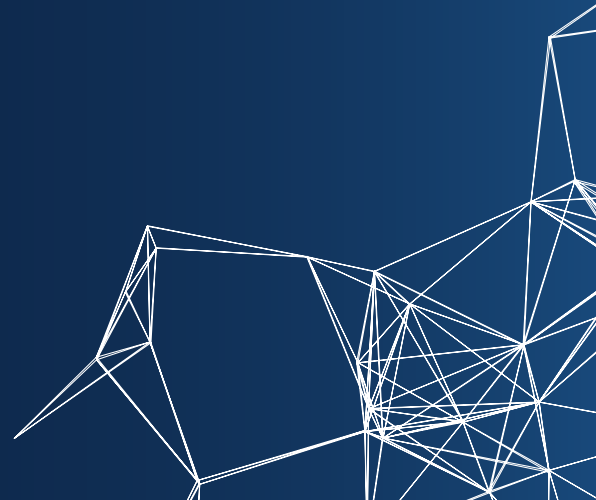




Mechanical Engineering Undergraduate Options

GENERAL | AEROSPACE | BIOMECHANICS & MEDICAL DEVICES
ENERGY & ENVIRONMENT | MECHATRONICS
NAVAL ARCHITECTURE & MARINE ENGINEERING



Our Options

The UBCV Mechanical Engineering undergraduate program gives you the teamwork, leadership, design, and technical skills you need to work across a wide variety of sectors. Explore your interests while developing core skills that will let you work in a range of areas – with the mobility to adapt when the industry changes.

Options allow you to choose your focus.

Breadth or depth: customize your degree to suit your career goals. The UBC Mechanical Engineering Options in **General (flex), Aerospace, Biomechanics & Mechanical Devices, Energy & Environment, Mechatronics,** and **Naval Architecture & Marine Engineering** allow you to pursue specialized coursework with professors who are leaders in their field, while still maintaining a solid core competency in mechanical engineering.

Whether your goal is graduate school, building your own business, or that perfect job in industry, pursuing a Mechanical Engineering Option allows you to demonstrate your passion, commitment, dedication, and abilities in the field you love.



Admissions

THERE ARE TWO INTAKES INTO THE OPTIONS:

Early Admission - apply by February 28 of your first year

- Acceptance to an Option is conditional upon being placed in Mech and successfully completing Mech 2

Regular Admission - apply by March 31 of your second year

- Must have completed Mech 2 (including 224/225)

TO APPLY

Submit an application package, including the application form (available online), a cover letter, resume, unofficial transcript, and up to 5 pages of supplemental material. See our website for full details.

IMPORTANT TO KNOW

- Application to the Mechanical Engineering undergraduate program is a separate process from applying to an Option. Acceptance into any of the Options is conditional upon you being placed in Mech at the end of first year.
- Because the cohort sizes for some Options are so small, most classes are only offered once per year. As most students in Mech are enrolled in co-op, the class schedule for most Options follows the co-op schedule. This means it will require a minimum of 2.5 years after Mech 2 to complete an Option, regardless of whether or not you enroll in co-op.

Learn More

[MECH.UBC.CA/UNDERGRADUATE](https://mech.ubc.ca/undergraduate)

Student Services Office

P: 604-822-6584

E: students@mech.ubc.ca

Core Courses

Regardless of the path you choose, you'll receive a solid foundation of core mechanical engineering skills that will prepare you for a wide range of industries.

MECH 2

Our award-winning second year program gives all our students foundational knowledge in math, physics and design that every mechanical engineer needs.

Second Year Courses

MATH 254	Multivariable Calculus (taught in MECH 222)
MATH 258	Differential Equations (taught in MECH 221)
MECH 220	Technical Skills Practicum
MECH 221	Engineering Science I
MECH 222	Engineering Science II
MECH 223	Mechanical Design
MECH 224	Integration of Engineering Topics I
MECH 225	Integration of Engineering Topics II
MECH 226 or 227	Technical Communication for Mechanical Engineers

THIRD + FOURTH YEAR

While you complete your Option courses, you will also have core studies that ensure you have all the competencies required for your profession.

Core 3rd + 4th Year Courses

MECH 328	Mechanical Engineering Design Project (3rd Year)
MECH 360	Mechanics of Materials
MECH 375	Heat Transfer I
MECH 400	Professionalism and Ethics in Engineering
MECH 431	Engineering Economics
MECH 463	Mechanical Vibrations
+	6 credits of Complementary Studies Electives

General (Flex) Option

Prepare yourself for a wide range of industries by sampling courses from all Options

Our General Option - also known as our flex curriculum - is our broadest, most flexible pathway. This is our most popular Option, allowing you to explore diverse interests as you complete your degree.

With a core set of courses that prepare you with the essential knowledge needed by every mechanical engineer, you are free to take up to 22 credits in technical electives on a range of subjects.



HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

MECH 305	Data Analysis and Mechanical Engineering Laboratories
MECH 325	Machine Design
MECH 368	Engineering Measurement and Instrumentation
MECH 457 or APSC 486	Mechanical Engineering Design Project* - or - Interdisciplinary Engineering Design Project**
MECH 466	Automatic Control
+	22 credits of Specialized Technical Electives

* Capstone Design Program

** New Venture Design (must be taken with APSC496A)

WHAT DOES THIS MEAN FOR YOU?

General lets you prepare for work in a range of industries while trying out different areas of interest without committing to the more focused curriculums of our other Options.

Aerospace

The sky is no limit when you create the aircraft, drones, and rockets of the future.

The Aerospace Option is designed to prepare you for mechanical engineering within the high-tech world of aircraft and spaceflight. With an already applicable skillset, mechanical engineers are uniquely qualified to work in this dynamic field. Follow your passion for flight and learn the skills that will make you stand out when you enter industry.

The Aerospace Option hones your mechanical engineering skills towards aerospace applications by combining concepts like heat transfer, fluid dynamics, thermodynamics, and combustion with more application-specific areas like materials, vibration, propulsion and aircraft design and structures.



WHAT DOES THIS MEAN FOR YOU?

Aerospace allows you to tailor your mechanical engineering degree with industry-specific skills, uniquely positioning you to work in the world of airplanes, helicopters, rockets, drones and unmanned aircraft systems. The skills you learn will also position you for further graduate studies in aerospace and related fields.

With passenger and cargo flight connecting our world, and satellites an integral part of global infrastructure, aerospace engineers open our skies to the future.

HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

MECH 305	Data Analysis and Mechanical Engineering Laboratories
MECH 327	Thermodynamics II
MECH 359	Computational Methods for Mechanical Engineering
MECH 368	Engineering Measurement and Instrumentation
MECH 380	Fluid Dynamics
MECH 426	Mechanical Design
MECH 462	Finite Element Analysis
MECH 466	Automatic Control
MECH 477	Aerospace Propulsion
MECH 479	Introduction to Computational Fluid Dynamics
MECH 481	Aerodynamics of Aircraft I
MECH 484	Aircraft Design: Aerodynamics
MECH 485	Aircraft Design: Structures
MECH 489	Experimental Thermofluids
MTRL 494	Composite Materials
MECH 453	Aerospace Design Project

Biomechanics & Medical Devices

In a world where the need for innovative medical solutions is rapidly growing, it's not surprising that biomedical engineering is one of the fastest growing fields.

From designing hip implants to heart valves, conducting research in academic and government institutions, and testing medical products, mechanical engineers are part of life-changing innovation in the medical field.

Courses in the Biomechanics & Medical Devices Option are specialized to medical applications, from biofluids to orthopedics, providing students with first-hand exposure to medical technologies. Access to highly reputed professors in the field and the opportunity to gain hands-on experience at some of the best biomedical facilities in Western Canada, also opens doors for those wishing to work in industry, pursue a graduate research degree or even head off to medical school.

HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

MECH 305	Data Analysis and Mechanical Engineering Laboratories
MECH 325	Machine Design
MECH 368	Engineering Measurement and Instrumentation
BMEG 410	Biomedical Equipment, Physiology and Anatomy
BMEG 456	Clinical and Industrial Biomedical Engineering
MTRL 495	Biomaterials
MECH 439	Biomechanics Research Seminar
MECH 466	Automatic Control
MECH 459	Biomedical Design Project
+	12 credits of Specialized Technical Electives

WHAT DOES THIS MEAN FOR YOU?

This option allows graduates to develop technical, communication and problem solving skills, as well as an in-depth understanding of medical technologies. As such, graduates are well-equipped to go out and work in industry, government institutions, or research facilities, or to pursue post-graduate education.

In industry, biomedical engineers can work in a variety of settings, from hospitals and pharmaceuticals to medical imaging and bioinstrumentation companies. Prosthesis development is a major area involving the design and optimization of knees, hips, shoulders and heart valves.



Energy & Environment

Energy, sustainability and transportation – society is moving, and we’re the ones making it flow. Design the future with an understanding of the intersection of energy + environment.

Most of the systems people use in their daily lives require energy and transportation. In today’s energy-hungry world, these areas are the source of some of our biggest challenges, and our biggest opportunities for innovation.

Whether in buildings, industrial applications, vehicle design, transportation, or renewable energy, engineers who can design the systems we depend on while considering their climate, health, economic, and political impacts will create the world of the future.

Course topics include thermodynamics, experimental thermofluids, instrumentation, air pollution, controls and more. The Option itself is heavily customizable and allows each student to refine their degree to suit their needs, while enriching them with a sound base of both general mechanical engineering and thermofluids knowledge.

WHAT DOES THIS MEAN FOR YOU?

Expect to take on some of the most challenging and applicable courses in your undergraduate degree. This Option will prepare you to tackle our generation’s growing energy demand, and give you a new perspective to solve engineering problems.



HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

MECH 305	Data Analysis and Mechanical Engineering Laboratories
MECH 325	Machine Design
MECH 327	Thermodynamics II
MECH 368	Engineering Measurement and Instrumentation
MECH 380	Fluid Dynamics
MECH 411	Air Pollution, Technology and Society
MECH 466	Automatic Control
MECH 489	Experimental Thermofluids
MECH 454	Energy & Environment Capstone Design Project
+	12 credits of Specialized technical electives



Mechatronics

With the growing capabilities of electronics, many mechanical systems are now either controlled by computers or enhanced by embedded sensors and circuits.

This is Mechatronics, and it is one of modern society's most critical fields.

Mechatronics combines the principles of mechanical, computer, electrical, and controls engineering into a unified whole. Mechatronics engineers design everything from smartphones and kitchen appliances to CNC Machines, medical devices, and robots.

Students in the Mechatronics Option have access to one of the most well-equipped laboratories in North America, giving them the unique opportunity to gain hands-on experience in the integrated design of mechanical, electrical, and software systems.

WHAT DOES THIS MEAN FOR YOU?

The Mechatronics Option provides students with technical, teamwork, and communication skills. Students leave the program well-positioned to pursue graduate studies in mechatronics, mechanical, electrical, or computer engineering, or to work in a wide range of industries, from consumer goods or industrial applications, such as CNC machine tools and biomedical instrumentation.

HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

CPSC 259	Data Structures and Algorithms for Electrical Engineers
CPEN 333	System Software Engineering
CPEN 312	Digital Systems and Microcomputers
ELEC 302	Electronic Circuits for Electromechanical Design
ELEC 343	Electromechanics
MECH 306	Data analysis and Mechatronics Laboratories
MECH 325	Machine Design
MECH 366	Modeling of Mechatronic Systems
MECH 392	Manufacturing Processes
MECH 420	Sensors and Actuators
MECH 421	Mechatronics System Instrumentation
MECH 423	Biomechanics
MECH 458	Electromechanical Design Project
MECH 467	Computer Control of Mechatronics Systems
+	3 credits of Specialized Technical Electives



Naval Architecture & Marine Engineering

Connect the world across oceans, and create the future of one of the largest international industries through ship design.

Marine transportation brings everything from food and raw materials to commercial goods to countries across the globe. The maritime industry requires shipbuilding innovation for international industry and global defense, as well as solutions to important challenges in sustainability, climate and marine life protection. This Option allows students interested in the design and construction of ships, and related systems to concentrate in these areas in their course and project work.

Courses include fluid dynamics, ship design, hydrodynamics and a plethora of technical electives. Drawing on our well-established graduate program, instructors in naval architecture and marine engineering have a depth of knowledge and close ties to industry.



HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

Option Courses

MECH 305	Data Analysis and Mechanical Engineering Laboratories
MECH 325	Machine Design
MECH 359	Computational Methods for Mechanical Engineering
MECH 368	Engineering Measurement and Instrumentation
MECH 380	Fluid Dynamics
MECH 466	Automatic Control
MECH 486	Introduction to Ship Design
MECH 488	Introduction to Ship Hydrodynamics
CIVL 435	Advanced Structural Analysis
MECH 455	NAME Capstone Design Project
+	9 credits Specialized Technical Electives

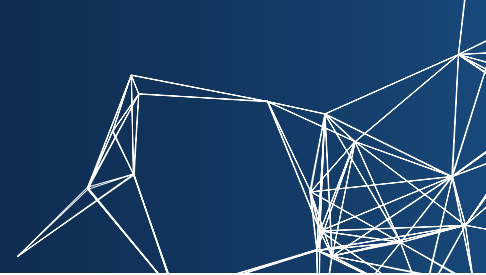
WHAT DOES THIS MEAN FOR YOU?

With specialized knowledge and industry-recognized teaching team, this Option will prepare you to enter the world of marine engineering. Beyond this field, your strong core mechanical engineering skills will let you work in a breadth of industries.



How does it work?

See how the Options fit in to your degree timeline.



ENGINEERING FIRST YEAR

Early Option Application

Application to MECH

MECH 2

Regular Option Application

SUMMER CO-OP

TERM 1 CO-OP

THIRD YEAR COURSES

SUMMER CO-OP

THIRD YEAR COURSES

TERM 2 CO-OP

SUMMER CO-OP

FOURTH YEAR COURSES

Year-long
Capstone Project

First Year

After a year of foundational engineering studies (at UBC or an accepted transfer program), you'll apply to join Mechanical Engineering and have the ability to apply early to an Option.

Early application to the Options is meant to help first-years make their discipline choice, and it's separate from applying to MECH. You can also apply to an Option in second year.

Second Year

Mech 2 provides you with a solid foundation in your new discipline, combining academic courses and hands-on technical training and design into integrated Modules. Through team-based projects, you'll get to know your cohort and build community.

Regular applications to the Options is in Term 2. Options with limited spots have reserved half of their availability, so that there will still be room for new applicants.

Third & Fourth Year

OPTIONS + ELECTIVES

Third and fourth year are when you will take your specialized Option courses, and your core upper year classes. This is also when you will take any technical electives and complementary studies electives.

CO-OP

Because co-op is so popular with our students, many Options are scheduled around co-op work terms. Co-op starts the summer after 2nd year, and 3rd year is split over two years.

You don't have to do co-op, particularly if you are in the General (flex) Option, and the co-op schedule will extend your degree by a year. Talk to a MECH advisor about alternative course schedules if you would like to condense your degree or change the order of your work terms.

CAPSTONE

All Options end with a year-long design project for a real client, that pulls together everything you've learned.

Learn More

Reach out to an advisor to find out more about our Options or undergraduate program.

MECH Student Services

604-822-6584 | students@mech.ubc.ca

MECH.UBC.CA/UNDERGRADUATE

