

UNDERGRADUATE EDUCATION COMMITTEE (UEC) MEETING September 23, 2022 - 10:00 AM A225

AGENDA

Page

44

- 1. APPROVAL OF THE AGENDA
- 2. APPROVAL OF UEC MINUTES
- **3** 4 **2.1.** UEC draft minutes: August 30, 2022

MOTION: To approve the draft minutes as presented.

3. COURSES AND PROGRAMS

5 - 12 **3.1. Teacher Education**

Review with changes: EDUC 200 Review with changes including title: EDUC 300

MOTION: To approve the revised EDUC course outlines as presented.

13 - **3.2. Engineering**

<u>Changes including total hours</u>: ENGR 210 <u>Changes including title, credits, pre/corequisites, and total hours</u>: ENPH 310 <u>Changes including title, prerequisites, and pre/corequisites</u>: ENPH 320 <u>Changes including title, prerequisites, and course code</u>: ENPH 340 (formerly ENGR 340) Changes including credits, prerequisites, and pre/corequisites: ENPH 390\

<u>Changes to entrance and program requirements</u>: Engineering Physics diploma in Mechatronics

MOTION: To approve the ENGR and ENPH course outlines as presented.

MOTION: To recommend the changes to the Engineering Physics diploma in Mechatronics as presented, effective September 2023.

4. OTHER BUSINESS/DISCUSSION ITEMS

4	4.1.	UEC	Policy	Subcommittee	membership
---	------	-----	--------	--------------	------------

- 4.2. APPC report
- 4.3. Senate report
- 4.4. Senate Teaching and Learning Committee report
- 4.5. Policy Subcommittee report

5. INFORMATION ITEMS

5.1. Student vacancy on UEC

5.2. Program suspensions <u>Suspended for two years</u>: Applied Ethical and Political Philosophy minor <u>Suspended for one year</u>: Digital Manufacturing diploma

6. ADJOURNMENT

46

Page 45



UNDERGRADUATE EDUCATION COMMITTEE (UEC) MEETING

August 30, 2022 10:00 AM - A225 Abbotsford Campus

DRAFT MINUTES

 PRESENT:
 Ian Affleck, Donna Alary, Courtney Boisvert, Claire Carolan, Carl Janzen, David Johnston, Selena Karli, Dana Landry, Catherine Liao, Samantha Pattridge, and Vanessa Radzimski Teresa Arroliga-Piper, Vlad Dvoracek, Shirley Hardman, Claire Hay, Bobby Jaswal, Nicholas Johnson, Amber Johnston, Randy Kelley, David McGuire, Sarbjot Nijjar, Linda Pardy, Ravneet Sohal, and Shel Stefan

 GUESTS:
 William Maher

 RECORDER:
 Amanda Grimson

1. APPROVAL OF AGENDA

2. APPROVAL OF UEC MINUTES

2.1. UEC draft minutes: June 17, 2022

MOTION:

To approve the draft minutes as presented. CARRIED

3. DISCUSSION ITEMS

3.1. Review of UEC Terms of Reference and committee procedures

UEC's responsibilities, Senate guidelines for committee members, and procedures for membership on Senate standing committees were reviewed. Committee members were asked to review the Terms of Reference and bring any suggestions to the next meeting.

3.2. UEC Subcommittees

Terms of Reference for both the Screening Subcommittee and Policy Subcommittee were reviewed, and the addition of a PDQA representative to both subcommittees was further discussed.

It was noted that the Screening ToR do not include a purpose, which should be added. It may also be appropriate to consider renaming this subcommittee. The role and function of Campus-Wide Consultation (CWC) were discussed in relation to Screening, and a rubric for CWC was suggested

MOTION:

To add a PDQA representative to the UEC Screening Subcommittee membership. CARRIED

UEC Draft Minutes 30 Aug 2022

Membership of the Policy Subcommittee will be finalized at the September meeting, as the faculty member that expressed interest in June was not present to confirm their continued interest.

MOTION:

To add a PDQA representative to the UEC Policy Subcommittee membership. CARRIED

3.3. Course prerequisites

Registrar David Johnston reviewed the principles that should guide course prerequisites, as outlined in the Prerequisites and Co-Requisites Policy (84). Prerequisites are often designed for enrolment control rather than for student success. Although this is occasionally needed, enrolment can usually be managed through other means. When considering what is necessary for student success, it may also be useful for departments to look at how often prerequisites are waived for a particular course.

3.4. Official course outline common questions

The committee discussed some common questions that arise when reviewing course outlines, such as how field trip information is communicated to students. Of particular concern are field trips that are required outside of class time. While the timetable typically includes general notes about required field trips, specific details about timing and cost are not usually provided. Information about mandatory workshops, such as those that nursing students must take as part of Fraser Health requirements, should also be readily available to students.

4. INFORMATION

4.1. UEC Resources

- Program and Course Approval Procedures
- <u>Approval processes and flowcharts</u>
- <u>Curriculum Quality Guidelines</u>
- <u>Course development</u>
- Program changes
- New program development
- Integrated Strategic Plan

5. ADJOURNMENT

The meeting was adjourned at 11:35, followed by a workshop for committee members.

Memo for Course Changes

To: FPSCC/UEC

From: Sheryl MacMath, Co-chair BEd Program Review Committee

Date: March 9, 2022

Subject: Proposal for revision of EDUC 200: Educational Psychology

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - ⊠ Six-year review
 - □ Number and/or course code
 - □ Credits and/or total hours
 - □ Title
 - \boxtimes Calendar description
 - □ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - Delivery methods and/or texts and resource materials
 - □ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - □ Other Please specify:
- 2. Rationale for change:

As part of our 2021 – 2022 program review year (including our five-year maintenance review with the BC Teachers' Council), the Teacher Education Department has completed revisions for all official course outlines. As part of these revisions, all course outlines were updated to:

- Conform to the new official course outline form as per UEC;
- Ensure EDID (equity, diversity, inclusion, and decolonization) was referenced in the learning outcomes, course content, and course description;
- Update course materials; and,
- > Ensure that current trends and research were represented.
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

There were no substantial changes to the learning outcomes. This course already includes outcomes related to demonstrating information competency, analyzing critically and imaginatively, proficiently using knowledge and skills, initiating inquiries, communicating effectively, engaging in collaborative leadership, and engaging in collaborative leadership. As this is a course that develops the knowledge and skills for practicum in local schools, it also teaches students to contribute locally.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No.

5. Which program areas have been consulted about the change(s)?

None.

- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP</u>).
 - This course specifically references Indigenous ways of understanding education and psychology.
 - The course materials and content now include specific reference to non-Western and Indigenous ways of understanding development.
 - > All of these changes specifically address the TRC calls to action #62 and 63.
- 7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?
 - This course specifically references understanding development from an inclusive lens that addresses all areas of EDID.
- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc. No changes.
- Estimate of the typical costs for this course, including textbooks and other materials:
 \$30 100 depending on texts.



ORIGINAL COURSE IMPLEMENTATION DATE: REVISED COURSE IMPLEMENTATION DATE: COURSE TO BE REVIEWED (six years after UEC approval): Course outline form version: 09/08/2021 August 2004 January 2023 September 2026

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: EDUC 200			Numb	er of Credits: 3 Course	credit policy (105)
Course Full Title: Educational Psychology					
Course Short Title:					
Faculty: Faculty of Education, Community, a	nd Human Dev	velopment	Depar	tment: Teacher Educati	on
Calendar Description:					
Students are introduced to theories of learnin decolonizing lens is used to critique and exte learning theories, motivation, and complex co and decolonizing learning environments migh	ng and developi nd traditional th ognitive process nt be structured	ment and how neoretical con ses. These the to best meet	these ca ceptualiza eories are the need	In be supported in educa ations of learning and de e then built upon to begir s of all students.	ational settings. A evelopment, including n considering how inclusive
rerequisites (or NONE): 15 university-level credits.					
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):					
Antirequisite Courses (Cannot be taken for	additional crec	lit.)	Course	Details	
Former course code/number:			Special	Topics course: No	
Cross-listed with:			(If yes desia	s, the course will be offer nations representing diff	red under different letter erent topics.)
Equivalent course(s):			Directed	d Study course: No	
(If offered in the previous five years, antirequ	isite course(s)	will be with crodit	(See	policy 207 for more infor	mation.)
for the antirequisite course(s) cannot take this	s course for fur	ther credit.)	Grading	System: Letter grades	i
			Delivery	Mode: May be offered	in multiple delivery
Typical Structure of Instructional Hours			modes		
Lecture/seminar		35	Expecte	ed frequency: Twice per	year
Tutorials/workshops		10	Maximu	im enrolment (for informa	ation only): 36
			Prior L	earning Assessment a	nd Recognition (PLAR)
			PLAR is	available for this course	Э.
	Total hours	45			
			Transfe	er Credit (See <u>bctransf</u> e	erguide.ca.)
Scheduled Laboratory Hours			Transfe	r credit already exists: Y	es
Labs to be scheduled independent of lecture	hours: 🖂 No	∑∏Yes	Submit	outline for (re)articulation	n: No
			(If yes	s, fill in <u>transfer credit for</u>	<u>m</u> .)
Department approval				Date of meeting:	December 8, 2021
Faculty Council approval				Date of meeting:	May 6, 2022
Undergraduate Education Committee (UE	C) approval			Date of meeting:	September 23, 2022

		the racer value of	ena enaci gradade ou		. ugo - 01
Jearning Outcomes (<i>TH</i> Jpon successful complet 1. Describe the ho 2. Create connecti 3. Describe multipl 4. Discuss an area 5. Describe an incl students with dis 6. Identify specific	ese should contribution of this course, stillistic development of ons between Indigere perspectives on more deucational psycularity of solutional psycularity of solutions, culturally teaching strategies	te to students' ability to sudents will be able to: f students (i.e., cognitiv nous, Western, and sup totivation and complex shology that has person learners that builds fror and linguistically divers that support inclusion ir	meet program outcomes e, emotional, physical, sp erdiverse perspectives o cognitive processes and al meaning and relevanc n the strengths of all stud e students, LGBTQ2+ stud classrooms.	and thus Institutional Learning piritual). n learning and development. how they interact with social co e. Jents, including Indigenous stude udents, and superdiverse stude	Outcomes ntexts. ents, nts.
Recommended Evaluat	ion Methods and W	leighting (Evaluation s	hould align to learning o	utcomes.)	
Assignments:	65%	Project:	35%		%
	%		%		%
Details: Assignments: 25	5% learning metapho	l or; 20% presentation; 20	0% group assignment		
NOTE: The following se	ections may vary by	/ instructor. Please se	e course syllabus avai	able from the instructor.	
exts and Resource Ma	terials (Include onli	ne resources and Indig	enous knowledge source	s. <u>Open Educational Resources</u>	(OER)
noula be incluaea when Type	ever possible. If mol Author or desi	re space is required, us cription	e the <u>Supplemental Text</u> Title and publication/	<u>s and Resource Materials form.</u> access details) Year
I. Textbook	Woolfolk, Winne	e, Perry	Educational psycholog	y: Applications in Canadian	2020
2. Textbook	Archibald		Indigenous storywork		2008
3. Online resource	Canadian Coun	cil on Learning	Redefining How Succe	ss is Measured	2007
I. Article	Tremblay		Aboriginal Perspective Competence in Early C	s on Social-Emotional Childhood	2013
5. Online resource	Nunavut Ministr	y of Education	Inuit Qaujimajatuqangi Learning Continuum	t Education Framework (The	2007
Western theorie Non-western, In Addressing the Addressing the Applying knowle Part 1: Development Holistic understa epistemologies) Theories of deve Contextual Influ Part 2: Learning Diverse learning LGBTQ2+ stude	s of learning, motiva digenous, and deco needs of superdivers adge to case studies andings of developm elopment (e.g., Piag ences (e.g., Indigeno preeds (including In ents, and superdivers	tion, memory, and deve lonial views of learning sity ent (e.g., physical litera et, Vygotsky, Kohlberg, ous Storywork, colonial digenous students, stud se students) genous, behavioural, co	elopment and development acy, social emotional dev Inuit Qaujimajatuqangit impacts) dents with dis/abilities, cu	elopment, neuroscience, Indige Education Framework) Ilturally and linguistically diverse	nous e students,

Memo for Course Changes

To: FPSCC/UEC

From: Sheryl MacMath, Co-chair BEd Program Review Committee

Date: March 10, 2022

Subject: Proposal for revision of EDUC 300: Best practices in teaching and learning

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - ⊠ Six-year review
 - □ Number and/or course code
 - □ Credits and/or total hours
 - 🛛 Title
 - Calendar description
 - □ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - ☑ Delivery methods and/or texts and resource materials
 - □ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - \Box Other Please specify:
- 2. Rationale for change:

As part of our 2021 – 2022 program review year (including our five-year maintenance review with the BC Teachers' Council), the Teacher Education Department has completed revisions for all official course outlines. As part of these revisions, all course outlines were updated to:

- Conform to the new official course outline form as per UEC;
- Ensure EDID (equity, diversity, inclusion, and decolonization) was referenced in the learning outcomes, course content, and course description;
- Update course materials;
- > Ensure that current trends and research were represented; and,
- The title was changed to remove the colonial hierarchy that is established with the term, "best practices." This part of the title was removed.
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

There were no substantial changes to the learning outcomes. This course already includes outcomes related to demonstrating information competency, analyzing critically and imaginatively, proficiently

using knowledge and skills, initiating inquiries, communicating effectively, engaging in collaborative leadership, and engaging in collaborative leadership. As this is a course that develops the knowledge and skills for practicum in local schools, it also teaches students to contribute locally.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No.

- Which program areas have been consulted about the change(s)? None.
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)</u>.
 - The course content and learning outcomes specifically reference Indigenous content and ways of knowing in line with the TRC's calls to action #62 and 63.
- 7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?
 - The course content and learning outcomes specifically reference EDID in relation to teaching and learning.
- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc. No changes.
- Estimate of the typical costs for this course, including textbooks and other materials:
 \$30 100 depending on texts.



ORIGINAL COURSE IMPLEMENTATION DATE: REVISED COURSE IMPLEMENTATION DATE: COURSE TO BE REVIEWED (six years after UEC approval): Course outline form version: 09/08/2021 January 2005 January 2023 September 2026

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: EDUC 300			Numb	er of Credits: 4 Course	credit policy (105)
Course Full Title: Teaching and Learning Pr	actices				
Course Short Title: Teaching & Learning Pra	actices				
Faculty: Faculty of Education, Community, a	nd Human Dev	velopment	Depar	tment: Teacher Education	on
Calendar Description:					
Provides opportunities for prospective teache decolonial, and non-Western educational the assessment, classroom management, differe case studies.	ers to start becc ories, research ntiation, schoo	oming reflectiv , and pedago l governance,	e practitio gy. Topics and equi	oners. Content includes s include strategies of tea ty/inclusion. Includes sch	Western, Indigenous, aching, learning, nool observations and/or
Note: Students should be aware that a Police	Information C	learance (PIC) will be r	equired. Please contact t	the department for details.
Prerequisites (or NONE): None.					
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):	EDUC 200 a	nd 75 universi	ty-level c	redits.	
Antirequisite Courses (Cannot be taken for	additional cred	dit.)	Course	Details	
Former course code/number:			Special	Topics course: No	
Cross-listed with:			(If yes	s, the course will be offer	ed under different letter
Equivalent course(s):			Director		ereni iopics.)
(If offered in the previous five years, antirequ	isite course(s)	will be	(See	policy 207 for more infor	mation.)
included in the calendar description as a note for the antirequisite course(s) cannot take this	e that students s course for fur	with credit rther credit.)	Gradino	Svstem: Letter grades	
		,	Delivery	/ Mode: May be offered	in multiple delivery modes
Typical Structure of Instructional Hours			Expecte	ed frequency: Twice per	vear
Lecture/seminar		30	Maximu	im enrolment (for informa	ation only): 36
Tutorials/workshops		20	Delegal	· · · · · · · · · · · · · · · · · · ·	
Experiential (work-integrated learning)		10		earning Assessment ar	id Recognition (PLAR)
			PLAR IS	s available for this course	9.
	Total hours	60	Transfe	er Credit (See bctransfe	erquide.ca.)
		•	Transfe	r credit already exists: Y	es
Scheduled Laboratory Hours			Submit	outline for (re)articulation	n: No
Labs to be scheduled independent of lecture	hours: 🖂 No	o ∐Yes	(If yes	s, fill in <u>transfer credit for</u>	<u>m</u> .)
Department approval				Date of meeting:	December 8, 2021
Faculty Council approval				Date of meeting:	May 6, 2022
Undergraduate Education Committee (UE	C) approval			Date of meeting:	September 23, 2022

	University of	the Fraser Valley Officia	al Undergraduate C	ourse Outline	Page 2 of
Learning Outcomes (Upon successful comp 1. Examine best 2. Explore perso 3. Identify charac students, and 4. Describe the i 5. Examine pers 6. Identify the init 7. Critique the th	These should contribu letion of this course, si practices from Wester and beliefs and values cteristics of the person curriculum). intention and impact of onal values and belief fluence values and belief abory and practice of d	te to students' ability to m tudents will be able to: rn, non-Western, Indigend through reflection and ex hal and methodological dir f public policies, prescribe s about education, learnir iefs have on teacher iden ifferent learning modalitie	eet program outcom bus, decolonial, and amination of educat nensions of the ped d curriculum, and pe g, teaching, schools tity and practice. s to instructional me	nes and thus Institutional Lear anti-racist theories in relation ional cases. agogical relationship (among edagogy on schooling and edu s, and communities.	ning Outcomes to education. teachers, ucation. ssessment.
Recommended Evalu	ation Methods and W	Veighting (Evaluation sho	ould align to learning	outcomes.)	
Assignments:	40%	Field evaluation:	40%	Portfolio:	20%
	%		%		%
IOIE: The following	sections may vary by	y instructor. Please see	course syllabus av	vailable from the instructor.	
lexts and Resource I should be included whe	Materials (Include onli enever possible. If mo	ne resources and Indiger re space is required, use	ous knowledge sou the <u>Supplemental Te</u>	rces. <u>Open Educational Reso</u> exts and Resource Materials f	urces (OER) form.)
Iexts and Resource I should be included whe Type	Materials (Include onli enever possible. If mo Author or des	ine resources and Indiger re space is required, use cription	ous knowledge sou the <u>Supplemental Te</u> Title and pu	rces. <u>Open Educational Resou</u> exts and Resource Materials f ublication/access details	<u>urces</u> (OER) f <u>orm</u> .) Year
I exts and Resource I should be included who Type 1. Textbook	Materials (Include onli enever possible. If mo Author or des Parkay, Vailland Hughes, Gadar	ine resources and Indiger re space is required, use cription court, Stephens, Harris, hidis & Petrarca	ous knowledge sour the <u>Supplemental To</u> Title and pu Becoming a	rces. <u>Open Educational Resou</u> exts and Resource Materials f ublication/access details Teacher	urces (OER) form.) Year 2019
Texts and Resource I should be included who Type 1. Textbook 2.	Materials (Include onli enever possible. If mol Author or deso Parkay, Vailland Hughes, Gadar	ine resources and Indiger re space is required, use cription court, Stephens, Harris, nidis & Petrarca	ous knowledge sour the <u>Supplemental To</u> Title and pu Becoming a	rces. <u>Open Educational Resou</u> exts and Resource Materials f iblication/access details Teacher	urces (OER) form.) Year 2019
I exts and Resource I should be included who Type 1. Textbook 2. 3.	Materials (Include onli enever possible. If mor Author or dese Parkay, Vailland Hughes, Gadar	ine resources and Indiger re space is required, use cription court, Stephens, Harris, hidis & Petrarca	ous knowledge sour the <u>Supplemental To</u> Title and pu Becoming a	rces. <u>Open Educational Resou</u> exts and Resource Materials f iblication/access details Teacher	urces (OER) <u>orm</u> .) Year 2019
I exts and Resource I should be included whe Type 1. Textbook 2. 3. 4. 5.	Materials (Include onli enever possible. If mor Author or dese Parkay, Vailland Hughes, Gadar	ine resources and Indiger re space is required, use cription court, Stephens, Harris, nidis & Petrarca	ous knowledge sour the <u>Supplemental To</u> Title and pu Becoming a	rces. <u>Open Educational Reso</u> exts and Resource Materials f ublication/access details Teacher	urces (OER) jorm.) Year 2019
Texts and Resource I should be included wheter included whete	Materials (Include onli enever possible. If more Author or dese Parkay, Vailland Hughes, Gadar Supplies and Materia Fopics	ine resources and Indiger re space is required, use cription court, Stephens, Harris, nidis & Petrarca	ous knowledge sour the <u>Supplemental To</u> Title and pu Becoming a pols, specialized close	rces. <u>Open Educational Resou</u> exts and Resource Materials f iblication/access details Teacher thing, etc.)	urces (OER) orm.) 2019

Memo for Course Changes

To: FATS CC, FATS FC, UEC

From: Lin Long, Department head, Physics

Date: Feb 14, 2022

Subject: Proposal for revision of ENGR 210 (Circuit Analysis)

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - □ Six-year review
 - □ Number and/or course code
 - ⊠ Credits and/or total hours
 - □ Title
 - ⊠ Calendar description
 - □ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - Delivery methods and/or texts and resource materials
 - □ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - □ Other Please specify:

2. Rationale for change:

- ENGR 210 includes lectures and labs. Due to the nature of the topics covered in this course, 57 hours of lectures and 18 hours of labs were not enough to adequately address all the required materials. Both the instructors and students requested additional hours in this course so that more materials/topics could be covered, and more lab time available for hands-on training. As a result, we have increased the hours in both lectures (75 hours) and labs (30 hours), and to compensate for the additional time, the course credit has been increased to 5.
- With the increase in experiments, the lab work portion is increased in the evaluation weighting.
- The calendar description is re-arranged to be clearer and updated to reflect the added course contents.
- The course contents and learning outcomes have been updated based on how the course has been and will be taught.
- One textbook is added to give students options in reference book.
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

No substantial changes to the learning outcomes. There are some minor changes in re-wording and one added topic.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No

- Which program areas have been consulted about the change(s)? Not applicable
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP</u>).

This course aligns and contributions in several ways according to the First Peoples' Principles of Learning. The team-based labs give students significant hands-on training, which give them opportunity to share knowledge and approaches with each other and reflect on one's practice. The skills learned from the course allow students to work in real-world projects including working with Indigenous communities when such opportunities arise.

7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?

This course attracts diverse students who are interested in electricity/electric circuits and power as well as improving their hands-on skills. Assignment design, topic selection, and curriculum delivery in this course are developed under the principles of equity, diversity, and inclusion. A significant portion of the grade is from labs (hands-on) and assignments (which allow time for reflection), so diverse strengths are enabled to excel.

- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
 Due to the limitation in lab space and equipment, the class size has to be limited to 18 students.
- Estimate of the typical costs for this course, including textbooks and other materials: About \$150



ORIGINAL COURSE IMPLEMENTATION DATE:SREVISED COURSE IMPLEMENTATION DATE:SCOURSE TO BE REVIEWED (six years after UEC approval):SCourse outline form version: 09/08/2021S

September 2014 September 2023 September 2028

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENGR 210		Number of	Credits:	5 Course credit policy (10	<u>)5)</u>
Course Full Title: Circuit Analysis					
Course Short Title:					
Faculty: Faculty of Applied and Technical St	udies	Departmen	t (or prog	gram if no department):	Physics
Calendar Description:					
Basic laws, current, voltage, power; DC circuits, network theorems, netw application of phasors and complex algebra in steady-state response; ba Laplace transform, two-port networks.				is; transients, AC circuits etic circuits, transformers;	, resonance, use and frequency response,
Prerequisites (or NONE): PHYS 112.					
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):	PHYS 221.				
Antirequisite Courses (Cannot be taken for	additional crea	dit.)	Course	Details	
Former course code/number:			Special	Topics course: No	
Cross-listed with:			(If yes, the course will be offered under different letter		ed under different letter
Equivalent course(s):			Directer	d Study course: No	
(If offered in the previous five years, antirequ	isite course(s)	will be	(See	policy 207 for more inform	nation.)
for the antirequisite course(s) cannot take this	e that students s course for fur	with credit ther credit.)	Grading	System: Letter grades	,
		,	Delivery	/ Mode: May be offered i	in multiple delivery modes
Typical Structure of Instructional Hours			Expecte	ed frequency: Annually	
Lecture/seminar		75	Maximu	im enrolment (for informa	tion only) : 18
Supervised laboratory hours (science lab)		30	Drier L		d Decognition (DLAD)
				earning Assessment an	a Recognition (PLAR)
				s available for this course	
	T	105			
	lotal nours	105	Transfer Credit (See <u>bctransferguide.ca</u> .)		<u>rguide.ca</u> .)
Scheduled Laboratory Hours			Transfe	r credit already exists: Ye	es
Labs to be scheduled independent of lecture	hours: 🛛 No	D 🗌 Yes	Submit (If yes	outline for (re)articulation s, fill in <u>transfer credit forn</u>	: Yes <u>n</u> .)
Department approval			·	Date of meeting:	February 14, 2022
Faculty Council approval				Date of meeting:	April 14, 2022
Undergraduate Education Committee (UEC	C) approval			Date of meeting:	September 23, 2022

AGENDA ITEM # 3.2.

Learning Outcomes (These should contribut	te to students' ability	to meet program outcom	nes and thus Institutional	Learning Outcomes
Upon successful comp	letion of this course, st	udents will be able to	:		-
1. Describe key	circuit elements includ	ing resistors, capacite	ors, inductors, transforme	ers, dependent and indep	endent power
 State the function needed for circle in the function of the funct	damental laws (Kirchho rcuit design and analys rical circuits containing equations using softwa h steady state and tran ric nower in DC and A	ff's Laws) and theore is. a variety of circuit el re, such as MATLAB sient responses in 1s circuits	ms (Thevenin/Helmholtz ements using the basic la st and 2nd order circuits.	z's and Norton/Helmholtz' aws, theorems, and techr	s equivalences) niques.
 Analyze simp Compare the 	le circuits in frequency theoretical results with	domain. measurements.			
Recommended Evalu	ation Methods and W	leighting (Evaluation	n should align to learning	outcomes.)	
Final exam:	40%	Assignments:	15%	Quizzes/tests:	25%
Lab work:	20%		%		%
Deteller					
Jelans.					
exts and Resource	Materials (Include onli	ne resources and Inc	ligenous knowledge sour	rces. <u>Open Educational R</u>	esources (OER)
Fexts and Resource I should be included wh	Materials (Include onli enever possible. If mor	ne resources and Inc re space is required,	igenous knowledge sour use the <u>Supplemental Te</u>	rces. <u>Open Educational R</u> exts and Resource Materi	<u>esources</u> (OER) <u>als form</u> .)
Texts and Resource I should be included wh Type 1 Textbook	Materials (Include onli enever possible. If mor Author or deso	ne resources and Inc re space is required, cription	ligenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio	rces. <u>Open Educational R</u> exts and Resource Materi on/access details	esources (OER) als form.) Year
Texts and Resource I should be included wh Type 1. Textbook	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an	ne resources and Inc re space is required, cription d S.A. Riedel	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0)	<u>Resources</u> (OER) <u>als form</u> .) <u>Year</u> 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Elec	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits	Vesources (OER) ials form.) Year 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3.	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits	Resources (OER) als form.) Year 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4.	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits	Vesources (OER) als form.) Year 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5.	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits	Vesources (OER) als form.) Year 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander Supplies and Material	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits thing, etc.)	Resources (OER) als form.) Year 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits thing, etc.)	Resources (OER) als form.) 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander Supplies and Material	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	Resources (OER) als form.) 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander Supplies and Material Topics	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	Resources (OER) als form.) 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and Basic circuit v Techniques o	Materials (Include onli enever possible. If mor Author or deso J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti f circuit analysis (noda	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational R</u> exts and Resource Materi on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included where Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional State None. Course Content and Techniques of theorem)	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti f circuit analysis (noda	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits I analysis, mesh anal	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materional Resource Materion</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included where Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional State None. Course Content and To Basic circuit w Techniques of theorem) Inductance, c	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal l inductance	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materional Resource Materion</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional 3 None. Course Content and 7 • Basic circuit v • Techniques of theorem) • Inductance, c	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua first-order RL and RC o	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku d S. (Software, hardwa ve circuits I analysis, mesh anal I inductance circuits	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and Basic circuit w Techniques o theorem) Inductance, c Response of Natural and s	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti of circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal il inductance circuits circuits	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and S Basic circuit w • Techniques of theorem) • Inductance, c • Response of • Natural and s • Sinusoidal stet thoacom)	Materials (Include onlii enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits I analysis, mesh anal I inductance circuits circuits asors, nodal analysis	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	Action of the second se
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and T Basic circuit w Techniques of theorem) Inductance, c Response of Natural and s Sinusoidal ste theorem)	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti of circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits I analysis, mesh anal I inductance circuits circuits asors, nodal analysis	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformati	rces. <u>Open Educational Rests and Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	Aesources (OER) als form.) 2014 2017
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and T Basic circuit w Techniques of theorem) Inductance, c Response of Natural and s Sinusoidal ste theorem) Magnetically of Basic concep	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti of circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph coupled circuits ts and performance ch	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal l inductance circuits circuits asors, nodal analysis	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformati	rces. <u>Open Educational Resource Materion</u> (axts and Resource Materion) (actric Circuits (bing, etc.) (bing, etc.) (con, superposition, Theven (transformation, Thevenin	Aesources (OER)
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and S Basic circuit W • Techniques of theorem) • Inductance, c • Response of • Natural and s • Sinusoidal stee theorem) • Magnetically • Basic concep • Sinusoidal stee • Sin	Materials (Include onlii enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph coupled circuits ts and performance ch eady-state power calcu	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal l inductance circuits circuits asors, nodal analysis aracteristics of transf lations	igenous knowledge sour use the <u>Supplemental Te</u> Title and publicatio Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformati , mesh analysis, source	rces. <u>Open Educational Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and T Basic circuit w Techniques of theorem) Inductance, c Response of Natural and s Sinusoidal stee theorem) Magnetically w Basic concep Sinusoidal stee Frequency re	Materials (Include onli enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph coupled circuits ts and performance ch eady-state power calcu sponse	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal l inductance circuits asors, nodal analysis aracteristics of transf lations	igenous knowledge sour use the <u>Supplemental Te</u> Title and publication Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformation, mesh analysis, source	rces. <u>Open Educational Resource Materion</u> (on/access details (0) (actric Circuits (thing, etc.) (fon, superposition, Theven (transformation, Thevenin	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and S Basic circuit w • Techniques of theorem) • Inductance, c • Response of • Natural and s • Sinusoidal ste theorem) • Magnetically • Basic concep • Sinusoidal ste theorem)	Materials (Include onlii enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti if circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph coupled circuits ts and performance ch eady-state power calcu sponse form	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits l analysis, mesh anal l inductance circuits circuits asors, nodal analysis aracteristics of transf lations	igenous knowledge sour use the <u>Supplemental Te</u> <u>Title and publication</u> Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformation, mesh analysis, source	rces. <u>Open Educational Resource Materion</u> (on/access details (0) (actric Circuits (thing, etc.) (thing, etc.) (transformation, Thevenin	nin and Norton
Texts and Resource I should be included wh Type 1. Textbook 2. Textbook 3. 4. 5. Required Additional S None. Course Content and Basic circuit w Techniques of theorem) Inductance, c Response of Natural and s Sinusoidal ste theorem) Magnetically Basic concep Sinusoidal ste theoremy Laplace trans Two-port netw	Materials (Include onlii enever possible. If mor Author or desc J.W. Nilsson an C.K. Alexander Supplies and Material Topics variables, simple resisti of circuit analysis (noda apacitance, and mutua first-order RL and RC of tep responses of RLC eady-state analysis (ph coupled circuits ts and performance ch- eady-state power calcu sponse form work	ne resources and Inc re space is required, cription d S.A. Riedel and M. Sadiku s (Software, hardwa ve circuits I analysis, mesh anal I inductance circuits circuits asors, nodal analysis aracteristics of transf lations	igenous knowledge sour use the <u>Supplemental Te</u> <u>Title and publicatio</u> Electric Circuits (E10 Fundamentals of Ele re, tools, specialized clot ysis, source transformati	rces. <u>Open Educational Rests and Resource Materi</u> on/access details 0) ectric Circuits thing, etc.)	nin and Norton

Memo for Course Changes

To: FSCC, SFC, UEC

From: Lin Long, Department head, Physics

Date: Feb 14, 2022

Subject: Proposal for revision of ENPH 310 (Electronics)

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - □ Six-year review
 - □ Number and/or course code
 - ⊠ Credits and/or total hours
 - □ Title
 - \boxtimes Calendar description
 - ☑ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - □ Delivery methods and/or texts and resource materials
 - ☑ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - \Box Other Please specify:
- 2. Rationale for change:
 - ENPH 310 (Electronics) is normally taken by both physics and engineering students. With the Engineering Physics diploma program to be revised, PHYS 232 (Experimental Methods in Physics) will be an elective (rather than required) course. Adding ENGR 210 (Circuit Analysis) as pre/corequisite will allow engineering students to take ENPH 310.
 - ENPH 310 includes lectures and labs. Due to the nature of the topics covered in this course, 57 hours of lectures and 18 hours of labs were not enough to adequately address all the required materials. Both the instructors and students requested additional hours in this course so that more materials/topics could be covered, and more lab time available for hands-on training. As a result, we have increased the hours in both lectures (75 hours) and labs (30 hours), and to compensate for the additional time, the course credit has been increased to 5.
 - The LOs are updated to reflect the added course materials and activities.
 - With the increase in experiments, the lab work portion is increased in the evaluation weighting.
 - The calendar description is re-arranged to be clearer and updated to reflect the added course contents.
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

There is no change in learning outcomes.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No

- Which program areas have been consulted about the change(s)? Not applicable.
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan</u>, <u>Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

This course aligns and contributions in several ways according to the First Peoples' Principles of Learning. It has significant hands-on training and practice, which give students opportunity to share knowledge and approaches with each other and reflect on one's practice. The skills learned from the course allow students to work in real-world projects including working with Indigenous communities when such opportunities arise.

7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?

This course attracts diverse students who are interested in electronics and want to improve their hands-on skills. Assignment design, topic selection, and curriculum delivery are designed under the principle of equity, diversity, and inclusion. A significant portion of the grade is from labs (hands-on) and assignments (which allow time for reflection), so diverse strengths are enabled to excel.

- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
 Due to the limitation in lab space and equipment, the class size has to be limited to 18 students.
- 9. Estimate of the typical costs for this course, including textbooks and other materials: About \$150.

CWC comments and responses:

- Is there a more descriptive title that could be used, rather than just "Electronics"? *Yes, we can use "Microelectronics"*.
- How did the PHYS 232 pre/corequisite fit in previously? PHYS 232 (Experimental methods in physics) includes some course materials in basic electric circuits and focuses on experiments and data analysis, which help the students to succeed in ENPH 310.



ORIGINAL COURSE IMPLEMENTATION DATE:SREVISED COURSE IMPLEMENTATION DATE:SCOURSE TO BE REVIEWED (six years after UEC approval):SCourse outline form version: 09/08/2021S

September 2014 September 2023 September 2028

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENPH 310		Number of	Credits:	5 Course credit policy (1	<u>05)</u>
Course Full Title: Microelectronics					
Course Short Title:					
Faculty: Faculty of Applied and Technical St	udies	Departmen	t (or prog	ram if no department):	Physics
Calendar Description:					
Time and frequency domain analysis of linear and nonlinear electronic c operational amplifiers, feedback and stability of amplifiers, oscillators and instrumentation.				sing and small signal ana ers, digital circuits, D/A a	alysis of transistor amplifiers, and A/D conversion,
Prerequisites (or NONE): PHYS 221.					
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):	PHYS 232 or	. ENGR 210.			
Antirequisite Courses (Cannot be taken for	additional crea	dit.)	Course	Details	
Former course code/number:			Special	Topics course: No	
Cross-listed with:			(If yes desig	s, the course will be offer nations representing diffe	ed under different letter
Equivalent course(s): PHYS 332 and PHYS	342		Directer	d Study course: No	
(If offered in the previous five years, antirequ	isite course(s)	will be	(See	policy 207 for more infor	mation.)
for the antirequisite course(s) cannot take this	e that students s course for fur	with credit ther credit.)	Grading	System: Letter grades	
			Delivery	Mode: May be offered	in multiple delivery modes
Typical Structure of Instructional Hours			Expecte	ed frequency: Annually	
Lecture/seminar		75	Maximum enrolment (for information only): 18		
Supervised laboratory hours (science lab)		30	Prior L	arning Assessment ar	ad Recognition (PLAR)
			PI AR is	available for this course	
			1 Es avene		
	Total hours	105	Transfe	r Cradit (See betransfe	
		II	Transfe	r credit already exists: V	<u>arguide.ca</u> ./
Scheduled Laboratory Hours			Subreit	outling for (re)erticulation	Veo
Labs to be scheduled independent of lecture	hours: 🛛 No	⊃ □ Yes	(If yes	s, fill in <u>transfer credit for</u>	n: Yes <u>m</u> .)
Department approval				Date of meeting:	February 14, 2022
Faculty Council approval				Date of meeting:	April 14, 2022
Undergraduate Education Committee (UE	C) approval			Date of meeting:	September 23, 2022

Upon successfu 1. Analyz 2. Design 3. Constr 4. Use D/ 5. Manag 6. Simula 7. Explain	completion of this course, s e existing analog and digital specific analog and digital e ict physical analog and digital A and A/D conversion profici e the devices, tools, and elec e electronic circuits using in how various basic electroni	electronic circuits at the lectronic circuits at the lectronic circuits at the la circuits using individuently.	block level.	ies and thus motional L	eaning Oucomes
 Analyz Design Constr Use D/ Manag Simula Explain 	e existing analog and digital specific analog and digital e ict physical analog and digital and A/D conversion profici the devices, tools, and elec e electronic circuits using in how various basic electroni	electronic circuits at the lectronic circuits at the al circuits using individu ently.	block level.		
 Analyz Design Constr Use D/ Manag Simula Explair 	existing analog and digital specific analog and digital ect physical analog and digit A and A/D conversion profici e the devices, tools, and elect e electronic circuits using in how various basic electroni	electronic circuits at the lectronic circuits at the al circuits using individu ently.	DIOCK IEVEI.		
 Constr Use D/ Manag Simula Simula 	Ict physical analog and digit A and A/D conversion profici e the devices, tools, and elec e electronic circuits using in how various basic electroni	al circuits using individue ently.			
4. Use D/ 5. Manag 6. Simula 7. Explair	A and A/D conversion protici the devices, tools, and elev e electronic circuits using in how various basic electroni	iently.	al electronic compone	nts.	
6. Simula 7. Explair	e electronic circuits using in how various basic electroni	ctronic components in a	basic electronics labo	ratory.	
7. Explair	how various basic electroni	dustry standard software	e tools.		
		c components work at b	oth a fundamental and	d a practical level.	
Recommended	Evaluation Methods and V	Neighting (Evaluation s	should align to learning	g outcomes.)	
Final exam:	40%	Assignments:	15%	Quizzes/tests:	25%
Lab work:	20%		%		%
Details:				I	
NOTE: The foll	owing sections may vary b	y instructor. Please se	e course syllabus av	vailable from the instruct	tor.
Texts and Reso	urce Materials (Include onl	ine resources and Indig	enous knowledge sou	rces. <u>Open Educational Re</u>	esources (OER)
should be includ	ed whenever possible. If mo	re space is required, us	e the <u>Supplemental To</u>	exts and Resource Materia	<u>als form</u> .)
Type 4 Touthoolu	Author or des	cription	Title and publication	on/access details	Year
1. Lextbook	Sedra / Smith		Microelectronic Circ	uits, 7e	2014
2.					
3.					
A					
4. 5					
4. 5. Required Addit	ional Sunnlies and Materia	Is (Software hardware	tools specialized clo	thing etc.)	
4. 5. Required Addit	ional Supplies and Materia	IIs (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addit Course Conten • Signals	ional Supplies and Materia t and Topics and amplifiers	ıls (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addit Course Conten Signals	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics	IIs (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addin Course Conten • Signals • Diodes • Binolar	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics	ıls (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addit Course Conten • Signals • Diodes • Bipolar • MOS E	t and Topics and amplifiers and semiconductor physics Junction Transistors	ıls (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addit Course Conten • Signals • Diodes • Bipolar • MOS F	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors eld Effect Transistors	IIS (Software, hardware,	, tools, specialized clo	thing, etc.)	
 4. 5. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integral 	ional Supplies and Materia and Topics and amplifiers and semiconductor physics Junction Transistors leld Effect Transistors onal Amplifiers	ıls (Software, hardware,	, tools, specialized clo	thing, etc.)	
 F. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integrat 	tonal Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors eld Effect Transistors onal Amplifiers ted - circuit amplifiers	Ils (Software, hardware,	, tools, specialized clo	thing, etc.)	
5. Required Addit Course Conten Signals Diodes Bipolar MOS F Operat Integra Power	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors led Effect Transistors onal Amplifiers red - circuit amplifiers amplifier	IIS (Software, hardware,	, tools, specialized clo	thing, etc.)	
 F. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integrat Power Freque 	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors eld Effect Transistors onal Amplifiers ed - circuit amplifiers amplifier ncy response	Ils (Software, hardware,	, tools, specialized clo	thing, etc.)	
 F. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integrat Power Frequet Digital 	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors eld Effect Transistors onal Amplifiers ed - circuit amplifiers amplifier ncy response circuits	ıls (Software, hardware,	, tools, specialized clo	thing, etc.)	
 F. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integrat Power Freques Digital D/A an 	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors field Effect Transistors onal Amplifiers and - circuit amplifiers amplifier ncy response circuits d A/D conversion	Ils (Software, hardware,	, tools, specialized clo	thing, etc.)	
 F. Required Addit Course Content Signals Diodes Bipolar MOS F Operat Integrat Power Freque Digital D/A an Filters 	ional Supplies and Materia t and Topics and amplifiers and semiconductor physics Junction Transistors eld Effect Transistors onal Amplifiers ad - circuit amplifiers amplifier ncy response circuits d A/D conversion and tuned amplifiers	Ils (Software, hardware,	, tools, specialized clo	thing, etc.)	

Memo for Course Changes

To: FSCC, SFC, UEC

From: Lin Long, Department head, Physics

Date: Feb 14, 2022

Subject: Proposal for revision of ENPH 320 (Fundamentals of Digital Logic and Design)

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - □ Six-year review
 - □ Number and/or course code
 - □ Credits and/or total hours
 - 🛛 Title
 - \boxtimes Calendar description
 - ☑ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - □ Delivery methods and/or texts and resource materials
 - □ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - \Box Other Please specify:
- 2. Rationale for change:
 - The title (formerly "Electronics II") is changed to "Fundamentals of Digital Logic and Design" to reflect the course contents more closely.
 - The calendar description is re-arranged and updated to reflect the course contents being taught.
 - ENPH 320 (Fundamentals of Digital Logic and Design) covers mainly digital logic circuits, and previous instructors have determined that students do not actually require ENPH 310 (Electronics I: Analog) as a prerequisite, as students are able to succeed in ENPH 320 without analog electronics knowledge. Knowledge and programming skills in any of ENGR 153 (Structured programming for engineers), COMP 150 (Introduction in Programming), and COMP 152 (Introduction to Structured Programming) will prepare the students to take ENPH 320. Either ENGR 210 (Circuit Analysis) or PHYS 232 (Experimental Methods in Physics) will ensure the students have enough circuits/electronics knowledge and lab skills to succeed in this course.
 - The course contents and learning outcomes have been updated based on how the course has been and will be taught.
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>

There are no substantial changes to the learning outcomes. There are only some minor changes in re-wording.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No.

- Which program areas have been consulted about the change(s)? Not applicable.
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP</u>).

This course aligns and contributions in several ways according to the First Peoples' Principles of Learning. It has significant labs and project portion. The students will demonstrate and present their projects where they share their approaches to solving problems in the projects, while peer feedback provides opportunities to reflect on one's practice. The project component also allows for students' creativity and thus they are able to pursue a personalized direction of learning.

7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?

Assignment design, topic selection, and curriculum delivery in this course are developed under the principles of equity, diversity, and inclusion. The distribution of grades is across labs (experiential), assignments (reflective), project (creative) and testing, giving a variety of academic strength types of the opportunity to excel. This course attracts students who want to improve their hands-on skills and enjoy experiential learning. Team-based labs and projects incorporate peer feedback and students' reflecting on each other's work.

- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
 Due to the limitation in lab space and equipment, the class size has to be limited to 18 students.
- Estimate of the typical costs for this course, including textbooks and other materials: About \$150

CWC comment and response:

 Is there data to support the memo comment that students do not require ENPH 310 as a prerequisite?

In the past, there were a few students from CIS who didn't take ENPH 310 but the instructor waived pre-requisite for them to register ENPH 320, and they succeeded in this course. An equivalent course in SFU's Engineering Physics degree, ENSC 252-4, only has one of the 1st year programming or computer science course as pre-requisite and doesn't have any analog electronics course as pre-requisite.



ORIGINAL COURSE IMPLEMENTATION DATE:SetREVISED COURSE IMPLEMENTATION DATE:SetCOURSE TO BE REVIEWED (six years after UEC approval):SetCourse outline form version: 09/08/2021Set

September 2014 September 2023 September 2028

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENPH 320		Number of	Credits:	4 Course credit policy (10	<u>05)</u>
Course Full Title: Fundamentals of Digital L	ogic and Desig	IN			
Course Short Title: Digital Logic and Design	ו	1			
Faculty: Faculty of Applied and Technical St	udies	Departmen	t (or prog	gram if no department):	Physics
Calendar Description:					
Boolean algebra, encoders, decoders, shift re Design of asynchronous circuits, synchronou tables and diagrams, and introduction to proc	egisters, and as s sequential cir grammable logi	synchronous and finct	and synch nite state	nronous counters togethe machines. Karnaugh ma	r with timing considerations. pping techniques, state
Prerequisites (or NONE): One of (ENGR 153, COM			P 150, or (COMP 152).	
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):	ENGR 210 o	r PHYS 232.			
Antirequisite Courses (Cannot be taken for	additional crea	dit.)	Course	Details	
Former course code/number:			Special	Topics course: No	
Cross-listed with:			(If yes desig	s, the course will be offen nations representing diffe	ed under different letter
Equivalent course(s): PHYS 362 and PHYS	372		Directer	d Study course: No	irent topics.)
(If offered in the previous five years, antirequ	isite course(s)	will be	(See	policy 207 for more infor	mation.)
for the antirequisite course(s) cannot take thi	e that students s course for fur	with credit rther credit.)	Grading	System: Letter grades	
			Delivery	Mode: May be offered	in multiple delivery modes
Typical Structure of Instructional Hours			Expecte	ed frequency: Annually	
Lecture/seminar		45	Maximum enrolment (for information only): 18		
Supervised laboratory hours (science lab)		30	Prior L	earning Assessment an	d Recognition (PLAR)
				e available for this course	
	Total hours	75	Turnet		unida es l
	Total fielding			er Credit (See <u>octransfe</u>	rguide.ca.)
Scheduled Laboratory Hours			I ranste	r creait aiready exists: Ye	25
Labs to be scheduled independent of lecture	hours: 🛛 No	o 🗌 Yes	Submit (If yes	outline for (re)articulation s, fill in <u>transfer credit forr</u>	:: Yes <u>n</u> .)
Department approval			·	Date of meeting:	February 14, 2022
Faculty Council approval				Date of meeting:	April 14, 2022
Undergraduate Education Committee (UE	C) approval			Date of meeting:	September 23, 2022

AGENDA ITEM # 3.2.

Learning Upon suc 1. / 2. [3. (4. § 5. [6. (7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Outcomes (The ccessful completi Analyze existing Design digital log Construct electro Simulate digital I Design and cons	ese should contribution of this course, st	te to students' ability	to meet program outcon	nes and thus Institutional L	earning Outcomes
Upon suc 1. / 2. [3. (4. 5 5. [6. (8 Recomm	ccessful completi Analyze existing Design digital log Construct electro Simulate digital I Design and cons	ion of this course, st				
1. / 2. [3. (4. § 5. [6. (7 8	Analyze existing Design digital log Construct electro Simulate digital I Design and cons		udents will be able t	0:		
Recomm	Communicate to authentic forms	digital logic circuits. gic circuits for use in onic circuits using in ogic circuits using in struct projects which both a technical an of the discipline.	, n specific tasks. dividual electronic c ndustry standard sof synthesize numero d non-technical aud	omponents and field prog tware. us aspects of digital circu ence the purpose, behav	rammable gate arrays (FF its. iour, and function of the pr	PGAs) roject using
	ended Evaluati	on Methods and W	leighting (Evaluation	n should align to learning	outcomes.)	
Final exa	am:	40%	Assignments:	15%	Quizzes/tests:	20%
Lab wor	k:	15%	Project:	10%		%
NOTE: The second should be	he following se d Resource Ma	ctions may vary by terials (Include online)	y instructor. Please ne resources and In re space is required.	see course syllabus av digenous knowledge sou use the Supplemental To	vailable from the instruct rces. <u>Open Educational Re</u> exts and Resource Materia	or. <u>esources</u> (OER) als form.)
Туре	9	Author or desc	cription	Title and publication	on/access details	Year
1. Textb	book	Morris Mano	•	Digital design, 6e		2017
2.						
3.						
4						
4. 5. Required	l Additional Su	oplies and Material	Is (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C	I Additional Sup Content and Top	pplies and Material oics	l s (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C	d Additional Sup Content and Top Digital systems a	pplies and Material pics and binary numbers	ls (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [I Additional Sup Content and Top Digital systems a Boolean algebra	pplies and Material pics and binary numbers and logic gates	l s (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [• [d Additional Sup Content and Top Digital systems a Boolean algebra Combinational logic	pplies and Material pics and binary numbers and logic gates ogic	Is (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [• [•]	I Additional Sup Content and Top Digital systems a Boolean algebra Combinational lo Sequential logic Registers and co	pplies and Material pics and binary numbers and logic gates ogic	ls (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [• [• [• [• [d Additional Sup Content and Top Digital systems a Boolean algebra Combinational lo Sequential logic Registers and co Analog/digital co	pplies and Material pics and binary numbers and logic gates ogic ounters nversion	ls (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [• [• [• [•]	I Additional Sup Content and Top Digital systems a Boolean algebra Combinational lo Sequential logic Registers and co Analog/digital co Memory and pro	pplies and Material pics and binary numbers and logic gates ogic ounters nversion grammable logic	ls (Software, hardwa	are, tools, specialized clo	thing, etc.)	
4. 5. Required Course C • [• [• [• [•] •]	Additional Sup Content and Top Digital systems a Boolean algebra Combinational lo Combinational logic Registers and co Analog/digital co Memory and pro Digital design us	pplies and Material pics and binary numbers and logic gates ogic ounters inversion grammable logic ing different digital o	Is (Software, hardwa	are, tools, specialized clo	thing, etc.)	

Memo for Course Changes

To: FSCC, SFC, UEC

From: Lin Long, Department head, Physics

Date: Feb 14, 2022

Subject: Proposal for revision of ENPH 340 (formerly ENGR 340), Microcontrollers and Embedded Systems

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - □ Six-year review
 - ⊠ Number and/or course code
 - □ Credits and/or total hours
 - 🛛 Title
 - $\boxtimes\,$ Calendar description
 - ☑ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ⊠ Learning outcomes
 - ☑ Delivery methods and/or texts and resource materials
 - ☑ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - \Box Other Please specify:

2. Rationale for change:

- This course can normally be taken by both physics and engineering students. However, as upper level "ENGR" courses are not counted as Physics program upper-level credits, we felt this unfairly limited course options for physics students. Changing the course code to "ENPH" should help to alleviate this inequity. Furthermore, the prefix change will attract more physics students who want to improve their hands-on skills, but require more upper level credits towards their degree.
- "Microcontrollers" has broader concepts and applications than "Micro-Processors". The title has been changed to "Microcontrollers and Embedded Systems" to reflect the evolving technology and the way the course is currently being taught.
- The updates in the calendar description include some re-wording of the course contents and one added topic (basic concepts of sensors and actuators).
- ENPH 320 (Fundamentals of Digital Logic and Design) will give students sufficient knowledge and lab/project skills for this course, so ENPH 310 (Electronics) is no longer needed as a prerequisite. COMP 150 (Introduction to Programming) or COMP 152 (Introduction to Structured Programming) is prerequisite for ENPH 320, so they are not needed as prerequisite for ENPH 340.

- The learning outcomes are updated to reflect the course contents being taught, and we have added one more content section (basic concepts of sensors and actuators). There was also some re-wording and re-grouping to make the LOs clearer. Also, as the HCS12 microcontroller is now discontinued, we have deleted it from the learning outcomes.
- The discontinuation of the HCS12 microcontroller has now pushed the ARM technology as one of the new mainstream microprocessors. Accordingly, textbooks are updated to match the new microcontroller.
- This course is lab/project oriented. The updates in the instructional hours (lectures and labs ratio) and evaluation methods/weighing reflect how the course has been taught, as well putting a higher emphasis on the experimental aspect of the course.
- There are some re-wording/regroupings in the course contents. The course contents have also been updated to reflect how the course is currently being taught, with one added topic (basic concepts of sensors and actuators).
- If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

No major changes in learning outcomes. There are some minor updates in re-wording/regrouping and one added topic.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No

- Which program areas have been consulted about the change(s)? Not applicable
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan, Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP</u>).

In this course, the team-based labs/projects will provide students opportunities to share their knowledge/approaches to each other as well as to reflect on one's practice. The skills learned from the course allow students to work in real-world projects and practice including working with Indigenous communities when such opportunities arise.

7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?

This course attracts students who are interested to improve their hands-on and problem-solving skills. The wide range of project options give diverse students flexibility and opportunities. The diverse curriculum delivery (lectures, labs, team work, project

proposal/demonstration/presentations) facilitates students' success under the principles of equity, diversity, and inclusion.

- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
 Due to the limitation in lab space and equipment, the class size has to be limited to 18 students.
- Estimate of the typical costs for this course, including textbooks and other materials: About \$150

CWC comment and response:

Suggest changing the Physics program to allow ENGR courses to be used, rather than changing the course code to ENPH.
 In UBC Physics degree program, PHYS 319 is a course on "Introduction to Embedded Systems Using Microcontrollers and the MSP430" and taken by physics students. So changing this

course's title to "ENPH" will benefit physics students. We don't want to allow ENGR courses to be counted as Physics upper level credits because not all ENGR courses are suitable for physics program, such as, ENGR 330 (Automatic Control Systems) and ENGR 350 (Sensors and Actuators) are for engineering stream.



ORIGINAL COURSE IMPLEMENTATION DATE:SepREVISED COURSE IMPLEMENTATION DATE:SepCOURSE TO BE REVIEWED (six years after UEC approval):SepCourse outline form version:09/08/2021

September 2014 September 2023 September 2028

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENPH 340		Number of	Credits:	4 Course credit policy (1	<u>05)</u>
Course Full Title: Microcontrollers and Emb Course Short Title: Microcontrollers & Embe	edded Systems ed Syst	5			
Faculty: Faculty of Applied and Technical St	udies	Departmen	t (or prog	gram if no department):	: Physics
Calendar Description:					
Introduction of the design and construction of to embedded systems using microcontrollers	microprocesso C and assemi	or-controlled of bly language	devices. B programm	asic concepts of sensors ing.	s and actuators. Introduction
Note: Students with credit for ENGR 340 can	not take this co	ourse for furth	er credit.		
Prerequisites (or NONE): ENPH 320.					
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):					
Antirequisite Courses (Cannot be taken for	additional crea	dit.)	Course	Details	
Former course code/number: ENGR 340			Special	Topics course: No	
Cross-listed with:			(If yes	s, the course will be offer	red under different letter
Equivalent course(s):			Director	nations representing unit	erent topics.)
(If offered in the previous five years, antirequ	isite course(s)	will be	(See	policy 207 for more infor	mation)
included in the calendar description as a note for the antirequisite course(s) cannot take thi	e that students s course for fur	with credit ther credit.)	Grading	System: Letter grades	
			Delivery	Mode: May be offered	in multiple delivery modes
Typical Structure of Instructional Hours			Expecte	ad frequency: Annually	
Lecture/seminar		21	Maximu	m enrolment (for inform	ation only) · 18
Supervised laboratory hours (science lab)		54	D in 1		
				earning Assessment ar	a Recognition (PLAR)
			PLAR IS	s available for this course	Э.
	Tatalhau	75			
L	i otal nours	/5	Transfe	er Credit (See <u>bctransfe</u>	erguide.ca.)
Scheduled Laboratory Hours			Transfe	r credit already exists: N	0
Labs to be scheduled independent of lecture	hours: 🛛 No	⊃ 🗌 Yes	Submit (If yes	outline for (re)articulatior s, fill in <u>transfer credit for</u>	n: Yes <u>m</u> .)
Department approval				Date of meeting:	February 14, 2022
Faculty Council approval				Date of meeting:	April 14, 2022
Undergraduate Education Committee (UE	C) approval			Date of meeting:	September 23, 2022

AGENDA ITEM # 3.2.

Upon successful completion of this course, students will be able to: Analyze the architecture of a microcontroller. Describe advanced addressing modes, macros and modules. Write programs using C and assembly language. Explain basic concepts of sensors and actuators. Describe advanced addressing modes, macros and modules. Write programs using C and assembly language. Design imple embedded systems. Design and construct projects using a microcontroller, sensor(s), motor(s), and electronic components. Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Details: MOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Type Author or description Title and publication/access details Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics Advanced addressing modes, macros, and modules Advanced a	259 9 7 <u>ces</u> (OER) 7 <u>m.</u>) Year 2010 2005
Analyze the architecture of a microcontroller. Describe arithmetic logic instructions and programs. Describe advanced addressing modes, macros and modules. Withe programs using C and assembly language. Explain basic concepts of sensors and actuators: Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Describe interface programs in a second digital I/O, timer/counter programming. Second digital construct programs is a second digital to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Materials (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Materials (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Materials (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Include online resources and Indigenous knowledge sources: <u>Open Educational Resources</u> (Include online resources and Indigenous knowledge sources and Resource Materials (Include online resources and Indigenous knowledge sources: <u>Open Educational</u>	259 9 7 7 7 7 7 7 7 7 8 7 9 9 9 9 9 9 9 9
 Describe arithmetic logic instructions and programs. Describe advanced addressing modes, macros and modules. Write programs using C and assembly language. Explain basic concepts of sensors and actuators. Describe interface with analog and digital I/O, timer/counter programming. Describe interface with analog and digital I/O, timer/counter programming. Descripts in programs using C and assembly any and concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Top Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the Instructor. Text and Resource Materials (Include online resources and Indigenous knowledge sources. One Educational Resources (0 should be included whenever passible. If more space is required, use the Supplemental Toxis and Resources (1 should be included whenever passible. If more space is required, use the Supplemental Toxis and Resources (1 should be included whenever passible. If more space is required, use the Supplemental Toxis and Resources (1 should be included whenever passible. If more space is required, use the Supplemental Toxis and Resources (2 should be included whenever passible. If more space is required, use the Supplemental Toxis and Resources (2 should be included whenever passible. If more space is required at the state of the	259 9 7 7 7 7 7 7 7 7 7 7 7 7 8 7 7 7 7 7
 Describe advanced addressing modes, macros and modules. Write programs using C and assembly language. Explain basic concepts of sensors and actuators. Descip simple embedded systems. Design simple embedded systems. Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tesis: Ow (Final exam: Lab work: 30% Project: NOTE: The following sections may vary by instructor. Please see course syllabus available from the Instructor. Type Author or description Title and publication/access details (Include online resources and Indigenous knowledge sources. Quen Educational Resources (Source Materials (Include online resources and Indigenous knowledge sources. Quen Educational Resources (Source Materials (Include online resources and Indigenous knowledge sources.) Type Author or description Title and publication/access details Textbook Edward H. Currie, David Van Es PSoC2/S Reference Book Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. 4. 5. Course Content and Topics 1. Introduction to microprocessor systems 2. Netwoortholler architectures 3. Advanced addressing modes, macros, and modules 3. Assembly language programming 3. Advanced addressin	259 9 7 <u>rces</u> (OER) 9 <u>77</u> 2010 2005
 write programs using C and assembly anguage. Explain basic concepts of sensors and actuators. Describe instrace with analog and digital I/O, timer/counter programming. Design and construct projects using a microcontroller, sensor(s), motor(s), and electronic components. Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% One NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Textbook Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book Trestbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book Tendetorial Control on the subclearing outpoint of the and publicational courses PSoC 3. The necessary laboratory equipment will be provided to the students. Course Control and Toppics Nores of the students. Course Control on the interoprocessor systems Microduction to microprocessor systems Author to processory systems Microduction to microprocessor systems Author to programming C programming for microprocessor systems Author to programming Author programming C programming for microprocessor systems Authorace addressing modes, macces, and modules Buttoduction to microprocessor systems Authorace addressing modes, macces, and modules Buttoduction of a major laboratory programming Authorace addressing modes, macces, and modules Buttoduction of a major laboratory program device programming, and interrupts Exportage modes macces, and modules Bu	259 9 7 7 7 7 7 7 7 7 7 7 7 9 7 9 7 9 7 9
 e. Describe interface with analog and digital I/O, timer/counter programming. Design and construct projects using a microcontroller, sensor(s), motor(s), and electronic components. Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: <u>5%</u> Quizzes/tests: <u>10%</u> Final exam: Lab work: <u>30%</u> Project: <u>30%</u> Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (should be included whenever possible. If more space is required, use the <u>Supplemental Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (should be included whenever possible. If more space is required, use the <u>Supplemental Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (should be included whenever possible. If more space is required, use the <u>Supplemental Texts and Resource Materials (more space is required, use the Supplemental Texts and Resource Materials (more space is required, use the <u>Supplemental Texts and Resource Materials (more space is required, use the Supplemental Texts and Resource Materials (more space is required, use the <u>Supplemental Texts and Resource Materials (more space is required, use the Supplemental Texts and Resource Materials (more space is required and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/S Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. 4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.</u></u></u></u></u>	259 9 7 7 7 7 7 7 7 7 7 7 8 7 9 7 9 7 9 7
To Design simple embedded systems. Design and construct projects using a microcontroller, sensor(s), motor(s), and electronic components. Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resource (Instructor, Press) Type Author of description Title and publication/access details Textbook Edward H. Currle, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. ERequired Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. EOurse Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming from encoronales 3. Assembly language programming 4. C programming from succoons, and modules 3. Assembly language programming 4. C programming from encoronales 5. Interfacing with I/O device; and sessions dedicated to the design and completion of a major taboratory project	259 9 7 7 7 7 7 7 7 7 7 7 8 7 9 7 7 7 7 9 7 7 7 7
Communicate effectively with project collaborators about the concepts above. Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: Solution of the structure o	259 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Some Details:	25% % //////////////////////////////////
Recommended Evaluation Methods and Weighting (Evaluation should align to learning outcomes.) Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30%	25% 9 7 7 7 7 7 7 7 7 7 7 7 7 9 7 7 7 7 7
Assignments: 5% Quizzes/tests: 10% Final exam: Lab work: 30% Project: 30% Image: Construct of	25% % <u>rces</u> (OER) <u>ym</u> .) <u>Year</u> 2010 2005
Lab work: 30% Project: 30% Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources: Open Educational Resources (I should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.) Type Author or description Title and publication/Jaccess details 1. 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	9 <u>rces</u> (OER) <u>m</u> .) <u>Year</u> 2010 2005
Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (i should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.) Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess 2. Textbook Robert Ashby 3. 4. 5. Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, programs 7. Advanced addressing modes, programs 7. Advanced addressing modes, indicated to the design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design; assembly and C language program devel programming and interfacing with	rces (OER) Sm.) 2010 2005
Details: NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (is should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form) or the and publication/access details Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. 4. 5. State of the students. Course Content and Topics . 1. Introduction to microprocessor systems . 2. Netrocontroller architectures . 3. Accessed programming . 4. Corrogramming for microcontrollers . 5. Netroduction to microprocessor systems . 6. Arithmetic logic instructions and programs . 7. Advanced addressing modes, macros, and modules . 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and se	rces (OER) pm.) 2010 2005
NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (i should be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.) Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. 4. 5. Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. Corgoramming for microcontrollers 5. Input/output ports and //O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projection of a major laboratory	rces (OER) <u>yrm.</u>) 2010 2005
NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor. Texts and Resource Materials (include online resources and Indigenous knowledge sources. <u>Open Educational Resources (is</u> should be included whenever possible. If more space is required, use the <u>Supplemental Texts and Resource Materials form</u>) Type Author or description Title and publication/access details Type Author or description Second Varian Varian Second Va	rces (OER) orm.) 2010 2005
NOTE: The following sections may vary by instructor. Please see course synables available from the instructor. Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (Isshould be included whenever possible. If more space is required, use the Supplemental Texts and Resource Materials form.) Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	rces (OER) orm.) 2010 2005
Texts and Resource Materials (Include online resources and Indigenous knowledge sources. Open Educational Resources (i should be included whenever possible. If more space is required, use the <u>Supplemental Texts and Resource Materials form</u> .) Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	rces (OER) orm.) Year 2010 2005
should be included whenever possible. If more space is required, use the Supplemental Toxts and Resource Materials form.) Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	<u>Year</u> 2010 2005
Type Author or description Title and publication/access details 1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	Year 2010 2005
1. Textbook Edward H. Currie, David Van Ess PSoC3/5 Reference Book 2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3.	2010 2005
2. Textbook Robert Ashby Designer's Guide to the Cypress PSoC 3. 4. 5. Sequired Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C. programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	2005
3. 4. 5. Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	
 4. 5. Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics Introduction to microprocessor systems Microcontroller architectures Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 5. Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics Introduction to microprocessor systems Microcontroller architectures Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projection of the design and completion of a major laboratory projection 	
 Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics Introduction to microprocessor systems Microcontroller architectures Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory project 	
Required Additional Supplies and Materials (Software, hardware, tools, specialized clothing, etc.) The necessary laboratory equipment will be provided to the students. Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory project	
The necessary laboratory equipment will be provided to the students. Course Content and Topics I. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	
Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory project	
Course Content and Topics 1. Introduction to microprocessor systems 2. Microcontroller architectures 3. Assembly language programming 4. C programming for microcontrollers 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projection	
 Introduction to microprocessor systems Microcontroller architectures Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 Microcontroller architectures Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 Assembly language programming C programming for microcontrollers Input/output ports and I/O interfacing Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 5. Input/output ports and I/O interfacing 6. Arithmetic logic instructions and programs 7. Advanced addressing modes, macros, and modules 8. Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 Arithmetic logic instructions and programs Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program devel programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
 Advanced addressing modes, macros, and modules Interfacing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program deve programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec 	
8. Interracing with analog and digital I/O, timer/counter programming, and interrupts Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program deve programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	
Laboratory sessions include experiments on microprocessor-based hardware design; assembly and C language program deve programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	
programming and interfacing with I/O device; and sessions dedicated to the design and completion of a major laboratory projec	ı developme
	project.

Memo for Course Changes

To: FSCC, SFC, UEC

From: Lin Long, Department head, Physics

Date: Feb 14, 2022

Subject: Proposal for revision of ENPH 390 (Mechatronics)

Note that even minor changes may result in comments from committees on all aspects of the course.

- 1. Summary of changes (select all that apply):
 - □ Six-year review
 - □ Number and/or course code
 - ⊠ Credits and/or total hours
 - □ Title
 - \boxtimes Calendar description
 - ☑ Prerequisites and/or co-requisites
 - □ Frequency of course offering
 - ☑ Learning outcomes
 - □ Delivery methods and/or texts and resource materials
 - □ PLAR options, grading system, and/or evaluation methods
 - □ Discontinuation of course
 - □ Other Please specify:

2. Rationale for change:

- With both students and the instructor spending significant hours and efforts in the projects outside of the scheduled instructional hours, 3 credits did not properly account for this additional time. We believe that 4 credits for this course is more commensurate with the amount of time and work put by students.
- This is a capstone project course which includes a wide range of project options each year. A more general description emphasizing the nature of the course in calendar description is more appropriate than giving specific project examples.
- ENGR 153 (Structured Programming for Engineers) is equivalent to COMP 152. Adding ENGR 153 gives students more options. ENGR 330 (Automated Control Systems) won't be required for (the revised) Engineering Physics diploma, so it has been removed from the list of prerequisites. ENGR 151 (Computer-aided graphics) is now discontinued so it has been deleted from the pre/corequisites. Either PHYS 382 (Experimental Physics) and ENPH 320 (Fundamentals of Digital Logic and Design) will give students sufficient lab/project skills for this course. ENPH 310 (Electronics) or ENPH 340 (Microcontrollers and Embedded Systems) listed as pre/corequisites will normally be taken alongside ENPH 390, and should enhance student success in the projects.
- A few learning outcomes have been added to reflect how the course is currently being taught, and are more inline with the nature of the course.

 If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s) and contribute to students' ability to meet the <u>Institutional Learning</u> <u>Outcomes (ILOs)</u>:

No major changes in learning outcomes. There are a few learning outcomes added to reflect how the course is being taught.

4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs?

No

- Which program areas have been consulted about the change(s)? Not applicable
- 6. In what ways does this course (not just the proposed changes) contribute to <u>Indigenizing Our</u> <u>Academy</u>? Provide explicit examples of assignment design, topic selection, curriculum delivery, or other methods, which can be in response to one or more of the following: <u>UFV Integrated Strategic</u> <u>Plan</u>, <u>Fulfilling Our Commitment to Aboriginal Peoples policy (BRP-200.05)</u>, the <u>TRC Calls to Action</u>, and/or the <u>United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP</u>).

This is a team-based project-oriented course which provides students opportunities to share their knowledge/approaches to each other as well as to reflect on one's practice. There are options for the students to engage with local industry and community including Indigenous community to initiate and work on real-world projects, especially projects to benefit Indigenous lives and communities.

7. How does the course reflect principles of <u>equity</u>, <u>diversity</u>, <u>and inclusion</u>, through assignment design, topic selection, curriculum delivery, or other methods?

The principles of diversity and inclusion are reflected in the students' freedom to design a project of their own initiative and creation, which allows them to draw on their own backgrounds, strengths, and interests. The principle of equity is supported through the teamwork required in the project. Students on a team will decide together how to allocate tasks based on each one's skills and interests, so that the work is distributed fairly and equitably.

- If applicable, discuss any special considerations for this course (credit value, class size limit, frequency of offering, resources required such as labs or equipment, field trips, etc.
 Due to the limitation in lab space and equipment, the class size has to be limited to 18 students.
- Estimate of the typical costs for this course, including textbooks and other materials: About \$150

CWC comments and responses:

• Learning outcome #6: are advanced communication and professional skills being taught in this course?

Advanced communication is not taught in this course, but the communication skills will be enhanced by working in a team, collaborating with local industry/community, and oral presentations. Professional skills are not specifically taught in the course, but EGBC (Engineers and Geoscientists BC)'s "Ethics and Laws" document will be shared and selfstudied by the students. The students' professional skills will be enhanced by conducting the projects with their team and working with local industry/community under supervision of their instructor. Also, professionalism will be assessed through their weekly reports/project performance/self and team's evaluations.

Learning outcome #7: are problem solving and creative thinking skills being taught in this course, or just assessed? Problem solving and creative thinking skills are not specifically taught, however, their problem solving and creative thinking sills will be enhanced by initiating projects, designing/prototyping/trouble-shooting their projects under the supervision of their instructor. These skills will be assessed through their project presentations and demonstrations (without these skills, they would not be able to complete the project and pass the course).



ORIGINAL COURSE IMPLEMENTATION DATE:SetREVISED COURSE IMPLEMENTATION DATE:SetCOURSE TO BE REVIEWED (six years after UEC approval):SetCourse outline form version: 09/08/2021Set

September 2014 September 2023 September 2028

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: ENPH 390 Nu		Number of	umber of Credits: 4 Course credit policy (105)		
Course Full Title: Mechatronics					
Course Short Title:					
Faculty: Faculty of Applied and Technical Str	udies	Departmen	t (or prog	gram if no department)	: Physics
Calendar Description:					
A guided, self-directed project course. Learn how to run a project from st identify/maximize value and opportunity for innovation.				n. Understand the proble	em and try to
Note: Students with credit for ENGR 390 can	not take this co	ourse for furth	er credit.		
Prerequisites (or NONE):	One of (PHY	S 382 or ENF	PH 320), a	nd one of (ENGR 153, C	COMP 150, or COMP 152).
Corequisites (if applicable, or NONE):					
Pre/corequisites (if applicable, or NONE):	ENPH 310 or	. ENPH 340.			
Antirequisite Courses (Cannot be taken for	additional crea	lit.)	Course	Details	
Former course code/number: ENGR 390			Special	Topics course: No	
Cross-listed with:			 (If yes, the course will be offered under different letter designations representing different topics.) Directed Study course: No (See policy 207 for more information.) 		
Equivalent course(s):					
(If offered in the previous five years, antirequ	isite course(s)	will be			
included in the calendar description as a note that students with credit for the antireguisite course(s) cannot take this course for further credit.			Grading System: Letter grades		
			Delivery Mode: May be offered in multiple delivery modes		
Typical Structure of Instructional Hours			Expected frequency: Annually		
Lecture/seminar		5	Maximu	m enrolment (for inform	ation only): 18
Tutorials/workshops		70	Brier L	arning Assassment a	nd Recognition (PLAP)
				anning Assessment a	
				he capstone course for t	the diploma
	Total hours	75	1113 13 1		
	Total nours	75	Transfe	er Credit (See <u>bctransf</u> e	erguide.ca.)
Scheduled Laboratory Hours			Transfer credit already exists: No		
Labs to be scheduled independent of lecture hours: No C Yes			Submit (If yes	outline for (re)articulation s, fill in <u>transfer credit for</u>	n: [click to select] <u>m</u> .)
Department approval			Date of meeting:	February 14, 2022	
Faculty Council approval			Date of meeting:	April 14, 2022	
Undergraduate Education Committee (UEC	C) approval			Date of meeting:	September 23, 2022

AGENDA ITEM # 3.2.

l earni	na Outcomes /7	hese should contribute to stu	idents' ability to meet program outcor	nes and thus Institutional Learni	na Outcome
		ation of this course, students	will be able to:		ng outcome
opon s	Managa the de				
1.	Propose, conce	sign process as well as the c eptualize, design, and demor	ocumentation.	and/or engineering.	
3.	Build creative s	olutions to real-world mecha	tronics problems.		
4.	Exhibit strong of through to its c	organizational skills as well a	s effective time and cost managemen	t by taking a project from the de	sign phase
5.	Collaborate, in	both leadership and subordi	nate roles, in small teams to complete	e major projects.	
6. 7	Demonstrate a	dvanced communication and	professional skills.		
	Demonstrate h	ando on, problem solving, a			
Recom	nmended Evalua	tion Methods and Weightir	g (Evaluation should align to learning	g outcomes.)	
Proje	ct:	100%	%		%
		%	%		%
Project (10%), NOTE:	t evaluation incluc professionalism (: The following s	es project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru	ctor. Please see course syllabus a	vailable from the instructor.	
Project (10%), NOTE: Texts a should	t evaluation incluc professionalism (: The following s and Resource M I be included when	es project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru aterials (Include online reso never possible. If more space	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u>	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u>	ces (OER)
Project (10%), NOTE: Texts a should Ty	t evaluation incluc professionalism (: The following s and Resource M I be included when ype	tes project proposal (15%), v (5%), and a short thesis (30%) ections may vary by instru aterials (Include online reso never possible. If more space Author or description	veekly progress report (30%), project (5). ctor. Please see course syllabus a urces and Indigenous knowledge sourt is required, use the <u>Supplemental T</u> Title and publicati	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource exts and Resource Materials for</u> on/access details	ces (OER) <u>m</u> .) Year
Project (10%), NOTE: Texts a should Ty 1.	t evaluation incluc professionalism (: The following s and Resource M I be included when ype	es project proposal (15%), v (5%), and a short thesis (30%) ections may vary by instru aterials (Include online reso never possible. If more space Author or description	ctor. Please see course syllabus a urces and Indigenous knowledge sou is required, use the <u>Supplemental T</u> Title and publicati	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource exts and Resource Materials for</u> on/access details	ces (OER) m.) Year
Project (10%), NOTE: Texts a should 1. 2.	t evaluation incluc professionalism (: The following s and Resource M I be included when ype	ections may vary by instru aterials (Include online reso never possible. If more space Author or description	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resourd</u> exts and Resource Materials for on/access details	Cess (OER) m.) Year
Project (10%), NOTE: Texts a should Ty 1. 2. 3. 4	t evaluation incluc professionalism (: The following s and Resource M I be included when ype	les project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru aterials (Include online reso never possible. If more space Author or description	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u> texts and Resource Materials for on/access details	ces (OER) <u>m.)</u> Year
Project (10%), NOTE: Texts <i>a</i> <i>should</i> Ty 1. 2. 3. 4. 5.	t evaluation incluc professionalism (: The following s and Resource M I be included when ype	les project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru aterials (Include online reso never possible. If more space Author or description	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resourd</u> exts and Resource Materials for on/access details	Cess (OER) m.) Year
Project (10%), NOTE: Texts a should 1. 2. 3. 4. 5. Requir	t evaluation incluc professionalism (: The following s and Resource M ! be included when pe red Additional St	es project proposal (15%), v (5%), and a short thesis (30%) ections may vary by instru aterials (Include online reso never possible. If more space Author or description	veekly progress report (30%), project 6). ctor. Please see course syllabus a <i>urces and Indigenous knowledge sou</i> <i>a is required, use the <u>Supplemental T</u> Title and publicati <i>Title and publicati</i> <i>ware, hardware, tools, specialized clo</i></i>	demonstration (10%), oral prese vailable from the instructor. rces. Open Educational Resource exts and Resource Materials for on/access details	Ces (OER) m.) Year
Project (10%), NOTE: Texts a should Ty 1. 2. 3. 4. 5. Requir Project	t evaluation incluc professionalism (: The following s and Resource M / be included when /pe	les project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru aterials (Include online reso never possible. If more space Author or description upplies and Materials (Soft lesigned/supplied by the inst	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati Title and publicati ware, hardware, tools, specialized cloructor.	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource exts and Resource Materials for</u> on/access details	Ces (OER) m.) Year
Project (10%), NOTE: Texts a should Ty 1. 2. 3. 4. 5. Requir Project Course	t evaluation incluc professionalism (: The following s and Resource M I be included when ype red Additional St ts and materials d e Content and To	des project proposal (15%), v (5%), and a short thesis (30%) ections may vary by instru- aterials (Include online reso never possible. If more space Author or description upplies and Materials (Soft lesigned/supplied by the instr opics	veekly progress report (30%), project 6). ctor. Please see course syllabus a <i>urces and Indigenous knowledge sou</i> <i>a is required, use the <u>Supplemental T</u> Title and publicati <i>Title and publicati</i> <i>ware, hardware, tools, specialized clo</i> ructor.</i>	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u> texts and Resource Materials for on/access details	Cees (OER) m.) Year
Project (10%), NOTE: Texts a should Ty 1. 2. 3. 4. 5. Requir Project Course 1.	t evaluation incluc professionalism (: The following s and Resource M / be included when /pe red Additional Su ts and materials d e Content and To Projects in physi	ections may vary by instru aterials (Include online reso never possible. If more space Author or description upplies and Materials (Soft lesigned/supplied by the inst	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati Ware, hardware, tools, specialized clo ructor. uting.	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u> texts and Resource Materials for on/access details	Ces (OER) m.) Year
Project (10%), NOTE: Texts a should 1. 2. 3. 4. 5. Requir Project Course 1. 2.	t evaluation incluc professionalism (The following s and Resource M be included when ype red Additional St ts and materials d e Content and To Projects in phy- Industry driven	ections may vary by instru aterials (Include online reso never possible. If more space Author or description upplies and Materials (Soft lesigned/supplied by the instru- pics sics, engineering, and compu- projects (such as agricultura	veekly progress report (30%), project 6). ctor. Please see course syllabus a <i>urces and Indigenous knowledge sou</i> <i>a is required, use the <u>Supplemental T</u> Title and publicati <i>Title and publicati</i> <i>ware, hardware, tools, specialized clo</i> ructor. <i>uting.</i> I technology and automation).</i>	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u> fexts and Resource Materials for on/access details	Ces (OER) m.) Year
Project (10%), NOTE: Texts a should 1. 2. 3. 4. 5. Requir Project Course 1. 2. 3. 3.	t evaluation incluc professionalism (The following s and Resource M <i>be included when</i> red Additional St ts and materials d e Content and To Projects in physi Industry driven Community driven	ections may vary by instru aterials (Include online reso never possible. If more space Author or description upplies and Materials (Soft lesigned/supplied by the inst opics sics, engineering, and compu projects (such as agricultura ven projects (such as medica	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati ware, hardware, tools, specialized clo ructor. uting. I technology and automation). I device).	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resourd</u> exts and Resource Materials for on/access details	
Project (10%), NOTE: Texts a should Ty 1. 2. 3. 4. 5. Requir Project Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 3. 4. 5. Course 1. 2. 5. Course 1. 2. 5. Course 1. 2. 5. Course 1. 2. 5. Course 1. 2. 5. Course 1. 2. 2. 5. 2. 2. 2. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.	t evaluation incluc professionalism (The following s and Resource M be included when ype red Additional Si ts and materials d e Content and To Projects in phys Industry driven Community driven Student initiativ	les project proposal (15%), v (5%), and a short thesis (30% ections may vary by instru aterials (Include online reso never possible. If more space Author or description Author or description upplies and Materials (Soft lesigned/supplied by the inst opics sics, engineering, and compu- projects (such as agricultura ven projects (such as medica ve driven projects.	veekly progress report (30%), project 6). ctor. Please see course syllabus a urces and Indigenous knowledge sou a is required, use the <u>Supplemental T</u> Title and publicati ware, hardware, tools, specialized clo ructor. uting. I technology and automation). I device).	demonstration (10%), oral prese vailable from the instructor. rces. <u>Open Educational Resource</u> texts and Resource Materials for on/access details	Ces (OER) m.) Year

Memo for Program Changes

To: FATS CC, FATS FC, UEC

From: Lin Long, Department head, Physics

Date: March 21, 2022

Subject: Program change Engineering Physics (Mechatronics) diploma

- 1. Summary of changes (select all the apply):
 - □ Program revision that requires new resources
 - Addition of new course options or deletion or substitution of a required course
 - ☑ Change to the majority of courses in an approved program
 - □ Change to the duration, philosophy, or direction of a program
 - □ Addition of a new field of specialization, such as a concentration
 - ☑ Change in requirements for admission
 - ☑ Change in requirements for residency or continuance
 - □ Change in admission quotas
 - □ Change which triggers an external review
 - Deletion of a program not included in the Program Discontinuance policy
 - □ Other Please specify:

2. Rationale for change(s):

Since the existing program is an advanced diploma requiring first year university level of physics (PHYS 112 Electricity and Magnetism) and math (MATH 112), that is, 3 years of study after high school graduation, the admissible rate is not high, especially for the international students. The domestic applicants from high schools would go somewhere else after they realized they were not admissible. A significant number of international applicants withdrew from the program because they did not want to complete one year of upgrading in first year Physics and Math courses to meet the entrance requirements. Furthermore, two upper level engineering courses (ENGR 330 Automatic Control Theory, ENGR 350 Sensors and Actuators) and one physics course (PHYS 231 Thermodynamics) don't fit this two year diploma well as per the feedback from the students and the instructors in the program. In order to still maintain the learning outcomes of the diploma and give students sufficient hands-on training, majority of the Engineering Transfer Program courses are a good fit to this diploma.

We consulted UFV International regarding the entrance requirements, the adoption of some Engineering Transfer Program courses into the diploma, and international student enrollments. UFV International is very positive and supportive on the proposed program changes. We consulted Academic advisors (specialized in STEM programs) regarding the entrance requirements, residency and graduation requirements. They gave us very valuable feedback and suggestions. We consulted the Work-Integrated Learning coordinator regarding the Co-op option. We won't add co-op option into this diploma program because of the timing challenges (students can only apply to the co-op program after completing two semesters at a Canadian Post-Secondary Institution). Based on the above-mentioned rationale and consultation, we have made the following changes to the diploma.

- Deleted two upper-level engineering courses: ENGR 330 (Automatic control theory) which is important for an engineering degree but not important for a two-year diploma, and ENGR 350 (Sensors and actuators) which doesn't need to be a separate course in the diploma because some materials of sensors and actuators are already in the course ENPH 340 (Microcontrollers and embedded systems). This will address the challenge of hiring sessionals for the upper-level engineering courses: people with a P.Eng (registered Professional Engineer) and PhD (preferred) are hard to find.
- Deleted PHYS 231 (Thermodynamics): this course is very useful for a physics and/or engineering degree but not important for a two-year diploma.
- Increased lecture and lab hours in ENGR 210 (Circuit analysis) and ENPH 310 (Electronics) to allow sufficient hands-on training and experiential learning.
- Gave the option of either PHYS 381 (Mathematical physics) or PHYS 232 (Experimental methods in physics) in the diploma (previously both courses were required). PHYS 381 is crucial for a BSc majoring in Physics but PHYS 232 is more useful (than PHYS 381) if the students want to go to industry directly with only the diploma.
- Added some Engineering Transfer Program (ETP) courses (MATH 111/112, PHYS 111/112, ENGR 113/123/124/153) to allow more hands-on training as well as a solid foundation of math/physics/programming. Those courses are transferrable to some institutions with engineering degrees in BC. Therefore, this also allows students to ladder into an Engineering degree elsewhere.
- Deleted the elective course option due to the addition of above mentioned ETP courses.
- Updated the entrance requirements to prerequisites for MATH 111 (Calculus I)/PHYS 111 (Mechanics), and UFV standard English requirement for the Degree/Diploma level English language proficiency requirement to make the program accessible to a larger pool of students with a wider variety of backgrounds, therefore, to increase the enrolments.
- Residency is updated to include 200-level physics/engineering/engineering physics courses accordingly as per the changes in program entrance requirements and courses.
- Readmission is updated to align with UFV Undergraduate Continuance policy (92).
- 3. If program outcomes are new or substantially changed, explain how they align with the Institutional Learning Outcomes:

N/A - The program outcomes remain the same.

4. What consideration has been given to indigenizing the curriculum?

ENGR 123/124/210, PHYS 232, ENPH 310/320/340 include significant team-based experiments, course projects, and presentations which give students opportunity to share knowledge and

approaches with each other and reflect on one's practice. As a capstone project course, ENPH 390, it has options for the students to engage with local industry and community including Indigenous community to initiate and work on real-world projects, especially projects to benefit Indigenous lives and communities. The students will also be encouraged to conduct integrated work study with local industry/community including Indigenous community during their summer terms.

5. Will additional resources be required? If so, how will these costs be covered?

No.

6. How will students be impacted? (Indicate the projected number of students impacted.) Is the change expected to increase/decrease enrolment in the program?

No existing students will be impacted because this program is suspended for one year to allow all existing students to graduate. The new applicants prior to the program suspension have been contacted and offered other program options. The change in the diploma is expected to increase the enrolment of both domestic and international students in the program.

7. Does the number of required core or elective credits from the program-specific discipline change? If so, will this change the total number of courses to be offered within the discipline?

The total number of required credits is increased (to 66 from 60-64) with the adoption of some ETP courses. But there is no change in the actual total number of courses.

8. Identify any available resources that will be used to accommodate the program changes. (Eg. seats in existing classes, conversion of sections, timetabling changes, deletion of courses, etc.)

There may be a small increase in enrolments for Math 111/112, Phys 111/112, and there will be more students in ENGR 113/123/124/153 courses.

9. Is the number of required or elective courses from other disciplines in the program changing? If so, what is the estimated impact to enrolments in these courses? Provide a memo from the respective dean(s) of the impacted faculty to confirm if budgetary implications have been considered and addressed.

The elective course option is deleted from the program. Since the enrolment in the program was small and there was a large diversity of elective courses, impact on each elective course is very little or none.

The major change in the diploma will impact the enrolment (increase) in 1st year engineering courses which are within Physics department.

10. Provide a memo from the program's dean to confirm that budgetary implications of the proposed changes have been considered and will be addressed within the faculty budget.

No budgetary implications.

Engineering Physics

ufv.ca/engineering

Engineering Physics diploma in Mechatronics

This is an advanced-two-year diploma program in Engineering Physics, specializing in Mechatronics.

The program itself contains <u>6660–64</u> credits. The program is designed for students to go directly to the workplace, but also to ladder <u>the diploma up</u> to a UFV Bachelor of Science degree with a Physics major<u>or even to complete an Those completing the diploma may be eligible to transfer to an</u> engineering degree at another institution.

Entrance requirements

B.C. secondary school graduation or equivalent.

- 1. English Studies 12 or English First Peoples 12 (or equivalent) with at grade of C plus (C+) or better
- 2. One of the following (see note 1)
 - A grade of A or better in Calculus 12
 - A grade of B or better in Principles of Math 12
 - o A grade of B or better in Pre-Calculus 12
- 1. Prerequisite for MATH 111One of the following:
 - B- or better in PHYS 112 and B- or better in MATH 112
- 3. Prerequisites for ENGL 105PHYS 111 Physics 12 with at grade of C or better (see note 2).

Transfer Applicants

English requirement: Applicants must meet the Degree/diploma level English language proficiency requirement. For details on how this requirement may be met, see the English language proficiency requirement section of the calendar.

<u>Completion of nine university-level credits with a minimum CGPA of 2.00 based on all university credits</u> attempted. Applicants with 8 credits or less will be assessed based on their high school record.

2. Minimum CGPA of 2.00.

Notes

- 1) Students without the stated mathematics high school course may present the prerequisite for MATH 111 instead
- 2) Students without the stated physics high school course may present the prerequisite for PHYS <u>111 instead</u>

When to apply

Applications are accepted for entrance to the Fall semester only. For application deadlines, see <u>Specific</u> intake application process.

How to apply

Apply online at <u>ufv.ca/admissions/apply</u>.

Basis for admission decision

Entrance to the program is <u>limited and not all qualified applicants may be admitted</u>. <u>Qualified applicants</u> who are not admitted due to space constraints will be offered a position in an alternate program.

on a first come first served basis; however, students must have met the above entrance requirements in order to be accepted into the program and therefore be able to access the reserved seats.

International students who do not have the stated prerequisite courses (or their transfer equivalent) will be considered for admission if suitability is determined by the department head in consultation with the Office of the Registrar. All students must meet the continuance level for the program.

Qualified students who are not admitted will be recorded on a wait list. When a seat is offered to a student, that student must accept the offer in a timely fashion or that seat will be offered to the next student on the wait list.

Applicants who do not meet the entrance requirements may be admitted to Qualifying Studies. If a student has already completed courses from the diploma prior to being accepted to the diploma, the Engineering Physics Diploma Committee (EPDC) will decide if this student should be accepted to the program (creating unfilled reserved seats in some courses) or if the student should be delegated to a wait list. Effective use of university resources can be a factor in the committee's decision.

Fees and additional costs

<u>Information on tuition and mandatory fees may be found here.</u> <u>International students will pay the</u> <u>Current UFV international student semester rate (see International Tuition & Fees) for four semesters.</u> <u>Domestic students will pay the standard rate (see the Fees and Other Costs section).</u>

Books and additional supplies for the Engineering Physics diploma in Mechatronics-could cost approximately \$50-200 per course.

Program duration

The Engineering Physics diploma in Mechatronics is <u>normally completed within</u> two years in <u>duration of</u> <u>full-time study</u>. However, students meeting the program requirements over a longer time period will also be allowed to graduate. Students are assumed to take at least four<u>required program</u> courses per semester for the four semesters of the diploma. <u>Due to the strict sequence of the courses, the students</u> are strongly recommended to see an academic adviser before the registration.

Location

Most courses are offered in Abbotsford. Courses <u>occasionally</u> may also be offered at the Chilliwack-and <u>Mission</u> campuses. <u>One course, ENGR 100 (Production in Practice) is only offered at the Chilliwack</u> <u>campus Trades and Technology Centre.</u>

Program outline

It is recommended that students take the following required course before the start of the program:

Course	Title	Credits
COMP 150	Introduction to Programming	4
or COMP 152	Introduction to Structured Programming	-

The following are the courses required for the program, as well as a sample schedule of how the courses will normally be taken.

Semester I (Fall): 164 credits

Course	Title	Credits
ENGR 210<u>MATH</u> 111	Circuit AnalysisCalculus I	4
MATH 211<u>PHYS</u> 111	Calculus III <u>Mechanics</u>	3 5
PHYS 221<u>ENGR</u> 153	Intermediate Mechanics (see Note)Structured Programming for Engineers	4 <u>3</u>
PHYS 231<u>ENGR</u> 123	ThermodynamicsEngineering Design I	3 4

Note: Students with credit for ENGR 113, ENGR 152/MATH 152, and ENGR 255/MATH 255 are not required to take PHYS 221.

Semester II (Winter): 173-14 credits

Course	Title	Credits
ENPH 310<u>MATH</u> 112	Electronics ICalculus II	4
PHYS 232PHYS 112	Experimental Methods in Physics (see Note)Electricity and Magnetism	3 5
ENGR 257/ PHYS 381/ MATH 381<u>ENGR 113</u>	Mathematical PhysicsStatics and Dynamics	<u>34</u>

Plus:ENGR 124	One course from the Elective options tables below <u>Engineering</u> Design II	3- 4
Note: Students who minimum of 60 credi	completed PHYS 232 as a two-credit course should note that this ts, and select their electives accordingly.	; diploma requires a
Semester III (Fall): 1	–17 credits	
Course	Title	Credits
ENGR 100	Production in Practice (see Note <u>1</u>)	1
ENPH 320	Electronics II Fundamentals of Digital Logic and Design	4
ENGR <u>330210</u>	Automatic Control SystemsCircuit Analysis	4 <u>5</u>
Plus:MATH 211	Two courses from the Elective options tables belowCalculus III	6-8<u>3</u>
PHYS 221	Intermediate Mechanics (see Note 2)	4

Note <u>1</u>: Although ENGR 100 is listed as a Fall course (students register for it in Fall), it will be offered at the end of the previous Summer semester (late August).

Note 2: Students with credit for all of ENGR 113, ENGR 152/MATH 152, and ENGR 255/MATH 255 are not required to take PHYS 221.

Semester IV (Winter): 14-1516 credits

Course	Title	Credits
EN <u>PH</u> GR 340	Micro <u>Econtrollers</u> Processors and Embedded Systems (formerly ENGR 340)	4
EN GR<u>PH</u> 350<u>310</u>	Sensors and Actuators <u>EMicroelectronics</u>	4 <u>5</u>
ENPH 390	Mechatronics (formerly ENGR 390)	3 4
Plus: Either PHYS 232 or PHYS 381/MATH	One course from the Elective options tables belowExperimental Methods in Physics	3–4
<u>381/ENGR 257</u>	or Mathematical Physics (see Note)	

Elective courses

Students must choose four elective courses from the tables below. Additional electives may be accepted upon approval by the Engineering Physics Diploma Committee.

<u>Note:</u> For students completing the **diploma only**, the electives on the following list are<u>PHYS 232 is</u> recommended: For students pursuing both the **diploma and Physics major**, PHYS 381 is recommended.

One of i 3 CMNS 125 Cmmunicating Professionally to Academic and Workplace with a conserve to the adminest (see Note 1) - CMNS 225 or higher (see Note 1) - - CMNS 225 or higher (see Note 1) - - ENGL 105 Academic Writing (see Note 1) - - ENGL 105 Academic Writing (see Note 1) - - FNor - - - <t< th=""><th>Course</th><th>Title</th><th>Credits</th></t<>	Course	Title	Credits
CMNS 125Communicating Professionally to Academic and Workplace Audiences (see Note 1)-CMNS 235 or higherAr/CMNS course numbered 235 or higher (see Note 1)-ENGL 105Academic Writing (see Note 1)-ENGL 105Kademic Writing (see Note 1)-Plus:ENGR 113Ingineering Physics—Statics & Dynamics-ENGR 152/MATH 152inear Algebra for Engineering (see Note 2)-er MATH 220inear Algebra (see Note 2)-MATH 220inear Algebra (see Note 2)-PHYS 225Waves and Introductory Optics-PHYS 225Modern Physics Laboratory I-PHYS 328Modern Physics Laboratory I-PHYS 408Special Topics in Physics-PHYS 408Special Topics in Physics-PHYS 408Special Topics in Physics Hot counted as an elective: to studiets publics Hot counted as an elective:vorture UNIT SECTION OF COUNT OF	One of:		3
CMMS-235-or Ava CMNS-course numbered 235 or higher (see Note 1) - ENGL 105 Academic Writing (see Note 1) - Pus: - - ENGR 113 Engineering Physics — Statics & Dynamics 4 ENGR 113 Iniear Algebra for Engineering (see Note 2) a-4 or MATH 2210 Linear Algebra (see Note 2) - MATH 270/STAT 270 Iniroduction to Probability and Statistics 3 PHYS 225 Vaves and Introductory Optics 3 PHYS 328 Modern Physics Laboratory 1 3 PHYS 328 Modern Physics Laboratory 1 3 PHYS 402 Avarced Optics 3 PHYS 402 Avarced Optics 3 PHYS 403 Special Topics in Physics 3 Vote 2: Only one UTH 152/ENGR 152 or MATH 221 may be counted as an elective. 3 Vote 2: Only one UTH 152/ENGR 152 or MATH 221 may be counted as an elective. 3 Vote 2: Only one UTH 152/ENGR 152 or MATH 221 may be counted as an elective. 3 Vote 2: Only one UTH 152/ENGR 152 or MATH 221 may be counted as an elective. 3 Vote 2: Only one UTH 152/ENGR 152 or MATH 221 may be counted as an elective. 3 Coun	CMNS 125	Communicating Professionally to Academic and Workplace Audiences (see Note 1)	-
ENGL 105 Acidemic Writing (see Note 1) - Plus: - ENGR 113 Engineering Physics — Statics & Dynamics 4 ENGR 113 inear Algebra for Engineering (see Note 2) 3-44 or - - or - - ATH 270 inear Algebra (see Note 2) - ATH 270 inear Algebra (see Note 2) - ATH 270 inear Algebra (see Note 2) - PMS 225 Vaves and Introductory Optics 3 PHYS 225 Modern Physics Laboratory I 3 PHYS 393 Omputational Physics I 3 PHYS 408 Special Topics in Physics 3 PHYS 408 Special Topics in Physics Parameter servers 3 Special Topics in Physics I aboratory I 3 3 PHYS 408 Special Topics in Physics Parameter servers 3 Special Topics in Physics Parameter Servers 3 3 Special Topics in Physics major: 3 3 Special Topics in Physics major: 3 3 Special Topics in Physics major: 3 3 Spec	CMNS 235 or higher	Any CMNS course numbered 235 or higher (see Note 1)	-
PMs: - ENGR 113 Figle-ering Physics—Statics & Dynamics 4 ENGR 152/MATH 152	ENGL 105	Academic Writing (see Note 1)	-
ENGR 113 Figine ering Physics — Statics & Dynamics 4 ENGR 113 initian Algebra for Engineering (see Note 2) a-4 or MATH 220 initian Algebra (see Note 2) - MATH 220 initian Algebra (see Note 2) - MATH 220 initian Algebra (see Note 2) - Mark 2000 initian Algebra (see Note 2) - Mark 2001 initian Algebra (see Note 2) - Physe 2012 initian Algebra (see Note 2) - Physe 2025 initian Algebra (see Note 2) - Physe 2026 initian Algebra (see Note 2) - Physe 2020 initian Algebra (see Algebra (see Note 2) - Physe 2021 initian Algebra (see Algebra (see Note 2) - Physe 2022 initian Algebra (see Algebra (see Note 2) - Physe 2023 initian Algebra (see Algebra (see Note 2) - Physe 2024 initian Algebra (see Algebra (see Note 2) - Physe 2024 <	Plus:		-
BNGR 152/MATh Inlear Algebra for Engineering (see Note 2) 3-4 or MATH 220 Inlear Algebra (see Note 2) - MATH 270/STAT Inlear Algebra (see Note 2) 3 MATH 270/STAT Inlear Algebra (see Note 2) 3 PMS 225 Wate and Introductory Optics 3 PMS 326 Fuid Mechanics 3 PMS 329 Omputational Physics Laboratory I 3 PMS 402 Advanced Optics 3 PMS 402 Advanced Optics 3 PMS 408 Special Topics in Physics 3 Vactor 2: Only one CENGE 152 or MATH 221 may be counted as an elective: 3 Vactor 2: Only one CENGE 152 or MATH 221 may be counted as an elective: Second 10 for sint Physics and P	ENGR 113	Engineering Physics — Statics & Dynamics	4
or MATH 221Linear Algebra (see Note 2)-MATH 2270klockian to Probability and StatisticsâPHYS 2250Vares and Introductory OpticsâPHYS 3250Fluid MechanicsâPHYS 382Nolern Physics Laboratory IâPHYS 393Computational Physics IâPHYS 4020Ároced OpticsâPHYS 4051Special Topics in PhysicsâPHYS 4052Special Topics in PhysicsâPHYS 4052Special Topics in PhysicsâPHYS 4052Special Topics in PhysicsâPhyser US Physics US Physics USâbPhyser US Physics USâbPhyser US Physics USâbPhyser US Physics USâbPhyser US Physics USbbPhyser US Physics USbcommended for the diploma physics USPhyser US Physer USfillefillePhyser US Ph	ENGR 152/ MATH 152	Linear Algebra for Engineering (see Note 2)	3- 4
MATH 270/STAT 270Introduction to Probability and Statistics4PHXS 225Waves and Introductory Optics3PHXS 326Fluid Mechanics3PHXS 382Molern Physics Laboratory I3PHXS 393Computational Physics I3PHXS 402Advanced Optics3PHXS 403Special Topics in Physics3PHXS 404Special Topics in Physics3PHXS 405Special Topics in Physics3PHXS 407Topics or ENGL 105 may be counted as an elective.3Vet 1: Only one USpecial Topics Topics Topics may be counted as an elective.Special Topics and Physics may be counted as an elective.Physe on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physics may be counted as an elective.Special Topics and Physics may be counted as an elective.Special Topics on the diploma and Physi	or MATH 221	Linear Algebra (see Note 2)	-
PHYS 225> wes and Introductory Optics3PHYS 325Fluid Mechanics3PHYS 382Modern Physics Laboratory I3PHYS 393Omputational Physics I3PHYS 402Advanced Optics3PHYS 403Special Topics in Physics3PHYS 408Special Topics in Physics3PHYS 408Special Topics in Physics3PHYS 408Special Topics in Physics3Phys 409Special Topics in Physics3Phys 409Special Topics in Physics3Phys 409Special Topics in Physics3Phys 409Special Topics in PhysicsSpecial Topics in PhysicsPhys 409Special Topics in Physics and Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 409Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 400Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 400Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 500Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 500Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 500Special Topics in Physics may be counted as an elective.Special Topics in Physics may be counted as an elective.Phys 500	MATH 270/ STAT 270	Introduction to Probability and Statistics	4
PHYS 325Fluid Mechanics3PHYS 382Modern Physics Laboratory I3PHYS 393Computational Physics I3PHYS 402Modern Coptics3PHYS 403Special Topics in Physics3Other 1: Only one Course or ENGL 105 may be counted as an electrive.3Note 1:: Only one Course or ENGL 105 may be counted as an electrive.Special Topics in Physics may be counted as an electrive.Note 2:: Only one Course or ENGL 105 may be counted as an electrive.Special Topics in Physics may be counted as an electrive.Note 2:: Only one Course or ENGL 105 may be counted as an electrive.Special Topics in Physics may be counted as an electrive.Note 2:: Only one Course or ENGL 105 may be counted as an electrive.Special Topics in Physics may be counted as an electrive.CourseItaleCreditsCourseItaleCreditsCourseObject-oriented Programming4MCTH 255/ENGR:Creditar Equations3	PHYS 225	Waves and Introductory Optics	3
PHYS 382Modern Physics Laboratory I3PHYS 393c→putational Physics I3PHYS 402Advanced Optics3PHYS 403Special Topics in Physics3Note 1: Only one Currse or ENGL 105 may be counted as an elective.3Note 2: Only one Currse or ENGL 105 may be counted as an elective.Special Topics in Physics and Physics may be counted as an elective.Note 2: Only one Currse or ENGL 105 may be counted as an elective.Special Topics in Physics and Physics major:Note 2: Only one Currse or ENGL 105 may be counted as an elective.Special Topics in Physics major:Course or Englowing additional list are accepted for the diploma, but are or ecommended for students put are or ecommended for the diploma put are or ecommended for students.CourseTitleCourseObject-oriented ProgrammingACMP 155Odipect-oriented EquationsMATH 255/ENGR 2: Ordinary Differential Equations3	PHYS 325	Fluid Mechanics	3
PHYS 393Cimputational Physics I3PHYS 402Airaced Optics3PHYS 408Dipical Topics in Physics3Note 1: Only one UTTY 152/ENGR 152 or MATH 221 may be counted as an elective.SNote 2: Only one UTTY 152/ENGR 152 or MATH 221 may be counted as an elective.SPhyse on the diploma and Physics major:SCourseFitleCourseFitleObject-oriented Programming4MATH 255/ENGLSchinztry Differential Equations	PHYS 382	Modern Physics Laboratory I	3
PHYS 402Advanced Optics3PHYS 408be in Topics in Physics3Aute 1: Only one Units on the cluster on ENGL 105 may be counted as an elective.3Note 2: Only one Units on the Units on the Cluster on	PHYS 393	Computational Physics I	3
PHYS 408 Special Topics in Physics 3 Note 1: Only one UNIT 2: Only one UN	PHYS 402	Advanced Optics	3
Note 1: Only one CMNS course or ENGL 105 may be counted as an elective. Note 2: Only one of MTH 152/ENGR 152 or MATH 221 may be counted as an elective. The electives on the following additional list are accepted for the diploma, but are only recommended for students pursuing beth the diploma and Physics major : COMP 155 Object-oriented Programming A MATH 255/ENGR 255 Ordinary Differential Equations	PHYS 408	Special Topics in Physics	3
Note 2: Only one of MATH 152/ENGR 152 or MATH 221 may be counted as an elective. The electives on the following additional list are accepted for the diploma, but are only recommended for students pursuing both the diploma and Physics major: Course Title COMP 155 Object-oriented Programming MATH 255/ENGR 255 Ordinary Differential Equations	Note 1: Only one C	MNS course or ENGL 105 may be counted as an elective.	
The electives on the following additional list are accepted for the diploma, but are only recommended for students pursuing both the diploma and Physics major: Course Title Credits COMP 155 Object-oriented Programming 4 MATH 255/ ENGR 255 Ordinary Differential Equations 3	Note 2: Only one o	f MATH 152/ENGR 152 or MATH 221 may be counted as an elective	/e.
CourseTitleCreditsCOMP 155Object-oriented Programming4MATH 255/ ENGR 255Ordinary Differential Equations3	The electives on the or students pursuit	e following additional list are accepted for the diploma, but are o ng both the diploma and Physics major :	hy recommended
COMP 155Object-oriented Programming4MATH 255/ ENGR 255Ordinary Differential Equations3	Course	Title	Credits
MATH 255/ ENGR 255 Ordinary Differential Equations 3	COMP 155	Object-oriented Programming	4
	MATH 255/ ENGR	255 Ordinary Differential Equations	3

PHYS 311	Statistical Physics	3
PHYS 312	Intermediate Electromagnetism	3
PHYS 321	Advanced Mechanics	3
PHYS 351	Quantum Mechanics	3
PHYS 412	Advanced Electromagnetism	3
PHYS 455	Solid State Physics	3
PHYS 481	Advanced Mathematical Methods of Physics	3

Program continuance

To remain in the program, students must maintain a minimum GPA of 2.00, calculated on all courses applied to the diploma.

Student who drop below the minimum GPA will have one semester to rectify the problem. The EPDC may grant exceptions under extenuating circumstances.

Undergraduate continuance

Students enrolled in undergraduate courses (courses numbered 100 or above) must maintain an undergraduate Cumulative Grade Point Average (CGPA) of at least 2.00 to remain enrolled in Good Academic Standing at UFV. Students in Good Academic Standing will have no registration limits placed on them. Failure to meet the minimum CGPA requirement will result in restrictions on registration and may eventually lead to academic suspension from undergraduate studies at UFV. Students on Academic Warning or Academic Probation are limited to registering in 10 credits. For further details, see the <u>Academic standing and undergraduate continuance</u> section of the academic calendar. Academic standing is governed by UFV's <u>Undergraduate Continuance policy (92)</u>.

Course repetition

Students may not register for a course more than twice without permission. No course in the program can be taken more than twice. No more than four 200-level or above course duplications will be permitted on courses which apply to the diploma. Students with more than four 200-level or above course duplications will not be able to graduate from the program. Where a course has been repeated, only the higher grade is counted in the GPA calculation.

Readmission

Students who have been required to withdraw from UFV under the **Undergraduate Continuance policy** (92) are subject to readmission and continuance requirements as listed in the UFV academic calendar. Students are normally only readmitted once to the same program. Readmission to the program is not guaranteed. Space must be available in the courses the student needs. The EPDC may choose to readmit a student who has achieved a minimum semester GPA of 2.00 in a semester in which the student took at least nine credits of courses.

Residency

In addition to the standard UFV residency requirements, students must complete ENGR 100 and ENPH 390 (formerly ENGR 390), plus four of the required <u>upper200</u>-level <u>or above</u> (300- or 400-level) Physics, Engineering, or Engineering Physics courses, at UFV (not including elective courses).

Graduation requirements

Students are responsible for ensuring they are eligible to graduate, and graduate and should regularly consult with an Academic Advisor. To be eligible to graduate, students must have completed all required courses and the four electives with a minimum GPA of 2.00, calculated on all the program courses.

It is possible for a student to take all courses in the program without being admitted to the program if seats reserved for diploma students were released for general admission and taken by the student. It is also possible that a student who failed to meet continuance requirements could complete the courses without meeting the readmission requirements. In these cases the committee would determine if the student has successfully completed the graduation requirements as described above and recommend the student for graduation.

<u>Students must apply for graduation in the first month of their final semester of studies. Visit the</u> <u>Graduation webpage for more information.</u>

Students must apply for graduation by completing the Graduation Request form available at <u>ufv.ca/registrar/forms</u>, or from the Office of the Registrar. This should be done in the first month of the final semester. The final deadline for students who wish to attend the June Convocation ceremony is April 1 of each year, with all program requirements completed by the Winter semester grade deadline (see Important Registration Dates) of each year.

Maximum length of time to complete program

The diploma is designed to be completed in two years, and if a student is unable to complete it in that time frame there is no guarantee that there will be space in the needed courses. All courses must be completed within five years of the start of the program.

Course listings

For complete details on courses see the course descriptions section.

Return to main Engineering page



UEC POLICY SUBCOMMITTEE

The UEC Policy Subcommittee is a subcommittee of the Undergraduate Education Committee.

PURPOSE

The purpose of the subcommittee is to suggest new policies or revisions to policies that fall under Items 2 and 4 of the UEC Terms of Reference:

2. Advise Senate on policies, procedures, and criteria for the admission, evaluation, withdrawal, and promotion of undergraduate students.

4. Advise Senate on policies and procedures for review and approval of new and existing courses, programs, or curricular changes.

TERMS OF REFERENCE

- 1. Review Senate Governance Committee requests for policy reviews.
- 2. Consult with relevant stakeholders where necessary to draft policy revisions.
- 3. Bring policy drafts to UEC for discussion, approval, or recommendation to Senate.
- 4. Identify policies in need of revision and propose policy reviews when appropriate.
- 5. Initiate policy reviews when directed by UEC to do so.

COMPOSITION

Membership

- One UEC Chair
- Registrar (or designate)
- University Secretary (or designate)
- Two UEC Faculty members*
- One UEC Advisor*
- One IR representative
- One PDQA representative
- One Dean
- One UEC at large member*
- * Two-year term, renewable.

As needed, the committee will consult specific areas (International Education, Graduate Studies Committee, Continuing Education, specific disciplinary or Faculty areas not otherwise included in the committee, etc.)



MEMO

To: Chair, Undergraduate Education Committee

Date: September 2, 2022

Re: Student Vacancy on UEC

The Secretariat office has confirmed that Sarbjot Nijjar, a student member, is no longer enrolled at UFV as of September 2022 and therefore not eligible to serve on the Undergraduate Education Committee.

The Secretariat will make a call to fill this position, starting as soon as possible, for the remainder of a two-year term, until July 31, 2024.

1