Information Slides to prepare for the 2024-2025 Academic Year

ECE 3rd Year Course Registration

May 2024

Faculty of Engineering and Applied Science
Department of Electrical and Computer Engineering
Queen's University

ECE Advisors

- ECE UG Assistants (WLH-416)
  - Irina Pavich (irina.pavich@queensu.ca), Last Names **A – L**;
  - Jazmine Battle (j.battle@queensu.ca), Last Names **M – Z;**
- EE Undergraduate Chair:
  - Prof. Il-Min Kim (eeugradchair@queensu.ca)
- CE Undergraduate Chair:
  - Prof. Jianbing Ni (ceugradchair@queensu.ca)
- UG Program Advisors https://smithengineering.queensu.ca/ece/undergraduate/contacts.html
  - Exchange Program/Transfer: Prof. Brian Frank

Academic Calendar and Registration Dates

- End of June - 2024-2025 Academic Calendar is published
- End of June – 2024-2025 Timetable is published
- July – course Pre-Load (students will be preloaded into 3rd year core courses, *if* the prerequisites are met)
- July 22nd – enrollment begins (check your enrollment appointment day/time on Solus) - time to add optional core course/s and electives.

Useful Links:

Registration Guide

Graduation Guide

SOLUS Help

Student Wellness Services

Online Resources

- OUR
  - Academic Calendar, Academic Plans and course information; FEAS Policies and Regulations;
  - Tuition, Graduation, Sessional Dates etc.
  - SOLUS Help;
- Smith Engineering
  - FORMS: Substitution request, Incomplete Grade Request, Late Course Add/Drop requests, Waivers etc.;
  - Smith Engineering Student Services resources: academic considerations, accommodations, embedded counsellors, dual degree, supplemental exam, awards etc.
- ECE
  - ECE Degree Planning Spreadsheets, Pre-requisite Charts, Course Information
  - ECE Faculty
  - Booking an appointment with the advisor

Curriculum Updates

New elective courses:

1. ELEC 446 Mobile Robotics (CE, EE) - Fall
2. ELEC 471 Safety Critical Software Engineering (CE) – Fall
3. ELEC 435 Energy Storage Technology (EE) - Winter

Computer Engineering Graduation Requirements

- Satisfy the minimum Accreditation Units (AU) set by ECE in each CEAB category
- Have at least **5 four-hundred level** elective courses
- Have at least **3 courses** from Electives Lists A and B that satisfy the Department criteria for **qualified accreditation units** in the categories of engineering science and engineering design
- Have at least **3 courses** from Elective **List B**
- Counting required core courses and elective courses in all four years, result in a total of no fewer than **157.5** (**160.5** for **ECEi**) credits for the complete program.

Computer Engineering, 3rd Year Curriculum

Fall	Winter
ELEC 326 Probability	ELEC 373 Computer Networks
ELEC 371 Microprocessor Interfacing…	ELEC 374 Digital Systems Engineering
ELEC 377 Operating Systems	ELEC 390 ECE 3rd Year Design
ELEC 379 Algorithms with Engineering Application	APSC 221 Eng. Economics (F/W/S) non-ECEI only
Optional Core: ELEC 376 Soft. Dev. Methodology (F) -OR-	Optional Core: CMPE 223 Software Specifications (W)
One Technical Elective (any term, F or W)	
One Complementary Studies Elective (any term, F or W)	
Innovation Stream	
COMM 301 Launching New Ventures (ECEi only)	COMM 302 Funding New Ventures (ECEi only)

CE: Technical Electives offered by the ECE Department

Fall 2024			
ELEC 324	Discrete-Time Signals & Systems	F	P.Eng
ELEC 345	Sensor Fabrication Technologies	F	
ELEC 353	Electronics II	F	P.Eng
ELEC 376	Software Dev. Methodology *(Opt. Core)*	F	
ELEC 409	Bioinformatic Analytics	F	P.Eng
ELEC 431	Power Electronics	F	P.Eng
ELEC 443	Linear Control Systems	F	P.Eng
ELEC 446	Mobile Robotics New!	F	P.Eng
ELEC 471	Safety Critical Software Engineering New!	F	
ELEC 473	Cryptography and Network Security	F	EIT
ELEC 475	Computer Vision with Deep Learning	F	P.Eng
SOFT 437	Performance Analysis	F	P.Eng

Winter 2025			
ELEC 224	Cont.-Time Signals & Systems	W	P.Eng
ELEC 372	Numerical Methods and Optimization	W	
ELEC 408	Biomedical Signal & Image Processing	W	
ELEC 421	Digital Signal Processing: Filters and Syst.	W	P.Eng
ELEC 425*	Machine Learning & Deep Learning	W	EIT
ELEC 464	Wireless Communications	W	P.Eng
ELEC 470	Computer Syst. Architecture	W	P.Eng
ELEC 472	Artificial Intelligence	W	P.Eng
ELEC 477	Distributed Systems	W	Eng. License
MREN 348	Introduction to Robotics	W	P.Eng
	Courses that require CE core prerequisites only		

CE: Technical Electives offered by the School of Computing

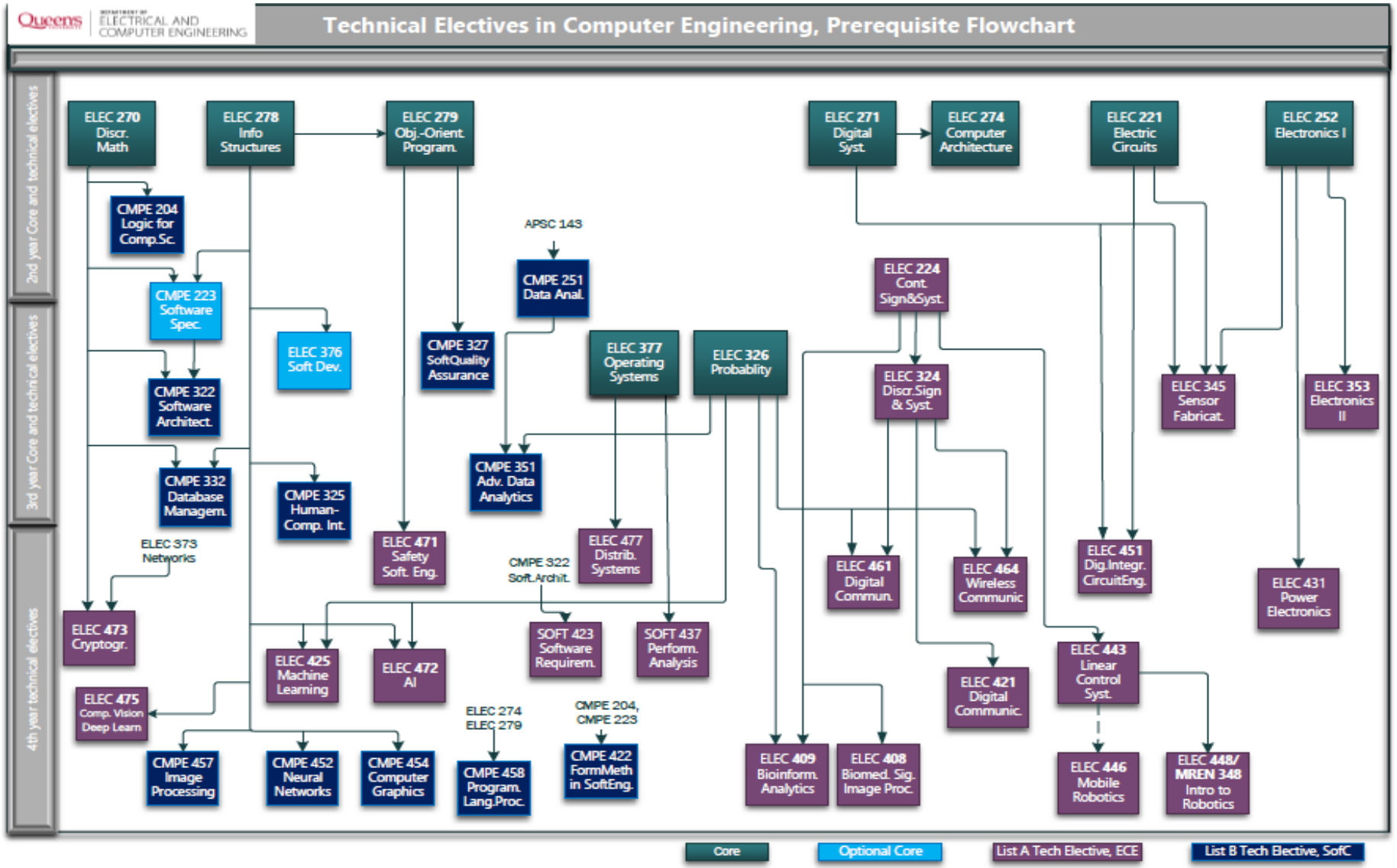
Fall 2024		
CMPE 204	Logic for Computing Science	F
CMPE 251	Data Analytics	F
CMPE 327	Software Quality Assurance	F
CMPE 330	Computer-Integrated Surgery	F
CMPE 422	Formal Methods in Soft. Eng.	F
CMPE 452*	Neural and Genetic Computing	F
CMPE 457	Image Processing & Comp. Vision	F

Winter 2025		
CMPE 204	Logic for Computing Science	W
CMPE 223	Software Specifications (*Opt. Core*)	W
CMPE 322	Software Architecture	W
CMPE 325	Human-Computer Interaction	W
CMPE 332	Database Management Systems	W
CMPE 351	Advanced Data Analytics	W
CMPE 454	Comp. Graphics	W
CMPE 458	Program. Language Processors	W
SOFT 423	S/W Requirements	W

**ELEC 425 and CMPE 452 are exclusions; only one course from the pair counts toward the degree requirements.*

ELEC 376 and CMPE 223 are Optional Core; if both are completed – CMPE 223 counts toward a List B elective.

Technical Electives in Computer Engineering – prerequisite flowchart



Electrical Engineering Graduation Requirements

- Satisfy the minimum Accreditation Units (AU) set by ECE in each CEAB category
- Have at least **5 courses** from Electives **List A**
- Have at least **5 four-hundred** level **elective** courses
- Counting required core courses and elective courses in all four years, result in a total of no fewer than **157.5** (**160.5** for **ECEi**) credits for the complete program

Electrical Engineering, 3rd Year Curriculum

Fall	Winter
ELEC 324 Discrete-Time Signals and Systems	ELEC 372 Numerical Methods and Optimization
ELEC 326 Probability	ENPH 336 Solid State Devices
ELEC 353 Electronics II	ELEC 390 ECE 3rd Year Design
ELEC 371 Microprocessor Interfacing…	APSC 221 Eng. Economics (F/W/S) non-ECEI only
ELEC 381 Applications of Electromagnetics	
One Technical Elective (any term, F or W)	
One Complementary Studies Elective (any term, F or W)	
Innovation Stream	
COMM 301 Launching New Ventures (ECEi only)	COMM 302 Funding New Ventures (ECEi only)

EE: Technical Electives

List A for ECE-controlled courses

ELEC 270 Discrete Mathematics
ELEC 279 Intro to Object-Oriented Programming
ELEC 333 Electric Machines
ELEC 345 Sensor Fabrication Technologies
ELEC 373 Computer Networks
ELEC 374 Digital Systems Engineering
ELEC 408 Biomedical Signal and Image Processing
ELEC 409 Bioinformatic Analytics
ELEC 421 Digital Signal Processing: Filters and Systems Design
ELEC 422 Digital Signal Processing: Random Models and App.
ELEC 425 Machine Learning and Deep Learning
ELEC 431 Power Electronics
ELEC 433 Energy and Power Systems
ELEC 435 Energy Storage Technology ***New!***
ELEC 436 Electric Machines And Control
ELEC 443 Linear Control Systems
ELEC 446 Mobile Robotics ***New!***
ELEC 448 Introduction to Robotics as **MREN 348**
ELEC 457 Integrated Circuits and System Application
ELEC 464 Wireless Communications
ELEC 470 Computer System Architecture
ELEC 472 Artificial Intelligence
ELEC 473 Cryptography and Network Security
ELEC 475 Computer Vision with Deep Learning
ELEC 486 Fiber Optic Communication
ELEC 497 Research Project

EE: Technical Electives

List B - external courses

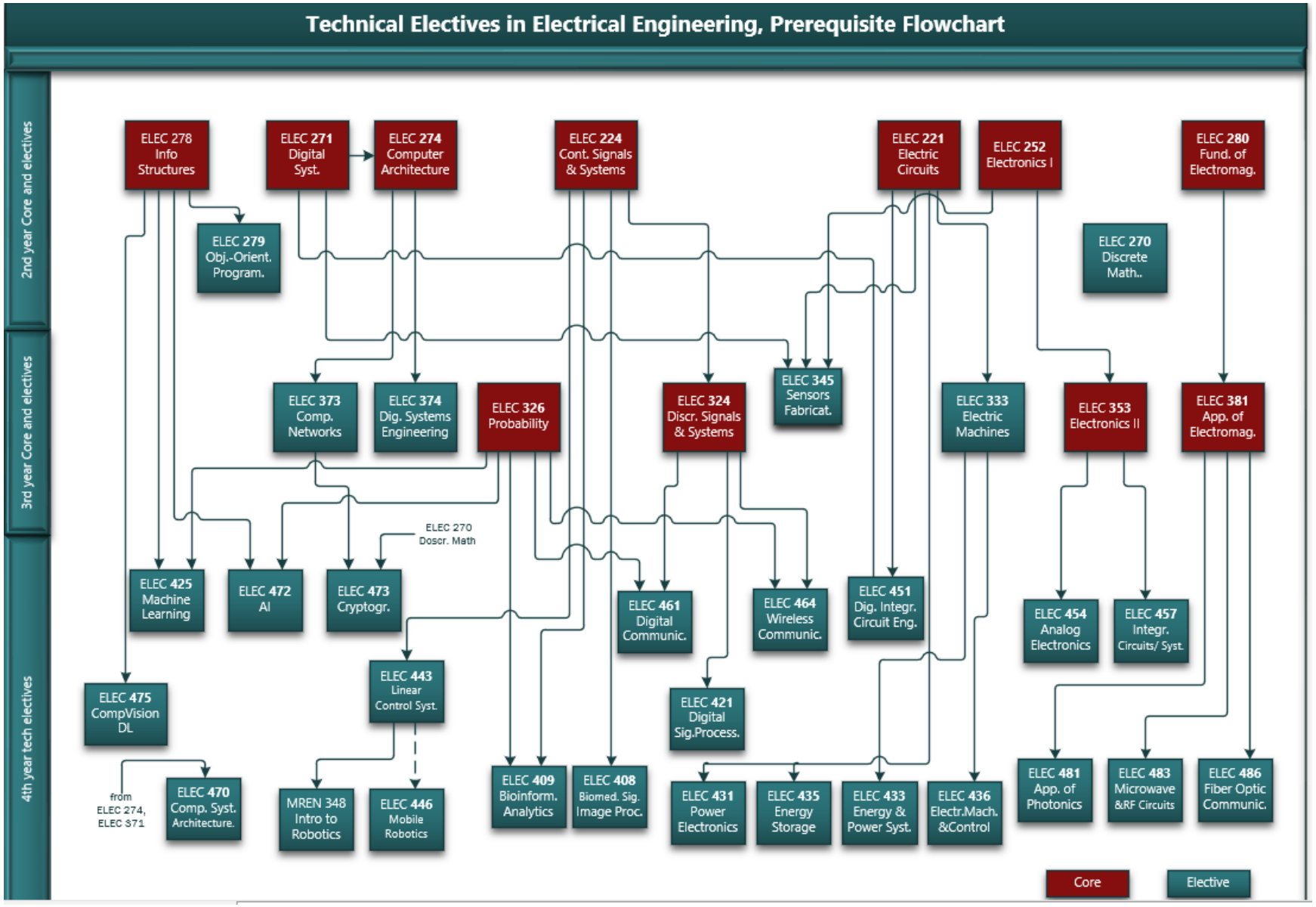
APSC 303 Professional Internship
APSC 400 Technology, Engineering & Management (TEAM) – Not offered
APSC 401 Interdisciplinary Projects
CHEE 340 Biomedical Engineering
ENPH 460 Laser Optics
CMPE 3XX Any Third Year Computing Science Course | 3
CMPE 4XX Any Fourth Year Computing Science Course | 3
MTHE 337 Intro. To Operations Research
MTHE 367 Engineering Data Analysis
MTHE 430 Control Theory
MTHE 455 Stochastic Processes & Applications
MTHE 472 Optimization and Control of Stochastic Systems
MTHE 474 Information Theory
MTHE 477 Data Compression and Source Coding: Theory and Algorithms
MTHE 478 Topics in Communication Theory
MECH 228 Kinematics and Dynamics
MECH 328 Dynamics and Vibration
MECH 393 Biomechanical Product Development
MECH 423 Introduction to Microsystems
MECH 455 Computer Integrated Manufacture
MECH 465 Computer Aided Design
MECH 478 Biomaterials
MECH 494 Kinematics of Human Motion

Electrical Engineering: ECE Course Offerings in 2024-25

Fall 2024		
ELEC 345	Sensor Fabrication Technologies	F
ELEC 409	Bioinformatic Analytics	F
ELEC 431	Power Electronics	F
ELEC 433	Energy and Power Systems	F
ELEC 443	Linear Control Systems	F
ELEC 446	Mobile Robotics New!	F
ELEC 457	Analog Integrated Circuits & Systems	F
ELEC 473	Cryptography and Network Security	F
ELEC 475	Computer Vision with Deep Learning	F

Winter 2025		
ELEC 279	Object-oriented Programming	W
ELEC 333	Electric Machines	W
ELEC 373	Computer Networks	W
ELEC 374	Digital Systems Engineering	W
ELEC 408	Biomedical Signal & Image Processing	W
ELEC 421	Digital Signal Processing: Filters and Syst.	W
ELEC 425	Machine Learning & Deep Learning	W
ELEC 435	Energy Storage Technology New!	W
ELEC 436	Electric Machines and Control	W
ELEC 464	Wireless Communications	W
ELEC 470	Computer System Architecture	W
ELEC 472	Artificial Intelligence	W
ELEC 486	Fiber Optic Communications	W
MREN 348	Introduction to Robotics	W

Technical Electives in Electrical Engineering – prerequisite flowchart



Design and Research Project Courses

ELEC 390 Principles of Design and Development

- topics in applied design principles, testing, teamwork, and communication;

ELEC 490/498 capstone design project courses

- prerequisites: 3rd year core courses incl. ELEC 390
- instructors and project supervisors
- group of 3 to design/build/document

ELEC 497 Research project (available to 4th year students)

- For those with an interest in exploring in depth some technical area in a more independently-driven research study

Complementary Studies Program Requirement

Complementary Studies – not Innovation Stream

- Must have a total of **9 credits** (108 units) of CS:
  - **1 course (or 3 credits)** must be from **List A** (Humanities and Social Sciences)
  - Remaining 2 courses (or 6 credits) can be from List A or List B
- Typically take 1 CS course in each of 2nd, 3rd, and 4th year, but whenever it can fit into schedule is fine (e.g., PSYC100 is 6 credits and goes fall and winter);
- Some CS courses are available online (see Arts and Science ONLINE, SSB online, LAW online etc.)

Innovation Stream: Business & Complementary Studies

2nd Year	COMM 201 – Introduction to Business for Entrepreneurs | F
3rd Year	COMM 301 – Funding New Ventures | F COMM 302 – Launching New Ventures | W List "A" Complementary Studies Course | F/W/S
4th Year	COMM 405 – New Business Development | F

ECEi: No reduction in technical content

Course Preload in 3rd Year

- Student are enrolled in 3rd year core courses by the department in July.

Please note the following:

- 3rd year Students can self-enroll in both core and elective courses;
- Students can swap course sections from their Solus account or drop courses before the drop deadline;
- Students need to self-register in Optional Core courses (not preloaded), complementary studies electives, technical electives;
- APSC 221 will be auto-loaded into 3rd year *Winter* semester, however Students can choose to register in APSC 221 in any term – Fall or Winter;
- Students are unable to register in a course with a missing prerequisite.
- Students are unable to self-register in first year APSC courses, 2nd year core courses.

SOLUS tutorials

QUIP

The Career Services office is always available to help (Engineering & Technology fair, Summer job fair etc.)

Queen's University Internship Program (QUIP):

- Internships are 12 to 16 month, paid, professional work experiences;
- Eligible to participate after completing your 2nd or 3rd year of studies;
- The QUIP courses count towards your Professional Internship Designation and towards your degree requirements (**3.5 technical credits, under List B electives – both EE and CE programs**);
- Internship courses require tuition. APSC 302 and APSC 303 carry tuition fee of 3.5 units per course and the tuition for them is due September 1st.
- Students can register in one academic course per term while on internship.

STREAMS – Flexibility

- ECE with streams instead of options
  - Suggested streams give a coherent set of courses in a particular area, e.g., mechatronics. Use interest and passion as your guide;
  - Streams provide primary and secondary course suggestions; primary courses are essential for a given concentration;
  - Streams allow you to mix and match as you wish and provide larger number of courses to choose from;

CE Streams

Streams of Specialization for Elective Courses in Computer Engineering

- Computer Hardware
- Computer Systems
- Software Engineering
- Mechatronics
- Artificial Intelligence

EE Streams

Streams of Specialization for Elective Courses in Electrical Engineering

- Biomedical Engineering
- Communications and Signal Processing
- Communication Systems and Networks
- Nanoelectronics and Photonics
- Mechatronics
- Power Electronics and Systems
- Robotics and Control

Exclusions - only one course counts towards the degree requirements

ELEC 425 Machine Learning (List A TE) and CMPE 452 Neural Networks (List B TE)

ELEC 425 Machine Learning and Deep Learning F|3.5
Lecture:3
Lab: 0.25
Tutorial: 0.25
Supervised and unsupervised machine learning methods for regression, classification, clustering, and time series modeling. Methods of fitting models. The problem of overfitting and techniques for addressing it. Deep learning and neural network models. Processes for how to refine/implement/test applications of machine/deep learning algorithms.

Academic Units
Mathematics 11
Natural Sciences 0
Complementary Studies 0
Engineering Science 20
Engineering Design 11

PREREQUISITE(S): ELEC 278 or CISC 235, ELEC 326 or permission of the instructor
EXCLUSION(S): CMPE452 Neural and Genetic Computing

ELEC 474 Machine Vision (List A TE) and **CMPE 457** Image Processing & Computer Vision (List B TE)

Substitutions

- Courses in each curriculum (CORE, TECH, COMP) meet CEAB requirements and Faculty regulations and have been approved by the Operations Committee
- If a student takes a course that is not on the approved curriculum for their program, the course will not count towards their program

.....except.....

- Sometimes a student can substitute a course with

a) Courses taken during the summer at another university

b) Courses taken while on exchange at another university

c) Courses that are not on the approved TECH lists

d) A course to replace a CORE course. (NOTE: This form of substitution is rare and requires detailed information as to why the student is not taking the CORE course at their home university.

Substitution Process

1. Send an email with the substitution request form to the Undergraduate Program Assistant (UPA) indicating the course you would like to take and what course you would like to substitute it for. Also include a web link to the following information:

    a) Course syllabus

    b) Total # of lecture/lab/tutorial hours

    c) Course grading scheme

    d) Reason why you would like to substitute one course with another

2. Instructor Signature:

    a) CORE/TECH Courses: The instructor of the course to be substituted will also need to sign the form as an indication that the course is a good substitute

    b) Complementary Studies Courses: No instructor signature required

3. UPA will submit the course substitution material(s) to the Undergraduate Program Chair for review. The UG Chair will sign the form if they support the request.

4. UPA then submit the completed paperwork to the Faculty Office for review by the Operations Committee. For courses taken outside of Queen's, the $60.00 administration fee needs to be paid via online system at https://store.engineering.queensu.ca/index.php?main_page=index&cPath=8

5. You will receive an email from the Faculty Office with the Operations Committee's decision. This email can be used as a letter of permission to register for courses at another institution.

Prerequisites

- Prerequisites: capture material necessary to do the course
  - If the professor thought you could do the course without knowing that material, it would not have been made a prerequisite
- So prerequisites only waived in exceptional circumstances
  - Submit to Undergraduate Program Assistant the Prerequisite Waiver Form which asks Undergrad Chair to waive prerequisite:

http://my.engineering.queensu.ca/Current-Students/Registration-Guide/files/Prerequisite_CorequisiteWaiver.pdf

- **Before submitting the form, the instructor of the course for which the waiver is required must approve the waiver justification in writing (sign the form or provide the approval over the email)**

Timetabling

- Timetabling of *all* courses is done by University Registrar centrally each year
- No guarantee that desired combinations of electives are completely conflict-free
  - ECE Dept. makes requests to Registrar to help avoid conflicts, but no guarantee
- You must be *flexible* in 3rd year *and* 4th year, as needed

Course Planning

- Use your **degree planning spreadsheet** to verify that all program requirements will be met
- Follow Calendar & all preregistration instructions
  - ❑ Confirm core courses are preloaded
  - ❑ Select electives (technical and/or complementary studies)
  - ❑ Check course prerequisites and **exclusions**
  - ❑ Submit substitution requests for courses outside ECE that are not listed as official technical electives (CISC, MECH, MTHE)
  - ❑ AVOID Negative Service Indicators (SOLUS account, unpaid tuition). Log on to SOLUS to view your financial account to see if you have any outstanding debts. The University Registrar's Office can be reached at solus@queensu.ca about registration or payment.
- Respect deadlines to avoid difficulties (Add/Drop courses)

Course Planning

- Not all electives offered every year. Some 400 level courses will not be offered the following year
  - **Plan both 3rd and 4th years together!**
- You are not limited to '300' level technical courses;
- If you have prerequisites for a '400' level elective & it fits in your timetable, you can take it in your 3rd year;
- APSC 221 F/W/S (**not for ECEi**)
- Use the **Calendar Information** and the **ECE planning spreadsheets** to ensure you are on track to complete all requirements by the end of the fourth year. This is one of the most important responsibilities for all ECE students.

Tuition

Engineering and Applied Science

Tuition is assessed on a per-unit basis up to 16.1 credits per term. **The maximum per term tuition is equal to 1/2 of the tuition fee.**

Expand All | Collapse All

Fall/Winter Domestic (Ontario)

Registration in the Engineering & Applied Science Extended (900 section) program incurs a fee of $539.63 per course. Supplemental examination incurs a fee of $300 per exam (see faculty calendar for details).

Normal Units: 32.2

Fee	Cost
Unit Fee	$370.02
Fall Tuition & SAL Due Sept 1	$6,006.82
Ancillary Fees Due Sept 30	$1,347.94
Winter Tuition & SAL Due Jan 10	$6,006.82
Total	**$13,361.58**

Fall/Winter Domestic (outside of Ontario) +

Fall/Winter International +

Summer Domestic +

Degree Planning Spreadsheet

- Electrical Engineering
- Computer Engineering

Queen's UNIVERSITY