List of Approved 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 areas include *Biomedical and Intelligent Systems*, *Communication and Signal Processing*, *Computer and Software Engineering*, *Microelectronics, Electromagnetics and Photonics*, and *Power Electronics*. Other courses that could count towards your degree requirements are also listed. Taking any course outside this list will require the Departmental approval on a case by case. For advice on taking courses not on the list, contact your M.Eng. Advisor.

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
Queen's Faculty of Engineering and Applied Science	
APSC 896	Engineering Leadership and Innovation (only one APSC primary course)
APSC 888	Engineering Innovation and Entrepreneurship (only one APSC primary course)
Queen's Electrical and Computer Engineering	
ELEC 825	Machine Learning and Deep Learning
ELEC 841	Nonlinear Systems: Analysis and Identification
ELEC 843	Control of Discrete Event Systems
ELEC 845	Autonomous Vehicle Control and Navigation
ELEC 848	Control Systems Design for Robots and Telerobots
ELEC 870	Human-Robot Interaction
ELEC 872	Artificial Intelligence and Interactive Systems

ELEC 874	Deep Learning in Computer Vision
ELEC 879	Wearable and IoT Computing
ELEC 408	Biomedical Signal and Image Processing
ELEC 409	Bioinformatic Analytics
ELEC 421	Digital Signal Processing: Filters and System Design
ELEC 422	Digital Signal Processing: Random Models and Applications
ELEC 425	Machine Learning and Deep Learning
ELEC 443	Linear Control Systems
ELEC 444	Modeling and Computer Control of Mechatronic Systems
ELEC 448	Introduction to Robotics: Mechanics and Control
ELEC 474	Machine Vision
Queen's Mechanical and Material Engineering	
MECH 816	Energetics & Mechanics of Locomotion
MECH 827	Biomechanics of Human Joints and Spine
MECH 828	Biomechanics of Human Gait
MECH 852	Mechatronics for Automation
MECH 857	Introduction to Robotics
MECH 494	Kinematics of Human Motion
Queen's Chemical Engineering	
CHEE 822	Model-Based Control
CHEE 825	System Identification
Queen's School of Computing	
CISC 855	Nonlinear Optimization
CISC 856	Reinforcement Learning
CISC 859	Pattern Recognition
CISC 867	Deep Learning
CISC 874	Neural and Cognitive Computing

CISC 881	Medical Image and Machine Learning
CMPE 457	Image Processing and Computer Vision
RMC Electrical and Computer Engineering	
EE503	Wheeled Mobile Robots: Control and Instrumentation
EE523	Integrated Navigation Systems
EE535	Adaptive Control Systems

Course No.	Other Courses
Queen's Electrical and Computer Engineering	
ELEC 823	Signal Processing
ELEC 861	Probability, Random Variables and Stochastic Processes
ELEC 880	Machine Learning for Natural Language Processing
Queen's Mechanical and Material Engineering	
MECH 823	Micro-Electro-Mechanical Systems (MEMS)
MECH 829	Tissue Mechanics
MECH 423	Introduction to Microsystems
MECH 455	Computer Integrated Manufacturing
MECH 465	Computer-Aided Design
MECH 478	Biomaterials
MECH 495	Ergonomics and Design
Queen's Mathematics and Engineering	
MTHE 830/430	Modern Control Theory
Queen's Mining Engineering	
MINE 852	Mine Mechanization and Automation
MINE 853	Mining Robotics

MINE 472	Mining Systems, Automation, and Robotics
Queen's Chemical Engineering	
CHEE 927	Advanced Global Optimization
Queen's School of Computing	
CISC 854/CMPE 454	Computer Graphics
CISC 875	Bioinformatics
CISC 888	Advanced Research in Human Computer Interaction
CMPE 425	Advanced User Interface Design
RMC Electrical and Computer Engineering	
EE541	Real-time Digital Computer Control Systems

Communication and Signal Processing

Course No.	Recommended Courses
Queen's Faculty of Engineering and Applied Science	
APSC 896	Engineering Leadership and Innovation (only one APSC primary course)
APSC 888	Engineering Innovation and Entrepreneurship (only one APSC primary course)
Queen's Electrical and Computer Engineering	
ELEC 823	Signal Processing
ELEC 827	Multimedia Signal Processing
ELEC 860	Communication Network Analysis
ELEC 861	Probability, Random Variables and Stochastic Processes
ELEC 865	Coding Theory
ELEC 866	Signal Detection and Estimation
ELEC 867	Data Communication
ELEC 869	MIMO Communication Systems
ELEC 421	Digital Signal Processing: Filters and System Design

ELEC 422	Digital Signal Processing: Random Models and Applications
ELEC 461	Digital Communications
ELEC 464	Wireless Communications
Queen's Mathematics and Engineering	
MTHE 806/406	Introduction to Coding Theory
MTHE 855/455	Stochastic Processes and Applications
MTHE 874/474	Information Theory
MTHE 877/477	Data Compression and Source Coding
MTHE 478	Topics in Communication Theory
Queen's School of Computing	
CISC 825	Paradigms of Wireless and Mobile Networks

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

Computer and Software Engineering

Course No.	Recommended Courses
Queen's Faculty of Engineering and Applied Science	
APSC 896	Engineering Leadership and Innovation (only one APSC primary course)
APSC 888	Engineering Innovation and Entrepreneurship (only one APSC primary course)

Queen's Electrical and Computer Engineering	
ELEC 825	Machine Learning and Deep Learning
ELEC 871	Shared-Memory Multiprocessor Systems
ELEC 872	Artificial Intelligence and Interactive Systems
ELEC 873	Cluster Computing
ELEC 875	Design Recovery and Automated Evolution
ELEC 876	Software Reengineering
ELEC 877	AI for Cybersecurity
ELEC 878	Extreme Scale Networking
ELEC 880	Machine Learning for Natural Language Processing
ELEC 425	Machine Learning and Deep Learning
ELEC 451	Digital Integrated Circuit Engineering
ELEC 470	Computer System Architecture
SOFT 423	Software Requirements
SOFT 437	Performance Analysis
Queen's School of Computing	
CISC 835/422	Formal Methods in Software Engineering
CISC 836	Beyond Code: An Intro to Model-Based Software Development
CISC 848	Software Reliability and Security
CISC 850	Cyber-Physical System Security
CISC 856	Reinforcement Learning
CISC 858/458	Programming Language Processors
CISC 866/447	Introduction to Cybersecurity
CISC 867	Deep Learning
CISC 874/CMPE 452	Neural and Cognitive Computing
CISC 878	Cyberspace and Policing
CISC 879	Computing beyond Turning
CISC 880	Mining Software Engineering Data

CMPE 432	Advanced Database Systems
CMPE 434	Distributed Systems
RMC Electrical and Computer Engineering	
EE 547	Digital Forensics
EE569	Malware Analysis
EE579	Computer Systems and Network Security
EE585	Real-time Software Design and Implementation
EE593	Advanced Network Traffic Analysis
EE595	Cyber Threat and Attack techniques

Course No.	Other Courses
Queen's Electrical and Computer Engineering	
ELEC 874	Deep Learning in Computer Vision
ELEC 879	Wearable and IoT Computing
ELEC 474	Machine Vision
Queen's School of Computing	
CISC 839/451	Topics in Data Analytics
CISC 846	Software Design Methodologies
CISC 873	Data Mining
CISC 888	Advanced Research in Human Computer Interaction
CMPE 425	Advanced User Interface Design
RMC Electrical and Computer Engineering	
EE519	Synthesis of Digital Systems
EE551	Real-time Operating Systems
EE553	VLSI Design

EE557	Test Methodologies for VLSI
EE559	Digital VLSI Architecture
EE573	Object-oriented Analysis and Design
EE 597	Operational Technology Cybersecurity

Microelectronics, Electromagnetics and Photonics

Course No.	Recommended Courses
Queen's Faculty of Engineering and Applied Science	
APSC 896	Engineering Leadership and Innovation (only one APSC primary course)
APSC 888	Engineering Innovation and Entrepreneurship (only one APSC primary course)
Queen's Electrical and Computer Engineering	
ELEC 852	Broadband Integrated Circuits
ELEC 854	Microwave Circuits and Systems
ELEC 855	Nanoelectronics and Nano-Devices
ELEC 856	Introduction to Nanophotonics
ELEC 857	Selected Topics in RF Engineering
ELEC 859	Unconventional Computing
ELEC 863	Topics in Optical Communications
ELEC 864	WDM Fiber Optic Communication Systems
ELEC 431	Power Electronics
ELEC 451	Digital Integrated Circuit Engineering
ELEC 454	Analog Electronics
ELEC 457	Integrated Circuits and System Applications
ELEC 483	Microwave and RF Circuits and Systems
ELEC 486	Fiber Optic Communications
Queen's Engineering Physics	
ENPH 460	Laser Optics

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

Power Electronics

Course No.	Recommended Courses
Queen's Faculty of Engineering and Applied Science	
APSC 896	Engineering Leadership and Innovation (only one APSC primary course)
APSC 888	Engineering Innovation and Entrepreneurship (only one APSC primary course)
Queen's Electrical and Computer Engineering	
ELEC 830	Emerging Technologies in Power Grid
ELEC 831	Power Electronics
ELEC 832	Modeling and Control of Switching Power Converters
ELEC 834	Micro-Grid Technology
ELEC 835	Nonlinear Control for Power Electronics
ELEC 837	High Power Electronics
ELEC 431	Power Electronics
ELEC 433	Energy and Power Systems
ELEC 436	Electric Machines and Control

RMC Electrical and Computer Engineering	
EE525	Power Quality in Electric Power Systems
EE539	Variable Speed Control of Electric Machines

Course No.	Other Courses
Queen's Electrical and Computer Engineering	
ELEC 443	Linear Control Systems
ELEC 454	Analog Electronics
RMC Electrical and Computer Engineering	
EE577	Neural Networks Applications to Power Systems