Electrical Engineering
*2019-2020 - UG - Minor Program Adjustment

(A) Proposal summary

Faculty of Engineering and Applied Science
Program

Summary of proposed changes*
It is hereby proposed that a course on Computational Engineering Applications be added to the Electrical Engineering Program. This course is added to the second (winter) semester of Year 2 of Electrical Engineering Program. The course will consists of 75% Engineering Science and 25% Mathematics. The prerequisites for two courses will be adjusted to include this new course.

As we added a course to the electrical engineering program the credit hours have changed from 129 to 132.

Is a new course associated with this proposal?* Yes

 Are you modifying a pathways program?* No

Effective semester* Fall 2019

(B) Program information

Program or shared core name* Electrical Engineering
Program type Bachelor (Honours)
Degree type Bachelor of Engineering (Honours)

Calendar copy: Attached

(C) Pathways programs

Complete this section only if you are modifying a pathways program.

(D) Detailed proposal information

Enhanced academic opportunities*
Several courses in Years 3 and 4 of Electrical Engineering Program heavily rely on programming skills in Matlab. There is currently a lack of knowledge and training in those skills for the students entering Year 3 of Electrical Engineering Program.

Financial/ resource implications*
 The teaching of this course can be covered by core teaching staff or a sessional instructor.

Enrolment implications*
N/A

Transition plan*
The students entering the Electrical Engineering Program in Fall 2018 will take this course in Winter 2020.

(E) Impact and consultation

Does this change include any indigenous content?* No

We have consulted with all impacted areas* Yes

Consultation* n/a

(F) Routing

Should this proposal be routed to the Program Approval step prior to Curriculum Committee?* No
Faculty or program-level group* Electrical Engineering
Is this change for a Bachelor of Engineering program?* Yes
Are there departments associated with your faculty?* Yes

(G) End of proposal

Electrical Engineering

General information

Electrical engineering is a broad field with many engineering applications and has been proven to be among the most popular of all engineering disciplines. UOIT's Electrical Engineering program teaches students to apply knowledge through analysis, design and implementation of electrical, power, control, electronic, biomedical, photonic, and wireless systems. The program of study includes courses in the areas of electronics, telecommunications, computers, control, and power systems. The curriculum assists students in understanding and applying the principles of electrical engineering and of the Canadian electrical engineering industry.

Admission requirements

Admission is competitive. The specific average or standing required for admission varies from year to year. Students are selected by taking into consideration a wide range of criteria including school marks, distribution of subjects taken, and performance in subjects relevant to the academic program. Possession of the minimum requirements does not guarantee acceptance. Preference will be given to applicants with the best qualifications.

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with six 4U or 4M credits including English (ENG4U) with a minimum average of 60 per cent, Advanced Functions (MHF4U), Calculus and Vectors (MCV4U), Chemistry (SCH4U), and Physics (SPH4U). In addition, a combined minimum 70 per cent average in math and science courses is required, with no grade below 60 per cent. All other applicants should refer to admissions for the requirements for their specific category of admission.

Work placement/internship/co-op opportunities

The university's proximity to some of the largest automotive, electrical, manufacturing and software companies in Canada provides many opportunities for work placements. In addition, a 12- to 16-month optional Engineering Internship program is available for students completing third year, and students may participate in two- to four-month work placements through the Engineering Co-op program. See course descriptions for ENGR 0998U – Engineering Internship Program and ENGR 0999U – Engineering Co-op Program for details.

Professional designation

All UOIT undergraduate engineering programs in the Faculty of Engineering and Applied Science have been fully accredited by the Canadian Engineering Accreditation Board. (Note: The new Mechatronics Engineering program will be reviewed for accreditation in 2019-2020, to coincide with the first graduating class, as per CEAB requirements.) Each graduate is eligible to apply for licensing as a professional engineer (PEng) in any province or territory in Canada.

Program details and degree requirements

To be eligible for an honours Bachelor of Engineering degree in Electrical Engineering, students must successfully complete ~~129~~ 132 credit hours, including all courses outlined here. For elective options, see the following list.

All courses in Year 1, except SSCI 1470U, are prerequisites to all non-elective courses in Year 3.

All courses in Years 1 and 2, except SSCI 1470U, are prerequisites to all non-elective courses in Year 4.

Approved students may undertake a co-op work term at any time before completing the program, and do so by registering in the course ENGR 0999U – Engineering Co-op Program.

Although reasonable efforts will be made to adhere to the order and timing of courses as indicated, course requirements and term offerings may change. For the most up-to-date list of course offerings, please visit the faculty website at engineering. uoit. ca.

Year 1

Semester 1 (15 credit hours)

COMM 1050U Technical Communications
ENGR 1015U Introduction to Engineering
MATH 1010U Calculus I
MATH 1850U Linear Algebra for Engineers
PHY 1010U Physics I

Semester 2 (18 credit hours)

CHEM 1800U Chemistry for Engineers
ENGR 1025U Engineering Design
ENGR 1200U Introduction to Programming for Engineers
MATH 1020U Calculus II
PHY 1020U Physics II
SSCI 1470U Impact of Science and Technology on Society

Year 2

Semester 1 (15 credit hours)

ELEE 2110U Discrete Mathematics for Engineers
ELEE 2200U Electrical Engineering Fundamentals
MATH 2860U Differential Equations for Engineers
MECE 2640U Thermodynamic and Heat Transfer
SOFE 2710U Object Oriented Programming and Design

Semester 2 ~~(15~~ **(18** credit hours)

ELEE 2210U Circuit Analysis
ELEE 2250U Introductory Electronics
ELEE 2450U Digital Systems
ELEE 2520U Fundamentals of Electromagnetics
ELEE 2530U Complex Analysis for Engineers
ENGR 2100U Computational Engineering Applications

Year 3

Semester 1 (18 credit hours)

Liberal Studies elective*
ELEE 3110U Signals and Systems
ELEE 3230U Electronic Circuit Design
ELEE 3240U Applications for Electromagnetics
ELEE 3250U Electric Machines
ELEE 3450U Microprocessors and Computer Architecture

Semester 2 (18 credit hours)

ELEE 3070U Probability and Random Signals
ELEE 3100U Introduction to Control Systems
ELEE 3130U Communication Systems
ELEE 3180U Design Principles and Project Management in Electrical Engineering
ELEE 3260U Power Systems
ENGR 3360U Engineering Economics

Approved students may opt to spend 12 to 16 months as an intern in an engineering setting in industry or elsewhere after Year 3, and do so by registering in the course ENGR 0998U – Engineering Internship Program.

Year 4

Semester 1 (15 credit hours)

Engineering elective*

ELEE 4150U Advanced Control Systems

ELEE 4420U Digital Signal Processing

ELEE 4750U Microwave and RF Circuits

ENGR 4940U Capstone Systems Design for Electrical, Computer and Software Engineering I

Semester 2 (15 credit hours)

Engineering elective*

Liberal Studies elective*

ELEE 4500U Wireless Communications

ENGR 4760U Ethics, Law and Professionalism for Engineers

ENGR 4941U Capstone Systems Design for Electrical, Computer and Software Engineering II

*Electives

Engineering electives

Courses selected for the Engineering elective must be approved by the Faculty of Engineering and Applied Science. Engineering courses from other engineering programs may be allowed as engineering electives provided students have the prerequisites and the courses extend the students' knowledge through greater depth in an advanced area, or greater breadth in a complementary field. Not all of the listed Engineering electives will necessarily be offered every year.

The following are approved courses as Engineering electives:

ELEE 4115U Fundamentals of Smart Grid

ELEE 4120U Introduction to Power Electronics

ELEE 4125U Smart Grid Networking and Security

ELEE 4130U Digital Communications

ELEE 4140U Power System Protection Relaying

ELEE 4180U Special Topics in Electrical Engineering

ELEE 4190U Multimedia Systems

ELEE 4930U Optical Communications

SOFE 4860U Computer Graphics Design

SOFE 4890U Advanced Computer Networks

Liberal Studies electives

Complementary studies, including courses in humanities, social sciences, arts, management, engineering economics, ethics and communication, are included in engineering programs to complement the technical content of the curriculum and thereby provide graduates with a broader perspective of their role in society. Inclusion of complementary studies also satisfies several accreditation criteria of the Canadian Engineering Accreditation Board. Courses or parts of courses covering engineering economics, ethics, and the impact of technology on society, as well as courses that develop the student's capability to communicate orally, visually and in writing, are essential to the education of an engineer and therefore are included in all engineering programs at UOIT.

Liberal studies electives are included in each engineering program to ensure adequate coverage of subject matter that deals with central issues, methodologies and thought processes of the humanities and social sciences. Such material is required in the education of an engineer. Liberal studies electives can include, but are not limited to, courses dealing with cultural analysis; historical analysis; literature and the arts; knowledge, cognition, and moral reasoning; and social and behavioural analysis.

Foreign language and business courses may not be used as liberal studies. Courses can be approved as liberal studies electives for students in engineering programs at UOIT by the dean of the Faculty of Engineering and Applied Science (or designate), in accordance with these principles.

Courses selected for the liberal studies electives must be approved by the Faculty of Engineering and Applied Science. Liberal studies electives are subject to change. An updated list of liberal studies electives will be maintained online at engineering.uoit.ca.

ENGR - 2100U - Computational Engineering Applications

2019-2020 - UG - New Course

(A) Proposal summary

Home faculty*	Faculty of Engineering and Applied Science

This new course is associated with the following:*
- ● A Minor Program Adjustment
- ○ A Major Program Modification
- ○ A New Program
- ○ None of the above

Will this new course appear anywhere other than the course description section of the calendar?*   ● Yes   ○ No

Program(s) impacted*   Electrical Engineering Program

Effective semester*   Fall 2019

Are you attaching any supporting documents?*   ○ Yes   ● No

(B) Course information

Course subject code*	ENGR	**Course number***	2100U

Course title (long form)*   Computational Engineering Applications

Subject area*   Electrical Engineering

Course description*   Introduction to MATLAB, the engineering applications of MATLAB to the following areas: solving systems of linear algebraic equations, interpolation and curve fitting, finding the roots of equations, numerical differentiation and numerical integration using MATLAB, solving initial value problems, solving two-

point boundary value problems, solving symmetric matrix eigenvalue problems, introduction to engineering design optimization using MATLAB.

Credit hours *	3

Lecture hours	3	**Lab hours**	1.5 weekly

Tutorial hours	1.5	**Other hours**	

Cross-listing(s)

Prerequisite(s)   MATH 1850U and ENGR 1200U and MATH 2860U

Prerequisite(s) for Banner

Corequisite(s)

Prerequisite(s) with concurrency

Credit restriction(s)

Is the credit restriction an equivalent course?

Recommended

Course restrictions

Course type * ☑ Core ☐ Elective

Is the course undergraduate or professional? * ☑ Undergraduate ☐ Professional

Grade mode * ⦿ N (normal alpha grades) ◯ P (pass/fail grade)

CLS (in-class delivery) *	⦿ Yes ◯ No	**HYB (in-class and online delivery)** *	◯ Yes ⦿ No
IND (individual studies) *	◯ Yes ⦿ No	**OFF (off-site)** *	◯ Yes ⦿ No
WB1 (virtual meet time - synchronous) *	◯ Yes ⦿ No	**WEB (fully online - asynchronous)** *	◯ Yes ⦿ No
N/A (not applicable) *	◯ Yes ⦿ No		

Teaching and assessment methods*	The course will have the following assessment methods:
	Assignments
	MATLAB Programming Projects
	Midterm exam
	Final exam

Course learning outcomes*	The following learning outcomes are expected. The students will learn
	the fundamentals of programming in MATLAB and debugging,
	interpolation and curve fitting in MATLAB
	numerical differentiation and integration in MATLAB
	solving initial value problems in MATLAB
	solving boundary value problems in MATLAB
	solving design optimization problem in MATLAB

(C) Impact and consultation

Does this course contain any indigenous content?*	◯ Yes ⦿ No
We have consulted with all impacted areas*	◯ Yes ⦿ N/A
Consultation*	N/A

(D) Financial implications

Financial implications*	Instructor for one 3-hour teaching credit is required. Tutor and lab instructors are also required.

Faculty Council: 5 November 2018
ECC: 29 October 2018

ELEE - 3110U - Signals and Systems

*2019-2020 - UG - Course Change

(A) Proposal summary

Home faculty *

Faculty of Engineering and Applied Science

Course changes *

- ☐ Contact hours
- ☐ Co-requisite(s)
- ☐ Course description
- ☐ Course instructional method
- ☐ Course number or course subject code
- ☐ Course title
- ☐ Credit restriction(s) and/or equivalencies
- ☐ Credit weighting
- ☐ Cross-listing(s)
- ☐ Grade mode
- ☐ Learning outcomes
- ☑ Prerequisite(s)
- ☐ Remove course from academic calendar
- ☐ Teaching and assessment methods
- ☐ Other

Other changes

Reason for change and ways in which it maintains/enhance course/program objectives *

New course ENGR 2100 – Computational Engineering Applications will be a prerequisite for ELEE 3110U – Signals and Systems

Financial implications *

n/a

Effective semester *

Fall 2019

Are you attaching any supporting documents? *

○ Yes ● No

Additional supporting

information, if applicable

(B) Course information

Course subject code*	ELEE
Course number*	3110U

Course title (long form)* Signals and Systems

Course title (short form)

Subject area Electrical Engineering

Course description Continuous-time and discrete-time signals and systems; basic system properties, linear time invariant (LTI) systems; impulse response and transfer function; autocorrelation and power spectrum; convolution; Fourier series, Laplace and Fourier transforms, frequency-domain representation and analysis in LTI systems; poles and zeros, stability of analog filters.

Credit hours 3

Lecture hours 3	**Lab hours** 3 (biweekly)
Tutorial hours 1.5	**Other hours**

Cross-listing(s)

Prerequisite(s) ELEE 2210U **and** , ELEE 2530U **and ENGR 2100U**

Prerequisite(s) (for Banner)

Corequisite(s)

Prerequisite(s) with concurrency

Credit restriction(s)

Is the credit restriction an equivalent course?

Recommended

Course restrictions	

Course type	☐ Core ☐ Elective

Is the course undergraduate or professional?	☐ Undergraduate ☐ Professional

Grade mode	○ N (normal alpha grades) ○ P (pass/fail grade)

CLS (in-class delivery)	○ Yes ○ No	**HYB (in-class and online delivery)**	○ Yes ○ No
IND (individual studies)	○ Yes ○ No	**OFF (off-site)**	○ Yes ○ No
WB1 (virtual meet time - synchronous)	○ Yes ○ No	**WEB (fully online - asynchronous)**	○ Yes ○ No

N/A (not applicable)	○ Yes ○ No

Teaching and assessment methods	

Course learning outcomes	

(C) Impact and consultation

Does this course contain any indigenous content?*	○ Yes ◉ No

We have consulted with all impacted areas*	○ Yes ◉ N/A

Consultation*	na

(D) Routing

Faculty or program-level group*	Electrical Engineering

Faculty Council: October 2018

ELEE - 3250U - Electric Machines

*2019-2020 - UG - Course Change

(A) Proposal summary

Home faculty*	Faculty of Engineering and Applied Science

Course changes*

- ☐ Contact hours
- ☐ Co-requisite(s)
- ☐ Course description
- ☐ Course instructional method
- ☐ Course number or course subject code
- ☐ Course title
- ☐ Credit restriction(s) and/or equivalencies
- ☐ Credit weighting
- ☐ Cross-listing(s)
- ☐ Grade mode
- ☐ Learning outcomes
- ☑ Prerequisite(s)
- ☐ Remove course from academic calendar
- ☐ Teaching and assessment methods
- ☐ Other

Other changes	New course ENGR 2100U – Computational Engineering Applications will be a prerequisite for ELEE 3250U – Electric Machines
Reason for change and ways in which it maintains/enhance course/program objectives*	New course ENGR 2100U – Computational Engineering Applications will be a prerequisite for ELEE 3250U – Electric Machines
Financial implications*	na
Effective semester*	Fall 2019
Are you attaching any supporting documents?*	◯ Yes ⦿ No

Additional supporting information, if applicable

(B) Course information

Course subject code*	ELEE	**Course number***	3250U

Course title (long form)* Electric Machines

Course title (short form)

Subject area Electrical Engineering

Course description Introduction to three-phase circuits; magnetic circuits; electrical transformers; force and torque generation; asynchronous machines, induction machines, DC machines; steady state and torque-speed characteristics of electric machines and their applications.

Credit hours 3

Lecture hours 3	**Lab hours** 3 (biweekly)
Tutorial hours 1.5	**Other hours**

Cross-listing(s)

Prerequisite(s) **ENGR 2100U**

Prerequisite(s) (for Banner)

Corequisite(s) ELEE 3240U ~~and ENGR 2100U~~

Prerequisite(s) with concurrency

Credit restriction(s)

Is the credit restriction an equivalent course?

Recommended

Course restrictions	

Course type	☐ Core ☐ Elective

Is the course undergraduate or professional?	☐ Undergraduate ☐ Professional

Grade mode	○ N (normal alpha grades) ○ P (pass/fail grade)

CLS (in-class delivery)	○ Yes ○ No	**HYB (in-class and online delivery)**	○ Yes ○ No
IND (individual studies)	○ Yes ○ No	**OFF (off-site)**	○ Yes ○ No
WB1 (virtual meet time - synchronous)	○ Yes ○ No	**WEB (fully online - asynchronous)**	○ Yes ○ No

N/A (not applicable)	○ Yes ○ No

Teaching and assessment methods	

Course learning outcomes	

(C) Impact and consultation

Does this course contain any indigenous content?*	○ Yes ⦿ No

We have consulted with all impacted areas*	○ Yes ⦿ N/A

Consultation*	na

(D) Routing

Faculty or program-level group*	Electrical Engineering

Faculty Council: October 2018