

Department of

# Mechanical and Materials Engineering

The Department of Mechanical and Materials Engineering prides itself on being a leader in project-based, team-oriented and hands-on learning. Students can choose to remain in the general Mechanical Engineering Option (ME1) or select a more focused path in the Materials Option (ME2) or the Biomechanical Option (ME3). All students that successfully complete the program will graduate with a highly respected Mechanical Engineering degree.



The Queen's Mechanical Engineering curriculum provides a solid foundation in the basic engineering sciences of solid mechanics and dynamics, materials engineering, fluid mechanics, thermodynamics, and heat transfer. Building on this foundation are courses key to the discipline of mechanical engineering including machine design, manufacturing methods, and instrumentation and control.

Many students are attracted to the mechanical engineering program because it is the most broadly based of the engineering disciplines. Mechanical engineers can be found working in analysis, consulting, design and development, maintenance, management, manufacturing, research and sales. A mechanical engineer's knowledge and skills are needed in a remarkable range of industries.



# Department of Mechanical and Materials Engineering

## 2<sup>nd</sup> Year Common CORE

APSC 200 Engineering Design and Practice  
APSC 293 Engineering Communications  
MECH 202 Math & Comp Tools for Mech Eng I  
MECH 203 Math & Comp Tools for Mech Eng II  
MECH 210 Circuits and Motors for Mechatronics  
MECH 211 Manufacturing Methods  
MECH 212 Machine Tool Lab  
MECH 217 Measurement in Mechatronics  
MECH 221 Solid Mechanics I  
MECH 228 Kinematics and Dynamics  
MECH 230 Thermodynamics I  
MECH 241 Fluid Mechanics I  
MECH 270 Materials Science and Engineering  
MECH 273 Materials Science and Engineering Lab

## 3<sup>rd</sup> Year Common CORE

APSC 221 Engineering Economics  
MECH 302 Math & Comp Tools for Mech Eng III  
MECH 310 Digital Systems for Mechatronics  
MECH 321 Solid Mechanics II  
MECH 323 Machine Design  
MECH 328 Dynamics and Vibration  
MECH 346 Heat Transfer  
MECH 350 Automatic Controls

## 3<sup>rd</sup> Year General Option

MECH 330 Applied Thermodynamics II  
MECH 341 Fluid Mechanics II  
MECH 398 Mechanical Engineering Lab I  
MECH 399 Mechanical Engineering Lab II

## 3<sup>rd</sup> Year Materials Option

MECH 370 Principles of Materials Processing  
MECH 371 Fracture Mechanics & Dislocation Theory  
MECH 396 Materials Engineering Lab I  
MECH 397 Materials Engineering Lab II

## 3<sup>rd</sup> Year Biomechanical Option

MECH 393 Biomechanical Product Development  
MECH 394 Frontiers in Biomechanical Engineering  
MECH 398 Mechanical Engineering Lab I  
MECH 399 Mechanical Engineering Lab II

## 4<sup>th</sup> Year General and Materials Option

MECH 460 Team Project - Conceive and Design  
MECH 464 Project Management & Communications  
Complementary Studies  
Technical Electives

## 4<sup>th</sup> Year Biomechanical Option

MECH 460 Team Project - Conceive and Design  
MECH 462 Team Project - Implement and Operate  
MECH 464 Project Management & Communications  
Complementary Studies  
Technical Electives

## Electives by Concentration

Although there is no formal streaming of electives in MME, the following Areas of Concentration are provided to give students some guidance.

### Aerospace Engineering

MECH 371 Fracture Mechanics & Dislocation Theory  
MECH 439 Turbomachinery  
MECH 444 Computational Fluid Dynamics  
MECH 448 Compressible Fluid Flow  
MECH 465 Computer Aided Design  
MECH 480 Airplane Aerodynamics and Performance  
MECH 481 Wind Energy

### Biomechanical Engineering

MECH 370 Principles of Materials Processing  
MECH 371 Fracture Mechanics and Dislocation Theory  
MECH 461 Research Project  
MECH 465 Computer Aided Design  
MECH 478 Biomaterials  
MECH 494 Kinematics of Human Motion  
MECH 495 Ergonomics and Design  
MECH 496 Musculoskeletal Biomechanics

### Energy and Fluid Systems

MECH 430 Thermal Systems Design  
MECH 435 Internal Combustion Engines  
MECH 439 Turbomachinery  
MECH 444 Computational Fluid Dynamics  
MECH 448 Compressible Fluid Flow  
MECH 480 Airplane Aerodynamics and Performance  
MECH 481 Wind Energy

### Manufacturing Engineering

MECH 370 Principles of Materials Processing  
MECH 455 Computer Integrated Manufacturing  
MECH 457 Additive Manufacturing  
MECH 461 Research Project  
MECH 465 Computer Aided Design  
MECH 476 Engineering of Polymers and Composite Materials

### Materials Engineering

MECH 461 Research Project  
MECH 470 Deformation Processing  
MECH 476 Engineering of Polymers and Composite Materials  
MECH 478 Biomaterials  
MECH 479 Nano-Structured Materials  
MECH 483 Nuclear Materials

### Mechatronics Engineering

ELEC 271 Digital Systems  
ELEC 274 Computer Architecture  
ELEC 371 Microprocessor Interfacing & Embedded Systems  
MECH 423 Introduction to Microsystems  
MECH 452 Mechatronics Engineering  
MECH 455 Computer Integrated Manufacturing  
MECH 456 Introduction to Robotics

*NOTE: Not all courses are offered every academic year*