Electrical Engineering in Memorial University of Newfoundland

In accordance with Senate's Policy Regarding Inactive Courses, the course descriptions for courses which have not been offered in the previous three academic years and which are not scheduled to be offered in the current academic year have been removed from the following listing. For information about any of these inactive courses, please contact the Head of the Department. (or the Associate Dean (Undergraduate Studies) of the Faculty in the case of ENGI courses).

Electrical and Computer Engineering courses are identified by a four-digit numbering system, the first two digits signifying the following:

The first digit denotes the academic term during which the course is normally offered.

The second digit denotes the primary areas of study, namely:

| 0: Design |
| --- |
| 1: Mathematics |
| 2: Controls |
| 3: Circuits |
| 4: Software |
| 5: Digital Hardware |
| 6: Signals & Communications |
| 7: Electromagnetism |
| 8: Power & Machines |
| 9: Special Topics |

Electrical and Computer Engineering courses are designated by ECE.

Non-departmental Engineering courses are designated by ENGI.

\*\*Engineering One Term\*\* -

- Required Courses:

1. Chemistry 1050 or 1200

2. 3 credit hours in English at the 1000 level or any Critical Reading and Writing course

3. Mathematics 1000, 1001, 2050

4. Physics 1050, 1051

5. ENGI 1010, 1020, 1030, 1040

- Elective Courses:

- Students who are expecting to successfully complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be successfully completed during the Fall semester. All other students are expected to successfully complete ENGI 200W in the Winter semester of Engineering One.

- In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under Description of Program, Complementary Studies.

\*\*Fall - Academic Term 3\*\* -

- Required Courses:

1. ECE 3300, 3400, 3500

2. ENGI 3101, 3424

3. Physics 3000

\*\*Winter\*\* -

- Required Courses:

1. ENGI 001W or 002W

\*\*Spring - Academic Term 4\*\* -

- Required Courses:

1. ECE 4300, 4500, 4600, 4800

2. ENGI 4430

\*\*Fall\*\* -

- Required Courses:

1. ENGI 001W or 002W or 003W

\*\*Winter - Academic Term 5\*\* -

- Required Courses:

1. ECE 5000, 5100, 5200, 5300, 5700

\*\*Spring\*\* -

- Required Courses:

1. ENGI 002W or 003W or 004W

\*\*Fall - Academic Term 6\*\* -

- Required Courses:

1. ECE 6200, 6600, 6700, 6800

- Elective Courses:

- Students in the Biomedical Stream:

- Human Kinetics and Recreation 2311

- All other students:

- 3 credit hours from: ECE 6610, 6810, or other courses as specified by the Head of the Department of Electrical and Computer Engineering

\*\*Winter\*\* -

- Required Courses:

1. ENGI 003W or 004W or 005W (optional)

\*\*Spring - Academic Term 7\*\* -

- Required Courses:

1. ECE 7000, 7600

- Elective Courses:

- Students in the Biomedical Stream:

- Medicine 6250

- 3 credit hours from: ECE 7200, 7410, ME 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

- 3 credit hours from: ECE 7200, 7210, 7410, 7800, 7810, ME 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

- All other students:

- 9 credit hours from: ECE 7200, 7210, 7410, 7620, 7800, 7810, ME 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

\*\*Fall\*\* -

- Required Courses:

1. ENGI 004W or 005W (optional) or 006W (optional)

\*\*Winter - Academic Term 8\*\* -

- Required Courses:

1. ECE 8000, 8610

2. ENGI 8152

- Elective Courses:

- Students in the Biomedical Stream:

- Human Kinetics and Recreation 4703

- 6 credit hours from: ECE 8410, 8600, other courses as specified by the Head of the Department of Electrical and Computer Engineering

- All other students:

- One free elective which must be a 2000-level or higher course from any academic unit. Selection of a course must be approved by the Head of the Department of Electrical and Computer Engineering.

- 6 credit hours from: ECE 5500, 8210, 8600, 8620, 8700, 8800, 8950-8999 or other courses as specified by the Head of the Department of Electrical and Computer Engineering

For Physics Majors and Honours students, a Minor in Applied Science - Electrical Engineering will consist of:

1. ECE [3300](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 3821 or Physics [3550](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/))
2. ECE [4300](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 4854)
3. Physics [3000](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) and
4. 15 credit hours chosen from  
   1. ECE [3500](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 3861)
   2. ECE [4500](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 4862)
   3. ECE [4600](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 4823)
   4. ECE [4800](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 4841)
   5. ECE [5000](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 5800)
   6. ECE [6700](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/) (or the former ENGI 6813 or Physics [4500](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/3/))
   7. or other courses subject to approval by the Head of the Department of Physics and Physical Oceanography and the Head of the Department of Electrical and Computer Engineering.

Completion of the Minor in Applied Science - Electrical Engineering does not qualify persons to hold the designation "Professional Engineer" as defined by various provincial acts governing the Engineering Profession.

\*\*Course Title:\*\* ECE 3300 Circuit Analysis

\*\*Course Information:\*\* ECE 3300 Circuit Analysis begins with a review of basic circuit analysis, including dependent sources. It then considers wye-delta transformation, bridge circuits, transient analysis of first- and second-order circuits, sinusoidal steady-state analysis, phasor diagrams, sinusoidal steady-state power, complex power, and maximum power transfer.

\*\*CO:\*\* ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Mathematics 2260 as the co-requisite instead of ENGI 3424.

\*\*CR:\*\* Physics 3550

\*\*EQ:\*\* The former ENGI 3821

\*\*LH:\*\* Eight 3-hour sessions per semester OR tutorial 1 hour per week

\*\*PR:\*\* ENGI 1040, Mathematics 1001, Mathematics 2050. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 2055 as the prerequisite instead of ENGI 1040.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303677>

\*\*Course Title:\*\* ECE 3400 Foundations of Programming

\*\*Course Information:\*\* ECE 3400 Foundations of Programming introduces fundamental concepts in object-oriented programming and develops vocational programming skills in C++. Topics include abstraction, types, contracts, object-oriented design, C++ language features including key elements of the standard library, and practical programming and debugging skills.

\*\*CR:\*\* Computer Science 2510

\*\*EQ:\*\* The former ENGI 3891

\*\*LH:\*\* At least four 2-hour sessions per semester OR tutorial one hour per week

\*\*PR:\*\* ENGI 1020

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303658>

\*\*Course Title:\*\* ECE 3500 Digital Logic

\*\*Course Information:\*\* ECE 3500 Digital Logic includes number systems and Boolean algebra; minimization techniques for Boolean functions; basic combinational logic circuit analysis and design; flip-flops, state machine design and implementation; decoders, multiplexors, registers, counters; simple arithmetic and logic units (ALUs); digital system design of small systems.

\*\*CR:\*\* The former Computer Science 3723

\*\*EQ:\*\* The former ENGI 3861

\*\*LH:\*\* Six 3-hour sessions per semester OR twelve 1-hour tutorial sessions per semester

\*\*PR:\*\* ENGI 1040. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Physics 2055 as the prerequisite instead of ENGI 1040.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303681>

\*\*Course Title:\*\* ECE 4300 Electronic Circuits I

\*\*Course Information:\*\* ECE 4300 Electronic Circuits I provides an introduction to semiconductor electronic devices and circuits. Topics covered include the internal structure of electronic devices, working principles, DC and small-signal models and analysis of p-n junction diodes, bipolar junction transistors and field effect transistors; introduction to digital electronics; differential and multistage amplifier circuits; Miller’s theorem; frequency response of discrete amplifiers; practical applications including power supplies, amplifiers, and switching circuits. CAD tools are used to illustrate the analysis and design of electronic circuits.

\*\*EQ:\*\* The former ENGI 4854

\*\*LH:\*\* Eight 3-hour sessions per semester OR tutorial 1 hour per week

\*\*PR:\*\* ECE 3300 or the former ENGI 3821. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Physics 3550 as the prerequisite instead of ECE 3300.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303670>

\*\*Course Title:\*\* ECE 4500 Microprocessors

\*\*Course Information:\*\* ECE 4500 Microprocessors includes microprocessor architecture; assembly language programming: addressing modes, table look up; memory mapped devices; interfacing techniques: parallel, serial; timing control; analog input and output, and computer displays.

\*\*EQ:\*\* the former ENGI 4862

\*\*LH:\*\* eight 3-hour sessions per semester

\*\*OR:\*\* nine 1-hour tutorial sessions per semester

\*\*PR:\*\* ECE 3500 or the former ENGI 3861

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303642>

\*\*Course Title:\*\* ECE 4510 Microprocessors and Digital Logic

\*\*Course Information:\*\* ECE 4510 Microprocessors and Digital Logic includes number systems, logic gates, Boolean algebra, Karnaugh maps and combinational logic design, sequential logic and state machines, microprocessor architectures, micro-processor programming, GPIO, analog input and output, and serial communication.

\*\*CR:\*\* ECE 3500, ECE 4500

\*\*LH:\*\* five 3-hour sessions per semester

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 3300 or the former ENGI 3821, ENGI 1040, ENGI 3424

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303666>

\*\*Course Title:\*\* ECE 4600 Introduction to Systems and Signals

\*\*Course Information:\*\* ECE 4600 Introduction to Systems and Signals begins with an introduction to systems and signals, and includes mechanical and electrical analogues; principles of linear superposition and time-invariance; definitions, properties, and use of the delta function; applications of complex variables and functions; impulse and step responses; input-output relations of continuous-time systems in terms of convolution and transfer functions; frequency response plots; the Fourier transform and applications; Laplace transforms with application to filtering, communications, and controls.

\*\*EQ:\*\* the former ENGI 4823

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 3300 or the former ENGI 3821, ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Physics 3820 as a prerequisite instead of ENGI 3424 and may successfully complete Physics 3550 as a prerequisite instead of ECE 3300.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303654>

\*\*Course Title:\*\* ECE 4800 Electromechanical Devices

\*\*Course Information:\*\* ECE 4800 Electromechanical Devices includes an introduction to fundamental principles of energy conversion; review of single-phase AC circuits; three-phase AC circuits; magnetic fields and circuits; transformer models, performance and applications; basic concepts of rotating machines; performance and control of DC motors.

\*\*CR:\*\* the former ENGI 5842

\*\*EQ:\*\* the former ENGI 4841

\*\*LH:\*\* six 3-hour sessions per semester

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 3300 or the former ENGI 3821, ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Physics 3820 as a prerequisite instead of ENGI 3424 and may successfully complete Physics 3550 as a prerequisite instead of ECE 3300.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303690>

\*\*Course Title:\*\* ECE 5000 Electrical Engineering Design

\*\*Course Information:\*\* ECE 5000 Electrical Engineering Design involves students working, normally in pairs, on small design projects that require them to follow a hierarchical design process including general product definition, specifications and requirements, functional-block diagrams, specification of functional blocks for circuit-level synthesis and implementation, system integration, simulation or modelling, testing and verification. The small projects are designed to encourage and motivate students to learn and practise the process of design. The course culminates in a large design project.

\*\*CO:\*\* ECE 5200 or the former ENGI 5821, ECE 5300 or the former ENGI 5854. There is no co-requisite for students completing a minor in Applied Science - Electrical Engineering.

\*\*EQ:\*\* the former ENGI 5800

\*\*LC:\*\* 18 lecture hours per semester

\*\*LH:\*\* ten 3-hour sessions per semester

\*\*OR:\*\* meetings with project supervisor as required

\*\*PR:\*\* ECE 4300 or the former ENGI 4854, ECE 4500 or the former ENGI 4862, ECE 4800 or the former ENGI 4841

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303639>

\*\*Course Title:\*\* ECE 5100 Probability and Random Processes

\*\*Course Information:\*\* ECE 5100 Probability and Random Processes includes basic concepts in probability, random variables, multiple random variables, descriptive statistics, random processes, and selected applications for engineering.

\*\*EQ:\*\* the former ENGI 5420

\*\*OR:\*\* twelve 1-hour tutorial sessions per semester

\*\*PR:\*\* ECE 4600 or the former ENGI 4823

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303689>

\*\*Course Title:\*\* ECE 5200 Control Systems I

\*\*Course Information:\*\* ECE 5200 Control Systems I includes an introduction to control systems with negative feedback; mathematical modelling and transfer functions of electromechanical systems; block diagram and signal flow graphs; controller realization; transient response analysis; Routh's stability criterion; basic control actions and response of control systems; root locus analysis and design; frequency response analysis; Bode diagram; gain and phase margins; compensator design in frequency domain; Nyquist stability criterion; digital implementations of analog compensators; and an introduction to PID controller tuning methods.

\*\*EQ:\*\* the former ENGI 5821

\*\*LH:\*\* four 3-hour sessions per semester

\*\*OR:\*\* six 1-hour tutorials per semester

\*\*PR:\*\* ECE 4600 or the former ENGI 4823

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303650>

\*\*Course Title:\*\* ECE 5300 Electronic Circuits II

\*\*Course Information:\*\* ECE 5300 Electronic Circuits II provides an introduction to circuits using operational amplifiers. Topics covered include operational amplifier configurations, analysis, and design; transient and frequency response of amplifier circuits; feedback amplifier analysis and design, stability and compensation techniques; noise and distortion in electronic circuits; analysis and design of data converters; and an introduction to analog filter design. CAD tools are used to illustrate the analysis and design of electronic circuits.

\*\*EQ:\*\* the former ENGI 5854

\*\*LH:\*\* eight 3-hour sessions per semester

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 4300 or the former ENGI 4854, ECE 4600 or the former ENGI 4823. Students in the Mechatronics Engineering program may complete ECE 5610 as a corequisite instead of ECE 4600.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303688>

\*\*Course Title:\*\* ECE 5700 Basic Electromagnetics

\*\*Course Information:\*\* ECE 5700 Basic Electromagnetics includes a review of relevant vector calculus, including the divergence, gradient and curl operators in Cartesian, cylindrical and spherical coordinates, divergence theorem, Stokes' theorem, and Laplace's and Poisson's equations. Topics in electrostatics include Coulomb's law, potential and energy, conductors, dielectrics, capacitance and electric field boundary conditions. Topics for magnetism include the steady magnetic field, the Biot-Savart law and Ampère's law.

\*\*CR:\*\* Physics 3500

\*\*EQ:\*\* the former ENGI 5812

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 3300 or the former ENGI 3821, ENGI 4430

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303679>

\*\*Course Title:\*\* ECE 6200 Industrial Controls and Instrumentation

\*\*Course Information:\*\* ECE 6200 Industrial Controls and Instrumentation examines control and instrumentation system components; transducers and signal processing circuits, linear variable differential transformers, power oscillators; electromechanical actuators, solenoids, power drives; A/D and D/A conversion, standard PC interfaces; real-time operating systems; design of discrete-time feedback controllers on a PC platform; system integration, control system tweaking and troubleshooting; programming soft-PLC's using IEC61131.

\*\*CR:\*\* the former ENGI 7858

\*\*EQ:\*\* the former ENGI 6855

\*\*LH:\*\* at least eight 3-hour sessions per semester

\*\*PR:\*\* ECE 5200 or the former ENGI 5821

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303645>

\*\*Course Title:\*\* ECE 6600 Communication Principles

\*\*Course Information:\*\* ECE 6600 Communication Principles begins with a review of signal representation and analysis and includes distortionless signal transmission, analog modulation (AM, FM and PM), super-heterodyne receiver, sampling theorem, pulse amplitude modulation (PAM), pulse code modulation (PCM), delta modulation.

\*\*EQ:\*\* the former ENGI 6871

\*\*LH:\*\* four 3-hour sessions per term

\*\*PR:\*\* ECE 4600 or the former ENGI 4823, ECE 5100 or the former ENGI 5420

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303664>

\*\*Course Title:\*\* ECE 6610 Communication Networks

\*\*Course Information:\*\* ECE 6610 Communication Networks is an introduction to communication networks such as the telephone and computer networks. Topics include circuit and packet switching, network protocols and layered architecture, physical layer, data link layer, network layer, error control; local area networks, and internetworking.

\*\*EQ:\*\* the former ENGI 6876

\*\*PR:\*\* ECE 5100 or the former ENGI 5420

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303663>

\*\*Course Title:\*\* ECE 6700 Electromagnetic Fields

\*\*Course Information:\*\* ECE 6700 Electromagnetic Fields is a continuation of the topics started in ECE 5700, including a review of electrostatics and magnetostatics, Maxwell’s equations, Lorentz force, Poynting's theorem, plane waves, and applications including two-wire transmission lines.

\*\*CR:\*\* Physics 4500

\*\*EQ:\*\* the former ENGI 6813

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 5700 or the former ENGI 5812. Students completing a Minor in Applied Science - Electrical Engineering may successfully complete Physics 3500 as the prerequisite instead of ECE 5700.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303683>

\*\*Course Title:\*\* ECE 6800 Rotating Machines

\*\*Course Information:\*\* ECE 6800 Rotating Machines examines the fundamentals of rotating machines; design of machine windings; polyphase and single-phase induction motor theory and applications; synchronous machine theory; stability and control of synchronous generators; introduction to permanent magnet machines; introduction to AC motor drives.

\*\*EQ:\*\* the former ENGI 6843

\*\*LH:\*\* six 3-hour sessions per semester

\*\*OR:\*\* eight 1-hour tutorial sessions per semester

\*\*PR:\*\* ECE 4800 or the former ENGI 4841

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303652>

\*\*Course Title:\*\* ECE 6810 Power Electronics

\*\*Course Information:\*\* ECE 6810 Power Electronics is an overview of power semiconductor switches, an introduction to energy conversion and control techniques and examination of controlled rectifiers; phase-controlled converters; switch-mode dc/dc converters; variable frequency dc/ac inverters; ac/ac converters; gate and base drive circuits; design of driver and snubber circuits; thermal models and heat sink design.

\*\*CR:\*\* the former ENGI 7846

\*\*EQ:\*\* the former ENGI 6856

\*\*LH:\*\* eight 3-hour sessions per semester

\*\*OR:\*\* eight 1-hour tutorial sessions per semester

\*\*PR:\*\* ECE 5300 or the former ENGI 5854

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303647>

\*\*Course Title:\*\* ECE 7000 Electrical Engineering Design Project I

\*\*Course Information:\*\* ECE 7000 Electrical Engineering Design Project I provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving an electrical engineering design problem. Students work in small teams with the assistance of a faculty mentor to define an appropriate design problem and propose a method of solution to the problem. The project is continued in ECE 8000.

\*\*CR:\*\* the former ENGI 7800

\*\*EQ:\*\* the former ENGI 7803

\*\*LC:\*\* at least 10 lecture hours per semester

\*\*OR:\*\* weekly meetings with the project supervisor

\*\*PR:\*\* ENGI 4102, completion of Academic Term 6 of the Electrical Engineering program

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303655>

\*\*Course Title:\*\* ECE 7200 Control Systems II

\*\*Course Information:\*\* ECE 7200 Control Systems II examines state space models for multi-input/output systems; observability, controllability; state feedback without and with integral controller structure, state observers; quadratic optimal regulator and tracking control strategies; discrete-time state equations; and an introduction to optimal control.

\*\*CR:\*\* the former ENGI 6825

\*\*EQ:\*\* the former ENGI 7825

\*\*PR:\*\* ECE 5200 or the former ENGI 5821, or ME 6202 or the former ENGI 6951

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303675>

\*\*Course Title:\*\* ECE 7210 Process Control and Instrumentation

\*\*Course Information:\*\* ECE 7210 Process Control and Instrumentation begins with an introduction to feedback control systems, and instrumentation. Topics include modeling thermal, gas, liquid and chemical processes; sensors and transmitters, controller design and simulation in Matlab /Simulink, industrial feedback controllers; design of feedback control loops, tuning of feedback controllers; cascade, ratio, digital controller design; feedforward control; multivariable process control; fuzzy logic control and tuning, instrumentation electronics design, and process system identification using Matlab /Simulink.

\*\*EQ:\*\* the former ENGI 8680

\*\*LH:\*\* twelve 3-hour sessions per semester

\*\*PR:\*\* ECE 5200 or the former ENGI 5821

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303668>

\*\*Course Title:\*\* ECE 7410 Image Processing and Applications

\*\*Course Information:\*\* ECE 7410 Image Processing and Applications presents fundamental theoretical and practical concepts of image processing and analysis. These concepts include image enhancement and filtering, frequency domain analysis, morphological image operations, image segmentation, and feature extraction. The course enables the use of these concepts to automatically process and analyze images and videos from various real-world applications such as biomedical imaging, visual surveillance, and robotics.

\*\*CR:\*\* the former Computer Science 4756

\*\*EQ:\*\* the former ENGI 7854

\*\*LH:\*\* at least four 3-hour sessions per semester

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303651>

\*\*Course Title:\*\* ECE 7600 Introduction to Digital Signal Processing

\*\*Course Information:\*\* ECE 7600 Introduction to Digital Signal Processing examines sampling theory; elementary discrete-time signals; discrete-time linear and time-invariant systems; linear constant-coefficient difference equations; the convolution sum; the discrete-time Fourier series; the discrete-time Fourier transform; the z-transform; the frequency response of discrete-time systems; the discrete Fourier transform; the efficient fast Fourier transform algorithm; an introduction to digital filter design techniques; and digital signal processing applications.

\*\*EQ:\*\* the former ENGI 7824

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 6600 or the former ENGI 6871

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303687>

\*\*Course Title:\*\* ECE 7620 Digital Communications

\*\*Course Information:\*\* ECE 7620 Digital Communications is a review of baseband transmission and basic digital modulation schemes, detection (optimum receiver, matched filter, correlator), error performance, intersymbol interference (ISI), equalization, the concept of information and entropy, source coding including Huffman coding and linear predictive coding, channel coding including block and convolutional error correcting codes, modulation and coding trade-offs, bandwidth and power efficiency.

\*\*EQ:\*\* the former ENGI 8879

\*\*PR:\*\* ECE 6600 or the former ENGI 6871

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303640>

\*\*Course Title:\*\* ECE 7800 Power System Analysis

\*\*Course Information:\*\* ECE 7800 Power System Analysis begins with an introduction to electric power systems. Topics include per unit quantities; transmission line parameters; modelling of power system components; single line diagrams; network equations formulation; bus impedance and admittance matrices; load flow analysis and control; design of reactive power compensation for power system performance enhancement; tap changing, auto and control transformers for power system application; economic dispatch and optimal power flow studies.

\*\*EQ:\*\* the former ENGI 7844

\*\*LH:\*\* six 3-hour sessions per semester

\*\*PR:\*\* ECE 6800 or the former ENGI 6843

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303676>

\*\*Course Title:\*\* ECE 7810 Renewable Energy Systems

\*\*Course Information:\*\* ECE 7810 Renewable Energy Systems examines the assessment of wind energy potential, wind turbine aerodynamics, types, modelling and control strategies; hybrid energy systems; energy storage; solar energy systems; photovoltaic, PV system engineering, stand-alone and grid connected systems, sizing and maximum power tracking; solar water pumping; micro-hydro systems and control; tidal power, wave energy converters, ocean thermal systems. Applications of hybrid energy system sizing software are also included in the course.

\*\*EQ:\*\* the former ENGI 7856

\*\*LH:\*\* eight 3-hour sessions per semester

\*\*PR:\*\* ECE 6800 or the former ENGI 6843

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303659>

\*\*Course Title:\*\* ECE 8000 Electrical Engineering Design Project II

\*\*Course Information:\*\* ECE 8000 Electrical Engineering Design Project II continues ECE 7000 and provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving an electrical engineering design problem. Students work in small teams with the assistance of a faculty mentor to complete detailed design, implementation, and testing of an electrical engineering system to solve the problem as defined in ECE 7000.

\*\*CR:\*\* the former ENGI 8800

\*\*EQ:\*\* the former ENGI 8853

\*\*LC:\*\* 0

\*\*OR:\*\* weekly meetings with the project supervisor

\*\*PR:\*\* ECE 7000 or the former ENGI 7803

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303648>

\*\*Course Title:\*\* ECE 8210 Supervisory Control and Data Acquisition

\*\*Course Information:\*\* ECE 8210 Supervisory Control and Data Acquisition examines data acquisition and intelligent field devices; distributed systems and fieldbus technology; programmable logic controllers and programming standards; operator control interface; supervisory control and data acquisition; and enterprise organization.

\*\*EQ:\*\* the former ENGI 7680

\*\*LH:\*\* at least four 3-hour sessions per semester

\*\*PR:\*\* ECE 5200 or the former ENGI 5821, or ME 6202 or the former ENGI 6951, or PROC 7021 or the former ENGI 7621

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303674>

\*\*Course Title:\*\* ECE 8410 Computer Vision

\*\*Course Information:\*\* ECE 8410 Computer Vision studies how to develop methods that enable a machine to "understand" or analyze images. The course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.

\*\*EQ:\*\* Computer Science 4301, the former ENGI 8814

\*\*LH:\*\* six 3-hour sessions per semester

\*\*PR:\*\* Computer Science 3301 or ECE 7410 or the former ENGI 7854 or permission of the instructor

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303665>

\*\*Course Title:\*\* ECE 8600 Design of Digital Signal Processing Systems

\*\*Course Information:\*\* ECE 8600 Design of Digital Signal Processing Systems is a review of introductory digital signal processing (DSP) principles, including sampling theory and discrete-time systems and signals. Topics include transform analysis of DSP systems; issues in the implementation of DSP systems; design of IIR and FIR digital filters; computable transforms and their use in the frequency analysis of digital signals; and design of DSP systems for current and emerging applications of digital signal processing.

\*\*EQ:\*\* the former ENGI 8821

\*\*PR:\*\* ECE 7600 or the former ENGI 7824

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303678>

\*\*Course Title:\*\* ECE 8610 Filter Synthesis

\*\*Course Information:\*\* ECE 8610 Filter Synthesis introduces analog filters. Topics include transfer functions and frequency response of filters; design of first-order passive and active filters; design and analysis of filter circuits such as biquad circuit, Sallen-Key circuit, multiple feedback circuit, and state variable filter; RC-CR transformation; cascade design principle; design of Butterworth, Chebyshev, and elliptic filters, Bessel-Thomson filters, switched capacitor filters; and the use of Matlab for the design of analog filters.

\*\*EQ:\*\* the former ENGI 8826

\*\*LH:\*\* at least four 3-hour sessions per semester

\*\*PR:\*\* ECE 5300 or the former ENGI 5854

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303662>

\*\*Course Title:\*\* ECE 8620 Wireless and Mobile Communications

\*\*Course Information:\*\* ECE 8620 Wireless and Mobile Communications cover the fundamentals and main concepts of wireless and mobile communication systems focusing on the system-level design and performance. Main topics to be covered include Introduction to Wireless Communication Systems, Wireless Channel Models, Frequency Reuse Concept, Wireless Multiple Access Techniques (TDMA, FDMA, CDMA), Orthogonal Frequency Division Multiplexing (OFDM), Wireless Systems (GSM, 3G, LTE, etc.).

\*\*EQ:\*\* the former ENGI 8804, the former ENGI 8877

\*\*PR:\*\* ECE 6600 or the former ENGI 6871, ECE 6610 or the former ENGI 6876

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303673>

\*\*Course Title:\*\* ECE 8700 Antennas

\*\*Course Information:\*\* ECE 8700 Antennas examine the fundamentals of electromagnetic radiation; potentials; small antennas and antenna parameters; thin linear wire antennas and antenna arrays; antenna impedance and ground effects; Friis transmission formula; and aperture antennas.

\*\*EQ:\*\* the former ENGI 7811

\*\*LH:\*\* three 3-hour simulation and demonstration sessions per semester

\*\*OR:\*\* tutorial 1 hour per week

\*\*PR:\*\* ECE 6700 or the former ENGI 6813

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303638>

\*\*Course Title:\*\* ECE 8800 Power System Operation

\*\*Course Information:\*\* ECE 8800 Power System Operation examines symmetrical components; power system fault analysis; power system stability; and power system protection.

\*\*EQ:\*\* the former ENGI 8845

\*\*LH:\*\* four 3-hour sessions per semester

\*\*PR:\*\* ECE 7800 or the former ENGI 7844

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303660>

\*\*Course Title:\*\* ECE 8950-8999 Special Topics in Electrical Engineering

\*\*Course Information:\*\* ECE 8950-8999 Special Topics in Electrical Engineering will have topics to be studied announced by the Department.

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303669>