AEROSPACE ENGINEERING *Section 71.55*

Faculty

Undergraduate Program Director
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The Aerospace Engineering program is offered jointly by the Department of Mechanical and Industrial Engineering and the Department of Electrical and Computer Engineering. For a complete list of faculty members, please consult the Departments' websites.

Location

Sir George Williams Campus
Engineering, Computer Science and Visual Arts Complex, Room: EV 004.139
514-848-2424, ext. 3125

Program Objectives

Aerospace Engineering is concerned with the engineering science governing flight and the design and construction of aircraft and spacecraft. This includes the mechanisms behind flight and propulsion in the atmosphere and space including aerodynamics, lift and drag as well as the design and control of aircraft such as airplanes, helicopters, unmanned aerial vehicles (UAVs) and rockets. The Aerospace Engineering curriculum comprises fundamental engineering courses followed by technical electives which allow students to obtain some specialization in a particular area of the field depending on their interests and expected future professional activity. Three options are available: Aerodynamics and Propulsion; Aerospace Structures and Materials; and Avionics and Aerospace Systems.
Aerodynamics and Propulsion is strongly related to the "flying" aspect of aircraft and includes topics such as aerodynamics, gas dynamics, aerospace vehicle performance, turbo-machinery and propulsion. Aerospace Structures and Materials is related to the design and manufacture of aircraft and spacecraft and includes topics such as aircraft stress analysis, aeroelasticity and vibrations, composite materials and aircraft design. Avionics and Aerospace Systems has significant electrical and computer engineering content in order to provide the necessary background for the avionics and systems engineering required to control modern aircraft and includes topics such as avionic navigation systems, communication networks, spacecraft mission design and flight control systems.

Course Requirements (BEng in Aerospace Engineering)

The program in Aerospace Engineering consists of the Engineering Core, the Aerospace Engineering Core, and option requirements as shown below. The minimum length of the program is 120 credits.

Engineering Core (27 credits)
See §71.20.5.

Aerospace Engineering Core		*Credits*
AERO 201	Introduction to Flight and Aerospace Systems	4.00
AERO 371	Modelling and Control Systems	3.50
AERO 390	Aerospace Engineering Design Project	3.00
AERO 417	Standards, Regulations and Certification	3.00
AERO 490	Capstone Aerospace Engineering Design Project	4.00
ENGR 242	Statics	3.00
ENGR 243	Dynamics	3.00
ENGR 244	Mechanics of Materials	3.75
ENGR 251	Thermodynamics I	3.00
ENGR 361	Fluid Mechanics I	3.00
		33.25

Option Requirements
Students in the Aerospace Engineering program must complete at least 59.75 elective credits from within one of options A, B, or C. Prior to registration for elective courses, students indicate their choice of option on a form available from the Department, which must be submitted to the Chair's office for approval *prior to March 30.*

1. Option A — Aerodynamics and Propulsion

Students must complete the following compulsory courses from the Option Core and at least 9.5 credits from the Option Electives, with no more than one of the courses marked *. Students having a GPA of 3.0 or more may submit a request to take a graduate course as an elective.

Option A Core		*Credits*
AERO 446	Aerospace Vehicle Performance	3.00
AERO 455	Computational Fluid Dynamics for Aerospace Applications	3.75
AERO 462	Turbomachinery and Propulsion	3.00
AERO 464	Aerodynamics	3.00
AERO 465	Gas Turbine Design	3.50
AERO 481	Materials Engineering for Aerospace	3.50
ENGR 311	Transform Calculus and Partial Differential Equations	3.00
MECH 211	Mechanical Engineering Drawing	3.50
MECH 215	Programming for Mechanical and Industrial Engineers	3.50
MECH 221	Materials Science	3.00
MECH 343	Theory of Machines	3.50
MECH 351	Thermodynamics II	3.50
MECH 352	Heat Transfer I	3.50
MECH 361	Fluid Mechanics II	3.50
MECH 461	Gas Dynamics	3.50
		50.25

Option A Electives		*Credits*
AERO 431	Principles of Aeroelasticity	3.00
AERO 444	Concurrent Engineering in Aerospace Systems	3.00
AERO 480	Flight Control Systems	3.50
AERO 482	Avionic Navigation Systems	3.00
AERO 485	Introduction to Space Systems	3.00
AERO 486*	Aircraft Stress Analysis	3.00
ENGR 412	Honours Research Project	3.00
INDU 372	Quality Control and Reliability	3.00
MECH 368	Electronics for Mechanical Engineers	3.50
MECH 375*	Mechanical Vibrations	3.50
MECH 411	Instrumentation and Measurements	3.50
MECH 426*	Stress and Failure Analysis of Machinery	3.00
MECH 452	Heat Transfer II	3.50
MECH 453	Heating, Ventilation and Air Conditioning Systems	3.00
MECH 460*	Finite Element Analysis	3.75
MECH 463	Fluid Power Control	3.50
MECH 498	Topics in Mechanical Engineering	3.00

2. Option B — Aerospace Structures and Materials

Students must complete the following compulsory courses from the Option Core and at least 6.25 credits from the Option Electives, with no more than one of the courses marked *. Students having a GPA of 3.0 or more may submit a request to take a graduate course as an elective.

Option B Core		*Credits*
AERO 431	Principles of Aeroelasticity	3.00
AERO 481	Materials Engineering for Aerospace	3.50
AERO 486	Aircraft Stress Analysis	3.00
AERO 487	Design of Aircraft Structures	3.00
ENGR 311	Transform Calculus and Partial Differential Equations	3.00
MECH 211	Mechanical Engineering Drawing	3.50
MECH 215	Programming for Mechanical and Industrial Engineers	3.50
MECH 221	Materials Science	3.00
MECH 311	Manufacturing Processes	3.75
MECH 313	Machine Drawing and Design	3.00
MECH 343	Theory of Machines	3.50
MECH 352	Heat Transfer I	3.50
MECH 375	Mechanical Vibrations	3.50
MECH 411	Instrumentation and Measurements	3.50
MECH 412	Computer-Aided Mechanical Design	3.50
MECH 460	Finite Element Analysis	3.75
		53.50

Option B Electives		*Credits*
AERO 444	Concurrent Engineering in Aerospace Systems	3.00
AERO 446*	Aerospace Vehicle Performance	3.00
AERO 455*	Computational Fluid Dynamics for Aerospace Applications	3.75
AERO 480*	Flight Control Systems	3.50
AERO 482*	Avionic Navigation Systems	3.00
AERO 485	Introduction to Space Systems	3.00
ENGR 412	Honours Research Project	3.00
INDU 372	Quality Control and Reliability	3.00
MECH 344	Machine Element Design	3.00
MECH 351*	Thermodynamics II	3.50
MECH 361*	Fluid Mechanics II	3.50
MECH 368	Electronics for Mechanical Engineers	3.50
MECH 422	Mechanical Behaviour of Polymer Composite Materials	3.00
MECH 425	Manufacturing of Composites	3.50
MECH 498	Topics in Mechanical Engineering	3.00

3. Option C — Avionics and Aerospace Systems

Students must complete the following compulsory courses from the Option Core and at least 11.75 credits from the Option Electives. Students having a GPA of 3.0 or more may submit a request to take a graduate course as an elective.

Option C Core		*Credits*
AERO 482	Avionics Navigation Systems	3.00
AERO 483	Integration of Avionics Systems	3.00
COEN 212	Digital Systems Design I	3.50
COEN 231	Introduction to Discrete Mathematics	3.00
COEN 243	Programming Methodology I	3.00
COEN 244	Programming Methodology II	3.00
COEN 311	Computer Organization and Software	3.50
COEN 352	Data Structures and Algorithms	3.00
ELEC 242	Continuous-Time Signals and Systems	3.00
ELEC 251	Fundamentals of Applied Electromagnetics	3.00
ELEC 273	Basic Circuit Analysis	3.50
ELEC 311	Electronics I	3.50
ELEC 342	Discrete-Time Signals and Systems	3.50
ELEC 483	Real-Time Computer Control Systems	3.50
SOEN 341	Software Process	3.00
		48.00

Option C Electives		*Credits*
AERO 480	Flight Control Systems	3.50
COEN 313	Digital Systems Design II	3.50
COEN 317	Microprocessor Systems	3.50
COEN 320	Introduction to Real-Time Systems	3.00
COEN 346	Operating Systems	3.50
COEN 413	Hardware Functional Verification	3.00
COEN 421	Embedded Systems Design	4.00
COEN 445	Communication Networks and Protocols	3.50
COEN 498	Topics in Computer Engineering	3.00
ELEC 331	Fundamentals of Electrical Power Engineering	3.50
ELEC 351	Electromagnetic Waves and Guiding Structures	3.00
ELEC 367	Introduction to Digital Communications	3.50
ELEC 433	Power Electronics	3.50
ELEC 442	Digital Signal Processing	3.50
ELEC 458	Techniques in Electromagnetic Compatibility	3.00
ELEC 464	Wireless Communications	3.00
ELEC 481	Linear Systems	3.50
ELEC 482	System Optimization	3.50
ELEC 498	Topics in Electrical Engineering	3.00
SOEN 342	Software Requirements and Specifications	3.00
SOEN 343	Software Architecture and Design I	3.00