Computer 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 4110, 4300, 4400, 4500, 4600

\*\*Fall\*\* -

- Required Courses:

1. ENGI 001W or 002W or 003W

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

- Required Courses:

1. ECE 5010, 5100, 5200, 5400, 5500

\*\*Spring\*\* -

- Required Courses:

1. ENGI 002W or 003W or 004W

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

- Required Courses:

1. ECE 6400, 6500, 6600, 6610

- Elective Courses:

- Students in the Biomedical Stream:

- Human Kinetics and Recreation 2311

- All other students:

- 3 credit hours from: ECE 6200 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 7010, 7400, 7600

- Elective Courses:

- Students in the Biomedical Stream:

- Medicine 6250

- 3 credit hours from: ECE 7200, 7410, 7420, ME 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

- All other students:

- 6 credit hours from: ECE 7200, 7410, 7420, 7500, 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 8010, 8400

2. ENGI 8152

- Elective Courses:

- Students in the Biomedical Stream:

- Human Kinetics and Recreation 4703

- 6 credit hours from: ECE 8410, 8420, 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 8210, 8410, 8420, 8600, 8620, 8900-8949, or other courses as specified by the Head of the Department of Electrical and Computer Engineering

A student in an Engineering degree program at the University, except Computer Engineering, may apply to the Department of Electrical and Computer Engineering for admission to the Minor in Computer Engineering (Software). The Minor is focused on Computer Engineering aspects such as programming, software design, and related applications. Before applying for the Minor, a student must complete the necessary prerequisites to register for ECE [3400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/) and ECE [4110](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/) (or Mathematics [2320](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/)).

The Minor in Computer Engineering (Software) will consist of 24 credit hours, as follows:

1. ECE [3400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [4110](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/) (or Mathematics [2320](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/)), ECE [4400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [5010](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [5400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [6400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), and
2. 6 credit hours chosen from: ECE [7400](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [7410](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [7420](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [8410](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), ECE [8420](https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/6/2/), or other courses subject to approval by the Head of the Department of Electrical and Computer Engineering.

\*\*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 4110 Discrete Mathematics for Computer Engineering

\*\*Course Information:\*\* ECE 4110 Discrete Mathematics for Computer Engineering is an introduction to discrete mathematics, including a selection of topics such as propositional logic, introductory predicate logic, mathematical reasoning, induction, sets, relations, functions, integers, graphs, trees, and models of computation.

\*\*CR:\*\* Computer Science 1002, or the former Computer Science 2740, the former ENGI 3422, Mathematics 2320

\*\*EQ:\*\* The former ENGI 4424

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

\*\*PR:\*\* Mathematics 1001 or Mathematics 2050

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303656>

\*\*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 4400 Data Structures

\*\*Course Information:\*\* ECE 4400 Data Structures examines fundamental data structures; recursive structures and generic programming techniques; modularity and reusability; time complexity and efficient data structures; procedural abstraction; data abstraction and precise documentation of data structures.

\*\*CO:\*\* ECE 4110 or Mathematics 2320 or the former ENGI 4424

\*\*EQ:\*\* The former ENGI 4892

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

\*\*PR:\*\* ECE 3400 or the former ENGI 3891

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303691>

\*\*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 5010 Software Design

\*\*Course Information:\*\* ECE 5010 Software Design examines the development process: requirement analysis, design, iterative development, design documentation; an introduction to the Unified Modelling Language: use cases, class diagrams and sequence diagrams; an introduction to software design patterns: creational patterns, structural patterns and behavioural patterns; object oriented, modular decomposition. The course includes a major design project.

\*\*EQ:\*\* the former ENGI 5895

\*\*LC:\*\* 25 lecture hours per semester

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

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

\*\*PR:\*\* ECE 4400 or the former ENGI 4892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303682>

\*\*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 5400 Algorithms: Correctness and Complexity

\*\*Course Information:\*\* ECE 5400 Algorithms: Correctness and Complexity presents fundamental theories and practices for the design of correct and efficient computing systems, including specification of computing systems and their components, correctness with respect to specifications; methods of verification; algorithmic problem-solving strategies (such as divide and conquer, dynamic programming); tractability and intractability of computational problems.

\*\*EQ:\*\* the former ENGI 5892, the former ENGI 6892

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

\*\*PR:\*\* ECE 4110 or the former ENGI 4424, ECE 4400 or the former ENGI 4892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303684>

\*\*Course Title:\*\* ECE 5500 Digital Systems

\*\*Course Information:\*\* ECE 5500 Digital Systems includes concepts, language, tools, and issues pertaining to specification, modeling, analysis, simulation, testing and synthesis of digital systems, including PLD, FPGA, and ASIC devices. Industry-standard CAD tools will be used in this course to facilitate system design and testing.

\*\*EQ:\*\* the former ENGI 5865

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

\*\*PR:\*\* ECE 3400 or the former ENGI 3891, ECE 4500 or ECE 4510 or the former ENGI 4862

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303644>

\*\*Course Title:\*\* ECE 5610 Sensors and Instrumentation

\*\*Course Information:\*\* ECE 5610 Sensors and Instrumentation involves modeling, analysis, and design of mechanical measurement systems. Topics covered include Laplace transforms, lumped parameter modeling of electro-mechanical systems, static and dynamic characteristics of sensors, sampling and anti-aliasing, classification and selection of sensors for motion and process, op-amps and signal conditioning and processing, and data acquisition system design.

\*\*CR:\*\* ECE 4600, ME 7203, the former ENGI 5952, the former ENGI 7930

\*\*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.303672>

\*\*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 6400 Software Development Practice

\*\*Course Information:\*\* ECE 6400 Software Development Practice introduces the student to software development processes, practices, and tools. It includes software project management using agile processes; development tools and practices; architectural level design; deployment and operations; and verification via static analysis, formal verification, and testing.

\*\*EQ:\*\* the former ENGI 6893

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

\*\*PR:\*\* ECE 5010 or the former ENGI 5895, ECE 5400 or the former ENGI 5892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303637>

\*\*Course Title:\*\* ECE 6500 Computer Architecture

\*\*Course Information:\*\* ECE 6500 Computer Architecture begins with a review of microprocessors and computer organization. Topics include fundamentals of computer design: performance metrics and cost; instruction set architecture; memory hierarchy design: cache, main memory and virtual memory; pipelining: hazards, parallelism; special purpose processors; multiprocessors and thread-level parallelism.

\*\*EQ:\*\* the former ENGI 6861

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

\*\*PR:\*\* ECE 5500 or the former ENGI 5865

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303685>

\*\*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 7010 Computer Engineering Design Project I

\*\*Course Information:\*\* ECE 7010 Computer 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 a computer 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 8010.

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

\*\*EQ:\*\* the former ENGI 7804

\*\*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 Computer Engineering program

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303667>

\*\*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 7400 Concurrent Programming

\*\*Course Information:\*\* ECE 7400 Concurrent Programming surveys parallel and distributed architectures and examines patterns of concurrent program design; correctness of concurrent programs: safety and liveness properties, proof of properties; synchronization using locks, semaphores, and monitors; communication using message passing and remote procedures; parallelization for high-performance computation and advanced topics such as scientific applications, distributed systems, model checking, and transaction processing.

\*\*CR:\*\* the former ENGI 8893

\*\*EQ:\*\* the former ENGI 7894

\*\*PR:\*\* ECE 5400 or the former ENGI 5892 or the former ENGI 6892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303643>

\*\*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 7420 Computer Security

\*\*Course Information:\*\* ECE 7420 Computer Security introduces students to key computer security concepts for applications, hosts, networks and the Web. Students will learn to employ the primitives provided by programming languages, cryptography, operating systems and network protocols for protecting engineered systems and their users.

\*\*EQ:\*\* the former ENGI 7864

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

\*\*PR:\*\* ECE 5010 or the former ENGI 5895, ECE 5400 or the former ENGI 5892 or the former ENGI 6892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303657>

\*\*Course Title:\*\* ECE 7500 Introduction to VLSI Design

\*\*Course Information:\*\* ECE 7500 Introduction to VLSI Design is an introduction to ASICs and ASIC design methodology and includes basic concepts of digital logic design tools and ASIC technology libraries; partitioning for logic synthesis and VHDL coding; constraining designs, synthesizing, simulation and optimization; design for testability; layout and post-layout optimization and SDF generation; and static timing analysis.

\*\*CR:\*\* the former Computer Science 4725

\*\*EQ:\*\* the former ENGI 8863

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

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

\*\*PR:\*\* ECE 5500 or the former ENGI 5865

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303649>

\*\*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 7610 Communications Electronics

\*\*Course Information:\*\* - \*Inactive course.\*

\*\*Course Title:\*\* ECE 8010 Computer Engineering Design Project II

\*\*Course Information:\*\* ECE 8010 Computer Engineering Design Project II continues ECE 7010 and provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving a computer engineering design problem. Students work in small teams with the assistance of a faculty mentor to complete detailed design, implementation, and testing of a computer engineering system to solve the problem as defined in ECE 7010.

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

\*\*EQ:\*\* the former ENGI 8854

\*\*LC:\*\* 0

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

\*\*PR:\*\* ECE 7010 or the former ENGI 7804

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303686>

\*\*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 8400 Real-time Operating Systems

\*\*Course Information:\*\* ECE 8400 Real-time Operating Systems examines real-time process scheduling; memory and device management; I/O communications; real-time systems; operating system and hardware concurrency issues; kernel architectures; device drivers; and a survey of available real-time operating systems and embedded platforms.

\*\*CR:\*\* Computer Science 4721, the former ENGI 7863

\*\*EQ:\*\* the former ENGI 8894

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

\*\*PR:\*\* ECE 6500 or the former ENGI 6861, ECE 7400 or the former ENGI 7894

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303661>

\*\*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 8420 Cryptography

\*\*Course Information:\*\* ECE 8420 Cryptography examines the techniques used to provide security in communication networks and computer systems. The course focuses on topics in cryptography required to provide privacy, authentication, and integrity, including symmetric key ciphers, public key ciphers, message authentication, and digital signature schemes.

\*\*EQ:\*\* the former ENGI 8868

\*\*PR:\*\* ECE 5400 or the former ENGI 5892 or the former ENGI 6892

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303680>

\*\*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 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 8630 Introduction to the Internet of Things

\*\*Course Information:\*\* ECE 8630 Introduction to the Internet of Things introduces the architectures, protocols, standards, and applications of the Internet of Things (IoT). Topics include: IoT concepts, architectures, and standards, communication and networking, computing and IoT data management, security and privacy, IoT applications, digital twins, and next-generation cellular networks and their impact on IoTs. Through this course, students will be able to understand the key challenges of the IoT systems and develop proper conceptual and technological solutions to real-world problems.

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

\*\*PR:\*\* ECE 4510, ECE 5610

\*\*Course Link:\*\* <https://www.mun.ca/university-calendar/st-johns-campus/faculty-of-engineering-and-applied-science/11/3/#d.en.303641>

\*\*Course Title:\*\* ECE 8900-8949 Special Topics in Computer Engineering

\*\*Course Information:\*\* ECE 8900-8949 Special Topics in Computer 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.303671>