

DETAILED COURSE INFORMATION
Master 2021-22

COURSE	TITLE	CREDIT	PRE-REQUISITE	CO-REQUISITE	SUM 1	SUM 2	FALL	WIN
ACCO 220	Financial and Managerial Accounting	3.00						X
AERO 201	Introduction to Flight and Aerospace Systems	4.00		ENGR 213			X	
AERO 290	Introduction to Aircraft Design	3.00	AERO 201	ENCS 282				X
AERO 371	Modelling and Control Systems	3.50	PHYS 205; ENGR 213, 243	ENGR 311 or ELEC 342 or ELEC 364				X
AERO 390	Aerospace Engineering Design Project	3.00	AERO 290, 371; ENCS 282				X	
AERO 417	Standards, Regulations and Certification	3.00	ENGR 201		X		X	
AERO 431	Principles of Aeroelasticity	3.00	ENGR 243, 361; MECH 375				X	
AERO 446	Aerospace Vehicle Performance	3.00	MECH 361					X
AERO 455	Computational Fluid Dynamics for Aerospace Applications	3.75	ENGR 311, 391; MECH 361					X
AERO 462	Turbomachinery and Propulsion	3.00	MECH 351, 361				X	
AERO 464	Aerodynamics	3.00	MECH 361				X	X
AERO 465	Gas Turbine Design	3.50	AERO 462					X
AERO 471	Aircraft Hydro-Mechanical and Fuel Systems	3.50	AERO 201 or permission of the Department					X
AERO 472	Aircraft Pneumatic and Electrical Power Systems	3.50	AERO 201; ENGR 361		n/a	n/a	n/a	n/a
AERO 480	Flight Control Systems	3.50	AERO 371 or ELEC 372 or MECH 371 or SOEN 385				X	
AERO 481	Materials Engineering for Aerospace	3.50	MECH 221 or MIAE 221				X	
AERO 482	Avionic Navigation Systems	3.00	ENGR 371 or COMP 233; AERO 371 or ELEC 372 or MECH 370 or SOEN 385				X	
AERO 483	Integration of Avionics Systems	3.00	AERO 482					X
AERO 485	Introduction to Space Systems	3.00	MECH 351, 361					X
AERO 486	Aircraft Stress Analysis	3.00	ENGR 243, 244				X	
AERO 487	Design of Aircraft Structures	3.00	AERO 486					X
AERO 490	Capstone Aerospace Engineering Design Project	4.00	75 credits in the program; AERO 390; ENGR 301				X	
BIOL 206	Elementary Genetics	3.00	Basic and Natural Science (INDU)					X
BIOL 261	Molecular and General Genetics	3.00	Basic and Natural Science (INDU)				X	X
BSTA 478	Data Mining Techniques	3.00	Permission from JMSB				X	X
BTM 430	Enterprise Resource Planning & Information Technology Integration	3.00	Permission from JMSB		X		X	X
BTM 480	Project Management	3.00	Permission from JMSB		X	X	X	X
CHEM 217	Introductory Analytical Chemistry I	3.00	Basic and Natural Science (INDU)				X	
CHEM 221	Introductory Organic Chemistry I	3.00	Basic and Natural Science (INDU)				X	X
CIVI 231	Geology for Civil Engineers	3.00	Basic and Natural Science (INDU)				X	
COEN 212	Digital Systems Design I	3.50	MATH 204		X	X	X	X
COEN 231	Introduction to Discrete Mathematics	3.00	MATH 204		X		X	X
COEN 243	Programming Methodology I	3.00	MATH 204			X	X	X
COEN 244	Programming Methodology II	3.00	COEN 243 or MECH 215 or MIAE 215			X	X	X
COEN 311	Computer Organization and Software	3.50	COEN 212, 243		X		X	X
COEN 313	Digital Systems Design II	3.50	COEN 212, 231		X		X	X
COEN 317	Microprocessor Systems	3.50	COEN 311 or COMP 228 or SOEN 228; COEN 313			X		X
COEN 320	Introduction to Real-Time Systems	3.00	COEN 346 or COMP 346				X	X
COEN 346	Operating Systems	3.50	COEN 311; COMP 352 or COEN 352				X	X
COEN 352	Data Structures and Algorithms	3.00	COEN 231, 244			X	X	X
COEN 366	Communication Networks and Protocols	3.50	COEN 346				X	X
COEN 413	Hardware Functional Verification	3.00	COEN 313					X
COEN 421	Embedded Systems Design	4.00	COEN 317, 320; SOEN 341					X
COEN 498	Topics in Computer Engineering	3.00			n/a	n/a	n/a	n/a
ELEC 242	Continuous-Time Signals and Systems	3.00	ELEC 273; ENGR 213		X		X	X
ELEC 251	Fundamentals of Applied Electromagnetics	3.00	ELEC 273 or ENGR 273	ENGR 233	X		X	
ELEC 273	Basic Circuit Analysis	3.50	PHYS 205	ENGR 213	X		X	X
ELEC 311	Electronics I	3.50	ELEC 273			X	X	X
ELEC 331	Fundamentals of Electrical Power Engineering	3.50	ELEC 251, 273				X	X
ELEC 342	Discrete-Time Signals and Systems	3.50	ELEC 242 or 264			X	X	X
ELEC 351	Electromagnetic Waves and Guiding Structures	3.00	ELEC 251, 242; ENGR 233				X	X
ELEC 367	Introduction to Digital Communications	3.50	ELEC 342 or 364; ENGR 371				X	X
ELEC 433	Power Electronics	3.50	ELEC 311, 331			X	X	
ELEC 442	Digital Signal Processing	3.50	ELEC 342 or 364; ENGR 371					X

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COURSE	TITLE	CREDIT	PRE-REQUISITE	CO-REQUISITE	SUM 1	SUM 2	FALL	WIN
ELEC 458	Techniques in Electromagnetic Compatibility	3.00	ELEC 351			X		
ELEC 464	Wireless Communications	3.00	ELEC 367				X	
ELEC 481	Linear Systems	3.50	AERO 371 or ELEC 372 or MECH 371				X	
ELEC 482	System Optimization	3.50	ENGR 391 or EMAT 391		X			
ELEC 483	Real-Time Computer Control Systems	3.50	AERO 371 or ELEC 372; ELEC 342 or 364					X
ELEC 498	Topics in Electrical Engineering	3.00			n/a	n/a	n/a	n/a
ENCS 282	Technical Writing and Communication	3.00	Engineering Writing Test (EWT), or ENCS 272 (min. C-)		X	X	X	X
ENGR 201	Professional Practice and Responsibility	1.50			X	X	X	X
ENGR 202	Sustainable Development and Environmental Stewardship	1.50			X		X	X
ENGR 213	Applied Ordinary Differential Equations	3.00	MATH 205	MATH 204	X		X	X
ENGR 233	Applied Advanced Calculus	3.00	MATH 204, 205		X	X	X	X
ENGR 242	Statics	3.00	MATH 204; PHYS 204	ENGR 213	X		X	X
ENGR 243	Dynamics	3.00	ENGR 213, 242		X		X	X
ENGR 244	Mechanics of Materials	3.75	ENGR 213 ; ENGR 242 or 245	ENGR 233	X	X		X
ENGR 245	Mechanical Analysis	3.00	PHYS 204	ENGR 213				X
ENGR 251	Thermodynamics I	3.00	MATH 203			X	X	X
ENGR 301	Engineering Management Principles and Economics	3.00			X	X	X	X
ENGR 311	Transform Calculus and Partial Differential Equations	3.00	ENGR 213, 233		X	X	X	X
ENGR 361	Fluid Mechanics I	3.00	ENGR 213, 233, 251		X	X	X	X
ENGR 371	Probability and Statistics in Engineering	3.00	ENGR 213, 233		X	X	X	X
ENGR 391	Numerical Methods in Engineering	3.00	ENGR 213, 233; COMP 248 or COEN 243 or MECH 215 or MIAE 215 or BCEE 231		X	X	X	X
ENGR 392	Impact of Technology on Society	3.00	ENCS 282; ENGR 201, 202		X	X	X	X
ENGR 411	Special Technical Report	1.00	ENCS 282; permission of the Department		X		X	X
ENGR 412	Honours Research Project	3.00	ENCS 282; 75cr in the program; min. CGPA 3.00; permission of the Department		X		X	X
ENGR 490	Engr 490 Multidisciplinary Capstone Design Project (4 Credits)	4.00	Eligibility to register in any other Capstone 490 course				X	
Gen. Ed.	General Education Elective	3.00	List of courses available in the Undergraduate Calendar, Sec. 71.110					
GEOL 206	Earthquakes, Volcanoes, and Plate Tectonics	3.00	Basic and Natural Science (INDU)		n/a	n/a	n/a	n/a
GEOL 208	The Earth, Moon and the Planets	3.00	Basic and Natural Science (INDU)				X	
INDU 211	Introduction to Production and Manufacturing Systems	3.00					X	
INDU 311	Simulation of Industrial Systems	3.50	ENGR 371				X	
INDU 320	Production Engineering	3.00	INDU 323				X	
INDU 321	Lean Manufacturing	3.00	INDU 320					X
INDU 323	Operations Research I	3.50	ENGR 213, 233; INDU 211		X			X
INDU 324	Operations Research II	3.50	INDU 323				X	
INDU 330	Engineering Management	3.00	ENCS 282	ENGR 301			X	
INDU 342	Logistics Network Models	3.00	INDU 324					X
INDU 371	Stochastic Models in Industrial Engineering	3.00	ENGR 371					X
INDU 372	Quality Control and Reliability	3.00	ENGR 371					X
INDU 410	Safety Engineering	3.00	MECH 311 or MIAE 311				X	
INDU 411	Computer Integrated Manufacturing	3.50	MECH 311 or MIAE 311					X
INDU 412	Human Factors Engineering	3.50	ENGR 371				X	
INDU 421	Facilities Design and Material Handling Systems	3.50	INDU 320	INDU 311			X	
INDU 423	Inventory Control	3.50	INDU 320				X	
INDU 431	Quantitative Methods in Health-care Systems	3.00			n/a	n/a	n/a	n/a
INDU 441	Introduction to Six Sigma	3.00	INDU 372		X			X
INDU 466	Decision Models in Service Sector	3.00	ENGR 371; INDU 320					X
INDU 475	Advanced Concepts in Quality Improvement	3.00	INDU 372				X	
INDU 480	Cases in Industrial Engineering	3.00	INDU 311, 324					X
INDU 490	Capstone Industrial Engineering Design Project	4.00	75 credits in the program; ENGR 301; MIAE 380	INDU 421			X	
INDU 498	Topics in Industrial Engineering	3.00			n/a	n/a	n/a	n/a
MANA 300	Entrepreneurship: Launching Your Business	3.00	Permission from JMSB					
MECH 321	Properties and Failure of Materials	3.50	MECH 221 or MIAE 221					X
MECH 343	Theory of Machines	3.50	ENGR 213, 233, 243				X	X
MECH 344	Machine Element Design	3.00	ENGR 244; MECH 313 or MIAE 313	MECH 343			X	X

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MECH 351	Thermodynamics II	3.50	ENGR 251				X	X
MECH 352	Heat Transfer I	3.50	ENGR 311 , 361				X	X
MECH 361	Fluid Mechanics II	3.50	ENGR 361				X	X
MECH 368	Electronics for Mechanical Engineers	3.50	PHYS 205	ENGR 311			X	X
MECH 370	Modelling and Analysis of Dynamic Systems	3.50	PHYS 205; ENGR 213; ENGR 245 or 243	ENGR 311		X	X	X
MECH 371	Analysis and Design of Control Systems	3.75	ENGR 311 ; MECH 370				X	X
MECH 375	Mechanical Vibrations	3.50	AERO 371 or MECH 370			X	X	X
MECH 390	Mechanical Engineering Design Project	3.00	ENCS 282, MECH 311 or MIAE 311; MECH 343; MIAE 380	MECH 344			X	X
MECH 411	Instrumentation and Measurements	3.50	ENGR 311; AERO 371 or MECH 370				X	
MECH 412	Computer-Aided Mechanical Design	3.50	MECH 313 or MIAE 313				X	
MECH 414	Computer Numerically Controlled Machining	3.50	MECH 311 or MIAE 311; MECH 412					X
MECH 415	Advanced Programming for Mechanical and Industrial Engineers	3.00	MECH 215 or MIAE 215				X	
MECH 421	Mechanical Shaping of Metals and Plastics	3.50	MECH 221 or MIAE 221					X
MECH 422	Mechanical Behaviour of Polymer Composite Materials	3.00	ENGR 233, 244; MECH 221 or MIAE 221				X	
MECH 423	Casting, Welding, Heat Treating and Non-Destructive Testing	3.50	MECH 221 or MIAE 221				X	
MECH 424	MEMS – Design and Fabrication	3.50	MECH 311 or MIAE 311; MECH 343					X
MECH 425	Manufacturing of Composites	3.50	MECH 311 or MIAE 311				X	
MECH 426	Stress and Failure Analysis of Machinery	3.00	ENGR 233, 244; AERO 481 or MECH 321					X
MECH 444	Guided Vehicle Systems	3.00	MECH 375		n/a	n/a	n/a	n/a
MECH 447	Fundamentals of Vehicle System Design	3.50	MECH 343				X	
MECH 452	Heat Transfer II	3.50	MECH 351, 352, 361					X
MECH 453	Heating, Ventilation and Air Conditioning Systems	3.00	MECH 352					X
MECH 454	Vehicular Internal Combustion Engines	3.00	MECH 351, 361					X
MECH 460	Finite Element Analysis	3.75	ENGR 244, 391					X
MECH 461	Gas Dynamics	3.50	MECH 361			X	X	
MECH 463	Fluid Power Control	3.50	ENGR 361; MECH 371				X	
MECH 468	Wind Turbine Engineering	3.00	MECH 343, 361	MECH 344, 371				X
MECH 471	Microcontrollers for Mechatronics	3.50	ENGR 311; MECH 368					X
MECH 472	Mechatronics and Automation	3.50	MECH 215 or MIAE 215	MECH 371				X
MECH 473	Control System Design	3.50	ELEC 372 or MECH 371				X	
MECH 474	Mechatronics	3.75	ELEC 372 or MECH 371					X
MECH 476	Generative Design and Manufacturing in Engineering	3.00	MECH 313 or MIAE 313	AERO 390 or MECH 390	n/a	n/a	n/a	n/a
MECH 490	Capstone Mechanical Engineering Design Project	4.00	75cr. in the program; ENGR 301; MECH 344, 390				X	
MECH 498	Topics in Mechanical Engineering	3.00			n/a	n/a	n/a	n/a
MIAE 211	Mechanical Engineering Drawing	3.50			X		X	X
MIAE 215	Programming for Mechanical and Industrial Engineers	3.50	MATH 204			X	X	X
MIAE 221	Materials Science	3.00	CHEM 205				X	X
MIAE 311	Manufacturing Processes	3.00	MECH 313 or MIAE 313		X		X	X
MIAE 312	Engineering Design and Manufacturing Processes Lab	1.00		MIAE 311	X		X	X
MIAE 313	Machine Drawing and Design	3.50	MECH 211 or MIAE 211				X	X
MIAE 380	Product Design and Development	3.00	MECH 211 or MIAE 211				X	X
PHYS 252	Optics	3.00	Basic and Natural Science (INDU)					X
PHYS 260	Introductory Biophysics	3.00	Basic and Natural Science (INDU)					X
PHYS 273	Introduction to Energy and Environment	3.00	Basic and Natural Science (INDU)					X
PHYS 284	Introduction to Astronomy	3.00	Basic and Natural Science (INDU)				X	
PHYS 385	Astrophysics	3.00	Basic and Natural Science (INDU)		n/a	n/a	n/a	n/a
SOEN 341	Software Process	3.00		COMP 352 or COEN 352, ENCS 282			X	X
SOEN 342	Software Requirements and Specifications	3.00	SOEN 341				X	X
SOEN 343	Software Architecture and Design I	3.00	SOEN 341	SOEN 342			X	X