 253</td>
<td>6</td>
</tr>
<tr>
<td>MATH 256</td>
<td>3</td>
</tr>
<tr>
<td>MATH 264</td>
<td>1</td>
</tr>
<tr>
<td>Total Credits</td>
<td>39</td>
</tr>
</tbody>
</table>

1 Students in the Biomedical Engineering Option will take ELEC 271 and ELEC 292 instead of ELEC 291.

(For Computer Engineering)

For students who entered the program in September 2013

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 211</td>
<td>5</td>
</tr>
<tr>
<td>CPEN 221</td>
<td>4</td>
</tr>
<tr>
<td>CPEN 281</td>
<td>3</td>
</tr>
</tbody>
</table>
CPSC 261 4
ELEC 201 4
ELEC 221 4
ELEC 291 6
MATH 220 3
MATH 253 3
MATH 256 3
Total Credits 39

(For Computer Engineering)
For students who entered the program in September 2018 or later

CPEN 211 5
CPEN 221 4
CPEN 281 3
CPEN 291 6
CPSC 221 4
CPSC 261 4
ELEC 201 4
MATH 220 3
MATH 253 3
MATH 256 3
Total Credits 39

Computer Engineering

Third Year (for students who enter the program in September 2013)

CPEN 311 4
CPEN 331 4
CPEN 391 6
CPSC 221 4
ELEC 202 4
One of MATH 318, STAT 251, MATH 302, STAT 302 3
Electives 1 6
Complementary Studies electives 2 6
Total Credits 37

Third Year (for students who enter the program in September 2018 or later)

CPEN 311 4
CPEN 331 4
CPEN 391 6
CPSC 221 4
ELEC 221 4
One of MATH 318, STAT 251, MATH 302, STAT 302 3
Electives\(^1\) & 10 \\
Complementary Studies electives\(^2\) & 6 \\
Total Credits & 37 \\

<table>
<thead>
<tr>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450    &amp; 2</td>
</tr>
<tr>
<td>CPEN 481    &amp; 3</td>
</tr>
<tr>
<td>CPEN 491    &amp; 10</td>
</tr>
<tr>
<td>Electives(^1) &amp; 21</td>
</tr>
<tr>
<td>Science elective(^1) &amp; 3</td>
</tr>
<tr>
<td>Total Credits &amp; 39</td>
</tr>
</tbody>
</table>

\(^1\) To be chosen based on Department-approved list of Computer Engineering electives.  
\(^2\) See Complementary Studies courses.

Software Engineering Option (enrolment suspended)

The Software Engineering Option, in Computer Engineering, puts a greater emphasis on methods and process for the design of software-intensive computer systems, including requirements elicitation, software design, software quality, user-interface, and software project management.

Students who satisfactorily complete the following program will be given recognition as receiving the Bachelor of Applied Science in Computer Engineering (Software Engineering Option).

<table>
<thead>
<tr>
<th>Third Year (for students who enter the program in September 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 311 &amp; 4</td>
</tr>
<tr>
<td>CPEN 321 &amp; 4</td>
</tr>
<tr>
<td>CPEN 331 &amp; 4</td>
</tr>
<tr>
<td>CPEN 391 &amp; 6</td>
</tr>
<tr>
<td>CPSC 221 &amp; 4</td>
</tr>
<tr>
<td>CPSC 304 &amp; 3</td>
</tr>
<tr>
<td>CPSC 320 &amp; 3</td>
</tr>
<tr>
<td>One of MATH 318, STAT 251, MATH 302, STAT 302 &amp; 3</td>
</tr>
<tr>
<td>Complementary Studies electives(^1) &amp; 6</td>
</tr>
<tr>
<td>Total Credits &amp; 37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year (for students who enter the program in September 2014 or later)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 311 &amp; 4</td>
</tr>
<tr>
<td>CPEN 321 &amp; 4</td>
</tr>
<tr>
<td>CPEN 331 &amp; 4</td>
</tr>
<tr>
<td>CPEN 391 &amp; 6</td>
</tr>
<tr>
<td>CPSC 221 &amp; 4</td>
</tr>
<tr>
<td>CPSC 304 &amp; 3</td>
</tr>
<tr>
<td>CPSC 320 &amp; 3</td>
</tr>
<tr>
<td>ELEC 221 &amp; 4</td>
</tr>
<tr>
<td>One of MATH 318, STAT 251, MATH 302, STAT 302 &amp; 3</td>
</tr>
</tbody>
</table>
Complementary Studies electives\(^1\)  
Total Credits  
\textbf{Fourth Year}  
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
<td>2</td>
</tr>
<tr>
<td>CPEN 421</td>
<td>4</td>
</tr>
<tr>
<td>CPEN 422</td>
<td>4</td>
</tr>
<tr>
<td>CPEN 481</td>
<td>3</td>
</tr>
<tr>
<td>CPEN 492</td>
<td>10</td>
</tr>
<tr>
<td>Science elective(^2)</td>
<td>3</td>
</tr>
<tr>
<td>Electives(^2)</td>
<td>13</td>
</tr>
</tbody>
</table>

Total Credits 39

\(^1\) See Complementary Studies courses.  
\(^2\) To be chosen based on Department-approved list of Software Engineering electives.

\textbf{Electrical Engineering}  

\textbf{Third Year}  
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 311</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 301</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 311</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 315</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 321 or STAT 357</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 341</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 342</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 391</td>
<td>6</td>
</tr>
<tr>
<td>Complementary Studies electives(^1)</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 40

\textbf{Fourth Year}  
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
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</tr>
<tr>
<td>ELEC 481</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 491</td>
<td>10</td>
</tr>
<tr>
<td>Electives(^2)</td>
<td>18</td>
</tr>
<tr>
<td>MATH elective(^2)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 36

\(^1\) See Complementary Studies courses.  
\(^2\) To be chosen based on Department-approved list of Electrical Engineering electives.

\textbf{Biomedical Engineering Option}  
The Biomedical Engineering Option, in Electrical Engineering, allows students interested in the application of technology to medicine and the life sciences to have a course and project concentration in these areas. The option provides core courses in Electrical Engineering as well as a broad range of specific courses traditionally covered in Biomedical Engineering: anatomy, physiology, biomedical instrumentation, biosignals and systems, medical imaging, regulatory standards, design processes, and the emerging areas of micro and nanotechnology.
Students will be admitted to the option at the end of first year by permission of the option coordinator, based on a demonstrated interest in biomedical engineering, and the grade point average obtained in the first year of engineering.

Students accepted into the option will take a modified version of the standard Electrical Engineering program.

Students who satisfactorily complete the following program will be given recognition as receiving the Bachelor of Applied Science in Electrical Engineering (Biomedical Engineering Option).

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEG 410</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 456</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 301</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 311</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 341</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 371</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 391</td>
<td>6</td>
</tr>
<tr>
<td>Breadth Electives¹</td>
<td>8</td>
</tr>
<tr>
<td>One of STAT 251, MATH 302, MATH 318, STAT 302</td>
<td>3</td>
</tr>
<tr>
<td>Complementary Studies electives²</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
<td>2</td>
</tr>
<tr>
<td>ELEC 422</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 471</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 473</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 481</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 494</td>
<td>10</td>
</tr>
<tr>
<td>Electives¹</td>
<td>9</td>
</tr>
<tr>
<td>Complementary Studies electives²</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>36</td>
</tr>
</tbody>
</table>

¹ To be chosen based on Department-approved list of Biomedical Engineering electives.
² See Complementary Studies Courses.

Electrical Energy Systems Option (enrolment suspended)

The Electrical Energy Systems Option in Electrical Engineering will provide students with theoretical and practical experience in the electric energy related fields. Students will be admitted at the third-year level. Those who satisfactorily complete the following program will be given recognition as receiving the Bachelor of Applied Science in Electrical Engineering (Electrical Energy Systems Option).

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC 301</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 311</td>
<td>4</td>
</tr>
</tbody>
</table>
ELEC 321 or STAT 357  
ELEC 341  
ELEC 342  
ELEC 352  
ELEC 391  
Breadth Elective  
Complementary Studies electives  
Total Credits  

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC 321 or STAT 357</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 341</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 342</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 352</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 391</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breadth Elective</td>
<td>4</td>
</tr>
<tr>
<td>Complementary Studies electives</td>
<td>6</td>
</tr>
<tr>
<td>Total Credits</td>
<td>40</td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
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</tr>
<tr>
<td>ELEC 451</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 453</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 454</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 481</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 492</td>
<td>10</td>
</tr>
<tr>
<td>Electives $^2,^3$</td>
<td>9</td>
</tr>
<tr>
<td>Total Credits</td>
<td>36</td>
</tr>
</tbody>
</table>

$^1$ See Complementary Studies courses.

$^2$ To be chosen based on Department-approved list of Electrical Energy Systems electives.

$^3$ Students who have not completed EECE 392 or EECE 492 should complete EECE 392 (4 credits) and at least 5 credits of electives.

---

Nanotechnology and Microsystems Option (enrolment suspended)

The Nanotechnology and Microsystems Option, in Electrical Engineering, allows students course concentration and practical project experience in electronics including emerging nanodevices; micro/nanoscale mechanisms and methods (physical, chemical, mechanical, biological and numerical); micro/nano system design and analysis; micrometer and nanometer scale fabrication and instrumentation; and electromagnetics at small length scales.

Students will be admitted at the third-year level. See the Department website for application information.

Students who satisfactorily complete the following program will be given recognition as receiving the Bachelor of Applied Science in Electrical Engineering (Nanotechnology and Microsystems Option).

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC 301</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 311</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 315</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 321 or STAT 357</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 361</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 391</td>
<td>6</td>
</tr>
<tr>
<td>Breadth Electives $^1$</td>
<td>8</td>
</tr>
<tr>
<td>Complementary Studies Electives $^2$</td>
<td>6</td>
</tr>
<tr>
<td>Total Credits</td>
<td>40</td>
</tr>
</tbody>
</table>

### Fourth Year
Bachelor of Applied Science > Engineering Physics

The mission of the Engineering Physics program is to provide the best possible broad-based engineering degree which emphasizes the fundamentals of physics and mathematics to prepare graduates for engineering research and innovation in technology companies and research labs. Numerous specializations are available within Engineering Physics, by appropriate choice of several technical electives. These include specializations in Mechanical Engineering, Electrical Engineering, Bioengineering, Biophysics, Applied Physics, Applied Mathematics, Materials Engineering, Astronomy, and Technology Entrepreneurship among others. Technical electives for these specializations will be chosen from a list of relevant courses or by approval of the program director.

Students wishing to complete part of their study abroad may apply in third year for the Coordinated International Exchange (CIE) Program. Students participating in this program will complete most of their technical electives at a partner university during the fall term of their fourth year.

Inquiries regarding admission to an engineering program should be directed to Engineering Student Services, room 1100, Kaiser Building. For information regarding the deadline to apply for admission to the Faculty of Applied Science, please consult the Application and Document Deadlines (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=2,295,0,0#17631) section of the UBC Calendar.

Students completing first year are required to submit a program preference form, available online in the spring from the Faculty of Applied Science. Students will rank their choices of engineering programs and submit the form electronically to the Engineering Student Services Office. Please consult Second-Year Placement (http://www.engineering.ubc.ca/current_students/undergraduate/first_y) for deadlines and procedures.

Applicants to Engineering Physics must attend an in-person interview, usually held in April, to be considered for admission. Please consult the Engineering Physics webpage (http://www.engphys.ubc.ca) in March to reserve an interview time.

The completion of a Bachelor of Applied Science in Engineering Physics will normally take five years. Having completed first year engineering in the Faculty of Applied Science, students must complete four more years in the Engineering Physics program.

Most students choose to obtain technical work experience by enrolling in the Co-operative Education Program. Four Co-op work terms of four months each are built into the Engineering Physics program, as shown in the Co-op Sequence of Placements below.

Students wishing to obtain technical work experience outside the Co-op Program should confer with the Director of Engineering
Students completing first year in the Faculty of Science will normally have the following course deficiencies: APSC 151, APSC 160, MATH 152, and PHYS 170. Some deficiencies will need to be completed as soon as possible, as they are pre-requisites for core courses. All deficiencies from first year must be completed prior to graduation.

The Engineering Student Services Office handles advising for all first-year students, for courses given by other faculties, and provides advice on transfer credits.

Inquiries regarding the Engineering Physics program should be made through the Engineering Physics program office, room 333A, Hennings Building. Academic Advising is available through the program office, or by appointment with the program director.

Engineering Physics is a program under the jurisdiction of the Dean of Applied Science and is administered by the Department of Physics and Astronomy in the Faculty of Science.

The following program-year curriculum tables are specific to students registered in the corresponding years of Engineering Physics for the current Academic Year.

### Engineering Physics

#### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 221</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 204</td>
<td>4</td>
</tr>
<tr>
<td>ENPH 253[^2]</td>
<td>5</td>
</tr>
<tr>
<td>ENPH 257[^2]</td>
<td>2</td>
</tr>
<tr>
<td>ENPH 259</td>
<td>3</td>
</tr>
<tr>
<td>ENPH 270[^2]</td>
<td>2</td>
</tr>
<tr>
<td>MATH 217[^1]</td>
<td>4</td>
</tr>
<tr>
<td>MATH 255</td>
<td>3</td>
</tr>
<tr>
<td>MATH 257[^2]</td>
<td>3</td>
</tr>
<tr>
<td>MECH 260</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 250[^2]</td>
<td>3</td>
</tr>
<tr>
<td>Complementary Studies electives[^3]</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

[^1]: If unable to take MATH 217, replace with MATH 253 and 317.
[^2]: Taken during the summer academic term.
[^3]: See Complementary Studies Courses.

#### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 278</td>
<td>3</td>
</tr>
<tr>
<td>APSC 279</td>
<td>1</td>
</tr>
<tr>
<td>CPEN 312</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 221</td>
<td>4</td>
</tr>
<tr>
<td>MATH 307</td>
<td>3</td>
</tr>
</tbody>
</table>

[^2]: Taken during the summer academic term.
[^3]: See Complementary Studies Courses.
### MATH 305
- 3

### MECH 280
- 3

### MECH 325
- 4

### MECH 360
- 3

### PHYS 301
- 3

### PHYS 304
- 3

### PHYS 350
- 3

### Technical electives
- 3

### Total Credits
- 39

1 Chosen in consultation with the Director. Students are advised to consider electives for fourth and fifth year and to ensure that the prerequisites have been taken. Technical elective requirements may be waived in part at the discretion of the Director for students pursuing dual degrees or minors. Students planning to enter the CIE program may defer their 3rd year technical elective to year 4.

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENPH 459</td>
<td>5</td>
</tr>
<tr>
<td>MATH 318</td>
<td>3</td>
</tr>
<tr>
<td>MATH 400</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 401</td>
<td>3</td>
</tr>
<tr>
<td>One of ELEC 341, MECH 466</td>
<td>4</td>
</tr>
<tr>
<td>Technical elective</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits
- 21

1 Chosen in consultation with the Director. Technical elective requirements may be waived in part at the discretion of the Director for students pursuing dual degrees or minors. Students enrolled in CIE may obtain technical elective credit while on exchange.

### Fifth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
<td>2</td>
</tr>
<tr>
<td>ELEC 301</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 481</td>
<td>3</td>
</tr>
<tr>
<td>ENPH 352</td>
<td>2</td>
</tr>
<tr>
<td>ENPH 479</td>
<td>4</td>
</tr>
<tr>
<td>MECH 326</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 403</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 408</td>
<td>4</td>
</tr>
<tr>
<td>One of MATH 405, 406, PHYS 410</td>
<td>3</td>
</tr>
<tr>
<td>Technical electives</td>
<td>9</td>
</tr>
<tr>
<td>Complementary Studies elective</td>
<td>3</td>
</tr>
</tbody>
</table>

### Total Credits
- 40

1 Students planning on graduate studies should take one of MATH 401 (as an elective) or MATH 406. Note that due to credit exclusion, only one of MATH 401, 406 can be taken.

2 Chosen in consultation with the Director. Technical elective requirements may be waived in part at the discretion of the Director for students pursuing dual degrees or minors.

3 See Complementary Studies Courses
Specialization in Mechanical Engineering

To qualify for a specialization in Mechanical Engineering, students must take at least the following courses as part of their technical electives:

1) Two courses from the following list: MECH 375, MECH 380, MECH 463
2) One additional course with subject code MECH

Specialization in Electrical Engineering

To qualify for a specialization in Electrical Engineering, students must take at least the following courses as part of their technical electives:

1) ELEC 431
2) One of ELEC 342, ELEC 343
3) One additional course with subject code ELEC

Co-operative Education Sequence of Placements

The degree will normally require the students to take nine academic ("Acad") semesters and four co-operative education placements ("Coop"). Students who have deficiencies in their program before entering Engineering Physics are encouraged to complete as many of those as possible during the "open" summer semester. Please seek the advice of an advisor in Engineering Physics.

Co-op Sequence of Placements

<table>
<thead>
<tr>
<th>Year</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Applied Science</td>
<td>Acad</td>
<td>Acad</td>
<td>Open</td>
</tr>
<tr>
<td>2 Engineering Physics</td>
<td>Acad</td>
<td>Coop #1</td>
<td>Acad</td>
</tr>
<tr>
<td>3 Engineering Physics</td>
<td>Acad</td>
<td>Acad</td>
<td>Coop #2</td>
</tr>
<tr>
<td>4 Engineering Physics</td>
<td>Coop #3</td>
<td>Acad</td>
<td>Coop #3</td>
</tr>
<tr>
<td>5 Engineering Physics</td>
<td>Acad</td>
<td>Acad</td>
<td></td>
</tr>
</tbody>
</table>

Students accepted into Engineering Physics who are interested in the Co-operative Education program must contact the Science Co-op Office (http://www.sciencecoop.ubc.ca), located in Room 170 of the Chemistry/Physics Building.

Last updated: March 6, 2018

Bachelor of Applied Science > Geological Engineering

Geological Engineering is an interdisciplinary program under the jurisdiction of the Dean of the Faculty of Applied Science and administered by a board of study. Inquiries regarding the program and student advising should be made through Dr. Erik Eberhardt (erik@eos.ubc.ca), Director, Geological Engineering, Room 251, Department of Earth, Ocean and Atmospheric Sciences, 604.827.5573.

Geological Engineering
### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 201</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 210</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 215</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 230</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 231</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 210</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 213</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 220</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 221</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 223</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 240</td>
<td>3</td>
</tr>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

1 Includes one week field school, end of Term 2.

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 311</td>
<td>4</td>
</tr>
<tr>
<td>CIVL 316</td>
<td>4</td>
</tr>
<tr>
<td>EOSC 323</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 328</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 329</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 330</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 350</td>
<td>3</td>
</tr>
<tr>
<td>MINE 303</td>
<td>3</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td>Earth Sciences technical elective</td>
<td>3</td>
</tr>
<tr>
<td>Technical electives</td>
<td>3</td>
</tr>
<tr>
<td>Complementary Studies electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>

1 End of third year.

2 300- or 400-level EOSC course from the Department of Earth, Ocean and Atmospheric Sciences.

3 See Complementary Studies Courses.

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVL 402</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 410</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 411</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 350</td>
<td>3</td>
</tr>
<tr>
<td>EOSC 429</td>
<td>3</td>
</tr>
</tbody>
</table>
Bachelor of Applied Science > Integrated Engineering

Integrated Engineering (IGEN) is a multidisciplinary engineering program that places a strong focus on team-based engineering design by means of three full year project courses. In addition to developing a broad foundation in engineering, the student develops primary and secondary knowledge in specific engineering disciplines via 18 credits of technical electives in third and fourth year.

Completion of a B.A.Sc. in Integrated Engineering will normally take four years of study. Students may enter the program from first-year Applied Science or via transfer from the first-year Science or Engineering transfer program at a community college. Students entering from first-year Science will normally have course deficiencies that must be made up. Consult the IGEN Student Advisor for assistance in such cases.

There is a Co-operative Education option (Co-op) where students normally take eight academic semesters and five Co-op semesters over a five-year period. Students normally apply for Co-op between January of first year and September of the second year of the program. Visit Engineering Co-op (http://www.coop.apsc.ubc.ca/home) for more information.

All inquiries concerning the program should be directed to the Program Director. See Integrated Engineering (http://www.igen.ubc.ca) for contact information.

Integrated Engineering Program

<table>
<thead>
<tr>
<th>Second Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 278</td>
<td>3</td>
</tr>
<tr>
<td>APSC 279</td>
<td>1</td>
</tr>
<tr>
<td>CHBE 241</td>
<td>3</td>
</tr>
<tr>
<td>CHBE 244</td>
<td>3</td>
</tr>
<tr>
<td>CIVL 215</td>
<td>4</td>
</tr>
<tr>
<td>CPEN 312</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 204</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 205</td>
<td>1</td>
</tr>
<tr>
<td>IGEN 201</td>
<td>3</td>
</tr>
<tr>
<td>IGEN 230</td>
<td>6</td>
</tr>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td>MATH 255</td>
<td>3</td>
</tr>
<tr>
<td>MECH 260</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credits</td>
<td>42</td>
</tr>
</tbody>
</table>
Bachelor of Applied Science > Materials Engineering

Materials Engineering is concerned with the characterization, processing, and use in design of metallic and non-metallic materials. An optional Co-operative Education program is available which permits students to obtain twenty months of related experience in the last three years of the program.

Materials Engineering

Second Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 278</td>
<td>3</td>
</tr>
<tr>
<td>APSC 279</td>
<td>1</td>
</tr>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td>MATH 255</td>
<td>3</td>
</tr>
<tr>
<td>MECH 260</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 201</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Students failing IGEN 201 will be required to pass APSC 201 subsequently.
2 Of the 18 credits of technical electives, 9 credits must be in one engineering discipline and 6 in another discipline. Several elective streams are possible. Consult the IGEN Student Advisor for assistance.
3 See Complementary Studies Courses.
## Bachelor of Applied Science > Mechanical Engineering

In addition to the regular Mechanical Engineering program, options in Biomedical Engineering, Mechatronics, and Thermofluids are also available.

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTRL 340</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 350</td>
<td>4</td>
</tr>
<tr>
<td>MTRL 358</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 359</td>
<td>1</td>
</tr>
<tr>
<td>MTRL 361</td>
<td>4</td>
</tr>
<tr>
<td>MTRL 363</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 365</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 378</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 381</td>
<td>1</td>
</tr>
<tr>
<td>MTRL 382</td>
<td>4</td>
</tr>
<tr>
<td>MTRL 392</td>
<td>2</td>
</tr>
<tr>
<td>MTRL 394</td>
<td>4</td>
</tr>
<tr>
<td>MTRL 398</td>
<td>1</td>
</tr>
<tr>
<td>STAT 251</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
<td>2</td>
</tr>
<tr>
<td>MTRL 455</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 456</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 460</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 466</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 467</td>
<td>3</td>
</tr>
<tr>
<td>MTRL 489</td>
<td>1</td>
</tr>
<tr>
<td><strong>Technical electives(^2)</strong></td>
<td><strong>21</strong></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>39</strong></td>
</tr>
</tbody>
</table>

\(^1\) See Complementary Studies Courses.

\(^2\) To be chosen from a course list available in the Department Office and in consultation with an Undergraduate Advisor.
Students enter Mechanical Engineering in a common second-year program known as Mech 2. Mech 2 begins the week before the normal start of Term 1 classes at UBC. Attendance during the first week is mandatory. Due to the early start date, students planning to live on campus in UBC Housing are required to apply for early arrival. Visit the Mech 2 (http://mech.ubc.ca/undergraduate/mech-2/) for information and instructions.

Students transferring into Mech 2 from other faculties or schools should consult Mech 2 (http://mech.ubc.ca/undergraduate/mech-2/) for information regarding prerequisite courses and transfer credits. In particular, any students missing MATH 100, MATH 101, MATH 152, one of (a) PHYS 153 or (b) all of PHYS 157, PHYS 158, PHYS 159, or PHYS 170 must have received credit for these courses no later than August 1st. Any student who fails to do so will not be permitted to start Mech 2 that year and will forfeit his/her seat in Mech 2 until a subsequent year in which he/she is able to meet the prerequisites by the above deadline.

Students admitted to Mechanical Engineering are required to satisfy the Language Proficiency Index (LPI) requirement for First-Year English prior to starting Mech 2. Students who need to meet the requirement by examination must provide proof of satisfactory examination results to the Department no later than August 4. Any student who fails to do so will not be permitted to start Mech 2 that year and will forfeit his/her seat in Mech 2 until a subsequent year in which he/she is able to meet the LPI requirement by the above deadline.

In undergraduate MECH courses where at least 50% of the final grade is assigned to examinations, students may only pass the course if they achieve a weighted average examination grade of at least 50%. The "examination grade" includes scores from the final examination, midterms, and other tests done individually in a classroom setting. This policy applies unless it is explicitly waived by the instructor in the course syllabus.

**Note:** A student's degree requirements are initially defined by the program that was in effect the year that the student entered Mech 2. For students that transfer into the department in third year, their degree requirements will be initially defined by the program that was in effect during the Winter Session of their first course registration in the department. Some students will not take courses in the order below, depending on their Co-op schedule. Please refer to the Department website for recommended course sequences.

### Mechanical Engineering

#### Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 253</td>
<td>3</td>
</tr>
<tr>
<td>MATH 255</td>
<td>3</td>
</tr>
<tr>
<td>MECH 220</td>
<td>4</td>
</tr>
<tr>
<td>MECH 221</td>
<td>12</td>
</tr>
<tr>
<td>MECH 222</td>
<td>6</td>
</tr>
<tr>
<td>MECH 223</td>
<td>7</td>
</tr>
<tr>
<td>MECH 224</td>
<td>1</td>
</tr>
<tr>
<td>MECH 225</td>
<td>1</td>
</tr>
<tr>
<td>MECH 226 or MECH 227</td>
<td>3 or 5</td>
</tr>
</tbody>
</table>

**Total Credits**: 40 or 42

#### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECH 305</td>
<td>6</td>
</tr>
<tr>
<td>MECH 325</td>
<td>4</td>
</tr>
<tr>
<td>MECH 326</td>
<td>3</td>
</tr>
<tr>
<td>MECH 327</td>
<td>3</td>
</tr>
<tr>
<td>MECH 328</td>
<td>3</td>
</tr>
<tr>
<td>MECH 358</td>
<td>3</td>
</tr>
</tbody>
</table>
MECH 360
MECH 368
MECH 375
MECH 380
MECH 392
Total Credits

Fourth Year

APSC 450
ELEC 344
MECH 329
MECH 431
MECH 457 or APSC 496
MECH 463
MECH 466
Technical electives
Complementary Studies electives
Total Credits

1 Taken prior to Term 1 of second year.
2 MECH 227 is taken in the summer after Second Year.
3 Department approval required for APSC 496
4 To be chosen from a course list available on the Department website.
5 See Complementary Studies Courses.

Biomedical Engineering Option

The Biomedical Option in Mechanical Engineering allows students interested in biomedical engineering, biomechanics and related topics to have a course and project concentration in these areas.

Students will be admitted to the option at the end of second year by permission of the program director, based on academic achievement and a demonstrated interest in biomedical engineering. Enrolment in this option is limited.

To complete this option, students will modify the standard Mechanical Engineering third- and fourth-year programs.

Note: Some students will not take courses in the order below, depending on their Co-op schedule. Please refer to the Department website for recommended course sequences.

Mechanical Engineering Biomedical Option

Third Year

BMEG 410
MECH 305
MECH 325
MECH 326
MECH 328

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This document was generated on 22 Mar 2018 at 11:01 AM.
MECH 358  3
MECH 360  3
MECH 368  3
MECH 375  3
MECH 380  3
MECH 463  4
Total Credits  38

### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 450</td>
<td>2</td>
</tr>
<tr>
<td>BMEG 456</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 344</td>
<td>3</td>
</tr>
<tr>
<td>MECH 431</td>
<td>3</td>
</tr>
<tr>
<td>MECH 439</td>
<td>1</td>
</tr>
<tr>
<td>MECH 459 or APSC 496</td>
<td>6</td>
</tr>
<tr>
<td>MECH 466</td>
<td>4</td>
</tr>
<tr>
<td>MTRL 495</td>
<td>3</td>
</tr>
<tr>
<td>Technical electives</td>
<td>9</td>
</tr>
<tr>
<td>Complementary Studies electives</td>
<td>6</td>
</tr>
<tr>
<td>Total Credits</td>
<td>40</td>
</tr>
</tbody>
</table>

1. Department approval required for APSC 496.
2. To be chosen from a course list available on the Department website.
3. See Complementary Studies Courses.

### Mechatronics Option

The Mechatronics Option in Mechanical Engineering allows students interested in mechanical systems integrated with embedded electronics, sensors, actuators, and related systems to have a course and project concentration in these areas.

Second-year students will take the same courses as regular mechanical engineering students.

Students will be admitted to the option at the end of first year by permission of the program director, based on a demonstrated interest in mechanical engineering and electronic design, and the grade point average obtained in the first year of engineering.

To complete this option, students will modify the standard Mechanical Engineering third- and fourth-year programs.

**Note:** Some students will not take courses in the order below, depending on their Co-op schedule. Please refer to the Department website for recommended course sequences.

### Third Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEN 312</td>
<td>3</td>
</tr>
<tr>
<td>CPEN 333</td>
<td>3</td>
</tr>
<tr>
<td>CPSC 259</td>
<td>4</td>
</tr>
<tr>
<td>ELEC 302</td>
<td>3</td>
</tr>
</tbody>
</table>
ELEC 343 3
MECH 306 4
MECH 325 4
MECH 328 3
MECH 360 3
MECH 366 3
MECH 463 4
Complementary Studies electives 2 3
Total Credits 40

Fourth Year
APSC 450 2
MECH 375 3
MECH 392 2
MECH 420 3
MECH 421 3
MECH 422 or MECH 423 3
MECH 431 3
MECH 458 6
MECH 467 4
Technical electives 1 6
Complementary Studies electives 2 3
Total Credits 38

1 To be chosen from a course list available on the Department website.
2 See Complementary Studies Courses.

Thermofluids Option

The Thermofluids Option in Mechanical Engineering allows students interested in aircraft, naval architecture, engines, and related systems to have a course and project concentration in these areas.

Students will be admitted to the option at the end of second year by permission of the program director, based on a demonstrated interest in engineering thermofluids.

Students can continue into the Thermofluids Option in the Master of Engineering degree program if they have a strong interest in a particular area of thermofluids and are eligible for graduate studies.

To complete this option, students will modify the standard Mechanical Engineering third- and fourth-year programs.

Mechanical Engineering Thermofluids Option

Third Year
MECH 305 6
MECH 325 4
MECH 327 3
Bachelor of Applied Science > Mining Engineering

Mining Engineering is concerned with the optimal exploitation of mineral resources while minimizing environmental impact. The discipline requires a broad knowledge of engineering and scientific subjects.

Mining Engineering

Second Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>APSC 201</td>
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<td>CIVL 210</td>
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<td>EOSC 210</td>
<td>3</td>
</tr>
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<td>MATH 253</td>
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<td>MECH 260</td>
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<td>MECH 280, CIVL 215, or CHBE 251</td>
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<td>MINE 224</td>
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<td>MINE 291</td>
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<td>MINE 293</td>
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1 See Complementary Studies Courses.
2 Department approval required for APSC 496.
3 To be chosen from a course list available on the Department website.
<table>
<thead>
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<tr>
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<td>MINE 310</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>Fourth Year</strong></td>
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<td>APSC 450</td>
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<td>MINE 486</td>
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<td>MINE 491</td>
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<td>MINE 493</td>
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<tr>
<td>MINE 403 and 455, or MINE 434 and 462</td>
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<td><strong>Technical electives&lt;sup&gt;2&lt;/sup&gt;</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Complementary Studies electives&lt;sup&gt;1&lt;/sup&gt;</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>37</td>
</tr>
</tbody>
</table>

<sup>1</sup> See [Complementary Studies Courses](#).

<sup>2</sup> Selected with the approval of the Department.

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**Co-operative Education Program**

The Engineering Co-operative Education Program is intended to provide motivated and qualified students with paid, faculty-monitored work experience, which is directly related to their academic program. The Co-op Program is available in Biomedical Engineering, Chemical and Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, Geological Engineering, Integrated Engineering, Materials Engineering, Mechanical Engineering, Mining
Engineering, and Engineering Physics.

The program is an optional, year-round program that normally requires completion of five work terms including one winter and one fall placement. The Co-op Program requires an additional year to complete the Bachelor of Applied Science requirements.

Students intending to enter these programs may apply between January of first year and September of second year. Specific deadlines are available from the Co-op office.

Coordinators visit students at their places of work and provide advice on the technical reports that are a requirement of the program.

Students who wish to be considered for the program must meet all requirements of the Faculty of Applied Science (engineering) and will be selected on the basis of academic performance, written and oral communication skills, and general suitability for the work environment.

The total enrolment is subject to the availability of appropriate work placements. Students who are accepted to the program will register in, and pay for, the appropriate 6-credit Co-operative Education course (see Program and Course Fees (Calendar page: http://www.calendar.ubc.ca/vancouver/index.cfm?tree=14,296,0,0#18093)) for each work term once a suitable position is confirmed.

In order to graduate in the year-round Co-operative Education Program, a student must have satisfactorily completed the required number of work placements, in addition to the normal academic requirements.

Normally, students transferring from other institutions may be given credit for work terms completed at their former institution if they meet the following requirements:

- the student must be accepted into the UBC Co-op Program;
- the program in which the work term was undertaken is accredited;
- the work term is officially recognized, (i.e., noted on the transcript), by the institution where the work term originated; and
- the work term was granted for experience in the same or similar discipline into which the student is transferring.

Regardless of the number of work terms accepted, students will be required to complete at least 50% of the required work terms in the new program into which they are transferring. Acceptance into a co-op program at one institution does not guarantee acceptance into UBC’s Co-op Program. Application for transfer of work terms must be made to the director of Co-operative Education prior to undertaking any additional work terms at UBC.

For more information please visit Engineering Co-operative Education (http://www.coop.apsc.ubc.ca).

Professional Associations

The right to practise engineering and accept professional responsibility in Canada is limited to those who are registered members of the Association of Professional Engineers in the Province concerned. During the period between graduation and registration, the graduate who intends to practise in BC should be enrolled with the Association as an "Engineer in Training."

All of the Bachelor of Applied Science programs at UBC are accredited by the Canadian Engineering Accreditation Board (CEAB) of Engineers Canada. Graduates of CEAB-accredited programs are accepted as being fully qualified academically for professional engineering registration anywhere in Canada. However, there are also experience qualifications and professional practice requirements that must be fulfilled before full registration is granted. These qualifications vary within Canada and applicants should...
obtain the necessary details from the appropriate association(s).

M.Eng., M.A.Sc., or Ph.D. degrees alone do not form an acceptable basis for application to Associations of Professional Engineers in Canada.

Joint UNBC/UBC Program: Environmental Engineering

The Environmental Engineering program is a four and one-half year (nine semester) joint degree between the UBC and the University of Northern British Columbia. The program starts with a two-year foundation in mathematics and the basic sciences from the College of Science and Management of the University of Northern British Columbia. In the third and fourth years, the program provides a thorough education and training in engineering fundamentals, engineering analysis and engineering design, largely through courses in Civil Engineering and Chemical and Biological Engineering at UBC. The final term at UNBC will expose students to practical environmental engineering problems.

The Environmental Engineering program is a joint program under the jurisdiction of the Dean of the Faculty of Applied Science at UBC and the Dean of the College of Science and Management at the University of Northern British Columbia. The program is administered by a joint board of study.

The program has been developed to satisfy Canadian Engineering Accreditation Board (CEAB) requirements for accreditation of engineering programs.

There is a Co-operative Education option (Co-op) where students normally take five work semesters in addition to the nine academic semesters. Accounting for summer work terms, this option results in a total duration of five and one-half years.

Environmental Engineering

<table>
<thead>
<tr>
<th>First Year (taken at UNBC)</th>
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<tbody>
<tr>
<td>CHEM 100</td>
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<tr>
<td>CHEM 101</td>
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<td>PHYS 111</td>
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Second Year (taken at UNBC)

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Information in this Calendar is subject to change. Visit www.calendar.ubc.ca/vancouver for current details.
This document was generated on 22 Mar 2018 at 11:01 AM.
<table>
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<td>ENGR 210</td>
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<td>ENGR 217</td>
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<td>ENGR 350</td>
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<td>ENGR 451</td>
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<td>ENSC 201</td>
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<td>GEOG 210</td>
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<td>MATH 200</td>
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<td>MATH 220</td>
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**Third Year (taken at UBC)**

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<td>CHBE 364</td>
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<tr>
<td>CHBE 373</td>
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<td>CHBE 484</td>
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<td>CHBE 485</td>
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<td>CIVL 200</td>
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<td>CIVL 210</td>
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<td>CIVL 315</td>
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<tr>
<td>CIVL 316</td>
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<tr>
<td>MINE 486</td>
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**Fourth Year (taken at UBC)**

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<td>CIVL 402</td>
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</tr>
<tr>
<td>CIVL 408</td>
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<tr>
<td>CIVL 409</td>
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<tr>
<td>CIVL 416</td>
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<tr>
<td>CIVL 418</td>
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<tr>
<td>EOSC 429</td>
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<tr>
<td>One of CHBE 459, CIVL 403</td>
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**Fifth Year (taken at UNBC)**

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<tr>
<td>ENPL 401</td>
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<td>ENSC 417</td>
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<td>ENSC 418</td>
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</table>
Master of Engineering

The Master of Engineering (M.Eng.) program is suited to students who wish to pursue their engineering education in a preferred area of specialization beyond the undergraduate level, but who do not wish to pursue a thesis research program. Applicants who are considering taking a Doctor of Philosophy (Ph.D.) in the future should apply for admission to the Master of Applied Science (M.A.Sc.) or Master of Science (M.Sc. in Chemical and Biological Engineering) through the Faculty of Graduate and Postdoctoral Studies.

Typical completion time for full-time Master of Engineering students is 12-16 months.

The Master of Engineering program (http://www.engineering.ubc.ca/academics/graduate) is administered by the Faculty of Applied Science.

Admission Requirements

Note: Master of Engineering degrees alone do not form an acceptable basis for application to associations of professional engineers in Canada.

Applicants to the Master of Engineering program in all specializations must hold a credential deemed academically equivalent to a four-year bachelor's degree from UBC, in engineering or a related discipline.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework, and at least 74% in the remaining senior-level coursework, in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall average of 76% (UBC-equivalency).

For all specializations, relevant professional experience is considered an asset.

Applicants holding a four-year bachelor's degree who do not meet the admissions minimum, but who have had sufficient formal training and relevant professional experience to offset the academic deficiency, may be granted admission on the recommendation of the graduate advisor in the area of specialization and the approval of the Applied Science Dean's office.

For the Naval Architecture and Marine Engineering specialization, applicants must have demonstrated proficiency in the areas of...
Structural Mechanics, Fluid Mechanics, Automatic Controls and Thermodynamics. Students lacking a background in these subject areas may be required to complete additional coursework.

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of competency prior to being extended an offer of admission. Acceptable English language proficiency tests for applicants to graduate studies include the TOEFL, IELTS, and MELAB. The required minimum is determined by the Graduate program office in the area of specialization, but must be at or above the university minimum for graduate-level study.

Students interested in applying to the Master of Engineering program apply through the UBC Graduate Studies Online Application (http://evision.as.it.ubc.ca/urd/sits.urd/run/siw_ubc_cwl). Lists of the required application documents are available on the respective program websites. Each graduate program office in an area of specialization is responsible for collection and assessment of application documents and issues the offer of admission letter.

Transfer Credit

Courses taken as an Access Studies or non-degree student may be approved for transfer toward a graduate program degree with the permission of the graduate program in the area of specialization.

Consistent with standard transfer credit regulations, students are limited to transferring a maximum of 12 credits or up to 40% of the program credit requirements, whichever is more, toward their master's program. No more than 6 credits of transfer credit may be at the undergraduate level (300-/400-level). In order to be eligible for transfer, the course(s):

- must be completed with a minimum B standing (UBC-equivalency)
- must not have been counted toward the completion of another degree or program
- must have been completed no more than five years prior to the time the student commences the degree program
- must not be used as a basis for admission to the graduate program

Financial Assistance

Financial assistance is generally not available to students in the Master of Engineering program. Top international students may be eligible to receive an entrance award of up to $2,000 towards tuition. Review each specialization website for specific assistance information.

Program Requirements

The program requires completion of at least 30 credits. In some program areas, minimum requirements may be higher than 30 credits:

- At least 24 credits must be at the 500-level.
- A minimum of 18 of the 24 credits must be in the program area at the 500-level, including a project, if required, up to a maximum 6 credits.
- A maximum of 6 credits may be taken at the 300-/400-level.
- A maximum of 6 credits of 500-level directed studies courses may be counted toward the program requirements.

Students should consult each specialization website for more information. Each student's coursework must be approved by the graduate program office for that area.

Specializations
Master of Engineering Leadership in Advanced Materials Manufacturing

Program Overview

The Master of Engineering Leadership in Advanced Materials Manufacturing (MEL in AMM) is a program within the Faculty of Applied Science.

The creation of this program has been driven, in part, by strong interest from the Canadian manufacturing community (includes aerospace, automotive and energy transmission whereby British Columbia will see a high level of activity over the next few decades). The objective of this program is to meet an identified need to educate engineers with a unique combination of leadership and strong technical, multi-disciplinary knowledge on multi-material solutions to advanced materials manufacturing.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/advanced-materials-manufacturing/) for further information and contact details.

Admission Requirements
• Applicants must normally hold an undergraduate credential in Material Engineering, Mechanical Engineering, Civil Engineering or related discipline;
• Have a minimum of two years of relevant experience.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in AMM are:

• TOEFL (Test of English as a Foreign Language)
  Either:
  • A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
  OR
  • Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).

• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.

• MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.

• PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.

• CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.

• CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the AMM program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MEL in AMM degree. Typically only 3 credits will be allowed to be transferred, provided that:
   • The courses were not used as a basis for admission to the AMM program;
2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of AMM, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses, including 6 credits of constrained electives and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material and is equivalent to a specialization. Each student's coursework must be approved by the MEL in AMM graduate program office. A complete list of the courses required for successful completion are available on the program website (apscpp.ubc.ca/program/advanced-materials-manufacturing/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
The University of British Columbia
Gerald McGavin Building
211 - 2386 East Mall
Vancouver, BC
Canada V6T 1Z3
Tel: 604.827.4136
Email: apscpp@apsc.ubc.ca
Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)

Last updated: March 6, 2018

Master of Engineering Leadership in Clean Energy Engineering
Program Overview

Master of Engineering Leadership in Clean Energy Engineering (MEL in CEEN) is a program within the Faculty of Applied Science.

The objective of the Clean Energy Program is to provide students with advanced knowledge in various aspects of energy conversion, distribution, storage and management, including renewable energy technologies, energy distribution networks and energy policy. It is designed to educate and challenge students to critical thinking about topics related to energy conservation and efficiency, energy and environment, and social impact. The curriculum is based on innovative teaching strategies which include a key feature of organizing and promoting interaction between students and industrial partners through seminars, debates on advanced energy related topics, industrially sponsored projects and conferences.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/clean-energy/) for further information and contact details.

Admission Requirements

- Applicants must normally hold an undergraduate credential in engineering or a BSc in environmental science or related specialization;
- Have a minimum three years relevant experience in the energy sector;
- Have completed a 2nd or 3rd-year-level-course in thermodynamics.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in CEEN are:

- TOEFL (Test of English as a Foreign Language)
  Either:
  - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking]; OR
  - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
- PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT
general) test is required.

- CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the CEEN program (e.g., from a different university, in a different UBC master’s program, or as an unclassified student) may apply to transfer credits toward their MEL in CEEN degree. Typically only 3 credits will be allowed to be transferred, provided that:

   - The courses were not used as a basis for admission to the CEEN program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the CEEN program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of CEEN, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration, and a 3-credit Capstone course. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material and is equivalent to a specialization. Each student's coursework must be approved by the Applied Science graduate program office. Students in the MEL CEEN will choose in their second term between a Co-operative Education Placement (APSC 412 non-additive credits not counted in the 30 credits program requirement) and an entrepreneurial experience. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/program/clean-energy/).

Financial Assistance
Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
The University of British Columbia
Gerald McGavin Building
211 - 2386 East Mall
Vancouver BC
Canada V6T 1Z3
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Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)

Last updated: March 6, 2018

Master of Engineering Leadership in Dependable Software Systems

Program Overview

The Master of Engineering Leadership in Dependable Software Systems (MEL in DSS) is a program within the Faculty of Applied Science.

Dependability of software systems is gaining much attention and importance with the pervasiveness of software systems. The ubiquity of these systems requires that these systems perform correctly with high confidence, and building such systems requires a multifaceted approach. This program addresses key concepts, namely:

- System correctness within specifications
- System robustness outside of specifications
- System security in case of hostile use outside of specification
- Software project lifecycle management for robust systems

The program is supported by a set of leadership, management, and analysis courses aimed at providing professional education for dependable software systems technical leaders.

Admission Requirements

- Applicants must hold an undergraduate degree in Computer Engineering or Computer Science;
- Have prior experience developing software systems;
- Have a minimum three years relevant experience.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.
The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in DSS are:

- **TOEFL (Test of English as a Foreign Language)**
  - Either:
    - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
    - OR
    - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- **IELTS (International English Language Testing Service):** minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- **MELAB (Michigan English Language Assessment Battery):** minimum overall score of 85, with a minimum score of 3 in the speaking test.
- **PTE (Pearson Test of English - Academic):** minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
- **CELPIP (Canadian English Language Proficiency Index Program):** minimum scores; 4L/4L/4L of the academic (NOT general) test is required.
- **CAEL (Canadian Academic English Language Assessment):** minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

**Transfer Credit**

1. Graduate students who have earned credits for equivalent courses outside of the DSS program (e.g., from a different university, in a different UBC master’s program, or as an unclassified student) may apply to transfer credits toward their MEL in DSS degree. Typically only 3 credits will be allowed to be transferred, provided that:
   - The courses were not used as a basis for admission to the DSS program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the DSS program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP
or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of DSS, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses, including 3 credits of constrained electives and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the MEL in DSS graduate program office. Students in the MEL in DSS will complete a Capstone Project. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/program/dependable-software-systems/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
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Gerald McGavin Building
211 - 2386 East Mall
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Email: apscpp@apsc.ubc.ca
Web: www.apscpp.ubc.ca/ (http://www.apscpp.ubc.ca/)

Master of Engineering Leadership in Green BioProducts

Program Overview

The Master of Engineering Leadership in Green BioProducts (MEL in GBPR) is a program within the Faculty of Applied Science.

The Green BioProducts program focuses on developing Highly Qualified Personnel (HQP) needed for the rapidly evolving lignocellulosic biomass (Green) products sector. This sector is seeing opportunities in the development of green, sustainable products, and chemistries to replace oil-based products and fuels. UBC has an exceptional group of researchers working on development of advanced biomaterials, ranging from specialty paper applications to fibre and fibril reinforced materials and carbon
fibres from lignin.

Students will develop mastery of knowledge related to the chemistry and anatomy of the tree, lignocellulosic separation chemistry, and the production pathways for biocomposites and fuels.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/green-bio-products/) for further information and contact details.

**Admission Requirements**

This program is delivered jointly between the Department of Chemical & Biological Engineering (within the Faculty of Applied Science) and the Faculty of Forestry.

- Applicants must hold an undergraduate credential in Chemical and Biological Engineering, Forestry, Wood Products Processing, Chemistry or Plant Science, Biotechnology, Biochemistry, Biology or Biophysics or equivalent;
- Have a minimum of three years relevant experience.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in GBPR are:

- **TOEFL (Test of English as a Foreign Language)**
  - Either:
    - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
    - OR
    - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).

- **IELTS (International English Language Testing Service):** minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.

- **MELAB (Michigan English Language Assessment Battery):** minimum overall score of 85, with a minimum score of 3 in the speaking test.

- **PTE (Pearson Test of English - Academic):** minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.

- **CELPPIP (Canadian English Language Proficiency Index Program):** minimum scores; 4L/4L/4L of the academic (NOT general) test is required.

- **CAEL (Canadian Academic English Language Assessment):** minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.
Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the GBPR program (e.g., from a different university, in a different UBC master’s program, or as an unclassified student) may apply to transfer credits toward their MEL in GBPR degree. Typically only 3 credits will be allowed to be transferred, provided that:
   - The courses were not used as a basis for admission to the GBPR program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the GBPR program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of GBPR, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses, including 3 credits of constrained electives, and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the MEL in Green Bio-Products graduate program office. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/program/green-bio-products/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.
Master of Engineering Leadership in High Performance Buildings

Program Overview

The Master of Engineering Leadership in High Performance Buildings (MEL in HPB) is a program within the Faculty of Applied Science.

The MEL in HPB program develops Highly Qualified Personnel (HQP) for the rapidly evolving high performance green building sector. This building sector is seeing opportunities as the demand for sustainable buildings and cities increases. UBC has an exceptional group of researchers working on green and sustainable buildings, cities and integrated energy systems.

This program is delivered by the Department of Mechanical Engineering and the School of Architecture and Landscape Architecture, both within the Faculty of Applied Science, in collaboration with the Faculty of Commerce and Business Administration (also known as the Sauder School of Business).

Admission Requirements

- Applicants must hold an undergraduate credential in either engineering (or equivalent) OR a professional Master of Architecture.
- A minimum of 3 years relevant work experience.

Applicants lacking these requirements may be required to complete additional coursework on the recommendation of the Program Director. Additionally, applicants with backgrounds only in architecture may be required to complete prerequisite coursework in engineering on the recommendation of the Program Director.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must provide results of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in HPB are:
• TOEFL (Test of English as a Foreign Language)
  Either:
  • A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
  OR
  • Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).

• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.

• MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.

• PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.

• CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.

• CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the HPB program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MEL in HPB degree. Typically only 3 credits will be allowed to be transferred, provided that:
   • The courses were not used as a basis for admission to the HPB program;
   • The courses were not used to satisfy the requirements of another credential;
   • The courses considered for transfer credit have been taken within five years of commencement of the HPB program;
   • At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of HPB, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.
Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. (Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master's programs. The Pillar contains the relevant technical material.)

The required core courses for the platform include:

- APPP 501 (1.5) Project Management and Leadership
- APPP 503 (1.5) Sustainability and Leadership
- APPP 503 (1.5) Organizational Leadership
- APPP 504 (3) Business Acumen for Technical Leaders
- APPP 505 (3) Analytics and Interpretation for Applied Sciences
- 1.5 credits of approved Commerce and Business Administration electives.

The required core courses for the pillar include:

- HPB 501 (3) Green Building Contemporary Practice
- HPB 502 (3) Regenerative Development
- HPB 503 (3) Whole Building Energy Modelling and Simulation
- HPB 504 (3) Building Energy Systems Design
- HPB 505 (3) Capstone: Greening Existing Buildings
- HPB 506 (3) Capstone: New Building Energy Systems Design

Each students' course plan must be approved by the MEL in HPB graduate program office. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL in HPB program website for more information.

Contact Information

Graduate Admissions
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Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)
Master of Engineering Leadership in Integrated Water Management

Program Overview

The Master of Engineering Leadership in Integrated Water Management (MEL in IWME) is a program within the Faculty of Applied Science.

There has been a rapid expansion in scientific and engineering knowledge around water with many new technologies and practical solutions emerging. These include advanced treatments, sophisticated monitoring tools, powerful information technologies, deeper understanding of natural systems, efficient water use and reuse, and novel biotechnologies. Students will learn necessary elements of environmental fluid dynamics, hydrology, chemical and biological treatment processes, water and wastewater management required of a professional working in water resource systems planning and management.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/integrated-water-management/) for further information and contact details.

Admission Requirements

- Applicants must hold an undergraduate credential in Chemical & Biological Engineering, Civil Engineering, Geological Engineering or related discipline in engineering, Environmental Sciences, Geology, Fluid Mechanics, Hydrology, Biotechnology, Biology, Biogeography (physical geography) or Microbiology or equivalent;
- Have a minimum of three years relevant experience.

The minimum admission requirement for students with degrees from institutions in Canada or the United States is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside Canada and the United States is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in IWME are:

- TOEFL (Test of English as a Foreign Language)
  - Either:
    - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
    - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.

CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.

CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the IWME program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MEL in IWME degree. Typically only 3 credits will be allowed to be transferred, provided that:

   - The courses were not used as a basis for admission to the IWME program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the IWME program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of IWME, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses, including 6 credits of constrained electives and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the MEL IWME graduate program office. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/program/integrated-water-management/).
Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
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211 - 2386 East Mall
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Email: apscpp@apsc.ubc.ca
Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)

Master of Engineering Leadership in Naval Architecture and Marine Engineering

Program Overview

The Master of Engineering Leadership in Naval Architecture and Marine Engineering (MEL in NAME) is a program within the Faculty of Applied Science.

The program will combine an essential understanding of the engineering science and physics of ship design, coupled with the broad business training contained in the program’s Platform courses. The intent is to produce engineering Program Managers who possess sufficient technical understanding to direct detailed engineering analyses.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/naval-architecture-marine-engineering/) for further information and contact details. The MEng NAME is also available, for further information and contact details please visit MEng NAME website (http://name.engineering.ubc.ca/).

Admission Requirements

- Applicants must normally hold an undergraduate credential in engineering;
- Have a minimum of 3 years of relevant experience.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.
The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in NAME are:

- TOEFL (Test of English as a Foreign Language)
  - Either:
    - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
    - OR
    - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
- PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science. Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the NAME program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MEL in NAME degree. Typically only 3 credits will be allowed to be transferred, provided that:
   - The courses were not used as a basis for admission to the NAME program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the NAME program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of NAME, addressed to the
Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 31 credits. This includes 22 credits of Pillar courses and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material and is equivalent to a specialization. Each student's coursework must be approved by the NAME graduate program office. A complete list of the courses required for successful completion are available on the program website [http://apspp.ubc.ca/program/naval-architecture-marine-engineering/](http://apspp.ubc.ca/program/naval-architecture-marine-engineering/).

Students in the MEL in NAME may choose to augment their program with a Co-operative Education Placement or an entrepreneurial experience. Participation in either of these options will not contribute to the degree requirements. Students should be advised that choosing to participate in a co-op term may extend the duration of the program.

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website [http://apscpp.ubc.ca/admissions/](http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
The University of British Columbia
Gerald McGavin Building
211 - 2386 East Mall
Vancouver BC
Canada V6T 1Z3

Tel: 604.827.4136
Email: apscpp@apsc.ubc.ca
Web: www.apscpp.ubc.ca

Master of Engineering Leadership in Smart Grid Energy Systems

Program Overview

The Master of Engineering Leadership (M.E.L.) in Smart Grid Energy Systems (S.G.E.S.) is a program within the Faculty of Applied Science.

The Smart Grid Energy Systems program option focuses on developing Highly Qualified Personnel (H.Q.P.) needed for the rapidly
evolving smart grid energy sector. This sector has opportunities in the development of methods and technologies for: the integration of emerging generation and storage equipment into today’s evolving power grid; communication systems for the ubiquitous sensing and control of all power grid components; and the automation of energy dispatch to meet the needs of users whether they are consumers, utility providers, emergency responders, for example. The curriculum emphasizes the application of technical knowledge through projects and labs.

Admission Requirements

- Applicants must hold an undergraduate credential in electrical engineering with a focus on energy or equivalent.
- A minimum of 3 years relevant experience.

The minimum admission requirement for students with degrees from Canadian or American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of competency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL SGES are:

- TOEFL (Test of English as a Foreign Language)
  Either:
  - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
  OR
  - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
- PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website. The Applied Science graduate program office is responsible for collection and assessment of application documents.
Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the SGES program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MEL in SGES degree. Typically only 3 credits will be allowed to be transferred, provided that:
   - the courses were not used as a basis for admission to the SGES program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the SGES program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of SGES, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

Program Requirements

Degree completion requires completion of 30 credits. This includes 18 credits of Pillar courses and 12 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material and is equivalent to a specialization. Each student’s course work must be approved by the Applied Science graduate program office. A complete list of the courses required for successful completion is available on the M.E.L. in S.G.E.S. program website.

Note: SGES 501 (6) runs three semesters (12 months)

**Winter Session – Term 2 (January – April)**
SGES 501 (see note above), SGES 502 (3), SGES 550 (2), APPP 501 (1.5), APPP 503 (1.5), APPP 505 (3)

**Summer Session – Term 1 (May – June); Summer Session – Term 2 (July – August)**
SGES 501 (see note above), SGES 502 (3), SGES 550 (2), APPP 501 (1.5), APPP 503 (1.5), APPP 505 (3), SGES 501 (see note above), SGES 503 (2), APPP 504 (3)

**Winter Session – Term 1 (September - December)**
SGES 501 (see note above), SGES 531 (3), SGES 592 (2), APPP 502 (1.5), Commerce & Business Admin. Elective (1.5)

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the M.E.L. in S.G.E.S. program website for more information.
Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
The University of British Columbia
Gerald McGavin Building
211 - 2386 East Mall
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Web: www.apscpp.ubc.ca

Master of Engineering Leadership in Urban Systems

Program Overview

The Master of Engineering Leadership in Urban Systems (MEL in URSY) is a program within the Faculty of Applied Science.

Urban systems provide the technical infrastructure that underpin modern urban society — transportation, water, waste handling, power, data, etc. The M.E.L. in Urban Systems program trains students to fill leadership roles in the planning, design, construction, operation, and overall management of these critical systems.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Engineering Leadership program. Please visit the MEL website (http://apscpp.ubc.ca/program/urban-systems/) for further information and contact details.

Admission Requirements

- Applicants must hold an undergraduate credential in Civil Engineering, Urban Planning or related discipline;
- Demonstrate competence in quantitative methods;
- Have a minimum of three years of relevant professional experience.

The minimum admission requirement for students with degrees from North American institutions is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside North America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MEL in URSY are:
• TOEFL (Test of English as a Foreign Language)
  Either:
  • A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
  OR
  • Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
• IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
• MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
• PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
• CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.
• CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the URSY program (e.g., from a different university, in a different UBC master’s program, or as an unclassified student) may apply to transfer credits toward their MEL in URSY degree. Typically only 3 credits will be allowed to be transferred, provided that:
   • The courses were not used as a basis for admission to the URSY program;
   • The courses were not used to satisfy the requirements of another credential;
   • The courses considered for transfer credit have been taken within five years of commencement of the URSY program;
   • At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of URSY, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.
Program Requirements

Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses, including 6 credits of constrained electives, and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the MEL in Urban Systems graduate program office. A complete list of the courses required for successful completion is available on the MEL in Urban Systems program website (http://apscpp.ubc.ca/program/urban-systems/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MEL admissions Website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio – Faculty of Applied Science
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Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)

Last updated: March 6, 2018

Master of Health Leadership and Policy in Clinical Education

This program is pending final approval by the Ministry of Advanced Education.

The Master of Health Leadership and Policy in Clinical Education (MHLP in CE) is a program within the Faculty of Applied Science.

This program is designed to prepare professionals to lead, design, and deliver comprehensive clinical education programs in a range of community and institutional settings in both the public and private sectors. The goal of the program is to provide learning experiences that enable graduates to complement their clinical expertise with both substantive knowledge related to clinical education and knowledge of business operations.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Health Leadership and Policy program. Please visit the MHLP website (http://apscpp.ubc.ca/programs/mhlp/) for further information and contact details.
Admission Requirements

- Applicants must hold an undergraduate credential in healthcare or related field (Nursing, Dietetics, Medicine)
- Have a minimum of three years of relevant experience and demonstrate, through references and work experience, that they are proficient and have been identified as having leadership potential in clinical practice.

The minimum admission requirement for students with degrees from recognized institutions within Canada or the United States of America is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside Canada and the United States of America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MHLP in CE are:

- TOEFL (Test of English as a Foreign Language)
  - Either:
    - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
    - OR
    - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).
- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.
- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.
- PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.
- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.
- CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet both the academic and English language proficiency requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the CE program (e.g., from a different university, in a different UBC master's program, or as an unclassified student) may apply to transfer credits toward their MHLP in CE degree. Typically only 3 credits will be allowed to be transferred, provided that:
• The courses were not used as a basis for admission to the CE program;
• The courses were not used to satisfy the requirements of another credential;
• The courses considered for transfer credit have been taken within five years of commencement of the CE program;
• At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of CE, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.

5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree requires completion of 30 credits. This includes 18 credits of Pillar (Nursing discipline) courses and 10.5 credits of specified courses and 1.5 credits of approved elective courses delivered in partnership with the Faculty of Commerce and Business Administration (also known as the Sauder School of Business). The Pillar contains the relevant technical material. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. Each student's coursework must be approved by the MHLP in CE Graduate Program Office.

Course Requirements for MHLP in CE:

• NURS 531 (3) Theoretical Foundations of Clinical Education
• NURS 504 (3) Research and Evidence-Based Practice
• NURS 541 (3) Clinical Nursing Education
• NURS 560 (3) The Politics of Health Policy
• NURS 577 (3) Graduate Practicum in Nursing
• NURS 586 (3) Specialized Domains of Nursing Practice

• APPP 501 (1.5) Project Management and Leadership
• APPP 502 (1.5) Sustainability and Leadership
• APPP 503 (1.5) Organizational Leadership
• APPP 504 (3) Business Acumen for Technical Leaders
• APPP 505 (3) Analytics & Interpretation for Applied Sciences
• Sauder Elective (1.5) Approved by the Program Office

Financial Assistance

Financial assistance based on academic merit and financial need may be available.
Students should consult the program website (http://www.apscpp.ubc.ca) for more information.

Contact Information

Graduate Admissions
Professional Masters Studio-Faculty of Applied Science
The University of British Columbia
Gerald McGavin Building
211-2386 East Mall
Vancouver, BC
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Email apscpp@apsc.ubc.ca
Web: www.apscpp.ubc.ca (http://www.apscpp.ubc.ca)

Master of Health Leadership and Policy in Seniors Care

Program Overview

The Master of Health Leadership and Policy in Seniors Care (MHLP in SC) is a program within the Faculty of Applied Science.

This program is designed to prepare professionals to lead, design, and deliver comprehensive care and services for seniors in a range of community and institutional settings in both the public and private sectors. The goal of the program is to provide learning experiences that enable graduates to complement their knowledge of the health of seniors with both substantive knowledge related to seniors care and knowledge of business operations.

This is a 12-month, full-time program for professionals who have relevant industry experience and are wanting to accelerate their career.

The Faculty of Applied Science administers the Master of Health Leadership and Policy program. Please visit the MHLP website (http://apscpp.ubc.ca/program/senior-care/) for further information and contact details.

Admission Requirements

- Applicants must hold an undergraduate credential in healthcare or related field (Nursing, Social Work, Occupational or Physical Therapy, Dietetics);
  - Have a minimum of three years of relevant experience with at least one year in seniors care.

The minimum admission requirement for students with degrees from recognized institutions within Canada or the United States of America is an average of 76% (UBC-equivalency), calculated from senior-level coursework. An applicant with an average slightly less than 76% may be admitted if they have achieved 80% or higher in at least 12 credits (UBC-equivalency) of senior-level coursework in the prospective area of study.

The minimum admission requirement for applicants with degrees from outside Canada and the United States of America is an overall degree average of 76% (UBC-equivalency).

Applicants from a university outside Canada in which English is not the primary language of instruction must present evidence of
English language proficiency prior to being extended an offer of admission. Tests must have been taken within the last 24 months at the time of submission of your application. Acceptable English language proficiency tests for the MHLP in SC are:

- TOEFL (Test of English as a Foreign Language)
  Either:
  - A minimum score of 90 (internet-based exam), with minimum component scores of 22 [in reading, listening] and minimum component score of 21 [in writing, speaking];
  OR
  - Minimum score 55 each for reading, listening, and writing (in the paper-based test), with a minimum score of 4.0 on the Test of Written English (TWE).

- IELTS (International English Language Testing Service): minimum overall band score of 6.5 with no other component score less than 6.0 of the academic (NOT general) IELTS test.

- MELAB (Michigan English Language Assessment Battery): minimum overall score of 85, with a minimum score of 3 in the speaking test.

- PTE (Pearson Test of English - Academic): minimum overall score of 65, with a minimum score of 60 reading, 60 writing, 60 listening, and 60 speaking.

- CELPIP (Canadian English Language Proficiency Index Program): minimum scores; 4L/4L/4L of the academic (NOT general) test is required.

- CAEL (Canadian Academic English Language Assessment): minimum overall score of 70, with a minimum score of 60 on the speaking sub-test.

Applicants who do not meet the academic requirements stated above, but who have had other significant formal training, relevant professional experience, and/or otherwise possess demonstrable knowledge or expertise that would prepare them adequately for successful study in the graduate program, may be granted admission on the recommendation of the Program Director and the approval of the Dean of Applied Science.

Lists of the required application documents are available on the program website (http://apscpp.ubc.ca/). The Professional Masters office is responsible for collection and assessment of application documents.

Transfer Credit

1. Graduate students who have earned credits for equivalent courses outside of the SC program (e.g., from a different university, in a different UBC master’s program, or as an unclassified student) may apply to transfer credits toward their MHLP in SC degree. Typically only 3 credits will be allowed to be transferred, provided that:
   - The courses were not used as a basis for admission to the SC program;
   - The courses were not used to satisfy the requirements of another credential;
   - The courses considered for transfer credit have been taken within five years of commencement of the SC program;
   - At least a B standing (UBC 74%) was obtained in courses considered for transfer.

2. Transfer credit may only be at the graduate level (500-/600-level).

3. Transferring credits is not permitted for APSC Professional Programs management and leadership courses, course code: APPP or Sauder business course codes.

4. Requests for transfer credit must be accompanied by a letter or memo of support from the Director of SC, addressed to the Associate Dean of Applied Science. The letter must provide an academic justification for allowing the transfer credit on a course by course basis and be accompanied by a set of original transcripts from the completed course institution.
5. Transferring credits will not reduce tuition fees.

Program Requirements

Degree completion requires completion of 30 credits. This includes 21 credits of Pillar courses and 9 credits of Platform courses, including 1.5 credits of approved electives from the Faculty of Commerce and Business Administration. Platform refers to foundational coursework focused on the professional skills required for an experienced graduate to be an effective professional leader. These courses are common across many of the Applied Science Professional Master’s programs. The Pillar contains the relevant technical material. Each student's coursework must be approved by the MHLP in SC graduate program office. A complete list of the courses required for successful completion are available on the program website (http://apscpp.ubc.ca/program/senior-care/).

Financial Assistance

Financial assistance based on academic merit and financial need may be available.

Students should consult the MHLP admissions website (http://apscpp.ubc.ca/admissions/) for more information.

Contact Information

Graduate Admissions
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211 - 2386 East Mall
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Master of Software Systems

P. Nasiopoulos, Program Director

The Master of Software Systems (http://www.icics.ubc.ca/mss) is a graduate-level degree program designed specifically for people who hold a science or engineering degree in a field other than computer science or computer engineering. The program is an opportunity to expand existing skills and develop them for a career in a software systems environment. UBC’s internationally known faculty and its top-notch facilities provide the expertise and atmosphere, and our students provide the desire and focus in a rigorous sixteen month program. M.S.S. students complete a master's degree consisting of three terms of coursework (30 credits) and a four-month industry internship. At the end of the program, students will have gained a broad understanding of software systems development and implementation; not just from a software engineer’s viewpoint, but from a manager’s perspective as well.

For more information, see also Software Systems.
Academic Staff

Academic Staff > Department of Chemical and Biological Engineering

P. Englezos, Head

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C. W. Oloman, B.Eng. (Syd.), M.A.Sc. (Br.Col.), P.Eng., MCIC

Professors

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X. Bi, B.S.Ch.E., M.S.Ch.E. (Tsinghua), Ph.D. (Br.Col.), P.Eng., MCIC, MAICHE, FCAE
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D. P. Wilkinson, B.A.Sc. (Br.Col.), Ph.D. (Ott.), P.Eng, FCIC, FCAE, FRSC

Associate Professor Emeritus


Associate Professors

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V. Yadav, B.Sc. (Wat.), Ph.D. (M.I.T.), EIT

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I. Instructors

G. Potvin, B.Sc., B.A.Sc., Ph.D. (Ott.), EIT
J. Verrett, B.Eng., Ph.D. (McG.), EIT

II. Adjunct Professors

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D. **Hucal**, Coordinator  
M. **Miyoshi**, Coordinator  
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A. **Senini**, Coordinator  
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