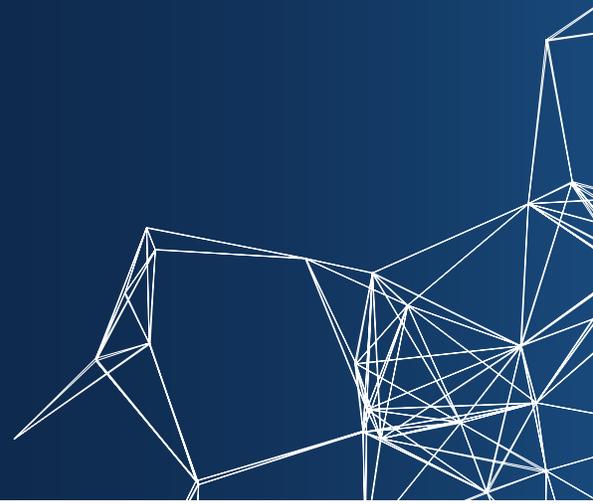




# Mechanical Engineering Undergraduate Options

AEROSPACE | BIOMEDICAL | MECHATRONICS | THERMOFLUIDS



## Our Options

The UBCV Mechanical Engineering undergraduate program engages you in an education with breadth and depth, giving you the teamwork, leadership, design and technical skills you need to work across a wide variety of sectors. This flexibility gives you the opportunity to explore different areas of interest, and the mobility to adapt when the industry changes. For many students, our general program is exactly what they want.

Some students, however, have a narrower focus.

They know where their passion lies, and they want to customize their degree to uniquely suit their career goals. The UBC Mechanical Engineering Options in **Aerospace, Biomechanics & Mechanical Devices, Mechatronics, and Thermofluids** 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 grad school, a second professional 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

- Acceptance into Mech is a separate process than acceptance into an Option, and your acceptance into any of the Options will be conditional upon you being placed in Mech
- Because the cohort sizes for the 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 the 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](mailto:students@mech.ubc.ca)**

# 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. Aerospace combines 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. 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?

### Remove these courses

<b>MECH 325</b>	<b>Machine Design</b>
<b>MECH 457</b>	<b>Mechanical Engineering Design Project</b>
<b>+</b>	<b>3 Technical Electives</b>

### Add these courses

<b>MECH 327</b>	<b>Thermodynamics II</b>
<b>MECH 358</b>	<b>Engineering Analysis</b>
<b>MECH 380</b>	<b>Fluid Dynamics</b>
<b>MECH 426</b>	<b>Mechanical Design</b>
<b>MECH 462</b>	<b>Finite Element Analysis</b>
<b>MECH 477</b>	<b>Aerospace Propulsion</b>
<b>MECH 479</b>	<b>Introduction to Computational Fluid Dynamics</b>
<b>MECH 481</b>	<b>Aerodynamics of Aircraft I</b>
<b>MECH 484</b>	<b>Aircraft Design: Aerodynamics</b>
<b>MECH 485</b>	<b>Aircraft Design: Structures</b>
<b>MECH 489</b>	<b>Experimental Thermofluids</b>
<b>MTRL 494</b>	<b>Composite Materials</b>
<b>MECH 453</b>	<b>Aerospace Design Project</b>

# 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.

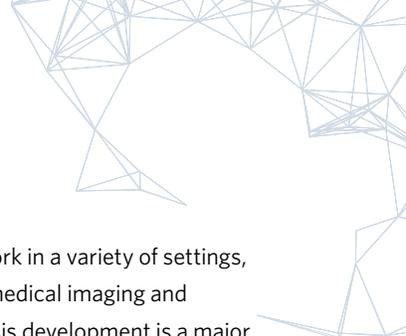
## HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

### Remove these courses

<b>MECH 457</b>	<b>Mechanical Engineering Design Project</b>
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### Add these courses

<b>BMEG 410</b>	<b>Biomedical Equipment, Physiology and Anatomy</b>
<b>BMEG 456</b>	<b>Clinical and Industrial Biomedical Engineering</b>
<b>MTRL 495</b>	<b>Biomaterials</b>
<b>MECH 439</b>	<b>Biomechanics Research Seminar</b>
<b>MECH 459</b>	<b>Biomedical Design Project</b>
<b>+</b>	<b>Specialized technical electives</b>



### 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.

## 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?

#### Remove these courses

<b>MECH 305</b>	<b>Data Analysis and Mechanical Engineering Laboratories</b>
<b>MECH 368</b>	<b>Engineering Measurements and Instrumentation</b>
<b>MECH 457</b>	<b>Mechanical Engineering Design Project</b>
<b>+</b>	<b>6 Technical Electives</b>

#### Add these courses

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



# Thermofluids

The most customizable of the Options, Thermofluids allows you to focus on what you're truly passionate about. Automotive design, naval architecture, power generation, heating and air conditioning – it's all here and it's your ticket to an exciting industry full of opportunities.

Thermofluids is the combined study of heat transfer, fluid dynamics, thermodynamics, and combustion. The applications of thermofluids range from efficient engine design to heating, ventilation, and air-conditioning (HVAC). Engineers in the field of thermofluids will find themselves well prepared for almost any challenge in a variety of industries.

Thermofluids courses include fluid dynamics, computational fluid dynamics, and a plethora of thermofluids technical electives. 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.



## HOW DOES THIS OPTION CUSTOMIZE YOUR DEGREE?

### Remove these courses

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**MECH 457** Mechanical Engineering Design Project

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### Add these courses

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**MECH 327** Thermodynamics II

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**MECH 380** Fluid Dynamics

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**MECH 386** Industrial Fluid Mechanics

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**MECH 479** Computational Fluid Dynamics

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**MECH 489** Experimental Thermofluids

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**MECH 454** Thermofluids Capstone Design Project

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**+** Specialized technical electives

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## 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 using applied thermofluids.

