UBC Okanagan
ACADEMIC CALENDAR
2019/20

www.calendar.ubc.ca/okanagan
School of Engineering

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A School within the Faculty of Applied Science

Associate Dean and Director’s Offices
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The University of British Columbia
Okanagan Campus
Engineering, Management & Education Building
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The School of Engineering at the UBC Okanagan campus offers the Bachelor of Applied Science (B.A.Sc.) degree in Civil Engineering, Electrical Engineering, and Mechanical Engineering. The School also offers a Bachelor of Applied Science (B.A.Sc.) degree in Manufacturing Engineering. Qualified applicants can be admitted directly from secondary school into Engineering One. Students may also enter the Engineering program after having successfully completed the equivalent of first-year Science. There are also admission routes via engineering transfer programs at various colleges and Engineering Bridge programs with Okanagan College and Camosun College.

Following entry from secondary school, the B.A.Sc. degree generally requires four or five years to complete.

The first-year program is common to all Engineering disciplines and lays the foundation for Engineering specializations in subsequent years. It is equivalent to first-year Engineering at the UBC Vancouver campus. The engineering-specific curriculum emphasizes project-based team learning, and offers first-year students the opportunity to implement the principles of engineering in a second-term design project. Upon successful completion of year one, students have the option of continuing at the UBC Okanagan campus in the second year of the integrated program or transferring to the UBC Vancouver campus. Students who elect to transfer compete for program spaces with students at the UBC Vancouver campus and limited seats are available.

Scheduled field trips and the activities of professional and technical societies complement the undergraduate programs, and students are expected to participate in them as fully as circumstances permit.

An optional Co-operative Education program, which integrates academic study with supervised work experience, is available during the second year.

Bachelor of Applied Science Program

Bachelor of Applied Science Program > Admission Requirements

Application for admission to the School of Engineering must be made through Enrolment Services. Procedures, policies, and admission requirements of UBC and the School of Engineering are specified in Admissions.
Due to limited resources, the School has been authorized to restrict enrolment in year one and within individual Engineering programs at the second-year level. Attainment of the minimum academic requirements listed below implies 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.

**Note:** proficiency in mathematics is an important part of preparing 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 British Columbia Grade 12 level, or the 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.

**Admission from a Post-Secondary Institution**

Applicants from another faculty at UBC or another post-secondary institution may be considered for admission to the School of Engineering. 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 admission as specified in Applicants from a College or University [here](http://www.calendar.ubc.ca/okanagan/index.cfm?tree=2,344,0,0).

Applicants must also have an average of at least 70% in all chemistry, mathematics, and physics courses that 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 fewer than 24 transferable credits from a post-secondary institution are evaluated against both secondary and post-secondary admission criteria.

Applicants with more than 24 credits that transfer to first-year Engineering may be eligible for second-year Engineering. Advice on transfer credit is available from the School of Engineering. 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.

**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 average of at least 65%.

**Transition from UBC Vantage College**

The Faculty of Applied Science delivers engineering programs at both UBC campuses: Okanagan and Vancouver. The Faculty has
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 BASc 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 UB 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 UB Vantage College Engineering Stream is not equivalent to the direct entry BASc 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 must be completed prior to graduation. Please consult here for details on Vancouver Engineering programs and here for details on Okanagan Engineering programs.

Eligible programs include: Okanagan Campus: Electrical, Mechanical and Civil Engineering. Vancouver Campus: Biomedical, Chemical, Chemical and Biological, Computer, Electrical, Environmental, Geological, Integrated, Materials, and Mining Engineering. Admission from Okanagan College Bridge Programs to Civil or Mechanical Engineering Students with a two-year diploma in Civil, Electronic, or Mechanical Engineering Technology from Okanagan College.

Engineering Admissions from other universities: Students with approved APSC 169 and/or APSC 176 and/or APSC 201 (or equivalent) and a minimum graduating grade average of 80%. Students must also successfully complete the corresponding Engineering Bridge program with a minimum grade of 60% in each course, and a minimum average of 70% in all courses other than University Writing (ENGL 100) and other elective courses required to complete the B.A.Sc. degree requirements. Typically, students admitted from each Engineering Bridge program will require two and a half years of additional study at UBC Okanagan to complete the B.A.Sc. degree requirements. Admission from Camosun College Engineering Bridge Programs to Civil or Mechanical Engineering Students with a two-year diploma in Civil or Mechanical Technology may be admitted to the third year of the B.A.Sc. program in Civil or Mechanical Engineering upon successful completion of an Engineering Bridge program offered by Camosun College. Students must achieve a minimum of 60% in each course and an average of 60% in all courses to be considered for admission to the B.A.Sc. program. Admitted students will be required to take additional UBC Okanagan campus courses from a list provided by the School of Engineering to fulfill B.A.Sc. degree requirements. Typically, students admitted from a Camosun College Engineering Bridge program will require two and a half years of additional study at the UBC Okanagan campus to complete the B.A.Sc. degree requirements.

Examinations Examinations are held in December and in April. In courses that includes both lecture and laboratory work, students 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 due to a medical condition, emotional or other problems, or religious observance must be submitted to the Faculty's Designated Officer prior to the written examination.

Supplemental Examinations are held in December and in April. Students who are required to participate in field trips will be responsible for expenses incurred during such trips. Students who have passed their year. Students must have failed a course but received a final grade of at least 40% in order to be eligible to write a supplemental examination in that course. Supplemental examinations are only offered during the session in which the students are taking the course. Applications for special consideration for examinations missed due to a medical condition, emotional or other problems, or religious observance must be submitted to the Faculty's Designated Officer prior to the written examination.

Part-time students will not normally be eligible for scholarships or for "Degree with Distinction" status. Students taking courses from more than one year level will normally be given academic year status based on the program year of the majority of credits being taken. Examinations Examinations are held in December and in April. In courses that includes both lecture and laboratory work, students 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 due to a medical condition, emotional or other problems, or religious observance must be submitted to the Faculty's Designated Officer prior to the written examination.

Promotion requirements are governed by the following:

First Year

- 0-27 credits

Second Year

- 28-63 credits

Third Year

- 64-90 credits

Fourth Year

- 100+ credits

Students must pass APSC 176 (or equivalent) and APSC 169 (or equivalent) prior to promotion to third year. Students must pass APSC 201 (or equivalent) and APSC 298 (or equivalent) prior to promotion to fourth year. In addition, to be promoted to the second year, students must have completed all courses from the first year and at least 27 credits from the current winter session's examinations. Students who are not eligible for promotion may apply to be reviewed on a case-by-case basis for evidence of academic promise for continued study in engineering.

Students will be granted a B.A.Sc. degree 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 if completing the Co-operative Education Program). With the approval of the Dean's Office, students may be allowed to study on a part-time basis. Credit will be granted for courses completed during the Summer Session. This credit will be granted for courses in Engineering Science, Chemical Engineering, Chemical and Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Electrical Engineering, Environmental Engineering, Environmental Engineering, Geographical Engineering, Geological Engineering, or Mechanical Engineering. In addition, if the student is on a part-time basis, the student must achieve a minimum passing grade of 70% in each course taken in any given Winter Session. Students who fail a year will be required to discontinue studies in the School for at least one year, but are eligible to apply for readmission after that year. Students who fail a second time will be required to withdraw. In a failed year, students will be granted credit for all courses passed. Students will be granted credit for all courses passed Students who withdraw during Term 2 of Winter Session after obtaining less than 50% in the December examinations will not be readmitted for the following Winter Session, but are eligible to apply for readmission after that year. Progress requirements are governed by the following:

First Year

- 0-27 credits

Second Year

- 28-63 credits

Third Year

- 64-90 credits

Fourth Year

- 100+ credits

Students must pass APSC 176 (or equivalent) and APSC 169 (or equivalent) prior to promotion to third year. Students must pass APSC 201 (or equivalent) and APSC 298 (or equivalent) prior to promotion to fourth year. In addition, to be promoted to the second year, students must have completed all courses from the first year and at least 27 credits from the current winter session's examinations. Students who are not eligible for promotion may apply to be reviewed on a case-by-case basis for evidence of academic promise for continued study in engineering.

Details of the specific courses conforming to the above requirements are available from Engineering Admissions. Last updated: April 11, 2019

Bachelor of Applied Science Program > Years 1 and 2

First Year Students admitted into the Engineering program directly from secondary school will take the first-year Engineering curriculum. Other students will need to contact Engineering Admissions for advice on their first-year program. Students proceeding to second year will have the option of continuing their Engineering program at the UBC Okanagan campus in Civil Engineering, Electrical Engineering, Manufacturing Engineering or Mechanical Engineering, or transferring to the UBC Vancouver campus (subject to the availability of Biomedical Engineering, Chemical and Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Geophysical Engineering, Integrated Engineering, Materials Engineering, Mechanical Engineering, or Mining Engineering). Admission to a selected program is dependent on performance in first year.

APSC 169 Fundamentals of Sustainable Engineering Design 3

APSC 171 Engineering Drawing and CAD/CAM 3

APSC 172 Engineering Analysis I 3

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Information in this Calendar is subject to change. Visit www.calendar.ubc.ca/okanagan for current details.
Criteria must be met and include completion of 37 credits of first year UBC Okanagan Campus Applied Science. The admission process is competitive, with limited seats available.

**Bachelor of Applied Science Program**

**Civil Engineering**

In the third year and fourth years, students will follow a program in Civil Engineering, Electrical Engineering, or Mechanical Engineering.

**Year Two Curriculum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 173</td>
<td>Engineering Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>APSC 176</td>
<td>Engineering Communication</td>
<td>3</td>
</tr>
<tr>
<td>APSC 177</td>
<td>Engineering Computation and Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>APSC 178</td>
<td>Electricity, Magnetism, and Waves</td>
<td>4</td>
</tr>
<tr>
<td>APSC 179</td>
<td>Linear Algebra for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>APSC 180</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>APSC 181</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>APSC 182</td>
<td>Matter and Energy I</td>
<td>3</td>
</tr>
<tr>
<td>APSC 183</td>
<td>Matter and Energy II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>37</strong></td>
</tr>
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</table>

*Criteria must be met and include completion of 37 credits of first year UBC Okanagan Campus Applied Science. The admission process is competitive, with limited seats available. Second Year*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSC 201</td>
<td>Technical Communication</td>
<td>3</td>
</tr>
<tr>
<td>APSC 246</td>
<td>System Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>APSC 248</td>
<td>Engineering Analysis III</td>
<td>3</td>
</tr>
<tr>
<td>APSC 252</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>APSC 254</td>
<td>Instrumentation and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>APSC 256</td>
<td>Numerical Methods for Analysis(^1)</td>
<td>3</td>
</tr>
<tr>
<td>APSC 258</td>
<td>Applications of Engineering Design(^1)</td>
<td>3</td>
</tr>
<tr>
<td>APSC 259</td>
<td>Materials Science I</td>
<td>3</td>
</tr>
<tr>
<td>APSC 260</td>
<td>Mechanics of Materials I</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Humanities/Social Sciences Elective (^2)</th>
<th></th>
</tr>
</thead>
</table>

\(^2\) Program specific courses.

**Electrical Engineering**

**Bachelor of Applied Science Program > Electrical Engineering**

Students pursuing the Electrical Program will take APSC 255 Electric Circuits and Power and APSC 262 Digital Systems Design. Students Pursuing the Mechanical Program will take APSC 253 Fluid Mechanics I and APSC 255 Matter and Energy I.

**Year Three Curriculum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 303</td>
<td>Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 305</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 325</td>
<td>Civil Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 327</td>
<td>Reinforced Concrete Design I</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 330</td>
<td>Optimization and Decision Analysis for Civil Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 331</td>
<td>Infrastructure Management I</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 332</td>
<td>Surveying and GIS Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 335</td>
<td>Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 340</td>
<td>Soil Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 341</td>
<td>Engineering Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 342</td>
<td>Open-Channel Flow</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 347</td>
<td>Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>36</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ENGR 415</td>
<td>Law and Ethics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 440</td>
<td>Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 447</td>
<td>Design of Processes for Water and Wastewater Treatment</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 449</td>
<td>Engineering Capstone Design Project</td>
<td>6</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 422</td>
<td>Infrastructure Management II</td>
<td></td>
</tr>
<tr>
<td>ENGR 423</td>
<td>Smart Grids</td>
<td></td>
</tr>
<tr>
<td>ENGR 432</td>
<td>Infrastructure Management II</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 432</td>
<td>Smart Grids</td>
<td></td>
</tr>
<tr>
<td>ENGR 433</td>
<td>Infrastructure Management</td>
<td></td>
</tr>
</tbody>
</table>

Note that the student's responsibility to ensure that the electives chosen meet the program requirements for design and technical elective graduation requirements. The option consists of a typical third year, followed by a set of prescribed fourth year courses. Only students in the Option are required to take these courses. Upon successful completion of the option, the notation "Resilient Infrastructure Management Option" will be added to the student's transcript. Electives to be chosen from a list of approved RIM Option courses provided by the School of Engineering. Last updated: April 16, 2019.

Bachelor of Applied Science Program > Electrical Engineering
In the third year and fourth years, students will follow a program in Civil Engineering, Electrical Engineering, or Mechanical Engineering.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ENGR 363</td>
<td>Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 365</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 315</td>
<td>Systems and Control</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 320</td>
<td>Electromechanical Devices</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 350</td>
<td>Linear Circuit Theory</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 361</td>
<td>Microelectronics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 353</td>
<td>Semiconductor Devices</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 359</td>
<td>Microcomputer Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 360</td>
<td>Engineering Probability and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 361</td>
<td>Signals and Communication Systems</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 362</td>
<td>Digital Signal Processing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 365</td>
<td>Engineering Electromagnetics</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGR 313</td>
<td>Law and Ethics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 320</td>
<td>Microelectronics II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 499</td>
<td>Engineering Capstone Design Project</td>
<td>6</td>
</tr>
</tbody>
</table>

**Design Electives**

- **Engineering Electives**
  - 3 credits Technical Electives
  - 3 credits Engineering Electives

- **Total Credits for Design Electives:** 6

**Electives**

- **Technical Electives:**
  - 3 credits from a list of Engineering Elective courses provided by the School of Engineering.

- **Electives for Design Electives:**
  - 12 credits from a list of approved Mechatronics Elective courses.

Note that the student’s responsibility to ensure that the electives chosen meet the program graduation requirements for design and technical electives. The option consists of typical years one to three, followed by a set of prescribed fourth-year courses with one additional required course. Applications must be submitted to the Engineering Advising Office by May 31st. Admission will be competitive based on GPA. The Biomedical Option under Electrical Engineering requires the following courses:

1. **Engineering Capstone Design Project – Biomedical Project**

2. **Application to the Biomedical Option is open to students in year 2 and above in the Bachelor of Applied Science program specializing in Mechanical or Electrical Engineering.**

3. **Electives to be chosen from a list of approved Mechatronics Option courses provided by the School of Engineering.**

**Bachelor of Applied Science Program > Manufacturing Engineering**

**Program Overview**

The Mission of the MANF program is to develop engineers with technical and managerial skills preparing them for sought-after careers in the exceptionally demanding and evolving domain of advanced design and manufacturing.

**Program Requirements**

- **APSC 201 Technical Communication**
- **APSC 246 System Dynamics**
- **APSC 248 Engineering Analysis III**
- **APSC 252 Thermodynamics**
- **APSC 253 Fluid Mechanics I**
- **APSC 254 Instrumentation and Data Analysis**
- **APSC 255 Electric Circuits and Power**
- **APSC 259 Materials Science I**
- **APSC 260 Mechanics of Materials I**
- **COSC 210 Software Construction**
### Bachelor of Applied Science Program > Mechanical Engineering

In the third and fourth years, students will follow a program in Civil Engineering, Electrical Engineering, or Mechanical Engineering.

#### Third Year Mechanical Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGR 303</td>
<td>Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 305</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 310</td>
<td>Fluid Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 315</td>
<td>Systems and Control</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 320</td>
<td>Electromechanical Devices</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 375</td>
<td>Energy System Design</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 376</td>
<td>Materials Science II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 377</td>
<td>Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 380</td>
<td>Design of Machine Elements</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 381</td>
<td>Kinematics and Dynamics of Machinery</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 385</td>
<td>Heat Transfer Applications</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 387</td>
<td>Vibration of Mechanical Systems</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>36</strong></td>
</tr>
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#### Fourth Year Mechanical Engineering

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 413</td>
<td>Law and Ethics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 430</td>
<td>Manufacturing Capstone Design Project</td>
<td>6</td>
</tr>
<tr>
<td>ENGR 450</td>
<td>Advanced Manufacturing CAD/CAM/CAE</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 476</td>
<td>Mechanics of Materials II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 499</td>
<td>Engineering Capstone Design Project</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

*To be chosen from a list of Mechanical Engineering design elective courses provided by the School of Engineering.*

#### Design Electives

- 1 Credit
- 2 Credits
- 3 Credits

#### Technical Electives

- 1 Credit
- 2 Credits
- 3 Credits
- 9 Credits

#### Humanities/Social Sciences Elective

- 3 Credits

*To be chosen from a list of Technical elective courses provided by the School of Engineering. Up to two third- or fourth-year courses offered outside the School of Engineering may qualify as technical electives with permission from the Mechanical Program Coordinator.*

*To meet graduation requirements, students must take at least one of ENGR 491: Computational Fluid Dynamics and ENGR 492: Finite Element Methods as part of the 4th year elective requirements.*

#### Biomedical Option

Available to Mechanical and Electrical students, the Biomedical Option allows students interested in biomedical Engineering and wearable technology to have courses focused in these areas.

Application to the Biomedical Option is open to students in year 2 and above in the Bachelor of Applied Science program specializing in Mechanical or Electrical Engineering. Applications for admission must be submitted to the Engineering Advising Office by May 31st. Enrolment in this option is limited and admission will be competitive based on GPA.

The Biomedical Option under Mechanical Engineering requires the following courses:

- APSC 193 Anatomy and Physiology for Engineers
- ENGR 351 Microelectronics I
- ENGR 401 Biomechanics

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>APSC 193</td>
<td>Anatomy and Physiology for Engineers</td>
</tr>
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</table>
Bachelor of Applied Science Program > Minor in Management

Students desiring a stronger foundation in management and/or entrepreneurship are encouraged to consider the Minor in Management. Upon successful completion of the Minor in Management, the student is eligible to apply to the Master of Business Administration program at the University of Victoria.

To be eligible for the Minor in Management, students must have completed the first-year requirements of the Bachelor of Applied Science degree, including the core course requirements. The Minor in Management consists of 30 credits: 12 at the lower level and 18 at the upper level. Students are encouraged to consult with their academic advisor to determine the appropriate courses to complete the Minor.

Bachelor of Applied Science Program > Pre-Med Alternative Path (P-MAP)

This alternative path is designed for students with an engineering background who wish to combine their B.A.Sc. in a medical science discipline or to enter medical school directly after graduation. This path involves taking additional courses in science and medicine, and completing a series of clinical rotations.

To graduate from the Engineering Co-op program, students must satisfactorily complete the required number of work placements, in addition to the normal academic requirements.

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. Acceptance into a co-op program at one institution does not guarantee acceptance into UBC's Engineering Co-op program.

The Engineering Co-op program is an optional, year-round program that normally requires completion of five work terms. The Co-operative Education Program provides students with opportunities to gain valuable work experience in industry and to develop skills in communication, leadership, and problem-solving.

For an application to be considered, the student must be eligible for admission to the Bachelor of Applied Science program. The application must be submitted to the Engineering Advising Office by May 31st. Admission is competitive based on academic performance and other applicable criteria.

The following courses are recommended for students pursuing the P-MAP:

- CHEM 213
- BIOL 319
- BIOL 311
- ENGL 112 (in place of APSC 176)
- ENGR 450 Clinical Engineering
- ENGR 406 Microelectromechanical Systems
- ENGR 410 Biomedical Engineering
- ENGR 450 Biomedical Engineering Capstone Project – Biomedical Project
- ENGR 455 Clinical Engineering Capstone Project – Biomedical Project

Note that students are required to complete the Bachelor of Applied Science degree before entry into the P-MAP. The P-MAP is designed to meet the requirements for admission to medical schools, including the completion of prerequisite courses in science and medicine.

Bachelor of Applied Science Program > Co-operative Education Program

The Engineering Co-operative Education program provides an opportunity for students to gain practical experience in the workplace and to develop skills in communication, leadership, and problem-solving. The program includes five work terms, in addition to the normal academic requirements.

To complete the Bachelor of Applied Science degree alone, students must complete at least 90 credits. The Co-operative Education Program requires an additional 30 credits, for a total of 120 credits. Careful planning is essential, and completion of the Option may require an additional term or terms of study beyond that required to complete the Bachelor of Applied Sciences degree alone.

The Mechatronics Option under Mechanical Engineering requires the following courses:

- ENGL 112 (in place of APSC 176)
- CHIM 121 & 122 (in place of APSC 182 & 183)
- PHYS 101

Applications for admission must be made through the Engineering Advising Office by May 31st. Admission is competitive based on academic performance and other applicable criteria.

Note: Space in many courses is limited. Admission to the minor does not guarantee access to courses agreed upon for the minor. Last updated: May 9, 2019

Bachelor of Applied Science Program > Biomedical Option

Entry into and continuation in the Option requires that the student remains in Good Standing. In the case of time of application.

For an application to be considered, the student must be eligible for admission to the Bachelor of Applied Science program. The application must be submitted to the Engineering Advising Office by May 31st. Admission is competitive based on academic performance and other applicable criteria.

The following courses are recommended for students pursuing the Biomedical Option:

- CHEM 213
- BIOL 319
- CHIM 213
- CHIM 214
- ENGR 450 Clinical Engineering
- ENGR 406 Microelectromechanical Systems
- ENGR 410 Biomedical Engineering
- ENGR 450 Biomedical Engineering Capstone Project – Biomedical Project
- ENGR 455 Clinical Engineering Capstone Project – Biomedical Project

Note that it is the student's responsibility to ensure that the elective chosen meet the program requirements for design and technical electives. The option of taking design courses outside of the Mechanical Engineering curriculum is encouraged, but students are responsible for ensuring that the courses selected satisfy the program requirements.

The following courses are recommended for students pursuing the Biomedical Option:

- CHEM 213
- BIOL 319
- CHIM 213
- CHIM 214
- ENGR 450 Clinical Engineering
- ENGR 406 Microelectromechanical Systems
- ENGR 410 Biomedical Engineering
- ENGR 450 Biomedical Engineering Capstone Project – Biomedical Project
- ENGR 455 Clinical Engineering Capstone Project – Biomedical Project

Note that it is the student's responsibility to ensure that the elective chosen meet the program requirements for design and technical electives. The option of taking design courses outside of the Mechanical Engineering curriculum is encouraged, but students are responsible for ensuring that the courses selected satisfy the program requirements.

The following courses are recommended for students pursuing the Biomedical Option:

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- BIOL 319
- CHIM 213
- CHIM 214
- ENGR 450 Clinical Engineering
- ENGR 406 Microelectromechanical Systems
- ENGR 410 Biomedical Engineering
- ENGR 450 Biomedical Engineering Capstone Project – Biomedical Project
- ENGR 455 Clinical Engineering Capstone Project – Biomedical Project

Note that it is the student's responsibility to ensure that the elective chosen meet the program requirements for design and technical electives. The option of taking design courses outside of the Mechanical Engineering curriculum is encouraged, but students are responsible for ensuring that the courses selected satisfy the program requirements.

The following courses are recommended for students pursuing the Biomedical Option:

- CHEM 213
- BIOL 319
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- ENGR 450 Clinical Engineering
- ENGR 406 Microelectromechanical Systems
- ENGR 410 Biomedical Engineering
- ENGR 450 Biomedical Engineering Capstone Project – Biomedical Project
- ENGR 455 Clinical Engineering Capstone Project – Biomedical Project
The rights to practice engineering and accept professional responsibility in Canada is limited to those who are registered Professional Engineers. Registration is overseen by the 12 provincial and territorial engineering regulatory bodies that regulate the engineering professions in Canada. During the period between graduation and registration, the graduate who intends to practice in BC should be enrolled with Engineers and Geoscientists British Columbia as an "Engineer in Training."