

# MECHANICAL ENGINEERING, B.A.SC. (CLASS OF 2028)

General First Year 2024-2025 (<https://www.queensu.ca/academic-calendar/engineering-applied-sciences/first-year-studies/>)

## Second Year CORE 2025-2026

| Code                            | Title  | Units        |
|---------------------------------|--|--------------|
| MECH 202                        | Mathematical and Computational Tools for Mechanical Engineers I            | 3.50         |
| MECH 211 & MECH 212 or MECH 213 | Manufacturing Methods and Machine Tool Laboratory or Manufacturing Methods | 4.50         |
| MECH 217                        | Measurement in Mechatronics  | 4.25         |
| MECH 221                        | Solid Mechanics I  | 3.50         |
| MECH 230                        | Applied Thermodynamics I   | 3.50         |
| MECH 270                        | Materials Science and Engineering  | 3.50         |
| APSC 200                        | Engineering Design & Practice II   | 4.00         |
| APSC 293                        | Engineering Communications 2   | 1.00         |
| MECH 203                        | Mathematical and Computational Tools for Mechanical Engineers II           | 3.50         |
| MECH 210                        | Electronic Circuits and Motors for Mechatronics                            | 4.50         |
| MECH 228                        | Kinematics And Dynamics  | 3.50         |
| MECH 241                        | Fluid Mechanics I  | 3.50         |
| MECH 273                        | Materials Science and Engineering Lab                                      | 1.00         |
| <b>Total Units</b>              |  | <b>43.75</b> |

Students take either MECH 211 and MECH 212, or MECH 213. MECH 213 combines the content of 211 and 212 in a single course.

Note: Students should be aware that a transfer or a change in option choice may result in their program requirements taking more than the typical 4 years because of course availability and conflicts in their core timetable. The department cannot guarantee that courses will not conflict when a student changes options or transfers, especially after 2nd year.

Mechanical Engineering students normally take APSC 200 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20200>) Engineering Design & Practice II/APSC 293 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20293>) Engineering Communications in the winter term.

## Third Year CORE 2026-2027

| Code               | Title   | Units        |
|--------------------|---|--------------|
| MECH 302           | Mathematical and Computational Tools for Mechanical Engineers III | 3.50         |
| MECH 310           | Digital Systems for Mechatronics                                  | 4.50         |
| MECH 321           | Solid Mechanics II  | 3.50         |
| APSC 221           | Economic and Business Practice                                    | 3.00         |
| MECH 328           | Dynamics And Vibration  | 3.50         |
| MECH 323           | Machine Design I  | 4.50         |
| MECH 346           | Heat Transfer   | 3.50         |
| MECH 350           | Automatic Control   | 3.50         |
| <b>Total Units</b> |   | <b>29.50</b> |

## General Sub-Plan (ME1)

Note: MECH 396 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20396>) Mechanical and Materials Engineering Laboratory I and MECH 397 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20397>) Mech And Material Eng Lab II require MECH 370 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20370>) Prin Of Materials Processing and MECH 371 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20371>) Fracture Mech & Dislocation as co-requisites which would be additional courses in the third year for students in the ME1 or ME3 options.

| Code               | Title   | Units        |
|--------------------|---|--------------|
| Third Year Core    |   | 29.50        |
| MECH 330           | Applied Thermo II   | 3.50         |
| MECH 398           | Mechanical Engineering Laboratory I or MECH 396 Mechanical and Materials Engineering Laboratory I | 2.00         |
| MECH 341           | Fluid Mechanics II  | 3.50         |
| MECH 399           | Mechanical Eng Lab II or MECH 397 Mech And Material Eng Lab II                                    | 2.00         |
| <b>Total Units</b> |   | <b>40.50</b> |

## Materials Sub-Plan (ME2)

| Code            | Title   | Units |
|-----------------|---|-------|
| Third Year Core |   | 29.50 |
| MECH 370        | Prin Of Materials Processing                              | 3.50  |
| MECH 396        | Mechanical and Materials Engineering Laboratory I         | 2.00  |
| MECH 371        | Deformation and Fracture Failure of Engineering Materials | 3.50  |



|                    |                              |              |
|--------------------|------------------------------|--------------|
| MECH 397           | Mech And Material Eng Lab II | 2.00         |
| <b>Total Units</b> |                              | <b>40.50</b> |

### Biomechanical Sub-Plan (ME3)

Note: MECH 396 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20396>) Mechanical and Materials Engineering Laboratory I and MECH 397 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20397>) Mech And Material Eng Lab II require MECH 370 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20370>) Prin Of Materials Processing and MECH 371 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20371>) Fracture Mech & Dislocation as co-requisites which would be additional courses in the third year for students in the ME1 or ME3 options.

| Code               | Title  | Units        |
|--------------------|--|--------------|
| Third Year Core    |  | 29.50        |
| MECH 394           | Frontiers in Biomechanical Engineering   | 3.50         |
| MECH 393           | Biomechanical Product Development  | 3.50         |
| MECH 398           | Mechanical Engineering Laboratory I<br>or MECH 396 Mechanical and Materials Engineering Laboratory I | 2.00         |
| MECH 399           | Mechanical Eng Lab II<br>or MECH 397 Mech And Material Eng Lab II                                    | 2.00         |
| <b>Total Units</b> |  | <b>40.50</b> |

### Fourth Year CORE 2027-2028

| Code   | Title | Units              |
|--|-------|--------------------|
| Complementary Studies, List A, F or W  |       | 3.00               |
| Complementary Studies, List A or B, F or W                                       |       | 6.00               |
| ME1, ME2 or ME3 Option Technical Electives (See Technical Elective List) F and W |       | 17.00              |
|  |       | -                  |
|  |       | 20.50              |
| <b>Total Units</b>   |       | <b>26.00-29.50</b> |

**Important to Note:** The above list is for a typical fourth year program and may vary depending on choices in previous years. Students must have a minimum total of 9 credits of Complementary Studies electives and a minimum of 20.5 credits of Technical Electives in the ME1 and ME2 options, and a minimum total of 17.0 credits of Technical Electives in the ME3 option, as detailed below. This count includes any electives taken in a student's 2nd, 3rd and 4th years from the specific lists required for their option which are outlined in the Technical Elective description.

### General Sub-Plan (ME1) Core

| Code               | Title                               | Units       |
|--------------------|-------------------------------------|-------------|
| MECH 460           | Team Project-Conceive & Design      | 4.00        |
| MECH 464           | Communications & Project Management | 1.50        |
| <b>Total Units</b> |                                     | <b>5.50</b> |

### Materials Sub-Plan (ME2) Core

| Code               | Title                               | Units       |
|--------------------|-------------------------------------|-------------|
| MECH 460           | Team Project-Conceive & Design      | 4.00        |
| MECH 464           | Communications & Project Management | 1.50        |
| <b>Total Units</b> |                                     | <b>5.50</b> |

### Biomechanical Sub-Plan (ME3) Core

| Code               | Title                                | Units       |
|--------------------|--------------------------------------|-------------|
| MECH 460           | Team Project-Conceive & Design       | 4.00        |
| MECH 464           | Communications & Project Management  | 1.50        |
| MECH 462           | Team Project - Implement and Operate | 3.50        |
| <b>Total Units</b> |                                      | <b>9.00</b> |

All students must take a final year capstone design course in their program. For the ME1 and ME2 option students this course would normally be MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design (4 credits, Fall) coupled with MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management (1.5 credits, Fall). ME3 students will normally take MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design (4 credits, Fall) coupled with MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management (1.5 credits, Fall) in addition to MECH 462 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20462>) Team Project - Implement and Operate (3.5 credits, Winter).

However, students in the ME1 and ME2 options may choose to take APSC 480 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20480>) Multi-disciplinary Industry (9 credits, Fall and Winter), Multi-disciplinary Industry Engineering Design Project as a substitute for MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design and MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management, and will receive 3.5 credits of List 1 technical electives that will count towards their required minimum technical elective credit count.

ME3 students may choose to take APSC 480 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20480>) Multi-disciplinary Industry (9 credits, FW) as a

substitute for MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design, MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management, and MECH 462 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20462>) Team Project - Implement and Operate.

Important Note: All students who want to take APSC 480 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20480>) Multi-disciplinary Industry must make sure they **drop** MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design, MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management, and MECH 462 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20462>) Team Project - Implement and Operate from their pre-loaded courses on SOLUS, and **add** APSC 480 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20480>) Multi-disciplinary Industry. All students are limited to taking only **one** final year capstone project course, either MECH 460 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20460>) Team Project-Conceive & Design or APSC 480 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20480>) Multi-disciplinary Industry.

### Complementary Studies

Refer to the Complementary Studies section of this calendar for details regarding the requirements for all Engineering plans. For the Mechanical Program, the Engineering Economics core course is APSC 221 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20221>) Economic And Business Practice, and the Communications core courses are APSC 293 (<https://www.queensu.ca/academic-calendar/search/?P=APSC%20293>) Engineering Communications and MECH 464 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20464>) Communications & Project Management.

### Technical Electives

Students are required to complete technical electives dependent on their option, as listed below:

#### ME1 Option

A minimum of 17.0 credits from any combination of courses on Lists 1, 2 or 3

A minimum of 3.5 additional credits from any combination of courses on Lists 1, 2, 3 or 4

**For a minimum total requirement of technical electives of 20.5 credits**

#### ME2 Option

A minimum of 10.0 credits from courses on List 2

A minimum of 7.0 additional credits from any combination of courses on Lists 1, 2 or 3

A minimum of 3.5 additional credits from any combination of courses on Lists 1, 2, 3 or 4

**For a minimum total requirement of technical electives of 20.5 credits**

#### ME3 Option

A minimum of 10.0 credits from courses on List 3

A minimum of 3.5 additional credits from any combination of courses on Lists 1, 2 or 3

A minimum of 3.5 additional credits from any combination of courses on Lists 1, 2, 3 or 4

**For a minimum total requirement of technical electives of 17.0 credits**

**(Note that ME3 students are required to take MECH 462 (<https://www.queensu.ca/academic-calendar/search/?P=MECH%20462>) Team Project - Implement and Operate as core, but it is an optional List 1 technical elective for ME1 and ME2 students. Students take the same total load in all three options.)**

**(As an example, 17.5 from List 1, 2 or 3; 3.0 from List 4 would also satisfy the ME1 requirement.)**

For all courses, students must meet the prerequisite requirements and no exclusion courses are allowed. Any exception to the requirements above must be approved by the Undergraduate Chair. It is the sole responsibility of the student to ensure that elective weights are sufficient to meet the total technical elective requirement.

All course availabilities and the term in which a course is held can change from one academic year to the next. This can occur due to curriculum changes, instructor availability or a change in departmental resources. Please refer to the individual course descriptions in the current calendar for further details.

Mechanical Engineering: Technical Elective Lists (<https://www.queensu.ca/academic-calendar/engineering-applied-sciences/academic-plans/mechanical-engineering/mechanical-materials-engineering-technical-electives/>)