

List of Recommended Courses for the M.Eng. Program

The M.Eng. program follows the same subject tracks as our research program. Below, you will find the list of recommended graduate and undergraduate courses for the M.Eng. program for specialization and your broader interest in the main research/technical areas carried out in the Department of Electrical and Computer Engineering. These include *Biomedical and Intelligent Systems, Communication and Signal Processing, Computer and Software Engineering, Microelectronics, Electromagnetics and Photonics, and Power Electronics*. Other courses that can count towards your degree requirements are also listed. For advice on taking courses not on the list, contact the M.Eng. Coordinator, Dr. Il-Min Kim. The Graduate Program Assistant is Ms. Debra Fraser. For a listing of graduate courses at Queen’s, please consult the [Courses of Instruction](#) in the graduate calendar.

Before enrolling in a graduate course, students are strongly advised to check the graduate course pre-requisites to make sure they have the right pre-requisites for the course. Also, for the Academic Project Option of the M.Eng. program, students should plan on choosing a project supervisor among one of the faculty who has instructed them in an approved course.

Biomedical and Intelligent Systems

Course No.	Recommended Courses	2018-2019
Queen’s Faculty of Engineering and Applied Science		
APSC 896	Engineering Leadership and Innovation	F
Queen’s Electrical and Computer Engineering		
ELEC 811	Biological Signal Analysis	N/O
ELEC 824	Machine Vision	N/O
ELEC 841	Nonlinear Systems: Analysis and Identification	W
ELEC 843	Control of Discrete Event Systems	F
ELEC 848	Control Systems Design for Robots and Telerobots	W
ELEC 879	Wearable and IoT Computing	F
ELEC 408	Biomedical Signal and Image Processing	N/O
ELEC 409	Bioinformatic Analytics	W

ELEC 421	Digital Signal Processing: Filters and System Design	N/O
ELEC 422	Digital Signal Processing: Random Models and Applications	F
ELEC 425	Machine Learning and Deep Learning	F
ELEC 443	Linear Control Systems	F
ELEC 444	Modeling and Computer Control of Mechatronic Systems	W
ELEC 448	Introduction to Robotics: Mechanics and Control	W
ELEC 472	Artificial Intelligence and Interactive Systems	W
ELEC 474	Machine Vision	N/O
Queen's Mechanical and Material Engineering		
MECH 816	Energetics & Mechanics of Locomotion	F
MECH 828	Biomechanics of Human Gait	N/O
MECH 852	Mechatronics for Automation	S
MECH 857	Introduction to Robotics	N/O
MECH 494	Kinematics of Human Motion	F
Queen's Mining Engineering		
MINE 855	Autonomous Ground Vehicles Engineering	W
Queen's Chemical Engineering		
CHEE 822	Model-Based Control	F
CHEE 825/436	System Identification	N/O
Queen's School of Computing		
CISC 855	Nonlinear Optimization	W
CISC 859	Pattern Recognition	W
CISC 874/CMPE 452	Neural Networks	W
CISC 881	Medical Image and Signal Processing	F
CMPE 457	Image Processing and Computer Vision	F
RMC Electrical and Computer Engineering		
EE503	Wheeled Mobile Robots: Control and Instrumentation	F

EE523	Integrated Navigation Systems	F
EE535	Adaptive Control Systems	F

Course No.	Other Courses	2018-2019
<u>Queen's Electrical and Computer Engineering</u>		
ELEC 823	Signal Processing	W
ELEC 861	Probability, Random Variables and Stochastic Processes	N/O
ELEC 880	Machine Learning for Natural Language Processing	W
<u>Queen's Mechanical and Material Engineering</u>		
MECH 823	Micro-Electro-Mechanical Systems (MEMS)	W
MECH 827	Biomechanics of Human Joints and Spine	N/O
MECH 829	Tissue Mechanics	F
MECH 423	Introduction to Microsystems	W
MECH 455	Computer Integrated Manufacturing	F
MECH 465	Computer-Aided Design	F
MECH 478	Biomaterials	F
MECH 495	Ergonomics and Design	W
<u>Queen's Mathematics and Engineering</u>		
MTHE 830/430	Modern Control Theory	F
<u>Queen's Mining Engineering</u>		
MINE 852	Mine Mechanization and Automation	W
MINE 853	Mining Robotics	N/O
MINE 472	Mining Systems, Automation, and Robotics	O/L
<u>Queen's Chemical Engineering</u>		
CHEE 927	Advanced Global Optimization	F
<u>Queen's School of Computing</u>		

CISC 854/CMPE 454	Computer Graphics	W
CISC 875	Applied Biomedical Computing	W
CISC 888	Advanced Research in Human Computer Interaction	F
CMPE 425	Advanced User Interface Design	N/O
RMC Electrical and Computer Engineering		
EE541	Real-time Digital Computer Control Systems	N/O

Communication and Signal Processing

Course No.	Recommended Courses	2018-2019
Queen's Faculty of Engineering and Applied Science		
APSC 896	Engineering Leadership and Innovation	F
Queen's Electrical and Computer Engineering		
ELEC 823	Signal Processing	W
ELEC 827	Multimedia Signal Processing	N/O
ELEC 861	Probability, Random Variables and Stochastic Processes	N/O
ELEC 865	Coding Theory	N/O
ELEC 866	Signal Detection and Estimation	W
ELEC 867	Data Communication	F
ELEC 869	MIMO Communication Systems	N/O
ELEC 421	Digital Signal Processing: Filters and System Design	N/O
ELEC 422	Digital Signal Processing: Random Models and Applications	F
ELEC 461	Digital Communications	F
ELEC 464	Wireless Communications	N/O
Queen's Mathematics and Engineering		
MTHE 806/406	Introduction to Coding Theory	F

MTHE 855/455	Stochastic Processes and Applications	F
MTHE 874/474	Information Theory	F
MTHE 877/477	Data Compression and Source Coding	W
MTHE 478	Topics in Communication Theory	N/O
Queen's School of Computing		
CISC 825	Paradigms of Wireless and Mobile Networks	F

Course No.	Other Courses	2018-2019
Queen's School of Computing		
CISC 435	Computer Networks	F
RMC Electrical and Computer Engineering		
EE505	Satellite Communications	F
EE521	Secure Communications	N/O
EE523	Integrated Navigation Systems	F
EE533	Hardware Implementation of Digital Signal Processing	W

Computer and Software Engineering

Course No.	Recommended Courses	2018-2019
Queen's Faculty of Engineering and Applied Science		
APSC 896	Engineering Leadership and Innovation	F
Queen's Electrical and Computer Engineering		
ELEC 871	Shared-Memory Multiprocessor Systems	N/O
ELEC 873	Cluster Computing	F
ELEC 875	Design Recovery and Automated Evolution	W
ELEC 876	Software Reengineering	F

ELEC 880	Machine Learning for Natural Language Processing	W
ELEC 425	Machine Learning and Deep Learning	F
ELEC 451	Digital Integrated Circuit Engineering	N/O
ELEC 470	Computer System Architecture	W
SOFT 423	Software Requirements	W
SOFT 437	Performance Analysis	W
Queen's School of Computing		
CISC 835/422	Formal Methods in Software Engineering	F
CISC 836	Beyond Code: An Intro to Model-Based Software Development	W
CISC 848	Software Reliability and Security	W
CISC 858/458	Programming Language Processors	W
CISC 874/CMPE 452	Neural Networks	W
CISC 880	Mining Software Engineering Data	F
CMPE 432	Advanced Database Systems	F
CMPE 434	Distributed Systems	N/O
RMC Electrical and Computer Engineering		
EE569	Malware Analysis	W
EE579	Computer Systems and Network Security	F
EE585	Real-time Software Design and Implementation	N/O
EE593	Advanced Network Traffic Analysis	F
EE595	Cyber Threat and Attack techniques	F

Course No.	Other Courses	2018-2019
Queen's Electrical and Computer Engineering		
ELEC 824/ELEC 474	Machine Vision	N/O

ELEC 879	Wearable and IoT Computing	F
ELEC 472	Artificial Intelligence and Interactive Systems	W
Queen's School of Computing		
CISC 846	Software Design Methodologies	F
CISC 873	Data Mining	F
CISC 888	Advanced Research in Human Computer Interaction	F
CMPE 425	Advanced User Interface Design	N/O
RMC Electrical and Computer Engineering		
EE519	Synthesis of Digital Systems	W
EE551	Real-time Operating Systems	N/O
EE553	VLSI Design	F
EE557	Test Methodologies for VLSI	N/O
EE559	Digital VLSI Architecture	N/O
EE573	Object-oriented Analysis and Design	N/O

Microelectronics, Electromagnetics and Photonics

Course No.	Recommended Courses	2018-2019
Queen's Faculty of Engineering and Applied Science		
APSC 896	Engineering Leadership and Innovation	F
Queen's Electrical and Computer Engineering		
ELEC 852	Broadband Microwave Integrated Circuits	F
ELEC 854	Microwave Circuits and Systems	N/O
ELEC 858	Principles of Microwave Imaging and Remote Sensing	W
ELEC 863	Topics in Optical Communications	N/O
ELEC 864	WDM Fiber Optic Communication Systems	F

ELEC 868	Simulation of Optical Communication Systems	N/O
ELEC 431	Power Electronics	F
ELEC 451	Digital Integrated Circuit Engineering	N/O
ELEC 454	Analog Electronics	N/O
ELEC 457	Integrated Circuits and System Applications	W
ELEC 483	Microwave and RF Circuits and Systems	W
ELEC 486	Fiber Optic Communications	N/O
Queen's Engineering Physics		
ENPH 460	Laser Optics	W

Course No.	Other Courses	2018-2019
Queen's Engineering Physics		
Phys 859	Principle of Microfabrication	N/O
Phys 860	Applied Science Topics in Micro/Nano-technology	W
Phys 882	Nonlinear and Quantum Optics	N/O
RMC Electrical and Computer Engineering		
EE537	Antenna Engineering	W
EE543	Radar Basics and Applications	F
EE555	Electromagnetic Compatibility	N/O

Power Electronics

Course No.	Recommended Courses	2018-2019
Queen's Faculty of Engineering and Applied Science		

APSC 896	Engineering Leadership and Innovation	F
Queen's Electrical and Computer Engineering		
ELEC 830	Emerging Technologies in Power Grid	W
ELEC 831	Power Electronics	F
ELEC 832	Modeling and Control of Switching Power Converters	W
ELEC 836	Power Systems Design for Telecommunications	N/O
ELEC 837	High Power Electronics	N/O
ELEC 431	Power Electronics	F
ELEC 433	Energy and Power Machines	N/O
ELEC 436	Electric Machines and Control	W
RMC Electrical and Computer Engineering		
EE525	Power Quality in Electric Power Systems	N/O
EE539	Variable Speed Control of Electric Machines	W

Course No.	Other Courses	2018-2019
Queen's Electrical and Computer Engineering		
ELEC 443	Linear Control Systems	F
ELEC 454	Analog Electronics	N/O
RMC Electrical and Computer Engineering		
EE577	Neural Networks Applications to Power Systems	N/O