MEMORIAL UNIVERSITY OF NEWFOUNDLAND
SENATE

The regular meeting of Senate was held on November 12, 2019, at 4:00 p.m. in the Lecture Theatre in the Physical Education Building, Room 2001.

14. PRESENT

The President, Dr. N. Golfman, Dr. N. Bose, Mr. G. Blackwood, Dr. S. Bugden, Ms. S. Cleyle, Dr. I. Dostaler, Dr. A. Gaudine, Dr. K. Goodnough, Dr. T. Hennessey (via teleconferencing), Dr. K. Jacobsen (via videoconferencing), Mr. T. Nault, Dr. L. Rohr, Dr. J. Simpson, Dr. A. Surprenant, Dr. G. Watson, Ms. A. Ambi, Dr. S. Barkanova, Dr. D. Behm, Dr. G. Cox, Dr. R. Croll (via videoconferencing), Professor A. Fisher, Dr. G. Galway, Dr. S. Ganz (via videoconferencing), Dr. G. George, Dr. E. Haven, Dr. J. Hawboldt, Dr. R. Haynes, Mr. D. Howse, Dr. E. Kendall, Dr. S. MacDonald, Dr. M. Marshall, Dr. E. Merschrod, Dr. J. Munroe, Dr. S. O'Neill, Dr. D. Peters, Ms. H. Skanes, Dr. K. Snelgrove, Dr. M. Stordy, Mr. M. Waller (via teleconferencing), Dr. J. Westcott, Mr. D. Dunphy, Ms. A. Francis, Mr. B. Greeley, Ms. K. McLaughlin, Mr. L. O'Neill, Mr. T. Roham.

Chair of the Senate Committee on Undergraduate Studies (Standing Invitation)

Dr. Shannon Sullivan

The President welcomed all Senators to this meeting of Senate.

Land acknowledgement:

We respectfully acknowledge the territory in which we gather as the ancestral homelands of the Beothuk, and the island of Newfoundland as the ancestral homelands of the Mi'kmaq and Beothuk. We would also like to recognize the Inuit of Nunatsiavut and NunatuKavut and the Innu of Nitassinan, and their ancestors, as the original people of Labrador. We strive for respectful partnerships with all the peoples of this province as we search for collective healing and true reconciliation and honour this beautiful land together.

Welcome:

New Senators

Arts and Social Science – Grenfell Campus	Dr. Rie Croll Dr. Shoshannah Ganz
Music	Dr. Caroline Schiller

The President noted that it would be appreciated if when you speak you use the microphone and introduce yourself and your constituency as Grenfell Campus Senators are joining by videoconferencing and otherwise will not be able to hear.

15. APOLOGIES FOR ABSENCE

Apologies were received from Dr. M. Piercey-Normore, Dr. M. Steele, Dr. T. Adey, Dr. J. Leibel, Dr. J. Lokash, Dr. S. Matthews, Dr. C. Schiller.

16. MINUTES

It was moved by Dr. G. George, seconded by Dr. D. Peters, and carried that the Minutes of the regular meeting held on September 10, 2019, be taken as read and confirmed.

CONSENT AGENDA

It was moved by Dr. G. George, seconded by Dr. A. Surprenant, and carried that the consent agenda, comprising the items listed in 17-20 below, be approved as follows.

17. Report of the Senate Committee on Undergraduate Studies

17.1 Faculty of Engineering and Applied Science

Page 123, 2019-2020 Calendar, under the heading 4.2 Complementary Studies, amend first bullet of clause 2 as follows:

- English 1090~~ or the former English 1080 or~~. A student whose first language is not English and who does not meet the standards for entry into regular first-year English courses may use English 1020 to fulfill this requirement.

Page 126, 2019-2020 Calendar, under the heading 5.2.1 Admission, amend clause 3 as follows:

"Applications for admission to the Winter and Spring semesters will be considered for Memorial University of Newfoundland students only, who have successfully completed or are currently registered for two or more of the following courses: Mathematics 1000, Mathematics 1001, Mathematics 2050, Physics 1050, Physics 1051, Chemistry 1050, English 1090 (or English 1020)~~ or the former English 1080~~. The deadline for application to the Winter semester is October 1 and to the Spring semester is February 1."

Page 127, 2019-2020 Calendar, under the heading 5.3.2 Memorial University of Newfoundland Applicants, amend the first bullet as follows:

Faculty of Engineering and Applied Science (cont'd)

- To be eligible for consideration for admission to the Bachelor of Engineering program, a student who is attending or has previously attended this University must have a cumulative average of at least 70%, and obtained a grade of at least 70% in two or more of the following courses: Mathematics 1000, Mathematics 1001, Mathematics 2050, Physics 1050, Physics 1051, Chemistry 1050, English 1090 (or English 1020) ~~or the former English 1080~~.

Page 127, 2019-2020 Calendar, under the heading 5.3.3 Transfer Applicants, amend the third bullet as follows:

- Applicants must have obtained a grade of at least 70% in two or more courses that have been deemed equivalent for transfer credit purposes to: Mathematics 1000, Mathematics 1001, Mathematics 2050, Physics 1050, Physics 1051, Chemistry 1050, English 1090 (or English 1020) ~~or the former English 1080~~.

Page 128, 2019-2020 Calendar, under the heading 6 Program Regulations, in all six charts (Tables 1 to 6 on pages 128, 129, 130, 132, 134 and 135), amend the first row after the header row as follows:

Engineering One	Chemistry 1050 English 1090 or 1020 ~~or the former 1080~~ ENGI 1010, 1020, 1030, 1040 Mathematics 1000, 1001, 2050 Physics 1050, 1051	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.

Page 136, 2019-2020 Calendar, under the heading 7.1 General Information, amend clause 1 as follows:

"Engineering One consists of eleven required courses: Mathematics 1000, Mathematics 1001, Mathematics 2050, Physics 1050, Physics 1051, Chemistry 1050, English 1090 (or English 1020) ~~or the former English 1080~~, ENGI 1010, ENGI 1020, ENGI 1030 and ENGI 1040."

Page 136, 2019-2020 Calendar, under the heading 7.2 Promotion Status (Engineering One), amend clause 1.a. as follows:

"a. an Engineering One promotion average of at least 65%. The promotion average is defined as the overall average of the following

Faculty of Engineering and Applied Science (cont'd)

nine courses: Mathematics 1001, Mathematics 2050, Physics 1051, Chemistry 1050, English 1090 (or English 1020) ~~or the former English 1080~~, ENGI 1010, ENGI 1020, ENGI 1030 and ENGI 1040; and"

17.2 Faculty of Humanities and Social Sciences

Page 369, 2019-2020 Calendar, under the heading 15.16 History, regularize the course History 3749 as follows:

"**3749 Social History of Alcohol** examines the motivations behind those who have tried to regulate or prohibit the consumption of alcohol and those who wish to consume it. In order to identify what alcohol consumption 'meant' in the past we will explore who drank what, where they drank it, and why. The course focuses on Europe from approximately 1600 onwards, but also discusses patterns of alcohol consumption in North America.
ABBREVIATED COURSE TITLE: Social History of Alcohol

3740-3750 (Excluding 3747, 3748 and 3749) Studies in Modern Social and Intellectual History are selected studies in the history of modern ideas and society. Aspects to be studies~~s~~d will be posted on the Department of History website."

17.3 School of Science and the Environment

Page 197, 2019-2020 Calendar, under the heading 7.5.2 Bachelor of Science with Major in Computational Mathematics, amend the section as follows:

"**7.5.2 Bachelor of Science with Major in Computational Mathematics**

www.grenfell.mun.ca/computational-mathematics

This Mathematics Major covers the essential undergraduate topics in mathematics, develops rigorous logical thinking, and equips students with computational techniques to model and solve real-world problems. Courses used to complete the requirements of this major may be used to meet the requirements of a minor or second major in a different subject area excluding a minor in Science and a major in General Science.

- The 120 credit hour, 40 course program may be completed on a full or part-time basis as set out under **Table 5 Bachelor of Science with Major in Computational Mathematics**.
- A student must complete Core Program Requirements as outlined under **School of Science and the Environment Core Program Requirements**.

School of Science and the Environment (cont'd)

- A student must complete an approved concentration of courses known as a Major and elective courses to make up the required total of 40 courses, 120 credit hours. A Minor is not required for this program.

Table 5 Bachelor of Science with Major in Computational Mathematics

Required Courses	**Elective Courses**
Courses as outlined under **School of Science and the Environment Core Program Requirements**.	Elective courses to make up the total of 120 credit hours.
3 credit hours in a computer programming course. Computer Science 1510 or 1001 is recommended. Mathematics 1000, 1001, 2000, 2050, 2051, 2130, 2260, 2320, 3000, 3132, 3240, 4242, 4950 ~~Philosophy 2030 or the former 2210~~ 3 credit hours in Physics chosen from Physics 1020, 1050, 2151, or 2400 Statistics 2550 (or equivalent) ~~12~~ 9 further credit hours in Mathematics and Statistics ~~including 3 credit hours at the 2000 level or higher; 6 credit hours~~ at the 3000 level or higher~~; and~~ , including 3 credit hours at the 4000 level (~~Computer Science 2510 and the former 2710, and~~ Physics ~~2820 and~~ 3820 may be used in place of an equivalent level Mathematics course) 3 credit hours chosen from Philosophy 2030 or the former 2210, Physics 2820, or Mathematics, Statistics, or Computer Science at the 2000 level or higher.	If a student decides to complete a minor, it must be comprised of 8 courses, 24 credit hours chosen from **Table 19 Minor Programs Offered by the School of Arts and Social Science**, or from **Table 5 Minor Program Offered by the School of Fine Arts**, or from **Table 10 Minor Programs Offered by the School of Science and the Environment**.

Page 201, 2019-2020 Calendar, under the heading 7.5.6 Minor Programs Offered by the School of Science and the Environment, amend the section as follows:

7.5.6 Minor Programs Offered by the School of Science and the Environment

www.grenfell.mun.ca/minor

Table 10 Minor Programs Offered by the School of Science and the Environment

Mathematics Minor
Mathematics 1000, 1001 Either 18 additional credit hours from Mathematics and Statistics courses at the 2000 level or higher, at least 6 credit hours shall be in courses at the 3000 level or higher (Physics 3820 can be used in place of a Mathematics course at the 3000 level); or 15 additional credit hours from Mathematics and Statistics courses at the 2000 level or higher, at least 6 credit hours shall be in courses at the 3000 level or higher (Physics 3820 can be used in place of a Mathematics course at the 3000 level); and 3 credit hours in one of Computer Science 1001, 1510, the former 1710, or Engineering 1020

School of Science and the Environment (cont'd)

Page 212, 2019-2020 Calendar, under the heading 13.7 Computer Science, amend the section as follows:

"**13.7 Computer Science**

Computer Science courses are designated by COMP.

1510 An Introduction to Programming for Scientific Computing introduces students to basic programming in the context of numerical methods with the goal of providing the foundation necessary to handle larger scientific programming projects. Numerical methods to solve selected problems from Physics, Chemistry, and Mathematics will be covered.
CR: the former COMP 2602 and the former Mathematics 2120
LH: 2
PR: Mathematics 1000

~~**1600 Basic Computing and Information Technology** offers an overview of computers and information technology. It provides students with the knowledge necessary to answer questions, such as: What is a computer system? How does it work? How is it used? This is done through the use of popular spreadsheet, word processing and database software packages and the Internet. Social issues and implications will also be included.~~
~~CR: the former Business 2700, the former COMP 2650, the COMP 2801~~
~~LH: 3~~
~~PR: Level III Advanced Mathematics or Mathematics 1090 or 109B, which can be taken concurrently~~

2500 Data Analysis with Scripting Languages introduces the use of scripting languages to solve common data analysis tasks. The control structures and expressions of the language are first discussed. Script solution to storing/retrieving data sets, searching data sets, and performing numeric and statistical calculation are covered. Plotting and visualization for data sets are also presented.
PR: COMP 1510 or the former COMP 1700 or the former COMP 1710 or COMP 1000 or COMP 1001 (or equivalent)"

17.4 Marine Institute

Page 154, 2019-2020 Calendar, under the heading 4.1.2 Bachelor of Technology, amend the section as follows:

"**4.1.2 Bachelor of Technology**

The Bachelor of Technology program prepares graduates for career advancement in health science technology or ~~engineering/applied science technology~~ engineering technology or applied science industries. It is designed for students who have graduated from an accredited diploma of

School of Science and the Environment (cont'd)

technology program that is applicable to one of two major areas of study. Courses in the program provide the student with an introduction to human resource and business management concepts, and the social contexts in which their careers will be based. The program consists of 39 credit hours in addition to work completed in a diploma program and can be taken on a full-time or part-time basis.
The major areas of study are:"

Page 154, 2019-2020 Calendar, under the heading 4.1.2.1 Major in Engineering and Applied Science Technology, amend the section as follows:

"**4.1.2.1 Major in Engineering Technology and Applied Science ~~Technology~~**

The Engineering Technology and Applied Science ~~Technology~~ Major is normally chosen by students who have an ~~engineering/applied science technology~~ engineering technology or applied science diploma."

Page 157, 2019-2020 Calendar, under the heading 6.2 Bachelor of Technology, amend the section as follows:

"**6.2 Bachelor of Technology**

- Students must complete 39 credit hours in addition to the work which was required under their category of admission.
- The required and elective courses are listed in **Table 4 Bachelor of Technology - Engineering Technology and Applied Science ~~Technology~~ Major** and **Table 5 Bachelor of Technology - Health Science Technology Major**.
- A maximum of 9 transfer credit hours applicable to the degree may be used to meet the degree requirements.
- When transfer credit has been granted for a course(s) taken to satisfy the requirements for admission, students must take an additional elective University course(s).
- To meet the academic requirements for a Bachelor of Technology a candidate shall successfully complete the program with a minimum overall average of 60% and a minimum numeric grade of 50% in each course required for the degree unless stated otherwise within the course description.

6.2.1 Engineering Technology and Applied Science ~~Technology~~ Major

- Students must take 39 credit hours with 24 credit hours from the required courses and 15 credit hours from the electives.
- At least one elective must be chosen from each of the groups A and B.

School of Science and the Environment (cont'd)

Table 4 Bachelor of Technology - Engineering Technology and Applied Science ~~Technology~~ Major

Required Courses	Group A Electives	Group B Electives
• 3 credit hours in a Critical Reading and Writing (CRW) course • TECH 4010 • TECH 4019 • TECH 4020 • TECH 4025 or Statistics 1510 or 2500 or equivalent • TECH 4040 • TECH 4060 • TECH 4400	• Business 1101 or 2102 • Business 4000 • Economics 3360 • MARI 4008 • TECH 4011 • TECH 4012 • TECH 4013 • TECH 4017 • TECH 4050 • TECH 4070 • TECH 4080 • TECH 4090 or Business 1000	• Economics 1010 or the former 2010 • Economics 1020 or the former 2020 • Economics 3080 • TECH 4014 • TECH 4015 • TECH 4016 • TECH 4030 or Sociology 2120 or Geography 3015 or Sociology 3015 • TECH 4055 • Philosophy 1100 • Philosophy 2330 or the former 2571

6.2.2 Health Science Technology Major

- Students must take 39 credit hours with 18 credit hours from the required courses and 21 credit hours from the electives.
- At least one elective must be chosen from each of the groups A, B, and C.

Table 5 Bachelor of Technology - Health Science Technology Major

Required Courses	Group A Electives	Group B Electives	Group C Electives
• 3 credit hours in a Critical Reading and Writing (CRW) course • TECH 4019 • TECH 4025 or Statistics 1510 or 2500 or equivalent • TECH 4040 • TECH 4060 • TECH 4400	• Business 1101 or 2102 • Business 4000 • Economics 3360 • MARI 4008 • TECH 4011 • TECH 4012 • TECH 4013 • TECH 4017 • TECH 4050 • TECH 4090 or Business 1000	• Economics 1010 or the former 2010 • Economics 1020 or the former 2020 • Economics 3080 • TECH 4014 • TECH 4015 • TECH 4016 • TECH 4030 or Sociology 2120 or Geography 3015 or Sociology 3015 • TECH 4055 • TECH 4080 • Philosophy 1100 • Philosophy 2100 or the former	• Biology 2040 or 2041 • Psychology 1000 • Psychology 2010 • Psychology 2020 • Psychology 2030 • Psychology 2800 • TECH 4110 • TECH 4111

		2551; 2110 or the former 2553; 2120 or the former 2552 • Philosophy 2330 or the former 2571	

Page 159, 2019-2020 Calendar, under the heading 10.2 Technology, amend the section as follows:

"**10.2 Technology**

Technology courses are designated by TECH.

4110 Health Care Management provides an introduction to health care management. Students will study leadership, change management, strategic planning, quality, and teamwork. They will also learn to analyze and examine health care related case studies. In addition, they will learn to research and analyze current health management issues which exist.

4111 Health Information Management and Technology focuses on the management of health care information through the use of technology and the interdisciplinary collaboration to analyze, design, implement and evaluate information that can enhance health outcomes.
ABBREVIATED COURSE TITLE: Health Info Mgmt and Tech

4400 Technological Assessment Project (same as the former MSTM 4400) provides students with the opportunity to conduct an assessment and implementation plan of a technical project in their area of interest. Students will utilize the knowledge that they have obtained in the required courses and incorporate this knowledge into a final project paper.
CR: the former MSTM 410A/B, the former MSTM 4000, the former MSTM 4100, the former MSTM 4200, the former MSTM 4400 and the former Technology 4000
PR: one of TECH 4019 or the former MSTM 4019, one of TECH 4040 or the former MSTM 4040, one of TECH 4060 or the former MSTM 4060, and TECH 4025 or Statistics 1510 or 2500 or equivalent"

17.5 Senate Committee on Undergraduate Studies

Page 50, 2019-2020 Calendar, University Regulations, under the heading 6.5.8 Completing a Course, amend the section as follows:

"~~1. When it is prescribed that students, once registered, must complete a particular course, it is understood that they shall, when required, attend lectures given in the course, perform laboratory projects, and exercises that may be assigned and any other written or oral exercises prescribed, write or otherwise answer tests and examinations given in the course throughout~~

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~~the semester or session, including any final examinations, and shall obtain an overall passing grade in the course in accordance with the prescribed evaluation procedures.~~

1. A student will be considered to have completed a course if the student attends and/or attempts the final examination (or a similarly cumulative or capstone form of evaluation, in the case of a course with no final examination), regardless of the grade achieved in the course.

a. A student who has not completed a course, but who has neither dropped the course (as described under **Registration – Dropping Courses**) nor withdrawn from the semester in which the student was registered for the course (as described under **Registration – Withdrawing from the University**), will be assigned a grade in the course following the prescribed method of evaluation.

b. Once a student has completed a course, neither a retroactive drop of the course nor a retroactive withdrawal from the semester in which the student was registered for the course will normally be possible.

2. A student will be considered to have successfully completed a course if the student has received a passing grade in the course based upon the method of evaluation for the section of the course in which the student was registered, as modified by any approved changes and/or exemptions to the method of evaluation, and in accordance with any relevant Faculty, School or Departmental regulations."

Page 4, 2019-2020 Calendar, General Information, under the heading 4 Glossary of Terms Used in This Calendar, amend the entry for "Course" as follows:

"is a unit of work in a particular subject normally extending through one semester or session, the successful completion of which normally carries credit toward the fulfilment of the requirements of certain degrees, diplomas or certificates."

Page 4, 2019-2020 Calendar, General Information, under the heading 4 Glossary of Terms Used in This Calendar, amend the entry for "Course number" as follows:

"**A** or **B** identifies a linked course. No credits or points are given until the "B" part is successfully completed."

Page 4, 2019-2020 Calendar, General Information, under the heading 4 Glossary of Terms Used in This Calendar, amend the entry for "Linked course" as follows:

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"is a course comprising two components and is normally identified by the letter "A" or "B" as the last character of the course number. No credits or points are given until the "B" part is successfully completed."

Page 42, 2019-2020 Calendar, University Regulations, under the heading 4.3.7 Applicants for Visiting Student Status, amend the third bullet as follows:

"have been offered provisional acceptance to a Memorial University of Newfoundland graduate-level program subject to the successful completion of specific pre-requisite courses."

Page 42, 2019-2020 Calendar, University Regulations, under the heading 4.3.7 Applicants for Visiting Student Status, amend the fourth bullet of 4.3.7.1 Application and Admission Criteria, as follows:

"Visiting students are normally eligible to register at Memorial University of Newfoundland under this category for a maximum of two semesters and registration eligibility is subject to course availability and successful completion of course pre-requisites."

Page 44, 2019-2020 Calendar, University Regulations, under the heading 4.4 Transfer Credit, amend the first bullet of 4.4.5 Member Institutions of Universities Canada, as follows:

"All university-level course work successfully completed by transfer students during the first two years of university study taken at universities/colleges that are ordinary members of Universities Canada will be recognized for transfer credit."

Page 44, 2019-2020 Calendar, University Regulations, under the heading 4.4 Transfer Credit, amend the second bullet of 4.4.5 Member Institutions of Universities Canada, as follows:

"Applicants who have successfully completed course work beyond the first two years of university study may be considered for further transfer credit subject to evaluation and recommendation by the appropriate academic unit(s) and **University Regulations**."

Page 46, 2019-2020 Calendar, University Regulations, under the heading 6.2.1 Year of Degree and Departmental Regulations – Faculty of Humanities and Social Sciences and Faculty of Science, amend Regulation 1 as follows:

"A student completing a degree program in the Faculty of Humanities and Social Sciences or in the Faculty of Science will normally follow the

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degree regulations in effect in the academic year in which the student first successfully completes a course(s) at Memorial University of Newfoundland."

Page 46, 2019-2020 Calendar, University Regulations, under the heading 6.2.1 Year of Degree and Departmental Regulations – Faculty of Humanities and Social Sciences and Faculty of Science, amend Regulation 2 as follows:

"In the case of departmental regulations for a major or minor, a student will normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000 level or above which may be applied to the major or minor program respectively."

Page 46, 2019-2020 Calendar, University Regulations, under the heading 6.2.2 Year of Degree and Departmental Regulations – All Other Faculties and Schools, amend Regulation 1 as follows:

"A student registered in any program, other than programs in the Faculty of Humanities and Social Sciences, programs in the Faculty of Science, the Bachelor of Business Administration program offered by the Faculty of Business Administration, or in the Bachelor of Maritime Studies or Bachelor of Technology programs offered by the Fisheries and Marine Institute will normally follow regulations in effect in the academic year in which the student first successfully completes a course(s) in the faculty or school following formal admission to that program."

Page 46, 2019-2020 Calendar, University Regulations, under the heading 6.2.2 Year of Degree and Departmental Regulations – All Other Faculties and Schools, amend Regulation 3 as follows:

"Under those circumstances, for the purpose of meeting **Degree and Departmental Regulations, Year of Degree and Departmental Regulations - All Other Faculties and Schools**, students will normally follow the degree regulations in effect in the academic year in which the student first successfully completes an undergraduate degree course in the Maritime Studies/Technology Management (MSTM) subject area."

Page 46, 2019-2020 Calendar, University Regulations, under the heading 6.2.2 Year of Degree and Departmental Regulations – All Other Faculties and Schools, amend Regulation 4 as follows:

"For the purpose of meeting Degree and Departmental Regulations, Year of Degree and Departmental Regulations - All Other Faculties and Schools, a student who is completing the Bachelor of Maritime

Senate Committee on Undergraduate Studies (cont'd)

Studies/Bachelor of Technology will normally follow the degree regulations in effect in the academic year in which the student first successfully completes a course(s) in the program following formal admission to that program."

Page 53, 2019-2020 Calendar, University Regulations, under the heading 6.9.2 Descriptions of Letter Grades, amend the fifth bullet as follows:

""F" indicates failing performance with evidence of:
an inadequate knowledge of the subject matter,
failure to successfully complete required work,
an inability to organize and analyse ideas, and
an inability to communicate.""

Page 54, 2019-2020 Calendar, University Regulations, under the heading 6.9.4 Linked Course, amend Regulation 1 as follows:

"No credits or points are given until the "B" part is successfully completed. Credits and points will be awarded upon successful completion of the ~~B~~"B" part and will be attributed to the ~~B~~"B" part only."

Page 60, 2019-2020 Calendar, University Regulations, under the heading 6.13.2 Classification of General Degrees, amend Regulation 5 as follows:

"A student who has been granted credit for courses successfully completed at Memorial University of Newfoundland before the introduction of the point system, and/or one who has been given credit for courses successfully completed at another university, will have the class of the degree determined by applying the scheme set forth in **Classification of General Degrees** in proportion to the total of required credit hours completed at Memorial University of Newfoundland since the introduction of the point system."

Page 61, 2019-2020 Calendar, University Regulations, under the heading 6.13.3 Classification of Honours Degrees, amend Regulation 2 as follows:

"A student who has been granted credit for courses successfully completed at Memorial University of Newfoundland before the introduction of the point system, and/or one who has been given credit for courses successfully completed at another university, will have the class of the honours degree determined in proportion to the total number of required credit hours completed at Memorial University of Newfoundland since the introduction of the point system."

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Page 64, 2019-2020 Calendar, University Regulations, under the heading 8 Scholarships, Bursaries and Awards, amend the fourteenth paragraph as follows:

"Students who fail one or more courses during the scholarship year, regardless of the number of courses successfully completed, will not be eligible for scholarships."

Page 71, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.2 Regulations for General Degree of Bachelor of Commerce (Co-operative), amend Regulation 1 of 5.2.1.2 Advanced Standing (for Current Memorial University of Newfoundland Students), as follows:

"Students applying for admission to a term beyond Terms A/B must have successfully completed all of the academic courses required in the program up to that term, including the academic courses required in Terms A/B, with grades at least as high as those required to meet promotion requirements."

Page 74, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.2.5 Examination and Promotion for the Bachelor of Commerce (Co-operative), amend Regulation 11 as follows:

"Permission to drop a work term does not constitute a waiver of degree requirements, and students who have obtained such permission must successfully complete an approved work term in lieu of the one dropped."

Page 75, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.4 Regulations for the Diploma in Business Administration, amend Regulation 2(d) as follows:

"BUSI 450W will not be required of students who successfully complete BUSI 4050 from the list in 2.b.iv. above."

Page 75, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.4 Regulations for the Diploma in Business Administration, amend Regulation 2(e) as follows:

"Students planning to pursue their Bachelor of Business Administration (see **Regulations for the General Degree of Bachelor of Business Administration (B.B.A.)**) are encouraged to note the prerequisites for BUSI 7000 and to plan their courses so that they have successfully completed the prerequisites prior to the semester in which they plan to take BUSI 7000."

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Page 76, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.5 Regulations for the General Degree of Bachelor of Business Administration (B.B.A.), amend Regulation 2(e) of 5.5.1 The Curriculum as follows:

"Students are encouraged to note the prerequisites for 7000 (Strategic Management 2) and to plan their courses so that they have successfully completed the prerequisites prior to the semester in which they plan to take 7000."

Page 77, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.7 Joint Degrees of Bachelor of Business Administration and Bachelor of Music, amend the "Winter – Academic Term 2" entry of "Table 3 Joint Degrees of Bachelor of Business Administration and Bachelor of Music Curriculum" under 5.7.2 The Curriculum as follows:

"Economics 1010 or Mathematics 1000 if not successfully completed in Term 1 [see note 1 below]"

Page 77, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.7 Joint Degrees of Bachelor of Business Administration and Bachelor of Music, amend the "Winter – Academic Term 4" entry of "Table 3 Joint Degrees of Bachelor of Business Administration and Bachelor of Music Curriculum" under 5.7.2 The Curriculum as follows:

"Economics 1010 if not successfully completed in Term 2 [see note 1 below]"

Page 79, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.8 Regulations for the General Degree of International Bachelor of Business Administration (i.B.B.A.), amend Regulation 2 of 5.8.2 Admission Requirements as follows:

"Students who are seeking admission for the Fall semester normally must have successfully completed all the courses required for admission by the end of the Winter semester."

Page 80, 2019-2020 Calendar, Faculty of Business Administration, under the heading 5.8.4.2 Cross-Cultural Study Experience, amend Regulation 4 as follows:

"Notwithstanding the **General Regulations** above and the **Continuance Regulations** below, a student may be held back from participating in the Cross-Cultural Study Experience if the student has not successfully completed at least ten courses since admission to the i.B.B.A. program or

Senate Committee on Undergraduate Studies (cont'd)

has not successfully completed a course load of 15 credit hours with a semester average of at least 65% in a single semester."

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6 Business Concentrations, amend as follows:

"In either case, students must successfully complete the required number of BUSI and non-BUSI electives outlined in the program regulations for the degree in which they are enrolled."

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.1 Accounting, amend as follows:

"Students electing an Accounting concentration should successfully complete the following courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.2 Finance, amend as follows:

"Students electing a Finance concentration should successfully complete the following courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.3 Human Resources and Labour Relations, amend as follows:

"Students electing the Human Resources and Labour Relations concentration should successfully complete the following courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.4 Information Systems, amend as follows:

"Students electing an Information Systems concentration should successfully complete the following courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.5 International Business, amend as follows:

"Students electing an International Business concentration should successfully complete the following eight courses, of which at least five should be from the Faculty of Business Administration:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.6 Marketing, amend as follows:

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"Students electing a Marketing concentration should successfully complete the following courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.7 Operational Research, amend as follows:

"Students electing a Operational Research concentration should successfully complete the following eight courses:"

Page 81, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.8 Resource-Based Industries Management, amend as follows:

"Students electing a Resource-Based Industries Management concentration should successfully complete the following courses:"

and

"Students completing the Bachelor of Business Administration program must either choose two courses from Economics 3080, Economics 4090, Engineering 8671, Geography 2425, Geography 3425, Political Science 3210, and Political Science 3250, or must successfully complete a non-Business elective in addition to the courses required for their program in order to meet clause 2.f. under **Regulations for the General Degree of Bachelor of Business Administration (B.B.A.), The Curriculum**."

Page 82, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.9 Small Business/Entrepreneurship, amend as follows:

"Students electing a Small Business/Entrepreneurship concentration should successfully complete the following courses:"

Page 82, 2019-2020 Calendar, Faculty of Business Administration, under the heading 6.10 Supply Chain Management, amend as follows:

"Students electing a Supply Chain Management concentration should successfully complete the following courses:"

Page 95, 2019-2020 Calendar, Faculty of Education, under the heading 8.1 Bachelor of Education (Intermediate/Secondary), amend the "Physical Education" entry of the table Academic Disciplines for Bachelor of Education (Intermediate/Secondary) as follows:

"In order to be considered for admission within this Academic Discipline, an applicant must have successfully completed courses in the following areas: Human Anatomy, Human Physiology, Motor Learning,

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Biomechanics, Primary/Elementary Physical Education Curriculum and Teaching, Issues and Trends in Physical Education and a minimum of 15 credit hours in Physical Education activities."

Page 96, 2019-2020 Calendar, Faculty of Education, under the heading 8.2 Bachelor of Education (Intermediate/Secondary) Conjoint with the Diploma in Technology Education, amend the "Physical Education" entry of the table Academic Disciplines for Bachelor of Education (Intermediate/Secondary) Conjoint with the Diploma in Technology Education as follows:

"In order to be considered for admission within this Academic Discipline, an applicant must have completed successfully courses in the following areas: Human Anatomy, Human Physiology, Motor Learning, Biomechanics, Primary/Elementary Physical Education Curriculum and Teaching, Issues and Trends in Physical Education and a minimum of 15 credit hours in Physical Education activities."

Page 100, 2019-2020 Calendar, Faculty of Education, under the heading 8.10 Bachelor of Special Education, amend Regulation 3(b) as follows:

"have successfully completed Education 4240 (or equivalent);"

Page 100, 2019-2020 Calendar, Faculty of Education, under the heading 8.10 Bachelor of Special Education, amend Regulation 3(c) as follows:

"have successfully completed Education 3312 and 3543, or 4350"

Page 101, 2019-2020 Calendar, Faculty of Education, under the heading 9.1 Bachelor of Education (Intermediate/Secondary), amend the "Fall – Semester 1" entry of "Table 1 Bachelor of Education (Intermediate/Secondary)" as follows:

"Those with a Geography discipline are required to successfully complete either ED 4180 or 4174. Those with a Social Studies discipline (Business Studies, Canadian Studies, Economics, History, Newfoundland and Labrador Studies, and Political Science) are required to successfully complete ED 4180. Those with first and second academic disciplines in Social Studies are required to successfully complete ED 4180 and 4181. Those with first and second academic disciplines in sciences (Biochemistry, Biology, Chemistry, Earth Sciences, Environmental Science, General Science, Physics) are required to successfully complete ED 4174 and 4175."

Page 102, 2019-2020 Calendar, Faculty of Education, under the heading 9.2 Bachelor of Education (Intermediate/Secondary) Conjoint with the

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Diploma in Technology Education, amend the "Fall – Semester 2" entry of "Table 2 Bachelor of Education (Intermediate/Secondary) Conjoint with the Diploma in Technology Education" as follows:

"Those with a Geography discipline are required to successfully complete either ED 4180 or 4174. Those with a Social Studies discipline (Canadian Studies, Economics, History, and Political Science) are required to successfully complete ED 4180."

Page 104, 2019-2020 Calendar, Faculty of Education, under the heading 9.5 Bachelor of Education (Primary/Elementary) as a First Degree, amend the "Winter – Semester 6" entry of "Table 5 Bachelor of Education (Primary/Elementary) as a First Degree" as follows:

"ED 4240 (or an Education elective if ED 4240 has been successfully completed previously)"

Page 104, 2019-2020 Calendar, Faculty of Education, under the heading 9.5 Bachelor of Education (Primary/Elementary) as a First Degree, amend the "French (24 credit hours)" entry of 'Table 6 Focus Areas for Bachelor of Education (Primary/Elementary" as follows:

"It is recommended that a student successfully complete at least one of French 2900, 3650, 3651, 3653, 3654."

Page 110, 2019-2020 Calendar, Faculty of Education, under the heading 16 Course Descriptions, amend the prerequisite for Education 407T (Extended Internship in the Intermediate and Secondary School) as follows:

"PR: Education 406T. Interns wishing to complete an internship in French immersion must successfully complete Education 4154 and obtain the permission of the Office of Undergraduate Programs. Normally, French immersion interns have the equivalent of a major in French and a minimum of two semesters in a French milieu."

Page 123, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 4.1 Program of Study, amend Regulation 3 as follows:

"To be eligible for registration for ENGI 001W in the Spring semester after completing Engineering One, students are expected to successfully complete the prerequisite ENGI 200W in the Fall semester of Engineering One. All other Engineering One students are expected to successfully complete ENGI 200W in the Winter semester of Engineering One."

Page 123, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 4.2 Complementary Studies, amend the third bullet of Regulation 2 as follows:

"Engineering 4102 must be successfully completed before Term 6 in the Civil and Process majors, and must be successfully completed before Term 7 in all other majors"

Page 126, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 5 Admission/Readmission Regulations for the Faculty of Engineering and Applied Science, amend Regulation 1 of 5.1 General Information as follows:

"The Bachelor of Engineering program requires successful completion of a minimum of four co-operative education work terms. Prospective applicants should review the information about work term expectations at **Work Terms**."

Page 128, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.1.1 Civil Engineering Major, amend "Engineering One" entry of "Table 1 Civil Engineering Major" as follows:

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

Page 129, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.2.1 Computer Engineering Major, amend "Engineering One" entry of "Table 2 Computer Engineering Major" as follows:

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

Page 130, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.3.1 Electrical Engineering, amend the "Engineering One" entry of "Table 3 Electrical Engineering Major" as follows:

"Students who are expecting to successfully complete the Engineering One requirements by the end of the Winter semester may apply to undertake a

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work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be successfully completed during the Fall semester. All other students are expected to successfully complete ENGI 200W in the Winter semester of Engineering One."

Page 132, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.4.1 Mechanical Engineering Major, amend the "Engineering One" entry of "Table 4 Mechanical Engineering Major" as follows:

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

Page 134, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.5.1 Ocean and Naval Architectural Engineering Major, amend the "Engineering One" entry of "Table 5 Ocean and Naval Architectural Engineering Major" as follows:

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

Page 135, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 6.6.1 Process Engineering Major, amend the "Engineering One" entry of "Table 6 Process Engineering Major" as follows:

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

Page 136, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 7.2 Promotion Status (Engineering One), amend Regulation 6 as follows:

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"In order to remain in the Engineering program, a student admitted to Engineering One must successfully complete the requirements for promotion to Academic Term 3 before the end of the academic year following the academic year of admission. Therefore, a student in Engineering One will have at most two years to successfully complete all requirements for promotion to Academic Term 3."

Page 136, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 7.2 Promotion Status (Engineering One), amend Regulation 9 as follows:

"A student is required to submit a Major Preference form, indicating ~~a~~ preferences for major in rank order, by April 1 in the academic year in which the student expects to successfully complete the requirements of Engineering One."

Page 140, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.3 Academic Term 3 Courses, amend the prerequisite for Engineering 3821 (Circuit Analysis) as follows:

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

Page 140, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.3 Academic Term 3 Courses, amend the prerequisite for Engineering 3861 (Digital Logic) as follows:

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

Page 141, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.4 Academic Term 4 Courses, amend the prerequisite for Engineering 4625 (Process Engineering Calculations) as follows:

"PR: ENGI 3901. Students completing a minor in Applied Science – Process Engineering must successfully complete Chemistry 2301 as the prerequisite instead of ENGI 3901."

Page 141, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.4 Academic Term 4 Courses, amend the prerequisite for Engineering 4823 (Introduction to Systems and Signals) as follows:

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"PR: ENGI 3424, ENGI 3821. Students completing a **Minor in Applied Science - Electrical Engineering** may successfully complete Physics 3820 as the pre-requisite instead of ENGI 3424 and may successfully complete Physics 3550 as a pre-requisite instead of ENGI 3821."

Page 141, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.4 Academic Term 4 Courses, amend the prerequisite for Engineering 4841 (Electromechanical Devices) as follows:

"PR: ENGI 3424, ENGI 3821. Students completing a **Minor in Applied Science - Electrical Engineering** may successfully complete Physics 3820 as the pre-requisite instead of ENGI 3424 and may successfully complete Physics 3550 as a pre-requisite instead of ENGI 3821."

Page 141, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.4 Academic Term 4 Courses, amend the prerequisite for Engineering 4854 (Electrical Circuits I) as follows:

"PR: ENGI 3821, Physics 3000. Students completing a **Minor in Applied Science - Electrical Engineering** may successfully complete Physics 3550 as the pre-requisite instead of ENGI 3821."

Page 144, 2019-2020 Calendar, Faculty of Engineering and Applied Science, under the heading 11.6 Academic Term 6 Courses, amend the prerequisite for Engineering 6813 (Electromagnetic Fields) as follows:

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

Page 154, 2019-2020 Calendar, Fisheries and Marine Institute, under the heading 5.2 Admission Requirements for Applicants to the Bachelor of Maritime Studies Program, amend Regulation 4 as follows:

"In accordance with the ***UNIVERSITY REGULATIONS*** **- Residence Requirements - Second Degree**, students completing the Bachelor of Maritime Studies Program, as a second degree, must successfully complete all required courses in their major area of study within the Bachelor of Maritime Studies program."

Page 155, 2019-2020 Calendar, Fisheries and Marine Institute, under the heading 5.3 Admission Requirements for Applicants to the Bachelor of Technology Program, amend Regulation 5 as follows:

"In accordance with the ***UNIVERSITY REGULATIONS*** **- Residence Requirements - Second Degree**, students completing the Bachelor of

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Technology program, as a second degree, must successfully complete all required courses in their major area of study within the Bachelor of Technology program."

Page 200, 2019-2020 Calendar, Grenfell Campus, under the heading 7.5.5 Bachelor of Science with Major in Physics, amend the "Required Courses" column of "Table 8 Bachelor of Science with Major in Physics" as follows:

"Mathematics 1000, 1001, 2000, 2050, 2260 (or the former Mathematics 3260), 3202. Since Mathematics 2000 is required for a number of upper-year Physics and Mathematics courses, a student not successfully completing Mathematics 1001 in first year will require more time to complete the degree. A student who has successfully completed Mathematics 1000 and Physics 1020 with a minimum grade of 65% may enrol in Physics 1051. Taking the sequence Physics 1020, 1021, and 1051 will increase the number of credit hours needed to complete the degree."

and

"Physics 1050 (or 1020), 1051, 2053, 2056, 2400 or 2151, 2820, 3060, 3061, 3220, 3400, 3650, 4100, 4880, 4950. It is recommended that students successfully complete Chemistry 1200 and 1001. A student who has successfully completed Mathematics 1000 and Physics 1020 with a minimum grade of 65% may enrol in Physics 1051. Taking the sequence Physics 1020, 1021, and 1051 will increase the number of credit hours needed to complete the degree."

Page 198, 2019-2020 Calendar, Grenfell Campus, under the heading 7.5.3 Bachelor of Science with Major in Environmental Science, amend the "Environmental Science Core" entry of "Table 6 Bachelor of Science with Major in Environmental Science" as follows:

"It is recommended that students successfully complete Environmental Science 1000."

Page 201, 2019-2020 Calendar, Grenfell Campus, under the heading 7.5.6 Minor Programs Offered by the School of Science and the Environment, amend the "Science Minor" entry of "Table 10 Minor Programs Offered by the School of Science and the Environment" as follows:

"The Minor in Science may be chosen in courses from the following disciplines: Biology, Chemistry, Computer Science, Earth Sciences, Environmental Science, Mathematics, Physics, Science, and Statistics. Students who have successfully completed courses drawn from other Science disciplines must obtain approval of the Head of Science."

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Page 203, 2019-2020 Calendar, Grenfell Campus, under the heading 8.7 Academic Standing for Honours Bachelor of Arts and Bachelor of Science Degrees, amend Regulation 1 of 8.7.1 Classification of Degrees as follows:

"No classification will be given to the degree awarded a student who has successfully completed fewer than one half of the courses required for the degree at this University, or who has successfully completed fewer than one half of the courses required for the degree at this University since 1959. All students for such degrees shall, however, fulfil the condition of **Academic Standing** above on the courses taken at this University since September 1959 in order to qualify for the degree."

Page 203, 2019-2020 Calendar, Grenfell Campus, under the heading 8.9.1 Course Requirements for Honours in Environmental Science (B.Sc.), amend Regulation 4 as follows:

"Honours graduates of the Environmental Science Program will have also successfully completed a two-semester research project consisting of a research proposal and literature review course (Environmental Science 4951) and a research project course (Environmental Science 4959)."

Page 204, 2019-2020 Calendar, Grenfell Campus, under the heading 8.10.1 Course Requirements for Honours in Psychology, amend the second paragraph as follows:

"Students must also successfully complete:"

Page 204, 2019-2020 Calendar, Grenfell Campus, under the heading 9.1 Bachelor of Fine Arts (Theatre), amend Regulation 2 of 9.1.1 Academic Performance as follows:

"A student who has failed a studio course shall not take more advanced courses in that discipline until the failed course has been ~~satisfactorily~~ successfully completed."

Page 204, 2019-2020 Calendar, Grenfell Campus, under the heading 9.1 Bachelor of Fine Arts (Theatre), amend Regulation 3 of 9.1.1 Academic Performance as follows:

"A student shall successfully complete all 1000 level Theatre courses before advancing to any 2000 level Theatre course."

Page 210, 2019-2020 Calendar, Grenfell Campus, under the heading 13.5 Chemistry, amend the second paragraph as follows:

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"Students are strongly advised to successfully complete the Chemistry sequence appropriate to their stream (Chemistry 1200/1001 or 1010/1011 or 1011/the former 1031 or 1050/1051) on the campus they first attend prior to transfer to another campus."

Page 219, 2019-2020 Calendar, Grenfell Campus, under the heading 13.15 French, amend the credit restriction for Français 2601 (Apprentissage de la lecture)as follows:

"CR: Les étudiants ayant complété Français 2550 avec succès peuvent suivre Français 2601 ou Français 2602, mais pas les deux. Les étudiants ayant complété Français 2551 avec succès peuvent suivre Français 2601 ou Français 2602, mais pas les deux. Les étudiants ayant complété Français 2550 et Français 2551 avec succès ne peuvent suivre ni Français 2601 ni Français 2602."

Page 219, 2019-2020 Calendar, Grenfell Campus, under the heading 13.15 French, amend the credit restriction for French 2601 (Reading Skills) as follows:

"CR: Students who have successfully completed FREN 2550 may take either FREN 2601 or FREN 2602, but not both. Students who have successfully completed FREN 2551 may take either FREN 2601 or FREN 2602, but not both. Students who have successfully completed both FREN 2550 and FREN 2551 may not take either FREN 2601 or FREN 2602."

Page 219, 2019-2020 Calendar, Grenfell Campus, under the heading 13.15 French, amend the credit restriction for Français 2602 (Lecture des textes intégraux) as follows:

"CR: Les étudiants ayant complété Français 2550 avec succès peuvent suivre ~~Françias~~ Français 2601 ou Français 2602, mais pas les deux. Les étudiants ayant complété Français 2551 avec succès peuvent suivre Français 2601 OU Français 2602, mais pas les deux. Les étudiants ayant complété Français 2550 et Français 2551 avec succès ne peuvent suivre ni Français 2601 ni Français 2602."

Page 219, 2019-2020 Calendar, Grenfell Campus, under the heading 13.15 French, amend the credit restriction for French 2602 (Reading Complete Texts) as follows:

"CR: Students who have successfully completed FREN 2550 may take either FREN 2601 or FREN 2602, but not both. Students who have successfully completed FREN 2551 may take either FREN 2601 or FREN 2602, but not both. Students who have successfully completed both FREN 2550 and FREN 2551 may not take either FREN 2601 or FREN 2602."

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Page 219, 2019-2020 Calendar, Grenfell Campus, under the heading 13.15 French, amend the credit restriction for French 2900 (A Survey of Francophone Cultures) as follows:

"PR: FREN 1502 or equivalent. Students who have obtained less than 70% in FREN 1051 are, however, advised to successfully complete FREN 2100 before attempting this course."

Page 220, 2019-2020 Calendar, Grenfell Campus, under the heading 13.16 Gender Studies, amend the prerequisite for Gender Studies 4000 (Contemporary Feminist Issues) as follows:

"PR: students must normally have successfully completed GNDR 3005 or the former Women's Studies 3005 or GNDR 3025 and 15 credit hours in other courses applicable to the Gender Studies Major and Minor programs before taking GNDR 4000. In exceptional cases, students without these prerequisites may be accepted, with the approval of the instructor of GNDR 4000 and the Head of the Department."

Page 220, 2019-2020 Calendar, Grenfell Campus, under the heading 13.17 Geography, amend the course description for Geography 3222 (Research Design and Quantitative Methods in Geography) as follows:

"is an introduction to principles of research design, and to the use of quantitative techniques. This course provides students with a basic understanding of data collection, entry, and analysis and presentation skills most commonly used by geographers. Practical, computer-based exercises are an essential part of the course. It is strongly recommended that this course be successfully completed before registration in a 4000-level geography course."

Page 220, 2019-2020 Calendar, Grenfell Campus, under the heading 13.17 Geography, amend the prerequisite for Geography 4405 (Outdoor Recreational Resources and Planning) as follows:

"PR: GEOG 2425 or the former GEOG 3325. It is strongly recommended that GEOG 3222 and 3226 be successfully completed before registration in 4000-level courses"

Page 223, 2019-2020 Calendar, Grenfell Campus, under the heading 13.21 Mathematics and Statistics, amend the first paragraph as follows:

"At most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, 1052, 1053, 1080, 1081, 1090, 109A/B, 1150, 1151."

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Page 223, 2019-2020 Calendar, Grenfell Campus, under the heading 13.21 Mathematics and Statistics, amend the credit restriction for Math 1090 (Algebra and Trigonometry) as follows:

"CR: if previously successfully completed or currently registered for MATH 1000, MATH 1001, 109A/B, the former 1080, or the former 1081"

Page 229, 2019-2020 Calendar, Grenfell Campus, under the heading 13.26 Religious Studies, amend the first paragraph as follows:

"Students who register in a 3000- or 4000-level course are encouraged, however, to make sure that they have adequate preparation for that course, preferably by having successfully completed a first- or second-year course in the field."

Page 229, 2019-2020 Calendar, Grenfell Campus, under the heading 13.27 Science, amend the course description for Science 1807 (Safety in the Scientific Laboratory) as follows:

"introduces students to safety practices required for working in science laboratories where hazards are present. Students complete an online module in Laboratory Safety. Normally, it will be taken before the start of the semester in which students take their first science laboratory course with this prerequisite, and it must be successfully completed no later than the first Friday of the semester. Check department lists of courses to see where this is a prerequisite."

Page 229, 2019-2020 Calendar, Grenfell Campus, under the heading 13.27 Science, amend the course description for Science 1808 (WHMIS) as follows:

"introduces students to Newfoundland and Labrador's Workplace Hazardous Materials Information System (WHMIS). Students will complete an online module in WHMIS. Normally, it will be taken before the start of the semester in which students take their first science laboratory course with this prerequisite, and it must be successfully completed no later than the first Friday of the semester. Check department lists of courses to see where this is a prerequisite."

Page 249, 2019-2020 Calendar, School of Human Kinetics and Recreation, under the heading 12 Course Descriptions, amend the prerequisite for HKR 399W (Work Term 2) as follows:

"PR: HKR 1123 and ~~successful completion of~~ 299W"

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Page 249, 2019-2020 Calendar, School of Human Kinetics and Recreation, under the heading 12 Course Descriptions, amend the prerequisite for HKR 499W (Work Term 3) as follows:

"PR: HKR 1123 and ~~successful completion of~~ 399W"

Page 260, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 4.2 Registration and Withdrawal, amend Regulation 1(b) as follows:

"A request to enroll in one additional regular course in a Fall, Winter or Spring semester shall be approved by an associate dean only when a student has successfully completed five courses in each of a minimum of two of the previous three semesters and obtained a minimum overall numeric grade average of 70% in those courses."

Page 263, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.1.2.5 Previous Calendar Regulations, amend as follows:

"A student who has successfully completed any course at Memorial University of Newfoundland prior to September 2015 may choose to follow Core Requirement Calendar regulations from the corresponding previous edition of the University Calendar. For all students, a course section with the former Research/Writing (R/W) designation that was successfully completed prior to September 2015 may be used to fulfil the second Critical Reading and Writing (CRW) course requirement (i.e., all students must successfully complete at least one English course); identifying eligible R/W courses may require consultation with an academic advisor."

Page 265, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.1.7 Limit on Certain Credit Hours, amend Regulation 2 as follows:

"Additional credit may not be obtained for successfully completing two versions of a crosslisted course (i.e., the same course delivered by two or more academic units)."

Page 265, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2 International Bachelor of Arts (iBA) Degree Regulations, amend Regulations 1 as follows:

"An iBA degree requires, in addition to the requirements of the Bachelor of Arts (B.A.) Degree, a combination of additional university-level language study, successful completion of designated courses with a clear

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international focus, and participation in either an international study or internship placement requiring residency outside of Canada."

Page 266, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.2 International Bachelor of Arts (iBA) Degree Components, amend Regulation 6(b) as follows:

"Grenfell Campus courses and courses successfully completed at other eligible academic institutions may be eligible to satisfy the **International Studies (IS) Courses Requirement**."

Page 267, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.4 Additional Language Study (LS) Requirement, amend Regulation 2 as follows:

"A student who successfully completes university-level study of language at another institution may apply for LS transfer credit, including the study of a language not taught at Memorial University of Newfoundland for which unspecified LS credit hours may be awarded."

Page 268, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.5.2 International Study Option, amend Regulation 4 as follows:

"~~C~~Successful completion of this non-credit hour course will designate fulfillment of the International Study Option. Alternatively, students may successfully complete an appropriate combination of INTL 301L-311L, or the former INTL 399L, to meet the requirement of a minimum of 12 weeks of university-level study while residing outside of Canada."

and

"The course shall be added to the transcript upon documentation of successful completion of such a program of study, normally involving residency outside of Canada a period of 12 weeks, being provided to the Office of the Registrar."

Page 268, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.5.2 International Study Option, amend Regulation 5 as follows:

"Documentation must establish that the course(s) was successfully completed while the student was residing outside of Canada, normally for a minimum 12 week duration."

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Page 268, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.5.2 International Study Option, amend the "7-8 (final 30 credit hours)" entry of "Table 4 Possible Course Sequencing for the iBA, International Study Option (Final 60 Credit Hours)" as follows:

"Choose 6 credit hours in IS courses at the 4000-level towards completing the remaining credit hours required for the **International Studies (IS) Courses Requirement**, ensuring that IS courses have been successfully completed in a minimum of 5 disciplines."

Page 269, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.5.3 International Internship Option, amend Regulation 9 as follows:

"~~C~~Successful completion of INTL 399W will designate fulfillment of the International Internship Option."

Page 269, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.5.3 International Internship Option, amend the "9 (final 12 credit hours)" entry of "Table 5 Possible Course Sequencing for the iBA, International Internship Option (Final 60 Credit Hours)" as follows:

"Choose 3 credit hours in an IS course at the 4000-level towards completing the remaining credit hours required for the **International Studies (IS) Courses Requirement**, ensuring that IS courses have been successfully completed in a minimum of 5 disciplines."

Page 270, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.2.7 Previous Calendar Regulations, amend as follows:

"An International Bachelor of Arts (iBA) student who, prior to September 2017, successfully completed an eligible course that subsequently received the IS designation may use up to 15 credit hours towards the **International Studies (IS) Courses Requirement**. Eligible courses successfully completed before September 2017 are limited to Anthropology 2412, 2413, 4416; Anthropology 3260 or Sociology 3260; Economics 3030, 4030, 4031; Folklore 3250, 4470; Geography 2102, 3510, 3800, 4300; History 2500, 2510, 2800, 3030; French 3654; Political Science 2200, 3210, 3220, 3250, 3290, 4215, 4230, 4255; Sociology 2250, 4230, 4093."

Page 272, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.5.2 Classification of Degrees, amend Regulation 3 as follows:

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"No classification will be given to the degree awarded a student who has successfully completed (1) fewer than one half of the courses required for the degree at this University, or (2) who has successfully completed fewer than one half of the courses required for the degree at this University since 1959."

Page 272, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 6.7.1 Suggested Program of Studies for the Bachelor of Arts and Bachelor of Commerce (Co-operative) Prior to admission to the Bachelor of Commerce (Co-operative) Program, amend Note 1(b) as follows:

"*Core requirements for English* ***Critical Reading and Writing (CRW)*** *courses and* ***Quantitative Reasoning (QR)*** *are satisfied by courses successfully completed in Terms A/B or during Terms 1 or 2 of the Bachelor of Commerce (Co-operative) degree.*"

Page 274, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 7.1 General Regulations for Diploma Programs, amend Regulation 4 as follows:

"It is the student's responsibility to recognize that additional credit may not be obtained for successfully completing two versions of a cross-listed course (i.e., the same course delivered by two or more departments)."

Page 275, 2019-2020 Calendar, under the heading 7.4.4 Regulations for the Diploma in Ancient Worlds, amend as follows:

"As part of the Diploma in Ancient Worlds, students must successfully complete courses up to and including the 3000 level and may take courses at the 4000 level."

Page 278, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 7.7 Diploma in Geographic Information Sciences, amend 7.7.5 Program of Study as follows:

"All students for the Diploma in Geographical Information Sciences must successfully complete the Field Placement course Geography 4290 and the capstone course Geography 4919."

Page 281, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 7.9 Diploma in Police Studies, amend 7.9.4 Program of Study, Regulation 2, as follows:

"By virtue of admission to the program with prior university experience, students are expected to be prepared to successfully complete courses in

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Police Studies, Political Science, Psychology, and Sociology at the 2000-level and higher. A student who successfully completed a **Table 1** course prior to admission to the Diploma in Police Studies and obtained a final grade lower than B is strongly encouraged to retake that course."

Page 281, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 7.10 Diploma in Stage and Screen Technique, amend the first paragraph of 7.10.3 Admission Requirements, as follows:

"To be considered for admission to the Diploma in Stage and Screen Technique, students must have successfully completed English 2451 (or the former English 3351) and earned a minimum of 75% in that course."

Page 282, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 7.10.7 The Former Diploma in Performance and Communications Media, amend as follows:

"Students currently enrolled in the former Diploma in Performance and Communications Media may choose to transfer to the Diploma in Stage and Screen Technique, but must successfully complete all the required courses of either one or the other."

Page 282, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.1 General Regulations for Certificate Programs, amend Regulation 4 as follows:

"It is the student's responsibility to recognize that additional credit may not be obtained for successfully completing two versions of a cross-listed course (i.e., the same course listed under two or more departments)."

Page 285, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.7.4 Regulations for the Certificate in Film Studies, amend the first paragraph as follows:

"As part of the Certificate in Film Studies students must successfully complete a communications theory course and a film theory course, supplemented by courses analyzing film in specific contexts."

Page 287, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.9.4 Regulations for the Certificate in Indigenous-Aboriginal Studies, amend the first paragraph as follows:

"As part of the Certificate in Indigenous-Aboriginal Studies students must successfully complete a 3 credit hour foundation course at the 1000-level. It is anticipated that the foundation course will be taken at the beginning of the program. As part of their course selections, students will also

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successfully complete at least two courses that emphasizes the origins and histories of Indigenous peoples ("past"), and at least two courses that emphasizes contemporary issues of Indigenous peoples ("present")."

Page 287, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.9.4 Regulations for the Certificate in Indigenous-Aboriginal Studies, amend the "Next 18 credit hours" entry of "Table 2 Suggested Course Sequencing for the Certificate in Indigenous-Aboriginal Studies" as follows:

"~~C~~Successfully complete an additional six courses selected from **Table 1 Courses for the Certificate in Indigenous-Aboriginal Studies**, including at least two "Past" courses and at least two "Present" courses (Certificate total is 7 courses)"

Page 289, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.11.4 Regulations for the Certificate in Public Policy, amend the first paragraph as follows:

"Students are encouraged to take courses in the concentration after successfully completing initial foundation-level courses in public policy offered by the Department of Political Science."

Page 289, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.11.4 Regulations for the Certificate in Public Policy, amend Regulation 2(c) as follows:

"**Governance:** 3 credit hours chosen from Political Science 3600 or 3620 (excluding Political Science 3600 if previously successfully completed to fulfill the requirements in 1. above), and a minimum of 9 additional credit hours at the 3000-level chosen from **Table 3 Approved Courses for the Concentration in Governance**, including at least 3 credit hours in Canadian Governance and 3 credit hours in International Governance; and"

Page 289, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 8.11.4 Regulations for the Certificate in Public Policy, amend the column headers of "Table 3 Approved Courses for the Concentration in Governance" to read "**Foundation Courses (successfully complete at least 1)**", "**3000-level Canadian Governance Courses (successfully complete at least 1)**" and "**3000-level International Governance Courses (successfully complete at least 1)**".

Page 291, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 10.3 International Exchanges, amend Regulation 2 as follows:

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"It is a student's responsibility to confirm that courses successfully completed at another institution are eligible for transfer to Memorial University of Newfoundland."

Page 292, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 12.2 Requirement for Courses Delivered at Memorial University of Newfoundland, amend Regulation 1 as follows:

"A student who successfully completes courses at another university in the area of a Major offered by the Faculty of Humanities and Social Sciences is required to complete at least 18 credit hours in the Major subject in Memorial University of Newfoundland courses."

Page 292, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 12.2 Requirement for Courses Delivered at Memorial University of Newfoundland, amend Regulation 2 as follows:

"A student who successfully completes courses in the area of the Minor at another university is required to complete at least 12 credit hours in that subject at Memorial University of Newfoundland."

Page 295, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.2 Archaeology, amend the first paragraph of 14.2.3.1 First Courses as follows:

"Students wishing to concentrate in this option must successfully complete the Required Courses Archaeology 1000 (or the former 1030), 2480, 4182, and 4411."

Page 295, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.2 Archaeology, amend 14.2.3.2 Minor as follows:

"A minor in Archaeology may be achieved by successfully completing the following courses: Archaeology 1000 (or the former 1030) and 2480; 6 credit hours in Archaeology courses at the 3000-level; 3 credit hours in Archaeology courses at the 4000-level, 9 credit hours chosen from Archaeology courses at any level, except Archaeology 2492, 2493 or the former Archaeology 2491, or 2495."

Page 297, 2019-2020 Calendar, Faculty of Humanities and Social Science, under the heading 14.2.6 Major in Archaeology (Co-operative), amend 14.2.6.1 Admission Requirements, Regulation 4, as follows:

"To be eligible for admission to the ACE program an applicant must have successfully completed a minimum of 30 credit hours with an overall

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average of at least 65%. All applicants must have successfully completed Archaeology 1000 (or the former 1030) and 2480 and an Archaeology Field School or Lab School or have significant archaeology experience."

Page 302, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.4 Major in Economics (B.A. or B.Sc.), amend Regulation 6 as follows:

"B.A. students who undertake a Major in Economics shall successfully complete Statistics 2500 and at least 39 credit hours in courses in Economics of which:"

Page 302, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.4 Major in Economics (B.A. or B.Sc.), amend Regulation 9 as follows:

"B.Sc. students must successfully complete credits from other Science disciplines as follows:"

Page 302, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.5 Honours in Economics (B.A. or B.Sc.), amend Regulation 3 as follows:

"All students shall successfully complete all non-Economics courses required of B.A. or B.Sc. Majors, and at least 60 credit hours in courses in Economics, including 1010 (or the former 2010), 1020 (or the former 2020), 2550, and at least 36 credit hours at the 3000-level or above including 3000, 3001, 3010, 3011, 3550, 3551, 4550 and 4551."

Page 303, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.8.1 Economics Co-operative Education Option (ECEO), amend Regulation 1(d) as follows:

"To be eligible for admission to Term 1 an applicant must have successfully completed a minimum of 30 credit hours with an overall average of at least 65% as follows: All applicants must have successfully completed Economics 1010 (or the former 2010), 1020 (or the former 2020); at least 6 credit hours in English (English 1110 is recommended); Mathematics 1000; and 15 credit hours chosen from courses in the Faculties of Humanities and Social Sciences, Business or Science. It is advised that Bachelor of Arts students choose courses which can satisfy the requirements for the Core Program (see Regulations for the General Degree of Bachelor of Arts for these requirements), including courses in a second language. Bachelor of Science applicants must have successfully completed Mathematics 1001."

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Page 303, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.8.1 Economics Co-operative Education Option (ECEO), amend Regulation 4(e) as follows:

"Permission to drop a Work Term does not constitute a waiver of degree requirements, and students who have obtained such permission must successfully complete an approved Work Term in lieu of the one dropped."

Page 304, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.5.9 Honours in Economics (Co-operative) (B.A. or B.Sc.), amend 14.5.9.2 Program of Study, Regulation 3, as follows:

"All students shall successfully complete all non-Economics courses required of B.A. or B.Sc. Majors, and at least 60 credit hours in Economics, including 1010 (or the former 2010), 1020 (or the former 2020), 2550, and at least 36 credit hours at the 3000-level or above including 3000, 3001, 3010, 3011, 3550, 3551, 4120, 4550 and 4551."

Page 307, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.6 English, amend 14.6.1.1 General Information, Regulation 2, as follows:

"It is strongly recommended that students have successfully completed at least five English courses, including English 2000, 2001, and 3200 or 3201 before applying."

Page 307, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.6.1.3 Courses That Fulfill National or Period Requirements in English Programs, amend Regulation 1 as follows:

"For example, although English 4271 can satisfy both the American requirement and a 4000-level requirement, students in an Honours, Joint Honours, or Major in English program, will have to successfully complete another course to satisfy the total number of credit hours required by the program."

Page 309, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.6.5 Major and Minor in Communication Studies, amend the first paragraph of 14.6.5.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty**

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of Science, candidates for a Major in Communication Studies will normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000-level or above which may be applied to the major or minor program respectively."

Page 309, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.6.5 Major in Communication Studies, amend the second paragraph of 14.6.5.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, candidates for a Major in Communication Studies will normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000-level or above which may be applied to the major or minor program respectively."

Page 312, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.8.3 Major in Folklore, amend the second paragraph as follows:

"Students who declare a major in Folklore should have successfully completed Folklore 1000 (or the former 2000); it is recommended that students intending to major in Folklore take Folklore 2100 as early in their programs as possible."

Page 312, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.8.4 Minor in Folklore, amend the second paragraph as follows:

"Students who declare a minor in Folklore should have successfully completed Folklore 1000 (or the former 2000); it is recommended that students intending to minor in Folklore take Folklore 2100 as early in their programs as possible."

Page 313, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.9 Gender Studies, amend 14.9.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, students for the Major or Minor in Gender Studies will

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normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000 level or above which may be applied to the Major or Minor Program respectively."

Page 314, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.10 Geography, amend 14.10.6.1 Bachelor of Arts as follows:

"The joint major in Geography requires successful completion of Geography 1050, 2001, 2102, 2195, 2302, 2425, 3222, 3228, 490A, 490B, 9 additional credit hours at the 3000-level, and 6 additional credit hours at the 4000-level."

Page 316, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.11.3.1 Major in History, amend Regulation 7 as follows:

"Some fourth-year courses may require successful completion of courses in the same topic/subject area."

Page 316, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.11.3.2 Minor in History, amend Regulation 5 as follows:

"Some fourth-year courses may require successful completion of courses in the same topic/subject area."

Page 317, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.11.3.3 Joint Major in History, amend as follows:

"Normal requirements to successfully complete History 2200 or 2210 and 3840 shall continue to apply."

Page 316, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.11 History, amend 14.11.4 Honours Degree, Regulation 4(d), as follows:

"if the student chooses to write the Honours Essay in History, the student must successfully complete History 4822 and History 4999; or"

Page 330, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.14.5.2 Spanish Major Program, amend Regulation 1 as follows:

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"It is strongly recommended that students in the Spanish Major Program successfully complete Classics 1120 and 1121."

Page 331, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.15 Philosophy, amend 14.15.7 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, students for a Philosophy Honours, Major, or Minor who had successfully completed a 2000-level course or above in Philosophy prior to September 2018 will normally follow the departmental regulations in effect at that time, although subsequent regulations are available for all students."

Page 331, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.15.8 Major and Minor in Medieval Studies, amend 14.15.8.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, students for a Medieval Studies Major or Minor who had successfully completed a 2000-level course or above in Medieval Studies prior to September 2018 will normally follow the departmental regulations in effect at that time, although subsequent regulations are available for all students."

Page 333, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16 Political Science, amend 14.16.3 General Information, Regulation 3, as follows:

"Students following this path may opt to take courses in the same area in the same academic year (e.g., if a 2000-level course is successfully completed in Fall then a corresponding 3000-level course may be taken in Winter)."

Page 333, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16 Political Science, amend 14.16.3.1 Course Prerequisites, Regulation 4, as follows:

"~~C~~Successful completion of POSC 1000 and POSC 1001 is generally recommended."

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Page 333, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16 Political Science, amend 14.16.3.1 Course Prerequisites, Regulation 5, as follows:

"~~C~~Successful completion of a corresponding 2000-level area introduction course is generally recommended as outlined under **Table 1 Recommended Course Sequencing by Student's Area of Interest**."

Page 333, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16 Political Science, amend 14.16.3.2 Previous Calendar Regulations as follows:

"Students who successfully completed the former POSC 2010 may elect to treat it as POSC 1001 for the purposes of Political Science degree regulations and towards the Bachelor of Arts **Critical Reading and Writing Requirement**."

Page 335, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16.7 Honours and Major in Political Science (Co-operative), amend 14.16.7.2 Program of Study, Regulation (c) as follows:

"Students must successfully complete three work terms, at least one of which must occur during a Fall or Winter semester."

Page 337, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.16.11 Major and Minor in Law and Society, amend 14.16.11.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, students for an Interdisciplinary Major or Minor in Law and Society will normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000-level or above which may be applied to the major or minor program respectively."

Page 339, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.18.4.1 Major in Religious Studies, amend Regulation 7 as follows:

"A student pursuing a Major in Religious Studies is encouraged to successfully complete Language Study (LS) courses offered by the Department in order to fulfill the Bachelor of Arts Language Study (LS)

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Requirement and as preparation for advanced studies in Religious Studies."

Page 339, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, amend 14.18.5 Honours Degree, Regulation 6, as follows:

"A student pursuing an Honours in Religious Studies is encouraged to successfully complete Language Study (LS) courses offered by the Department in order to fulfill the Bachelor of Arts **Language Study (LS) Requirement** and as preparation for advanced studies in Religious Studies. Students whose area of specialization requires a knowledge of Greek must successfully complete Classics 1130 and 1131."

Page 342, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.19.9 Major in Police Studies, amend the first paragraph of 14.19.9.6 Previous Calendar Regulations as follows:

"In accordance with ***UNIVERSITY REGULATIONS*** **- Degree and Departmental Regulations, Year of Degree and Departmental Regulations - Faculty of Humanities and Social Sciences and Faculty of Science**, students for the Interdisciplinary Major in Police Studies will normally follow regulations in effect in the academic year in which the student first successfully completes a course in that subject at the 2000-level or above which may be applied to the major or minor program respectively."

Page 342, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 14.19.9 Major in Police Studies, amend the second paragraph of 14.19.9.6 Previous Calendar Regulations as follows:

"Courses approved for the Major in Police Studies that do not appear in the Interdisciplinary Major and which are successfully completed after August 2018 may, for the purpose of that former program, be treated as the former Table 1 courses."

Page 349, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.3.2 Greek and Roman Studies, amend the prerequisite for Classics 3020 (Roman Religion), 3030 (Greece and Persia), 3040 (Socrates and Athens), 3050 (Augustus and Rome), 3405 (Tragic Drama in Greece and Rome), 3410 (Comic Drama in Greece and Rome), 3415 (Epic Poetry in Greece and Rome), 3501-3510 (Special Topics in Classics), 3600 (Ancient Myth and Cult), 3700 (The Ancient World in Film), 3710-3729 (Special Topics in Classics: Harlow), 3900 (Greek and Roman Medicine), 4010 (Seminar in Roman History and Society), 4020 (Seminar in Greek Literature and Culture), 4030 (Seminar in Roman Literature and Culture), as follows:

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"PR: there is no prerequisite for this course but students are strongly advised to have successfully completed at least one 1000- level or 2000-level Greek and Roman Studies course before registering in any 3000-level or higher Greek and Roman Studies course"

Page 353, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.6 English, amend the course description for English 1020 (Writing for Second Language Students I) as follows:

"is an introduction to the use of English with emphasis on composition for non-native English-speaking students. This course is for students whose first language is not English and who have passed 102F or have attained a standard acceptable to the Department on the English Placement Test. Students who have passed ENGL 1020 may take as their second English course one of ENGL 1021, 1090, 1191, 1192, or 1193. Students successfully completing this course may elect to use it with ENGL 1021 to fulfill the Bachelor of Arts **Language Study Requirement**."

Page 353, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.6 English, amend the course description for English 1021 (Writing for Second Language Students II) as follows:

"develops skills in critical reading and writing of academic English, with emphasis on research and writing syntheses from sources, for non-native English-speaking students. Students successfully completing this course may elect to use it with ENGL 1020 to fulfill the Bachelor of Arts **Language Study Requirement**."

Page 353, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.6 English, amend the prerequisite for English 5000 (Instructional Field Placement) as follows:

"PR: ENGL 2450, 2451 (or the former 3350, 3351) and 4400, and two of ENGL 4401 and Communication Studies 3816 (or the former ENGL 3816) and Communication Studies 4402, (or the former ENGL 4402) with an overall average of 75% in these courses. Restricted to students in the **Diploma in Stage and Screen Technique**. Admission is by application to the Program Coordinator, normally at least three months before the beginning of the placement, and is limited to students who at the time of admission have successfully completed the six courses listed above with an overall average of at least 75% and who already hold a first degree or are in their final year of a degree program as confirmed by the Office of the Registrar."

Page 358, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.6.1 Communication Studies, amend the

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prerequisite for Communication Studies 2001 (Introduction to Communication Theory) as follows:

"PR: prior successful completion of CMST 2000 is encouraged"

Page 360, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.9 French, amend the first paragraph as follows:

"Students who have successfully completed one or more credit courses in French language will not subsequently be permitted to receive credit for courses not previously successfully completed and judged by the Department to be of a lower level than those already successfully completed with the following provisos:"

Page 360, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.9 French, amend the second bullet as follows:

"Students who wish to return to a previously successfully completed course to improve their standing may do so only with the permission of the Head of the Department."

Page 360, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.9 French, amend the prerequisite for French 2900 (A Survey of Francophone Cultures) as follows:

"PR: FREN 1502 with a grade of at least 60% or Passport Français 3302 with a grade of at least 85% or Grade 12 French Immersion with a grade of at least 80% or French 4283 with a grade of at least 85% or French 3283 with a grade of at least 85% or equivalent. Students who have obtained less than 70% in 1051 are, however, advised to successfully complete FREN 2100 before attempting this course."

Page 360, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.9 French, amend the prerequisite for French 4999 (Honours Essay II) as follows:

"PR: successful completion of FREN 4900 with a minimum grade of 70%"

Page 364, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.10 Gender Studies, amend the prerequisite for Gender Studies 3015 (Indigenous Feminisms in Theory and Practice) as follows:

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"PR: successful completion of GNDR 1000 is advised but not required"

Page 364, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.10 Gender Studies, amend the prerequisite for Gender Studies 3500 (Justice, Politics, and Reproduction) as follows:

"PR: successful completion of Law and Society 1000 and/or GNDR 1000 are advised but not required"

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the first paragraph as follows:

"It is strongly recommended that all 2000-level core courses be successfully completed before registration in 3000-level courses. All 2000-level core courses must normally be successfully completed prior to registration in a 4000-level course."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the course description for Geography 3222 (Research Design and Quantitative Methods in Geography) as follows:

"is an introduction to principles of research design, and to the use of quantitative techniques. This course provides students with a basic understanding of data collection, entry, and analysis and presentation skills most commonly used by geographers. Practical, computer-based exercises are an essential part of the course. It is strongly recommended that this course be successfully completed before registration in a 4000-level geography course."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4010 (Cultural Geography) as follows:

"PR: GEOG 2001 and at least one of GEOG 3610, 3620, 3800. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4015 (Cultural Resource Management) as follows:

"PR: it is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses"

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Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4150 (Environmental Change and Quaternary Geography) as follows:

"PR: 6 credit hours in physical geography courses at the 3000-level; or permission of Head of Department. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4190 (Coastal Geomorphology) as follows:

"PR: GEOG 3150 or permission of instructor. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4202 (Advanced Cartography) as follows:

"PR: GEOG 3202 or permission of instructor. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4250 (Environmental Image Analysis) as follows:

"PR: GEOG 3250. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4261 (Advanced Methods in Geographic Information Systems (GIS)) as follows:

"PR: GEOG 3260; Mathematics 2050; Computer Science 1001; (or equivalent, with permission of instructor and the Head of Department). It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

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Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4290 (Geographic Information Sciences Practicum) as follows:

"PR: GEOG 4202, 4250, 4261, and be enrolled in the Diploma in Geographic Information Sciences. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4300 (World Fisheries: Current Discourse and Future Directions) as follows:

"PR: 6 credit hours in Geography at the 3000-level or permission of Head of Department. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4320 (Regional Development Seminar) as follows:

"PR: GEOG 2302 or permission of Head of Department. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4405 (Outdoor Recreational Resources and Planning) as follows:

"PR: GEOG 2425 or the former GEOG 3325. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4410 (Research Seminar in Resources) as follows:

"PR: GEOG 2425 or the former GEOG 3325. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

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Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4600 (Historical Geography) as follows:

"PR: GEOG 2001 and at least one of GEOG 3610, 3620, 3800. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4650 (Conservation in Biology and Geography) as follows:

"PR: 30 credit hours in either Biology or Geography and permission of the course coordinator. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4700 (Seminar in Advanced Urban Geography) as follows:

"PR: GEOG 3701. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4900-4918 (Special Topics in Geography) as follows:

"PR: permission of the instructor and the Head of the Department of Geography. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4919 (Integrative Practicum in Geographic Information Sciences) as follows:

"PR: GEOG 4202, 4250, 4261, and be enrolled in the Diploma in Geographic Information Sciences. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4990 (Nature of Geography) as follows:

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"PR: It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses. Admission to the Honours program."

Page 365, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.11 Geography, amend the prerequisite for Geography 4999 (Dissertation Honours Degree) as follows:

"PR: Admission to the Honours program. It is strongly recommended that GEOG 3222 and the former 3226 be successfully completed before registration in 4000-level courses."

Page 378, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.24 Philosophy, amend the first paragraph as follows:

"Courses at the 3000-level usually assume that students have successfully completed at least two courses in Philosophy."

Page 382, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.26 Political Science, amend the first paragraph as follows:

"Courses at the 3000-level usually assume that students have successfully completed at least two courses in Political Science including the corresponding 2000-level introductory course."

Page 382, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.26 Political Science, amend the prerequisite for Political Science 3600 (Public Policy Fields) as follows:

"PR: prior successful completion of POSC 2600 is recommended but not required"

Page 382, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.26 Political Science, amend the prerequisite for Political Science 4011 (Honours Essay II) as follows:

"PR: successful completion of POSC 4010 with a minimum grade of 70%"

Page 382, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.26 Political Science, amend the prerequisite for Political Science 4600 (Public Policy Work Internship) as follows:

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"PR: a minimum 60 credit hours, including at least 12 credit hours in Political Science courses with a minimum 70% average, and permission of the instructor. Prior successful completion of public policy courses is recommended but not required."

Page 386, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.27 Religious Studies, amend the course description for Religious Studies 1061 (Sanskrit Language Study II) as follows:

"is a continuation of Sanskrit Language Study I. On successful completion of this course, students will have the ability to consult Sanskrit texts for research purposes. All sections of this course follow the Language Study Course Guidelines available at www.mun.ca/hss/ls."

Page 386, 2019-2020 Calendar, Faculty of Humanities and Social Sciences, under the heading 15.27 Religious Studies, amend the course description for Religious Studies 3812 (Religion and Disney Films: Not Just Another Mickey Mouse Course) as follows:

"PR: successful completion of RELS 2812 is recommended but not required"

Page 401, 2019-2020 Calendar, Faculty of Medicine, under the heading 10.5 Promotion, amend Regulation 8(a) as follows:

"Upon completion of a Phase or after the successful completion of 8710 and 8720 in Phase four, a student in good academic standing may elect to withdraw temporarily from studies (e.g. to pursue graduate studies)."

Page 411, 2019-2020 Calendar, School of Music, under the heading 6.2 Core Program Requirements, amend the first paragraph as follows:

"All Bachelor of Music students, regardless of Major, must successfully complete the following courses (55 credit hours) as outlined below:"

Page 415, 2019-2020 Calendar, School of Music, under the heading 6.11 Joint Degrees of Bachelor of Music and Bachelor of Business Administration, 6.11.1 The Curriculum, amend the "Winter — Academic Term 2" entry of "Table 1 Joint Degrees of Bachelor of Music and Bachelor of Business Administration Curriculum" as follows:

"Economics 1010 or Mathematics 1000 if not successfully completed in Term 1 [see note 1 below]"

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Page 415, 2019-2020, School of Music, under the heading 6.11 Joint Degrees of Bachelor of Music and Bachelor of Business Administration, 6.11.1 The Curriculum, amend the "Winter — Academic Term 4" entry of "Table 1 Joint Degrees of Bachelor of Music and Bachelor of Business Administration Curriculum" as follows:

"Economics 1010 if not successfully completed in Term 2 [see note 1 below]"

Page 416, 2019-2020 Calendar, School of Music, under the heading 7 Academic Standards and Continuance in the Bachelor of Music, amend Regulation 2 as follows:

"With the exception of those who have successfully completed Music 440B or 445B, students who are not registered for a Principal Applied Study course or Education 403X at the end of the regular registration period will be deemed to have withdrawn from the Bachelor of Music degree program."

Page 417, 2019-2020 Calendar, School of Music, under the heading 8.2 Minor in Music History, amend Regulation 3 as follows:

"Students shall successfully complete the following requirements (29 credit hours) for the Minor in Music History."

Page 444, 2019-2020 Calendar, School of Pharmacy, under the heading 4.1.2.2 Advanced Pharmacy Practice Experience (APPE), amend Regulation 1 as follows:

"The Pharm.D. for Working Professionals requires the successful completion of two Advanced Pharmacy Practice Experiences (APPE) in the final year of the program."

Page 447, 2019-2020 Calendar, School of Pharmacy, under the heading 6 Program Regulations, 6.1 Doctor of Pharmacy (Pharm.D.), Full-Time Program, amend the "Winter Year 1, Academic Term 2" entry of "Table 1 Doctor of Pharmacy (Pharm.D.), Full-Time Program" as follows:

"PHAR 2010 (if not previously successfully completed)"

Page 447, 2019-2020 Calendar, School of Pharmacy, under the heading 6 Program Regulations, 6.1 Doctor of Pharmacy (Pharm.D.), Full-Time Program, amend the "Spring Year 1, Academic Term 3" entry of "Table 1 Doctor of Pharmacy (Pharm.D.), Full-Time Program" as follows:

"PHAR 2010 (if not previously successfully completed)"

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Page 462, 2019-2020 Calendar, Faculty of Science, under the heading 4.4 Programs of Study for the General Degree of Bachelor of Science, amend Regulation 3 as follows:

"A Program of Study may require the student to successfully complete additional courses from subject areas other than the Major subject(s)."

Page 462, 2019-2020 Calendar, Faculty of Science, under the heading 4.5 Programs of Study for the Honours Degree of Bachelor of Science, amend 4.5.1 Course Requirements, Regulation 2 as follows:

"The Program of Study for the Honours Degree shall normally require the student to successfully complete courses from the Major subject(s) as follows, except in cases where it has been deemed that an appropriate rationale exists to warrant the requirement of an extraordinary number of credit hours:"

Page 462, 2019-2020 Calendar, Faculty of Science, under the heading 4.5 Programs of Study for the Honours Degree of Bachelor of Science, amend 4.5.1 Course Requirements, Regulation 3 as follows:

"A Program of Study may require the student to successfully complete additional courses from subject areas other than the Major subject(s)."

Page 462, 2019-2020 Calendar, Faculty of Science, under the heading 4.5 Programs of Study for the Honours Degree of Bachelor of Science, amend 4.5.1 Course Requirements, Regulation 4 as follows:

"When a student is compelled to complete more than 120 credit hours in order to satisfy the prerequisites of courses required for a Program of Study, all of the courses which a student was required to successfully complete in order to satisfy the requirements of the Honours Degree shall be used in the determination of the student's **Academic Standing**."

Page 463, 2019-2020 Calendar, Faculty of Science, under the heading 4.6 Electives, amend the first paragraph as follows:

"In addition to the Core Requirements and the Program of Study, a candidate for the General Degree of Bachelor of Science or the Honours Degree of Bachelor of Science shall successfully complete additional courses to satisfy the requirement of 120 credit hours, subject to the following:"

Page 463, 2019-2020 Calendar, Faculty of Science, under the heading 4.6 Electives, amend Regulation 1 as follows:

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"Including the courses which comprise the Core Requirements and the Program of Study, the student shall successfully complete courses from subject areas listed under **Programs in the Faculty of Science** with a total number of credit hours as follows:"

Page 463, 2019-2020 Calendar, Faculty of Science, under the heading 4.6 Electives, amend Regulation 2 as follows:

"There shall be not fewer than five subjects in which the student shall have successfully completed courses."

Page 464, 2019-2020 Calendar, Faculty of Science, under the heading 4.8.2 Classification of Degrees, amend Regulation 2(c) as follows:

"No classification will be given to the degree awarded to students who have successfully completed fewer than one-half of the courses required for the Honours Degree at this University."

Page 466, 2019-2020 Calendar, Faculty of Science, under the heading 5.3.4 Programs Tables, retitle the first table "**For Students Who Successfully Complete Mathematics 1090 in Their First Semester**" and retitle the second table "**For Students Who Successfully Complete Mathematics 1000 in Their First Semester**".

Page 464, 2019-2020 Calendar, Faculty of Science, under the heading 5 Bachelor of Science in Nutrition (Dietetics Option), amend 5.3.4 Programs Tables, Note 2, as follows:

"*While students are strongly encouraged to complete Nutrition 2323 in the first year, they can substitute an Humanities and Social Sciences elective for Nutrition 2323 in the first year but must then successfully complete Nutrition 2323 in the second year.*"

Page 464, 2019-2020 Calendar, Faculty of Science, under the heading 5 Bachelor of Science in Nutrition (Dietetics Option), amend 5.3.4 Programs Tables, Note 3, as follows:

"*All three Open Acadia courses must be successfully completed prior to starting courses at Acadia.*"

Page 469, 2019-2020 Calendar, Faculty of Science, under the heading 10.1.12 Economics (Co-operative) and Statistics Joint Major, amend 10.1.12.1 Admission Requirements, Regulation 4, as follows:

"To be eligible for admission to Term 1 an applicant must have successfully completed a minimum of 30 credit hours with an overall

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average of at least 65% as follows: All applicants must have successfully completed Economics 1010 (or the former 2010) and 1020 (or the former 2020); at least 6 credit hours in English; Mathematics 1000 and 1001; and 12 credit hours chosen from courses in the Faculties of Humanities and Social Sciences or Science."

and

"It is recommended that students successfully complete English 1110 Critical Reading and Writing II (Context, Substance, Style) as one of these English courses."

Page 469, 2019-2020 Calendar, Faculty of Science, under the heading 10.1.12 Economics (Co-operative) and Statistics Joint Major, amend 10.1.12.2 Program of Study, Regulation (b), as follows:

"Students must successfully complete three Work Terms which follow Academic Terms 2, 4, and 5."

Page 471, 2019-2020 Calendar, Faculty of Science, under the heading 10.1.13 Marine Biology Joint Major, amend the second paragraph as follows:

"Students who wish to enroll in the program should seek academic advising well in advance to ensure they have successfully completed the appropriate prerequisites."

Page 471, 2019-2020 Calendar, Faculty of Science, under the heading 10.1.13 Marine Biology Joint Major, amend the first paragraph of 10.1.13.1 Admission Requirements as follows:

"To be considered for admission to the program, students will normally have successfully completed the following courses (or their equivalents) with an overall average of at least 60%:"

Page 476, 2019-2020 Calendar, Faculty of Science, under the heading 10.2.21 Marine Biology Joint Honours, amend the first paragraph as follows:

"Specifically, students must have successfully completed Biology 2060, 2250, 2600, and 2900 and Ocean Sciences 2000 (or Biology 3710), 2001, 2100 and 2300 and obtained in these courses a grade of "B" or better, or an average of 75% or higher."

Page 478, 2019-2020 Calendar, Faculty of Science, under the heading 11.1.2.3 Minor in Biochemistry, amend the first paragraph as follows:

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"Students who take a minor in Biochemistry will successfully complete:"

Page 479, 2019-2020 Calendar, Faculty of Science, under the heading 11.2 Biology, amend the second paragraph of 11.2.1 Entrance Requirements as follows:

"To be considered for admission to the program students must have successfully completed Biology 1001/1002 with an average of at least 65%. In addition, applicants will normally have successfully completed the following courses (or their equivalents) and must have a minimum overall average of 60% in these courses."

Page 480, 2019-2020 Calendar, Faculty of Science, under the heading 11.2.3.2 Major in Biology (Co-operative) Program (BCOP), amend Regulation 2(c) as follows:

"A student is required to successfully complete three work terms, one of which must be either in the Fall or Winter semester."

Page 480, 2019-2020 Calendar, Faculty of Science, under the heading 11.2.3.2 Major in Biology (Co-operative) Program (BCOP), amend Regulation 4(f) as follows:

"Permission to drop a Work Term does not constitute a waiver of degree requirements, and a student who has obtained such permission must successfully complete an approved Work Term in lieu of the one dropped."

Page 482, 2019-2020 Calendar, Faculty of Science, under the heading 11.2.4.2 Honours in Biology (Co-operative), amend Regulation 2(c) as follows:

"A student is required to successfully complete three work terms, one of which will normally be either in the Fall or Winter semester."

Page 483, 2019-2020 Calendar, Faculty of Science, under the heading 11.3.3 Minor in Chemistry, amend the first paragraph as follows:

"Students who take a minor in Chemistry will successfully complete CHEM 1050 and 1051 (or 1010, the former 1011 and the former 1031) (or 1200 and 1001), CHEM 2100, 2210, 2301 or 2302, and 2400, and 6 credit hours in other chemistry courses at the 2000 level or above."

Page 484, 2019-2020 Calendar, Faculty of Science, under the heading 11.3.6 General Degree – Major in Computational Chemistry, amend 11.3.6.1 Required Courses, Regulation 8, as follows:

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"A sufficient number of elective courses to bring the degree up to a total of 120 credit hours must also be successfully completed."

Page 484, 2019-2020 Calendar, Faculty of Science, under the heading 11.3.7 Honours Degree in Computational Chemistry, amend 11.3.7.1 Required Courses, Regulation 10, as follows:

"A sufficient number of elective courses to bring the degree up to a total of 120 credit hours must also be successfully completed."

Page 486, 2019-2020 Calendar, Faculty of Science, under the heading 11.4 Computer Science, under 11.4.2 Admission to Honours Programs, amend the first paragraph as follows:

"To be eligible for admission, students must have successfully completed all Computer Science core requirements (Computer Science 1001, 1002, 1003, 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008) and obtained in these courses a grade of "B" or better, or an average of 75% or higher."

Page 487, 2019-2020 Calendar, Faculty of Science, under the heading 11.4.3 Major in Computer Science, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science or the **Degree Regulations** for the General Degree of Bachelor of Arts, as appropriate, a student must successfully complete the following courses:"

Page 487, 2019-2020 Calendar, Faculty of Science, under the heading 11.4.4 Major in Computer Science (Smart Systems) (B.Sc. only), amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science a student must successfully complete the following courses:"

Page 487, 2019-2020 Calendar, Faculty of Science, under the heading 11.4.5 Major in Computer Science (Visual Computing and Games) (B.Sc. only), amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science a student must successfully complete the following courses:"

Page 489, 2019-2020 Calendar, Faculty of Science, under the heading 11.5 Earth Sciences, amend the third paragraph of 11.5.2 Entrance Requirements as follows:

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"Students will not normally be permitted entry to 3000 level (or above) Earth Sciences courses without having successfully completed all 1000-level courses listed in the **Common Block of Required Courses** specified in Clause 1. in the **Major Programs in Earth Sciences**."

Page 490, 2019-2020 Calendar, Faculty of Science, under the heading 11.5.4 Major Programs in Earth Sciences, amend the first paragraph of 11.5.4.1 Common Block of Required Courses as follows:

"All majors in Earth Sciences must successfully complete those courses specified in Clauses 1. through 4."

Page 490, 2019-2020 Calendar, Faculty of Science, under the heading 11.5.4 Major Programs in Earth Sciences, amend 11.5.4.1 Common Block of Required Courses, Regulation 1, as follows:

"Students who intend or are required to successfully complete higher level Physics courses must successfully complete Physics 1051 as well, since it is a prerequisite for higher level Physics courses."

Page 490, 2019-2020 Calendar, Faculty of Science, under the heading 11.5.4 Major Programs in Earth Sciences, amend the second paragraph of 11.5.4.1 Common Block of Required Courses as follows:

"Great difficulties in timetabling may be encountered if the required first-year courses are not successfully completed before the beginning of second year."

Page 490, 2019-2020 Calendar, Faculty of Science, under the heading 11.5.5 Honours B.Sc. Degree in Earth Sciences, amend the second paragraph as follows:

"In addition to the Common Block of Required Courses listed under Major Programs in Earth Sciences, the following requirements must be successfully completed to qualify for the Honours B.Sc. degree in Earth Sciences:"

Page 492, 2019-2020 Calendar, Faculty of Science, under the heading 11.8 Mathematics and Statistics, amend 11.8.1 Regulations, Regulation 1, as follows:

"At most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, 1052, 1053, the former 1080, the former 1081, 1090, 109A/B, the former 1150 and 1151."

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Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.4 Major in Applied Mathematics (B.Sc. Only), amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science, a student shall successfully complete the following requirements:"

Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.5 Major in Pure Mathematics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science or the **Degree Regulations** for the General Degree of Bachelor of Arts, as appropriate, a student shall successfully complete the following requirements:"

Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.6 Major in Statistics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science or the **Degree Regulations** for the General Degree of Bachelor of Arts, as appropriate, a student shall successfully complete the following requirements:"

Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.7 Honours in Applied Mathematics (B.Sc. Only), amend the first paragraph as follows:

"A student shall successfully complete the following requirements:"

Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.8 Honours in Pure Mathematics, amend the first paragraph as follows:

"A student shall successfully complete the following requirements:"

Page 493, 2019-2020 Calendar, Faculty of Science, under the heading 11.8.9 Honours in Statistics, amend the first paragraph as follows:

"A student shall successfully complete the following requirements:"

Page 495, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.3.1 Admission Requirements for the Major in Ocean Sciences or the Major in Ocean Sciences (Environmental Systems), amend the first paragraph as follows:

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"It is recommended that the following courses be successfully completed before admission:"

Page 495, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.3.2 Program Regulations for the Bachelor of Science with Major in Ocean Sciences, amend Regulation 4(a) as follows:

"Ocean Sciences 1000, successfully completed under **Admission Requirements for the Major in Ocean Sciences or the Major in Ocean Sciences (Environmental Systems)**, will count as 3 of the required 30 credit hours in Ocean Sciences;"

Page 495, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.3.3 Program Regulations for the Bachelor of Science with Major in Ocean Sciences (Environmental Systems), amend Regulation 7(a) as follows:

"Ocean Sciences 1000, successfully completed under **Admission Requirements for the Major in Ocean Sciences or the Major in Ocean Sciences (Environmental Systems)**, will count as 3 of the required 30 credit hours in Ocean Sciences;"

Page 495, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.4 Honours in Ocean Sciences, amend Regulation 2 as follows:

"The program includes a prescribed number of courses at the 3000/4000 level as well as mandatory successful completion of Ocean Sciences 499A/B, which consist of supervised research leading to the submission and oral defence of a dissertation."

Page 496, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.4.2 Program Regulations for the Honours in Ocean Sciences, amend Regulation 2 as follows:

"Students are therefore strongly encouraged to successfully complete the Chemistry 2400/2401 sequence or otherwise carefully plan their options;"

Page 496, 2019-2020 Calendar, Faculty of Science, under the heading 11.9.4.2 Program Regulations for the Honours in Ocean Sciences, amend Regulation 6(a) as follows:

"Ocean Sciences 1000, successfully completed under **Admission Requirements for the Major in Ocean Sciences or the Major in Ocean Sciences (Environmental Systems)**, will count as 3 of the required 45 credit hours in Ocean Sciences;"

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Page 497, 2019-2020 Calendar, Faculty of Science, under the heading 11.10 Physics and Physical Oceanography, amend Note 4 as follows:

"*Mathematics 1000 must be taken at the same time as, or be successfully completed prior to, taking Physics 1050. Students who have successfully completed Mathematics 1000 and Physics 1050 are required to register for or successfully complete Mathematics 1001 before registering for Physics 1051.*"

Page 497, 2019-2020 Calendar, Faculty of Science, under the heading 11.10 Physics and Physical Oceanography, amend Note 5 as follows:

"*Students who successfully complete Physics 1020 (with a grade of at least 70%) and Mathematics 1000 are eligible for admission to Physics 1051.*"

Page 497, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.2 Major in Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science, a student shall successfully complete the following requirements:"

Page 497, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.2 Major in Physics, amend the second paragraph as follows:

"Mathematics 1001, 2000 and 2050 are prerequisites to many Physics courses and should be successfully completed by the end of second year. Mathematics 2260 is co-requisite to Physics 3220 and is recommended to be successfully completed before the Winter semester of the third year."

Page 498, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.3 Honours in Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the Honours Degree of Bachelor of Science, students shall successfully complete the following requirements:"

Page 498, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.4 Major in Environmental Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science, students shall successfully complete the following requirements:"

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Page 498, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.5 Honours in Environmental Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the Honours Degree of Bachelor of Science, students shall successfully complete the following requirements:"

Page 498, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.6 Major in Ocean Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the General Degree of Bachelor of Science, students shall successfully complete the following requirements:"

Page 498, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.6 Major in Ocean Physics, amend the second paragraph as follows:

"Mathematics 1001, 2000 and 2050 are prerequisites to many Physics courses and should be successfully completed by the end of second year. Note that Mathematics 2260 is co-requisite to Physics 3220 and is recommended to be successfully completed before the Winter term of the third year."

Page 499, 2019-2020 Calendar, Faculty of Science, under the heading 11.10.7 Honours in Ocean Physics, amend the first paragraph as follows:

"As a component of the **Degree Regulations** for the Honours Degree of Bachelor of Science, students shall successfully complete the following requirements:"

Page 500, 2019-2020 Calendar, Faculty of Science, under the heading 11.11 Psychology, amend 11.11.1 Admission to Major Programs, Regulation 4, as follows:

"Six credit hours of electives (9 if only Mathematics 1000 is successfully completed)."

Page 500, 2019-2020 Calendar, Faculty of Science, under the heading 11.11 Psychology, amend 11.11.2 Admission to Honours Programs as follows:

"To be eligible for admission, students must have successfully completed Psychology 2910, 2911, 2520, and 2930 and obtained in these courses a grade of "B" or better, or an average of 75% or higher."

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Page 500, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.3 Requirements for a Major in Psychology, amend Regulation 2 as follows:

"Psychology Majors following the B.Sc. program are also required to successfully complete the following:"

Page 500, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.3 Requirements for a Major in Psychology, amend Regulation 3 as follows:

"Psychology Majors following the B.A. program are also required to successfully complete Mathematics 1000 or two of 1090, 1050, 1051 (or equivalent), and are encouraged to complete at least 6 credit hours in Biology."

Page 500, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.4 Requirements for Honours in Psychology, amend Regulation 2 as follows:

"Honours students must also successfully complete the requirements listed in either Clause 2. or Clause 3., as applicable, of the requirements for a Major in Psychology."

Page 501, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.6 Requirements for Honours in Behavioural Neuroscience (B.Sc. Only), amend Regulation 1 as follows:

"Honours students in Behavioural Neuroscience are required to successfully complete the following Psychology courses: 1000, 1001, 2520, 2910, 2911, 2930, 3250, 3800, 3820, 3900, 499A/B, one further course in Psychology chosen from the following: 3050, 3100, 3350, 3450, 3620, 3650, 3750; any research experience course and one of Psychology 4250, 4251, 4850 or 4851; or, any selected topics course and one of Psychology 4270 or 4870."

Page 501, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.6 Requirements for Honours in Behavioural Neuroscience (B.Sc. Only), amend Regulation 2 as follows:

"Honours students in Behavioural Neuroscience must also successfully complete the requirements listed in Clauses 2. and 3. of the requirements for a Major in Behavioural Neuroscience."

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Page 501, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.8 Requirements for Major and Honours in Psychology (Co-operative) (B.A. or B.Sc.), and Major and Honours in Behavioural Neuroscience (Co-operative) (B.Sc. only), amend 11.11.8.2 Program of Study, Regulation 3, as follows:

"Students are required to successfully complete three work terms."

Page 501, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.8 Requirements for Major and Honours in Psychology (Co-operative) (B.A. or B.Sc.), and Major and Honours in Behavioural Neuroscience (Co-operative) (B.Sc. only), amend 11.11.8.4 Registration and Evaluation of Performance, Regulation 7, as follows:

"Permission to drop a Work Term does not constitute a waiver of degree requirements, and students who have obtained such permission must successfully complete an approved Work Term in lieu of the one dropped."

Page 503, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.9 Suggested Course Sequences, amend the final entry of "Table 1 Suggested Course Sequence for B.A. in Psychology (Co-operative)" as follows:

"Psychology Majors are required to successfully complete Mathematics 1000 or two of 1090, 1050, 1051 (or equivalent)."

Page 503, 2019-2020 Calendar, Faculty of Science, under the heading 11.11.9 Suggested Course Sequences, amend the final entry of "Table 3 Suggested Course Sequence for B.A. (Honours) in Psychology (Co-operative)" as follows:

"Psychology Majors are required to successfully complete Mathematics 1000 or two of 1090, 1050, 1051 (or equivalent)."

Page 511, 2019-2020 Calendar, Faculty of Science, under the heading 12.2 Biology, amend the prerequisite for Biology 3300 (Introductory Entomology) as follows:

"PR: Science 1807; BIOL 2600. It is recommended that students have successfully completed BIOL 2900"

Page 511, 2019-2020 Calendar, Faculty of Science, under the heading 12.2 Biology, amend the prerequisite for Biology 4607 (Models in Biology) as follows:

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"PR: BIOL 2060, 2600 and 2900; Statistics 2550 or equivalent. It is recommended that students successfully complete BIOL 3295."

Page 511, 2019-2020 Calendar, Faculty of Science, under the heading 12.2 Biology, amend the prerequisite for Biology 4820 (Field Course in Terrestrial Biology) as follows:

"PR: Science 1807; BIOL 2010, 2122, 2210, 2600 and permission of the Head of the Department. It is recommended that students successfully complete BIOL 4605."

Page 517, 2019-2020 Calendar, Faculty of Science, under the heading 12.4 Computer Science, amend the credit restriction for Computer Science 1002 (Introduction to Logic for Computer Scientists) as follows:

"CR: COMP 2742, Engineering 4424, Mathematics 2320. Students cannot receive credit for COMP 1002 if they have previously successfully completed, or are currently registered for, ~~completed with, or subsequent to,~~ Mathematics 2320.

Page 520, 2019-2020 Calendar, Faculty of Science, under the heading 12.5 Earth Sciences, amend the course description for Earth Sciences 2401 (Structural Geology) as follows:

"provides an introduction to basic concepts; the physics of rock deformation, the classification and descriptive geometry of major and minor structures and their relationship to stress and strain. Laboratory work will concentrate on analysis of structural orientation data, and the analysis of structures in geological maps and cross-sections. Earth Sciences majors are advised to complete field course, EASC 3905, immediately following successful completion of this course."

Page 524, 2019-2020 Calendar, Faculty of Science, under the heading 12.8.1 Mathematics Courses, amend the usage limitation for Mathematics 1000 (Calculus I) as follows:

"UL: at most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, the former 1080, the former 1081, 1090, 109A/B, the former 1150 and 1151"

Page 524, 2019-2020 Calendar, Faculty of Science, under the heading 12.8.1 Mathematics Courses, amend the usage limitation for Mathematics 1050 (Finite Mathematics I) as follows:

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"UL: At most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, 1052, 1053, the former 1080, the former 1081, 1090, 109A/B, the former 1150 and 1151. Students who have already obtained 6 or more credit hours in Mathematics or Statistics courses numbered 2000 or above should not register for this course, and cannot receive credit for it."

Page 524, 2019-2020 Calendar, Faculty of Science, under the heading 12.8.1 Mathematics Courses, amend the usage limitation for Mathematics 1051 (Finite Mathematics II) as follows:

"UL: At most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, 1052, 1053, the former 1080, the former 1081, 1090, 109A/B, the former 1150 and 1151. Students who have already obtained 6 or more credit hours in Mathematics or Statistics courses numbered 2000 or above should not register for this course, and cannot receive credit for it."

Page 524, 2019-2020 Calendar, Faculty of Science, under the heading 12.8.1 Mathematics Courses, amend the credit restriction and usage limitation for Mathematics 1090 (Algebra and Trigonometry) as follows:

"CR: if previously successfully completed or currently registered for MATH 1000, 1001,
109A/B, the former 1080, or the former 1081"

and

"UL: at most 9 credit hours in Mathematics will be given for courses successfully completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, the former 1080, the former 1081, 1090, 109A/B, the former 1150 and 1151"

Page 524, 2019-2020 Calendar, Faculty of Science, under the heading 12.8.1 Mathematics Courses, amend the credit restriction for Mathematics 109A and 109B (Introductory Algebra and Trigonometry) as follows:

"CR: if previously successfully completed or currently registered for MATH 1000, 1001, 1090, the former 1080, or the former 1081"

Page 536, 2019-2020 Calendar, Faculty of Science, under the heading 12.12 Science, amend the course description for Science 1807 (Safety in the Scientific Laboratory) as follows:

Senate Committee on Undergraduate Studies (cont'd)

"introduces students to safety practices required for working in science laboratories where hazards are present. Students complete an online module in Laboratory Safety. Normally, it will be taken before the start of the semester in which students take their first science laboratory course with this prerequisite, and it must be successfully completed no later than the first Friday of the semester. Check department lists of courses to see where this is a prerequisite."

Page 536, 2019-2020 Calendar, Faculty of Science, under the heading 12.12 Science, amend the course description for Science 1808 (WHMIS) as follows:

"introduces students to Newfoundland and Labrador's Workplace Hazardous Materials Information System (WHMIS). Students will complete an online module in WHMIS. Normally, it will be taken before the start of the semester in which students take their first science laboratory course with this prerequisite, and it must be successfully completed no later than the first Friday of the semester. Check department lists of courses to see where this is a prerequisite."

Page 540, 2019-2020 Calendar, School of Social Work, under the heading 4.2 Social Work Field Practica, amend Regulation 1 as follows:

"In addition to their course work, students are required to successfully complete two supervised 350 hour field practica which normally occur in Fall and Winter semesters."

Page 540, 2019-2020 Calenar, School of Social Work, under the heading 4.2 Social Work Field Practica, amend Regulation 9 as follows:

"Students must successfully complete and have received final grades for all required courses before proceeding to each field practicum."

Page 541, 2019-2020 Calendar, School of Social Work, under the heading 4.5 Complementary Studies, amend Regulation 3 as follows:

"Students are required to successfully complete Complementary Studies courses as part of the admission requirement for the First and Second Degree programs."

Page 541, 2019-2020 Calendar, School of Social Work, under the heading 4.5 Complementary Studies, amend Regulation 4 as follows:

"Once admitted to the First Degree program, students successfully complete Complementary Studies courses in order to fulfill the general education course requirement."

Senate Committee on Undergraduate Studies (cont'd)

Page 543, 2019-2020 Calendar, School of Social Work, under the heading 5.3.4 Admission Following Voluntary Withdrawal, amend Regulation 2 as follows:

"If the time since the last successfully completed course(s) in a BSW Program of Study is three years or greater, then the student will be required to repeat previously successfully completed Social Work courses and the Committee on Undergraduate Studies will review and determine what, if any, Complementary Studies courses will need to be successfully completed as listed under the Program Regulations for the Social Work program."

Page 543, 2019-2020 Calendar, School of Social Work, under the heading 5.3.5 Admission Following Promotion Denied, amend Regulation 2 as follows:

"If the time since the last successfully completed course(s) in a BSW Program of Study is three years or greater, then the student will be required to repeat previously successfully completed Social Work courses and the Committee on Undergraduate Studies will review and determine what, if any, Complementary Studies courses will need to be successfully completed as listed under the Program Regulations for the Social Work program."

Page 544, 2019-2020 Calendar, School of Social Work, under the heading 6.1 Bachelor of Social Work (as a First Degree), amend the sixth bullet as follows:

"In order for students to proceed to each field practicum (i.e., SCWK 3300 and SCWK 4302), all professional education courses and all general education courses prior to each field practicum as listed in the **Table 2 Bachelor of Social Work (as a First Degree)** Program of Study must be successfully completed with each course having a final grade of 65% or greater."

Page 545, 2019-2020 Calendar, School of Social Work, under the heading 6.2 Bachelor of Social Work (as a Second Degree), amend the fourth bullet as follows:

"In order for students to proceed to each field practicum (i.e., SCWK 3300 and SCWK 4302), all professional education courses as listed in the **Table 3 Bachelor of Social Work (as a Second Degree)** must be successfully completed with each course having a final grade of 65% or greater."

18. Report of the Academic Council of the School of Graduate Studies

18.1 Engineering

Page 624, 2019-2020 Calendar, under the heading 14.10 Graduate Diploma in Engineering, amend the section as follows:

"**14.10 Graduate Diploma in Engineering**

The Faculty of Engineering and Applied Science offers course-based graduate diplomas in engineering to provide opportunities for engineers to obtain credentials or upgrade their training in various specialized areas of engineering. The programs are available on a full-time or part-time basis.

14.10.1 Qualifications for Admission
Admission to the program is limited and competitive. To be eligible for consideration for admission, an applicant shall meet the requirements described under **General Regulations, Qualification for Admission**, or shall have qualifications and/or engineering experience that is acceptable to the Dean of Graduate Studies and to the Faculty of Engineering and Applied Science. To be eligible for consideration for admission, applicants will meet English proficiency requirements described under **General Regulations, English Proficiency Requirements**.

14.10.2 Program of Study
The graduate diploma program requires the completion of 15 credit hours consisting of three core and two elective courses.

~~**14.10.2.1 Arctic Engineering**~~
~~Engineering 9052, 9062, and 9092; and two courses selected from Engineering 9090, 9096, 9501, 9506, 9516~~

14.10.2.1~~2~~ Communications Engineering
Engineering 9871, 9872, and 9878; and two courses selected from Engineering 9806, 9821, 9825, 9876, 9877

~~**14.10.2.3 Geotechnical and Structural Engineering**~~
~~Engineering 9501, 9723, and 9760; and two courses selected from Engineering 9002, 9022, 9505, 9520, 9750, 9755~~

~~**14.10.2.4 Mechanics and Materials Engineering**~~
~~Engineering 9210, 9520, and 9550; and two courses selected from Engineering 9501, 9516, 9540, 9982~~

~~**14.10.2.5 Mechatronics Engineering**~~
~~Engineering 9804, 9826, and 9940; and two courses selected from Engineering 9496, 9516, 9685, 9875~~

Engineering (cont'd)

14.10.2. 26 ~~6~~ Safety and Risk Engineering
Engineering 9115, 9121, and 9411; and two courses selected from Engineering 9116, 9516, 9609, 9622

~~**14.10.2.7 Thermofluids Engineering**~~
~~Engineering 9901, 9977, and 9985; and two courses selected from Engineering 9211, 9420, 9501, 9902, 9979~~"

18.2 Psychology

Page 715, 2019-2020 Calendar, under the heading 37.3 Program of Study, amend the section as follows:

"**37.3 Program of Study**

Students are required to successfully complete at least 63 credit hours in regulation graduate courses. These include:

a. 6 credit hours in statistics and research design courses (6000, 6602);
b. ~~30~~ 27 credit hours in core courses (6611, 6612, 6620, 6623, 6630, 6631, ~~6632,~~ 6633, 6650, 6670); and
c. ~~27~~ 30 credit hours in practicum courses (7010, 7020, 7021, 7022, 7030, 7031, 7032, 7033, 7034, 7035).

Students must also complete a year-long internship, pass a comprehensive exam and successfully complete a research thesis."

Page 716, 2019-2020, under the heading 37.4 Courses, amend the section as follows:

"**37.4 Courses**

- 6000 Advanced Statistics
- 6001 Research Design
- 6602 Research Design in Clinical Psychology
- 6611 Ethics of Professional Practice
- 6612 Adult Psychopathology
- 6614 Selected Topics in Psychopathology
- 6620 Principles of Adult Assessment and Diagnosis
- 6621 Principles of Child Assessment and Diagnosis
- 6622 Selected Topics in Assessment and Diagnosis
- 6623 Child Psychopathology, Assessment and Diagnosis
- 6630 Principles of Intervention with Adults
- 6631 Principles of Intervention with Children
- 6632 Community Interventions
- 6633 Clinical Psychopharmacology

Psychology (cont'd)

- 6634 Selected Topics in Intervention
- 6640 Consultation Processes
- 6650 Supervision
- 6660-6669 Special Topics in Clinical Psychology
- 6670 Interprofessional Education *(3 credit hours over six terms: Fall and Winter terms for Years 1, 2, and 3)*
- 7010 Practicum in Ethics and Relationship Skills
- 7020 Practicum in Adult Assessment and Diagnosis I
- 7021 Practicum in Adult Assessment and Diagnosis II
- 7022 Practicum in Child Assessment and Diagnosis
- 7030 Practicum in Assessment and Intervention I
- 7031 Practicum in Assessment and Intervention II
- 7032 Practicum in Assessment and Intervention III
- 7033 Practicum in Advanced Assessment and Intervention I
- 7034 Practicum in Advanced Assessment and Intervention II
- 7035 Practicum in Rural Intervention and Interprofessional Practice
- 7050 Practicum in Supervision I
- 7051 Practicum in Supervision II"

18.3 Mathematics and Statistics

Page 659, 2019-2020 Calendar, under the heading 27.18.3 Courses, amend the section as follows:

"**27.18.3 Courses**

A selection of the following graduate courses will be offered to meet the requirements of candidates, as far as the resources of the Department will allow:

"**27.18.3.1 Mathematics**

…

6320 Group Theory
6321 Ring Theory
6322 Nonassociative Algebra
6323 Homological Algebra
6324-6329 Special Topics in Algebra 6330 Analytic Number Theory
6331 Algebraic Number Theory 6332 Point Set Topology
6333 Representation Theory
6340 Graph Theory
6341 Combinatorial Design Theory 6342 Advanced Enumeration
6343-6349 Special Topics in Combinatorics 6351 Advanced Linear Algebra
. . ."

Mathematics and Statistics (cont'd)

Page 705, 2019-2020 Calendar, under the heading 36.26.4 Courses, amend the section as follows:

"**36.26.4 Courses**

A selection of the following graduate courses will be offered to meet the requirements of candidates, as far as the resources of the Department will allow:

36.26.4.1 Mathematics

…
6320 Group Theory
6321 Ring Theory
6322 Nonassociative Algebra
6323 Homological Algebra
6324-6329 Special Topics in Algebra 6330 Analytic Number Theory
6331 Algebraic Number Theory 6332 Point Set Topology
6333 Representation Theory
6340 Graph Theory
6341 Combinatorial Design Theory 6342 Advanced Enumeration
6343-6349 Special Topics in Combinatorics 6351 Advanced Linear Algebra
…"

18.4 Philosophy

Page 600, 2019-2020 Calendar, under the heading 8.18.1 Program of Study, amend the section as follows:

"**8.18.1 Program of Study**

The Degree of Master of Arts is offered in Philosophy by full-time or part-time study. The program is designed so that it may be completed in one academic year (three semesters) of full-time study.

1. In addition to meeting the requirements listed under **General Regulations**, to complete a M.A. in Philosophy, students ~~The candidate~~ must complete a minimum of 18 credit hours in graduate Philosophy courses as follows:

- 3 credit hours ~~from~~ in Philosophy 6000
- ~~12~~ 15 credit hours ~~from 6011-6016, any 3 credit hours from 6101-6102 and a thesis~~ in graduate Philosophy courses selected from the **Courses** listed below. Courses will be selected by the student in consultation with the student's Supervisory Committee.

Philosophy (cont'd)

2. Normally, a full-time candidate will complete all the 18 credit hours and submit a thesis proposal by the end of the second semester of study. A minimum of one additional semester will be spent in completing the balance of the program.
3. The student must also complete a thesis in accordance with General Regulations, Thesis and Reports during the third semester of the program."

Page 600, 2019-2020 Calendar, under the heading 8.18.2 Courses, amend the section as follows:

"**8.18.2 Courses**

A selection of the following graduating courses will be offered to meet the requirements of candidates, as far as the resources of the Department will allow.

6000 Graduate Research Seminar
~~**Author Seminars**~~
6011 Seminar in Ancient and Medieval Philosophy
6012 Seminar in Modern Philosophy
6013 Seminar in Contemporary Philosophy

~~**Area Seminars**~~
6014 Seminar in Metaphysics
6015 Seminar in ~~Theory of Knowledge~~ Epistemology
6016 Seminar in ~~Ethical~~ Social and Political ~~Theory~~ Philosophy

~~**Tutorials**~~
6040-6099 Seminar in Special Topics
6101 Seminar in Selected Philosophical Texts
6102 Seminar in Current Issues in Philosophy"

Page 709, 2019-2020 Calendar, under the heading 36.30 Philosophy, amend the section as follows:

"**36.30 Philosophy**

The degree of Doctor of Philosophy (Ph.D.) is offered in Philosophy by full-time study only. Graduate courses are taught as small seminars. ~~and directed reading courses~~Program ~~candidates~~ students must spend a minimum of two years in residence at this institution.

36.30.1 Program of Study

1. remain unchanged

Philosophy (cont'd)

2. remain unchanged

3. In addition to meeting the requirements listed under **General Regulations**, to complete a Ph.D. in Philosophy, students must ~~All candidates are required to~~ complete ~~a minimum of~~ 15 credit hours in graduate Philosophy courses ~~selected from the Courses listed below and including the following~~ as follows:

1. 3 credit hours in Philosophy 6000, unless this course was previously completed as part of an MA program at Memorial University.
2. ~~Four additional courses (~~12 credit hours) ~~only one of which (3 credit hours) may be a directed reading~~ in graduate Philosophy courses selected from the **Courses** listed below. Courses will be selected by the candidate in consultation with the candidate's Supervisory Committee.

4. remain unchanged

5. The Ph.D. Comprehensive Examination shall be administered and evaluated in accordance with **General Regulations, Comprehensive Examinations**. The examination shall consist of ~~three~~ an oral and a written parts: ~~a four-hour examination in the student's area of concentration and two three-hour examinations in two of the Department's research clusters (Metaphysics and its History, Kant and Continental Philosophy, and Ethics and Social and Political Philosophy).~~ Students will write one essay on a predetermined Area question, and a second essay on a predetermined Breadth question. The student will then defend these essays in a 2-hour examination.

6. remain unchanged

7. remain unchanged

34.30.2 Courses

A selection of the following graduate courses will be offered to meet the requirements of candidates, as far as the resources of the Department will allow.

6000 Graduate Research Seminar

~~• **History of Philosophy Seminars**~~
- 6011 Seminar in Ancient and Medieval Philosophy
- 6012 Seminar in Modern Philosophy
- 6013 Seminar in Contemporary Philosophy

Philosophy (cont'd)

~~• **Area Seminars**~~
• 6014 Seminar in Metaphysics
• 6015 ~~Theory of Knowledge~~ Seminar in Epistemology
• 6016 ~~Ethical~~ Seminar in Social and Political ~~Theory~~ Philosophy
~~• **Tutorials**~~
• 6040-6099 Seminar in Special Topics
• 6101 Seminar in Selected Philosophical Texts
• 6102 Seminar in Current Issues in Philosophy"

18.5 School of Science and the Environment

Page 666, 2019-2020 Calendar, under the heading 28.5 Courses, amend the section as follows:

"**28.5 Courses**
• BEAS 6000 Issues in Boreal Ecosystems and Agricultural Sciences
• BEAS 600A/B Graduate Research Seminar
• BEAS 6002 Advanced Quantitative Research Methods for the Natural Sciences
• BEAS 6003 Advanced Quantitative Research Methods for the Social Sciences
• BEAS 6010 Agriculture and Forestry Economics
• BEAS 6020 Management of Crop Nutrition
• BEAS 6021 Organic Farming for Sustainable Agriculture
• BEAS 6022 Plant Biochemistry
• BEAS 6023 Plant Physiology
• BEAS 6030 Chemical Speciation Modeling for Environmental Matrices
• BEAS 6031 Soil Functions Soil as a Bioreactor
• BEAS 6032 Environmental Soil Physics
• BEAS 6033 Soil and Water Conservation
• BEAS 6040 Advanced Groundwater Management
• BEAS 6041 Applied Hydrology
• BEAS 6042 Soil and Groundwater Remediation
• BEAS 6050-6150 Special topics in Boreal Ecosystems and Agricultural Sciences (excluding 6052)
• BEAS 6052 Statistical Model Building in Boreal Ecology"

18.6 Master of Technology Management Program

Page 678, 2019-2020 Calendar, under the heading 35 Regulations Governing the Degree of Master of Technology Management, amend the section as follows:

"35 Regulations Governing the Degree of Master of Technology Management
www.mun.ca/sgs/contacts/sgscontacts.php
www.mi.mun.ca

Master of Technology Management Program (cont'd)

35.1 Administration

The Program will be administered by an Academic Director appointed by the Associate Vice-President (Marine Institute), Academic & Student Affairs, ~~Vice-President (Marine Institute),~~ together with an Academic Advisory Committee.

An Academic Advisory Committee will be appointed by the Dean of Graduate Studies on recommendation of the Associate Vice-President (Marine Institute), Academic & Student Affairs.~~Vice-President (Marine Institute).~~ This committee will consist of the Academic Director as Chair, three members from the Marine Institute and ~~one member~~two members from other academic units of the University, normally~~from each of~~ the Faculty of Business Administration and the Faculty of Engineering and Applied Science. Normally, all appointments will be for a period of three (3) years.

A Technical Advisory Committee consisting of a cross-section of members with professional expertise related to the technology sector, will provide regular feedback on program content, instruction, and future direction of the Program. Members of this Committee will be appointed by the Dean of Graduate Studies on recommendation of the Associate Vice-President (Marine Institute), Academic & Student Affairs. ~~Vice-President (Marine Institute).~~ The Academic Director will be an ex officio member and Chair of the Technical Advisory Committee. Normally all appointments will be for a period of three (3) years.

35.2 Program

The Master of Technology Management (MTM) is a comprehensive academic program that provides a broad understanding of the structure and operation of organizations and the factors that influence business decisions in the context of technology-based organizations. It provides a technology management focus through the development of knowledge and understanding of the nature of technical operations and the factors that have an impact on their success, as well as the ability to apply these concepts within their organizations.

The program consists of two Options:

- Engineering Technology and Applied Science ~~Technology~~ Option
- Aquaculture Technology Option

The program is offered online and requires successful completion of either 1) 24 credit hours of course work and a comprehensive project and report (6 credit hours), or 2) 30 credit hours of comprehensive course work. Students will typically register on a part-time basis.

Master of Technology Management Program (cont'd)

35.2.1 Admission Requirements

Admission to the program is on a competitive basis.

~~1. The deadlines for submission of applications are as follows:~~

~~• Fall (September) semester: May 15~~

~~• Winter (January) semester: September 15~~

~~Applications received after listed deadlines will be considered as time and resources permit.~~

~~2.~~1. To be considered for admission to the Engineering Technology and Applied Science ~~Technology~~ Option an applicant will normally possess a second class or better undergraduate degree from a university of recognized standing and will normally have:

• ~~a Memorial University of Newfoundland Bachelor of Technology, Bachelor of Maritime Studies, or a comparable undergraduate degree with~~ appropriate technology sector and business management course work; and

• a minimum of two (2) years relevant employment experience.

~~3.~~2. To be considered for admission to the Aquaculture Technology Option an applicant will normally possess a second class or better undergraduate degree from a university of recognized standing and will normally have:

• a post-graduate aquaculture credential or an aquaculture focus in their undergraduate degree; or significant professional experience in the aquaculture industry; and

• a minimum of two (2) years relevant employment experience.

~~4.~~3. In exceptional cases, applicants who have not completed an undergraduate degree, but who meet all other requirements, may be considered for admission. Preference will be given to those who have significant and relevant professional experience, and have successfully completed several years of post-secondary studies. Applicants who do not meet normal admission requirements shall be required to complete, with a high level of achievement, certain undergraduate courses before being considered for admission.

~~5.~~4. Applicants who did not complete a baccalaureate or post-graduate degree at a recognized university where English is the primary language of instruction must normally complete either the:

• Test of English as a Foreign language (TOEFL) and achieve a paper-based score of 580 (or higher), computer-based score of 237 (or higher), or Internet based score of 92-93 (or higher); or

• International English Language Testing System (IELTS) and achieve a score of 7 (or higher).

Information regarding the TOEFL is available from the Educational Testing Service at www.ets.org. IELTS information is available

Master of Technology Management Program (cont'd)

at www.ielts.org. It is noted that other equivalent tests acceptable to the School of Graduate Studies will also be considered

~~6.~~5. Upon acceptance into the program, students will be admitted to one of the two Options: the Engineering Technology and Applied Science ~~Technology~~ Option or the Aquaculture Technology Option.

35.2.2 Program of Study

35.2.2.1 Master of Technology Management - Engineering Technology and Applied Science ~~Technology~~ Option

1. Students in the Master of Technology Management (Engineering Technology and Applied Science ~~Technology~~ Option) shall be required to complete a minimum of either:

a. 24 credit hours of course work and a major project and report (6 credit hours). Course work includes ~~two~~ three compulsory core courses (~~6~~ 9 credit hours) and ~~six~~ five Category A Electives ~~elective courses~~ (~~18~~ 15 credit hours). Students on the project route will complete ~~MSTM~~TECH 6100: Project in Engineering ~~and~~ Technology, Applied Science and Technology Management (6 credit hours). See **Courses**.

~~i. **Core Courses (Two to be completed):**~~
~~MSTM 6031 Overview of Technical Operations~~
~~MSTM 6032 Managing Technological Innovation~~

~~ii.~~i. ~~**Elective courses (Six to be completed):**~~
~~MSTM 6022 Communication and Conflict Resolution in a Technical Environment~~
~~MSTM 6023 Strategic Planning, Policy, Participation and Management in Technical Operations~~
~~MSTM 6030 Principles of Management for Engineering Technology Enterprises~~
~~MSTM 6033 Quality Systems~~
~~MSTM 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments~~
~~MSTM 6035 Information Technology Applications in the Health and Engineering Technology Environments~~
~~MSTM 6036 Supply Chain Management and Advanced Engineering Technology Operations~~
~~MSTM 6037 Risk Analysis and Operations in the Engineering Technology Sector~~
~~MSTM 6038 Manufacturing and Engineering Technology Management~~
~~MSTM 6039 Sustainability and Environmental Responsibility~~
~~MSTM 6052 Management of Intellectual Property~~
~~MSTM 6054 Technology Assessment~~
~~MSTM 6056 Management of International Development~~

Master of Technology Management Program (cont'd)

~~**Project in Engineering and Applied Science Technology Management**~~
~~MSTM 6100 Project in Engineering and Applied Science Technology Management (6 credit hours). Students will choose a topic in consultation with the Academic Director and will work independently to carry out an in-depth study of a problem or application within the area of technology management and fully document and present their findings. Preferably the problem will be directly related to a workplace situation.~~

b. 30 credit hours on a comprehensive-course route. Course work includes ~~two~~ three compulsory core courses (~~6~~ 9 credit hours) and ~~eight~~ seven Category A Electives ~~elective courses~~ (~~24~~ 21 credit hours). See **Courses**.

~~i. **Core Courses (Two to be completed):**~~
~~MSTM 6031 Overview of Technical Operations~~
~~MSTM 6032 Managing Technological Innovation~~
~~ii. **Elective Courses (Eight to be completed):**~~
~~MSTM 6022 Communication and Conflict Resolution in a Technical Environment~~
~~MSTM 6023 Strategic Planning, Policy, Participation and Management in Technical Operations~~
~~MSTM 6030 Principles of Management for Engineering Technology Enterprises~~
~~MSTM 6033 Quality Systems~~
~~MSTM 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments~~
~~MSTM 6035 Information Technology Applications in the Health and Engineering Technology Environments~~
~~MSTM 6036 Supply Chain Management and Advanced Engineering Technology Operations~~
~~MSTM 6037 Risk Analysis and Operations in the Engineering Technology Sector~~
~~MSTM 6038 Manufacturing and Engineering Technology Management~~
~~MSTM 6039 Sustainability and Environmental Responsibility~~
~~MSTM 6052 Management of Intellectual Property~~
~~MSTM 6054 Technology Assessment~~
~~MSTM 6056 Management of International Development~~

2. Up to three relevant elective courses (9 credit hours) may be transferred from other graduate programs within the School of Graduate Studies or from other post-secondary institutions recognized by Senate, subject to the approval of the Dean of Graduate Studies on the recommendation of the Academic Director.

3. Students with full-time status may register for a maximum of 9 credit hours in any regular semester and a maximum of 6 credit hours in intersession or summer session.

Master of Technology Management Program (cont'd)

Students with part-time status may register for a maximum of 6 credit hours in any regular semester and a maximum of 3 credit hours in intersession or summer session.

Students may register for additional courses in a semester or session with the permission of the Academic Director of the Program.

35.2.2.2 Master of Technology Management - Aquaculture Technology Option

1. Students in the Master of Technology Management (Aquaculture Technology Option) shall be required to complete a minimum of either:

a. 24 credit hours of course work and a major project and report (6 credit hours). Course work includes ~~two~~ three compulsory core courses (~~6~~ 9 credit hours); and ~~six~~ five elective courses (~~18~~ 15 credit hours), of which at least 3 must be from Category B. Students on the project route will complete MSTM 6102: Project in Aquaculture Technology Management (6 credit hours). See **Courses**.

~~i. **Core Courses (Two to be completed):**~~
~~MSTM 6031 Overview of Technical Operations~~
~~MSTM 6032 Managing Technological Innovation~~

~~ii.~~i. ~~**Elective Courses (six to be completed including at least three from Category B):**~~

~~**Category A**~~
~~MSTM 6022 Communication and Conflict Resolution in a Technical Environment~~
~~MSTM 6023 Strategic Planning, Policy, Participation and Management in Technical Operations~~
~~MSTM 6033 Quality Systems~~
~~MSTM 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments~~
~~MSTM 6037 Risk Analysis and Operations in the Engineering Technology Sector~~
~~MSTM 6039 Sustainability and Environmental Responsibility~~
~~MSTM 6052 Management of Intellectual Property~~
~~MSTM 6056 Management of International Development~~

~~**Category B**~~
~~MSTM 6071 Management of Aquaculture Technology~~
~~MSTM 6072 Animal Husbandry Management~~
~~MSTM 6073 Aquaculture Environmental Management~~
~~MSTM 6074 Aquaculture Site and Operational Assessment~~
~~MSTM 6075 Aquaculture Engineering Technology Management~~

~~**Project in Aquaculture Technology Management**~~
~~MSTM 6102 Project in Aquaculture Technology Management (6 credit hours). Students will choose a topic in consultation with the Academic~~

Master of Technology Management Program (cont'd)

~~Director or designate and will work independently to carry out an in-depth study of a problem or application within the area of aquaculture technology management and fully document and present their findings. Preferably the problem will be directly related to a workplace situation.~~

b. 30 credit hours on a comprehensive-course route. Course work includes ~~two~~ three compulsory core courses (~~6~~ 9 credit hours) and ~~eight~~ seven elective courses (~~24~~ 21 credit hours), of which at least 3 must be from Category B. See **Courses**.

~~i. **Core Courses (Two to be completed):**~~
~~MSTM 6031 Overview of Technical Operations~~
~~MSTM 6032 Managing Technological Innovation~~

~~ii. **Elective courses (Eight to be completed including at least three from Category B):**~~
~~**Category A**~~
~~MSTM 6022 Communication and Conflict Resolution in a Technical Environment~~
~~MSTM 6023 Strategic Planning, Policy, Participation and Management in Technical Operations~~
~~MSTM 6033 Quality Systems~~
~~MSTM 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments~~
~~MSTM 6037 Risk Analysis and Operations in the Engineering Technology Sector~~
~~MSTM 6039 Sustainability and Environmental Responsibility~~
~~MSTM 6052 Management of Intellectual Property~~
~~MSTM 6056 Management of International Development~~
~~**Category B**~~
~~MSTM 6071 Management of Aquaculture Technology~~
~~MSTM 6072 Animal Husbandry Management~~
~~MSTM 6073 Aquaculture Environmental Management~~
~~MSTM 6074 Aquaculture Site and Operational Assessment~~
~~MSTM 6075 Aquaculture Engineering Technology Management~~

2. Up to three relevant elective courses (9 credit hours) may be transferred from other graduate programs within the School of Graduate Studies or from other post-secondary institutions recognized by Senate, subject to the approval of the Dean of Graduate Studies on the recommendation of the Academic Director.

3. Students with full-time status may register for a maximum of 9 credit hours in any regular semester and a maximum of 6 credit hours in intersession or summer session.

Master of Technology Management Program (cont'd)

Students with part-time status may register for a maximum of 6 credit hours in any regular semester and a maximum of 3 credit hours in intersession or summer session.

Students may register for additional courses in a semester or session with the permission of the Academic Director of the Program.

35.2.3 Evaluation

1. Students for the Master of Technology Management Degree must obtain a grade of B or better in all program courses.

2. Students who receive a grade of less than B in any course will be permitted to remain in the program provided the course is repeated and passed with a grade of B or better. Alternatively, the student may, on the recommendation of the Academic Director, and with the approval of the Dean of Graduate Studies, substitute another graduate course. Only one course repetition or substitution will be permitted during the ~~students's~~ student's program after which the student shall be required to withdraw from the program.

35.2.4 Courses

Core Courses:

~~MSTM~~TECH 6031 Overview of Technical Operations (CR the former MSTM 6031)

~~MSTM~~TECH 6032 Managing Technological Innovation (CR the former MSTM 6032)

~~MSTM~~TECH 6054 Technology Assessment (CR the former MSTM 6054)

Elective Courses

Category A Electives

~~MSTM~~TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)

~~MSTM~~TECH 6023 Strategic Planning, Policy, Participation and Management in Technical Operations (CR the former MSTM 6023)

~~MSTM~~TECH 6030 Principles of Management for Engineering Technology Enterprises (CR the former MSTM 6030)

~~MSTM~~TECH 6033 Quality Systems (CR the former MSTM 6033)

~~MSTM~~TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)

~~MSTM~~TECH 6035 Information Technology Applications in the Health and Engineering Technology Environments (CR the former MSTM 6035)

~~MSTM~~TECH 6036 Supply Chain Management and Advanced Engineering Technology Operations (CR the former MSTM 6036)

~~MSTM~~TECH 6037 Risk Analysis and Operations in the Engineering Technology Sector (CR the former MSTM 6037)

Master of Technology Management Program (cont'd)

~~MSTM~~TECH 6038 Manufacturing and Engineering Technology Management (CR the former MSTM 6038)
~~MSTM~~TECH 6039 Sustainability and Environmental Responsibility (CR the former MSTM 6039)
~~MSTM~~TECH 6052 Management of Intellectual Property (CR the former MSTM 6052)
TECH 6053 Legal Implications of Technology Management (PR MSTM 6032)
TECH 6055 Asset Integrity Management
~~MSTM 6054 Technology Assessment~~
MSTM 6056 Management of International Development

Category B Electives
MSTM 6071 Management of Aquaculture Technology
MSTM 6072 Animal Husbandry Management
MSTM 6073 Aquaculture Environmental Management
MSTM 6074 Aquaculture Site and Operational Assessment
MSTM 6075 Aquaculture Engineering Technology Management

Project Courses
~~MSTM~~TECH 6100 Project in Engineering Technology, Applied Science and Technology Management (6 credit hours)
Students will choose a topic in consultation with the Academic Director and will work independently to carry out an in-depth study of a problem or application within the area of technology management and fully document and present their findings. Preferably the problem will be directly related to a workplace situation.
(CR the former MSTM 6100)

MSTM 6102 Project in Aquaculture Technology Management (6 credit hours)
Students will choose a topic in consultation with the Academic Director or designate and will work independently to carry out an in-depth study of a problem or application within the area of aquaculture technology management and fully document and present their findings. Preferably the problem will be directly related to a workplace situation."

Page 633, 2019-2020 Calendar, under the heading 19.2.4.3 Category B Electives, amend the section as follows:

19.2.4.3 Category B Electives
~~MSTM~~ TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)
~~MSTM~~ TECH 6023 Strategic Planning, Policy, Participation and Management in Technical Operations (CR the former MSTM 6023)
~~MSTM~~ TECH 6033 Quality Systems (CR the former MSTM 6033)

~~MSTM~~ TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)
~~MSTM~~ TECH 6039 Sustainability and Environmental Responsibility (CR the former MSTM 6039)
MSTM 6044 Marine Environment Law and Pollution Control
MSTM 6056 Management for International Development
MSTM 6071 Management of Aquaculture Technology

Page 633, 2019-2020 Calendar, under the heading 19.3.2.1 Core Courses, amend the section as follows:

19.3.2.1 Core Courses
All students must complete the following compulsory core courses:

MSTM 6011 Introduction to Integrated Coastal and Ocean Management / Marine Spatial Planning
MSTM 6012 Fundamentals of Geospatial Analysis
MSTM 6013 Resource/Natural Environment and Ocean Use Characterization
MSTM 6014 Geospatial Analysis for Marine Spatial Planning (prerequisites: MSTM 6011, 6012, and 6013)
~~MSTM~~TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)
MSTM 6027 Coastal and Ocean Environmental Policies
~~MSTM~~ TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)

Page 635, 2019-2020 Calendar, under the heading 19.3.6.1 Core Courses, amend the section as follows:

19.3.6.1 Core Courses
MSTM 6011 Introduction to Integrated Coastal and Ocean Management / Marine Spatial Planning
MSTM 6012 Fundamentals of Geospatial Analysis
MSTM 6013 Resource/Natural Environment and Ocean Use Characterization
MSTM 6014 Geospatial Analysis for Marine Spatial Planning (prerequisites: MSTM 6011, 6012, and 6013)
~~MSTM~~ TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)
MSTM 6027 Coastal and Ocean Environmental Policies
~~MSTM~~ TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)

Page 636, 2019-2020 Calendar, under the heading 20.2.2 Program of Study, amend clause 1.a.ii. as follows:

Master of Technology Management Program (cont'd)

ii. Elective Courses (Six to be completed: a minimum of one from Category A and three from Category B):

Category A

~~MSTM~~ TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)

~~MSTM~~ TECH 6023 Strategic Planning, Policy, Participation and Management in Technical Operations (CR the former MSTM 6023)

~~MSTM~~ TECH 6030 Principles of Management for Engineering Technology Enterprises (CR the former MSTM 6030)

~~MSTM~~ TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)

~~MSTM~~ TECH 6039 Sustainability and Environmental Responsibility (CR the former MSTM 6039)

~~MSTM~~ TECH 6052 Management of Intellectual Property (CR the former MSTM 6052)

~~MSTM~~ TECH 6054 Technology Assessment (CR the former MSTM 6054)

Page 636, 2019-2020 Calendar, under the heading 20.2.2 Program of Study, amen clause 1.b.ii. as follows:

ii. Elective Courses (Eight to be completed: a minimum of two from Category A and four from Category B):

Category A

~~MSTM~~ TECH 6022 Communication and Conflict Resolution in a Technical Environment (CR the former MSTM 6022)

~~MSTM~~ TECH 6023 Strategic Planning, Policy, Participation and Management in Technical Operations (CR the former MSTM 6023)

~~MSTM~~ TECH 6030 Principles of Management for Engineering Technology Enterprises (CR the former MSTM 6030)

~~MSTM~~ TECH 6034 Project Management in the Offshore, Health, Fisheries and Engineering Technology Environments (CR the former MSTM 6034)

~~MSTM~~ TECH 6039 Sustainability and Environmental Responsibility (CR the former MSTM 6039)

~~MSTM~~ TECH 6052 Management of Intellectual Property (CR the former MSTM 6052)

~~MSTM~~ TECH 6054 Technology Assessment (CR the former MSTM 6054)

18.7 School of Graduate Studies – Transcript Notations

The School of Graduate Studies awards scholarships/bursaries which, although they may be as competitive as other scholarships/bursaries, are not currently recorded on a student's transcript.

It was agreed that for scholarships/bursaries awarded by the Associate Vice-President (Academic) and Dean of Graduate Studies, such awards be noted on students' academic records.

19. Senate Committee on Elections and Committees

19.1 Name for Membership on Senate Standing Committee – MISU

The Committee on Elections and Committees approved the following membership on Senate Standing Committees for a term expiring April 30, 2020:

Senate Committee on Undergraduate Studies
Michael Howse (MISU student representative)

19.2 Names for Membership on Senate Standing Committees

The Committee on Elections and Committees approved the following membership on Senate Standing Committees for a term commencing immediately and expiring August 31, 2022:

Committee on Course Evaluation
John Hawboldt (Pharmacy)

Executive Committee of Senate
Ronald Haynes (Mathematics/Statistics)

19.3 Names for Membership on Senate Standing Committees - MISU

The Committee on Elections and Committees approved the following membership on Senate Standing Committees for a term expiring April 30, 2020:

Senate Committee on Academic Appeals
Kaitlin Squires (MISU student representative)

Committee on Course Evaluation
Samantha Tinkham (MISU student representative)

Teaching and Learning Committee
Ben Pritchett (MISU student representative)

19.4 Names for Membership on Senate Standing Committees - GSU

The Committee on Elections and Committees approved the following membership on Senate Standing Committees for a term expiring April 30, 2020:

Senate Committee on Academic Appeals
Narendra Singh (GSU student representative)

Committee on Honorary Degrees and Ceremonial
Narendra Singh (GSU student representative)

19.5 Senate Elections

The Committee on Senate Elections and Committees declared the election/re-election of the following people to the Senate for a term of office commencing immediately and expiring August 31, 2022:

CONSTITUENCY	**NAME**
GRENFELL CAMPUS – Arts and Social Science	Dr. Rie Croll Dr. Shoshannah Ganz
MUSIC	Dr. Caroline Schiller

20. Annual Senate Committee Reports to Senate

Annual Reports to Senate were received from the following Senate Committees:

- Senate Committee on Teaching and Learning
- Senate Committee on Undergraduate Studies
- University Committee on Admissions
- Academic Unit Planning Committee
- Senate Committee on Academic Appeals

REGULAR AGENDA

21. Report of the Senate Committee on Undergraduate Studies

21.1 Election of Chair for 2019-2020 Academic Year

In accordance with the **HANDBOOK OF SENATE BY-LAWS AND PROCEDURES, SECTION VI. SENATE COMMITTEES – SELECTION AND PROCEDURES**, A. Senate Committee Procedures, Clause 7, the Senate Committee on Undergraduate Studies is required to elect its Chair for the 2019-2020 academic year at it first meeting of the year.

At its first meeting of the academic year, held on September 12, 2019, the Committee elected Dr. Shannon Sullivan, Department of Mathematics and Statistics, and Chair, Committee on Undergraduate Studies, Faculty of Science, as Chair for the 2019-2020 academic year.

As Dr. Sullivan is not a Senator, the Committee requests that a standing invitation to attend all Senate meetings for the 2019-2020 academic year be extended to the Chair so that the business being forwarded to Senate from the Senate Committee on Undergraduate studies can be presented.

Election of Chair for 2019-2020 Academic Year (cont'd)

It was moved by Dr. G. George, seconded by Dr. A. Gaudine, and carried that Dr. Sullivan be given a standing invitation to attend all Senate meetings for the 2019-2020 academic year.

21.2 Faculty of Engineering and Applied Science

It was moved by Dr. D. Peters, seconded by Dr. G. George, and carried that on page 139, 2019-2020 Calendar, under the heading 11 Course Descriptions, amend the section as follows:

"**11 Course Descriptions**

~~All courses of the Faculty are designated by ENGI.~~

11.1 Work Terms and Non-Credit Courses

Engineering work terms and non-credit courses are designated by ENGI.

001W Engineering Work Term 1 provides opportunity for an introductory experience in an engineering work environment. Students are expected to learn, develop and practise the basic standards of behaviour, discipline and performance normally found in a professional work environment. They are expected to learn the basics of technical writing and to become familiar with the various communications tools used in an engineering work environment.
CH: 0
LC: 0
PR: ENGI 200W

002W Engineering Work Term 2 requires students, under supervision, to contribute positively to the engineering and problem solving processes practised in the work environment. They are expected to set objectives, take direction, work independently as required, learn professional behaviours, and function as effective team members. An ability to investigate work- related concepts should be demonstrated. Students should become better familiarized with the use of engineering tools, data analysis, prioritization of assignments, and effective communication of technical information.
CH: 0
LC: 0
PR: ENGI 001W, ENGI 3101

003W Engineering Work Term 3 requires greater participation in the students' engineering discipline. They become more experienced and proficient in problem solving and use of appropriate design processes. They should demonstrate speed and accuracy in their work, accept greater

responsibility and be able to function with less direct supervision. Good judgement, increased initiative and improved analytical skills are expected to develop at this stage. Students should better appreciate the attitudes, responsibilities, and ethics expected of engineers.
CH: 0
LC: 0
PR: ENGI 002W

004W Engineering Work Term 4 requires students to engage in complex facets of engineering. Participation in their selected engineering discipline is expected. Students should be able to contribute independently to design and/or problem solving processes, understand their responsibility to society and the environment, understand project management strategies, think critically, and use engineering tools appropriately. The level of responsibility should reflect their academic background and experience. Good teamwork skills are expected and leadership skills may be developed.
CH: 0
LC: 0
PR: ENGI 003W

005W Engineering Work Term 5 requires students to continue to engage in advanced facets of engineering. Participation in their selected engineering discipline is expected. Students should apply skills independently in engineering analysis, contribute to a safe work environment, and utilize engineering tools while understanding their limitations. They will contribute significantly to design and/or problem solving processes, and demonstrate project management and leadership abilities. The level of responsibility should be commensurate with their academic background and experience.
CH: 0
LC: 0
PR: ENGI 004W

006W Engineering Work Term 6 requires students to further engage in various advanced facets of engineering. Participation in their selected engineering discipline is expected. Students should gain further appreciation of the use and importance of acquired analytical skills in engineering analysis, and significantly contribute to design and/or problem solving processes. The level of responsibility should be commensurate with their academic background and experience. Work scope should be mostly independent, with longer timelines, and with the possibility of leadership opportunities.
CH: 0
LC: 0
PR: ENGI 005W

Faculty of Engineering and Applied Science (cont'd)

200W Work Term Preparation and Professional Development introduces the Co-operative Education process and professional development, and prepares the student for work terms. This course is designed to assist students to apply for, interview and obtain the first work term, as well as to be prepared for a professional work environment. It is a one semester course offered during the Fall and Winter semesters of Engineering One, prior to a student's first work term competition. This course is graded PAS or FAL.
AR: attendance is required
CH: 0
LC: as scheduled

11.2 Engineering One Courses

Engineering One courses are designated by ENGI.

1010 Engineering Statics is the first course in Engineering mechanics. Forces and moments are described with vector algebra, leading to a description of the equilibrium conditions for particles and solid bodies. The importance of free body diagrams is highlighted. This knowledge is then applied to the analysis of trusses, frames and machines. Additional topics include an examination of friction and the concepts of centre of force, centroids and second moments of area.
CO: Mathematics 1000
CR: the former ENGI 1313
OR: tutorial 1 hour per week
PR: Level III Physics or Physics 1020 or equivalent

1020 Introduction to Programming is an introduction to algorithmic problem solving techniques and computer programming, including basic program control structures (sequence, call, branch, loop) and data representations, functional decomposition, and design by contract. Exercises and examples are drawn from a variety of engineering disciplines and are implemented using a standard modern programming language.
CR: the former ENGI 2420
LH: at least four 2-hour sessions per semester
PR: eligibility to register for Mathematics 1000

1030 Engineering Graphics and Design provides two complementary competencies. Firstly, it provides an introduction to the fundamentals of graphic communication, including orthographic projections, three dimensional pictorials, sectioning and dimensioning. Both sketching and CAD are utilized. Secondly, the course introduces students to standard design methodologies. The graphics and design competencies are reinforced through lab and project exercises.

Faculty of Engineering and Applied Science (cont'd)

LH: 3
PR: eligibility to register for Mathematics 1000

1040 Mechanisms and Electric Circuits is offered in two serial modules, including laboratory and workshop practice, and a team project to expose students to the concept of system integration involving electrical and mechanical systems. The electrical module provides an introduction to dc circuits, with an analysis of dc circuits used in control, measurement and instrumentation systems. The mechanism module provides an introduction to machine components such as belts, pulleys, gears, and simple linkages. The laboratory and workshop component introduces students to hands-on practice in basic laboratory instruments, tools and safety procedures. A team project involves the construction, assembly and testing of a simple mechanism.
LH: 3
PR: Level III Physics or Physics 1051 (which may be taken concurrently) and Mathematics 1000 (which may be taken concurrently).

11.3 Complementary Studies and Interdisciplinary Courses

Engineering complementary studies courses and interdisciplinary courses are designated by ENGI.

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

3101 Engineering Professionalism I examines issues associated with professional engineering practice and with functioning effectively in the workplace. Topics include communication, workplace and professional ethics, information literacy, equity, gender, diversity, and occupational health and safety (including first-aid). This is a writing-intensive course with a critically-reflective component. Current accreditation graduate attributes are introduced for further development throughout the program.
PR: Science 1807 and Science 1808

3424 Engineering Mathematics includes ordinary differential equations of first order and first degree; linear ordinary differential equations of higher order, methods of undetermined coefficients and variation of parameters; applications to electric circuits and mass-spring systems; Laplace transforms; partial differentiation; convergence of series; Taylor and binomial series; remainder term; and an introduction to Fourier series.

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CH: 4
CR: the former ENGI 2422
LC: 4
OR: tutorial 1 hour per week
PR: Mathematics 1001, Mathematics 2050

4102 Engineering Economics is an introduction to the concepts in the determination of the economic feasibility of engineering projects; time value of money – interest rates, depreciation, annual, present and future worth analysis; benefit-cost analysis, tangible and intangible benefits and costs; economic risk and sensitivity analysis, economic optimization.

4421 Probability and Statistics includes probability, probability distributions, probability densities, sampling distribution, hypothesis testing, regression and correlation.
CR: the former ENGI 3423, ~~STAT~~ Statistics 2550, the former ~~STAT~~ Statistics 2510
OR: tutorial 1 hour per week
PR: Mathematics 1001

4430 Advanced Calculus for Engineering includes parametric vector functions; polar curves; gradient, divergence and curl; multiple integration; vector calculus, theorems of Green, Stokes and Gauss; an introduction to partial differential equations; and application of advanced calculus to relevant engineering problems.
CR: the former ENGI 5432
OR: tutorial 1 hour per week
PR: ENGI 3424

6101 Assessment of Technology ~~deals with the issues of the impact of technology on society from an economic, environmental and sociological point of view. Public safety as an engineering responsibility will also be covered. Students will be expected to participate in group discussions, write a number of essays and give oral presentations.~~ – inactive course

8102-8149 Special Topics in Engineering will have topics to be studied announced by the Faculty.

8150 Engineering Entrepreneurship (same as the former ENGI 8607) is an introduction to the concepts, issues, and themes related to business planning, strategy, and entrepreneurship, with an overview of the functional activities in a typical business venture. Business analysis and planning skills are developed. The course explores the business planning and strategic management issues of technology-driven enterprises in the early stages of development and focuses on the engineer as an entrepreneur.

Faculty of Engineering and Applied Science (cont'd)

CR: the former ENGI 8607
PR: completion of Academic Term 6

8151 Technology, Sustainable Society and International Development (same as the former ENGI 8977) examines multidisciplinary planning on technical international development projects through the conceptual frameworks of international development and project implementation theory. Emphasis is placed on analysis of the complex relationships between society, culture, economic, environmental and political factors, and technology to achieve sustainable international development objectives.
CR: the former ENGI 8977
PR: ENGI 3101

8152 Engineering Professionalism II (same as the former ENGI 7102) examines the demands upon the 21st Century engineer. Topics include the roles and responsibilities of the professional engineer in society, the Engineering Code of Ethics, sustainable development, environmental stewardship, the place of technology in society and the nature of technological decisions. Students will reflect on their entire course of studies, in the context of current accreditation graduate attributes. This is a writing-intensive course with a critically-reflective component.
CO: one of Civil Engineering 8000, Electrical and Computer Engineering 8000, Electrical and Computer Engineering 8010, Mechanical Engineering 8705, Ocean and Naval Architectural Engineering 8000, Process Engineering 8040 or one of the former ENGI 8000, ~~ENGI~~ 8640, ~~ENGI~~ 8650, ~~ENGI~~ 8700, ~~ENGI~~ 8853, ~~ENGI~~ 8854~~,~~ or ~~ENGI~~ 8926
CR: the former ENGI 5101, the former ENGI 7102
PR: ENGI 004W

11.4 Civil Engineering

Civil Engineering courses are designated by CIV.
ENGI indicates non-departmental Engineering courses

Courses are also identified by a four-digit numbering system, the first two digits signifying the following:

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

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

0: Capstone courses
1: Hydrotechnical & Water Resources

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2: Geotechnical courses
3: Mechanics & Structural Analysis
4: Mathematics and Science
5: Design and Civil cross-disciplinary courses
6: Environmental courses
7: Highways and Construction Materials
8: Construction
9: Special Topics

3210 ~~**3610**~~ **Earth Sciences for Civil Engineering** (same as the former ENGI 3610) is an introduction to basic concepts in geology with emphasis on applications in Civil, Geological, Mining and Environmental Engineering through the study of basic concepts and case histories. It includes the study of rocks, minerals, sediments and their physical properties in laboratory exercises.
CR: the former ENGI 3610
LH: 3

3440 ~~**3425**~~ **Mathematics for Civil Engineering I** (same as the former ENGI 3425) includes sequences & series, functions of a single parameter, conic sections, polar coordinates, partial differentiation, multiple integration, introduction to first order ordinary differential equations.
CH: 4
CR: the former ENGI 3425
LC: 4
OR: tutorial 1 hour per week
PR: Mathematics 1001 and 2050

3710 ~~**3703**~~ **Surveying and Geomatics** (same as the former ENGI 3703) includes distance, elevation, and angle measurements; horizontal curves; plane survey calculations; area and volume computations; introduction to photogrammetry; global positioning (GPS) and geographical information systems (GIS). A surveying field school to introduce students to the use of surveying equipment and mapping will be held in the first two weeks of the term.
CR: the former ENGI 3703
LH: nine 3-hour sessions per semester
OR: 18 hours of field school which occurs in the first two weeks of the semester

3720 ~~**3731**~~ **Materials for Construction** (same as the former ENGI 3731) includes structure of metals and nonmetals; deformation of metals; strengthening mechanisms in metals; concrete and cementitious materials; admixtures; iron and steel; brick masonry; concrete masonry; mortar grout and plaster; wood and wood products.
CR: the former ENGI 3731
LH: nine 3-hour sessions per semester

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4220 ~~4723~~ Geotechnical Engineering I (same as the former ENGI 4723) includes an introduction to soil as a three-phase material and examines physical and mechanical properties; particle size distribution; soil plasticity and structure; classification of soils; soil compaction; hydraulic properties; permeability; flow of water in soil; flownets; effective stress concept in soils; stresses in soils beneath loaded areas; and one-dimensional consolidation theory.
CR: the former ENGI 4723
LH: 3
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 3210 or the former ENGI 3610

4310 ~~4312~~ Mechanics of Solids I (same as the former ENGI 4312) examines force analysis of structures and structural components, free body diagrams of structure, components and section of a components, definition of a stress at point, stress notation, complementary property of shear stress, definition of strain, normal strain, shear strain, thermal strain, mechanical properties of materials, analysis of prismatic members due to axial, bending and torsion loading, analysis of beams, shear force and bending moment diagrams, combined loads; and the transformation of stresses and strains.
CR: ~~ENGI 4934~~ Mechanical Engineering 4601, the former ENGI 4312, the former ENGI 4934
LH: four 1-hour sessions per semester
LH: up to ten 1-hour tutorials per semester
PR: ENGI 1010

4450 ~~4425~~ Mathematics for Civil Engineering II (same as the former ENGI 4425) examines the analytical solutions of ordinary differential equations of the first and higher orders and numerical methods: errors, round off and stability, solution to nonlinear equations, curve fitting and interpolation methods, numerical differentiation and integration.
CH: 4
CR: the former ENGI 4422, the former ENGI 4425
LC: 4
OR: tutorial 1 hour per week
PR: ~~ENGI~~ CIV 3440 or the former ENGI 3425

4610 ~~4717~~ Applied Environmental Science and Engineering (same as the former ENGI 4717) examines the nature and scope of environmental problems; concept of sustainable development; basic concepts of environmental quality parameters and standards; water and wastewater treatment; solid and hazardous wastes; atmospheric, water and noise, pollution, their measurements, and mitigation control.
CR: the former ENGI 4717
LH: six 3-hour sessions per semester

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OR: two 3-hour tutorials per semester
PR: Chemistry 1050, ~~ENGI~~ CIV 3210 or the former ENGI 3610

5110 ~~5713~~ **Fluid Mechanics** (same as the former ENGI 5713) examines fluid properties; fluid statics; buoyancy and stability; kinematics; pressure measurement; continuity, energy and momentum principles; control volume analysis; energy and hydraulic grade lines; free jets; laminar and turbulent flow; dimensional analysis; drag on immersed bodies; flow measurement; head loss in pipes; and an introduction to flow in pipe systems.
CR: Mechanical Engineering 4501, ~~ENGI 4961,~~ the former ENGI 4913, the former ENGI 4961, the former ENGI 5713, the former ENGI 5961
LH: five 2-hour sessions per semester
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 4450 or the former ENGI 4425

5230 ~~5723~~ **Geotechnical Engineering II** (same as the former ENGI 5723) examines shear strength of soil; types of laboratory and in-situ soil shear strength tests; lateral earth pressure on retaining structures; slope stability analysis; soil bearing capacity for shallow foundations; introduction to pile foundations and limit state design in geotechnical engineering.
CR: the former ENGI 5723, the former ENGI 6723
LH: 3
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 4220 or the former ENGI 4723

5320 ~~5312~~ **Mechanics of Solids II** (same as the former ENGI 5312) includes a review of earlier concepts; strain transformation; failure theories; deflections of beams; energy methods; buckling of columns and the inelastic behaviour of beam cross-sections.
CR: the former ENGI 5312
LH: four 3-hour sessions per semester
OR: twelve 1 hour tutorials per semester
PR: ~~ENGI~~ CIV 4310 or the former ENGI 4312

5460 ~~5434~~ **Applied Mathematical Analysis** (same as the former ENGI 5434) examines numerical and analytical solutions of applied mathematical problems in Civil Engineering, problems with higher order ordinary differential equations, stiff equations, systems of ODE, Runge-Kutta methods, boundary value problems, applications of eigenvalue problems (numerical solutions), Fourier analysis, elliptic, parabolic and hyperbolic partial differential equations and their numerical solutions with engineering applications.
CR: the former ENGI 5434
PR: ~~ENGI~~ CIV 4450 or the former ENGI 4425

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5510 ~~**5706**~~ **Design of Concrete Structures** (same as the former ENGI 5706) begins with a review of mechanical properties of concrete. Topics include design methods and requirements, strength of reinforced concrete sections in bending, balanced condition at ultimate strength with tension reinforcement, bending with both tension and compression reinforcement; serviceability, deflections, flexural crack control for beams and one-way slabs; shear strength, inclined cracking, and shear reinforcement; bond stress and development of reinforcement; members in compression and bending; short columns.
CR: the former ENGI 5706
LH: five 3-hour sessions per semester
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 4310 or the former ENGI 4312

6120 ~~**6713**~~ **Hydraulics** (same as the former ENGI 6713) examines flow in pipe systems and networks; uniform and non-uniform flow in open channels; hydraulic machinery and associated conduits; design and analysis of culverts; and pipeline/pump system optimization.
CR: the former ENGI 6713
LH: four 3-hour sessions per semester
PR: ENGI 4102, CIV 5110 or the former ENGI 5713

6330 ~~**6705**~~ **Structural Analysis I** (same as the former ENGI 6705) examines structure classification and loads, building code provisions, the analysis of statically determinate frames, arches and cables, stability and determinacy of planar structures, shear and moment diagrams for frames, influence lines for statically determinate structures, the force method of analysing indeterminate structures, the slope deflection method, and moment distribution method.
CR: the former ENGI 6705
LH: six 3-hour sessions per semester
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 5320 or the former ENGI 5312

6470 ~~**6322**~~ **Thermal Sciences** (same as the former ENGI 6322) examines fundamental concepts associated with thermodynamics, fluid dynamics and heat transfer; first and second laws of thermodynamics; system and control volume analysis; classification of flows; introduction to boundary layers and drag; convection, conduction and radiation heat transfer; thermal insulation and calculation of R-values; and cooling of electrical components.
CR: the former ENGI 4322, the former ENGI 6322
PR: ~~ENGI~~ CIV 5320 or the former ENGI 5312

6520 ~~**6707**~~ **Design of Concrete and Masonry Structures** (same as the former ENGI 6707) examines the design of slender columns, design

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methods for reinforced concrete two-way slabs, two-way slabs supported on walls and stiff beams, direct design method, design of foundation systems, footing design, design of concrete retaining walls, engineered masonry, mortar stress, analysis and design of flexural members, axial load and bending in unreinforced and reinforced walls.
CR: the former ENGI 6707
LH: 2
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 5510 or the former ENGI 5706

6810 ~~**6749**~~ **Construction Planning Equipment and Methods** (same as the former ENGI 6749) includes construction equipment selection and utilization; earthmoving including use of explosives; case studies of major civil projects; principles of project planning and control; computer applications to the construction industry.
CR: the former ENGI 6749, the former ENGI 8749
PR: ENGI 4102, completion of Academic Term 5 of the Civil Engineering program

7130 ~~**7713**~~ **Hydrology and Water Resources** (same as the former ENGI 7713) examines basic hydrometeorological processes, evapotranspiration, precipitation, intensity- duration-frequency (IDF) analysis and development, snowmelt, infiltration, runoff and streamflow; statistical treatment of hydrologic data; hydrograph analysis and synthesis; design storms and design floods; reservoir storage and flood routing; urban run-off and drainage; use of hydrologic modelling software.
CR: the former ENGI 7713
LH: four 2-hour sessions per semester
PR: ~~ENGI~~ CIV 5110 or the former ENGI 5713

7140 ~~**7716**~~ **Hydrotechnical Engineering** (same as the former ENGI 7716) examines the theory and application of steady gradually-varied flow in artificial and natural open channels together with an introduction to appropriate software; erosion protection and mobile- boundary hydraulics; problems with ice in rivers, the design of spillways, energy dissipaters, and culverts. There is an introduction to water hammer and surge tanks.
CR: the former ENGI 7716
LH: four 3-hour sessions per semester
PR: ~~ENGI~~ CIV 6120 or the former ENGI 6713

7240 ~~**7723**~~ **Geotechnical Engineering III** (same as the former ENGI 7723) examines soil investigation and site characterization; pile foundations; embankment dams; elements of geotechnical earthquake engineering; constitutive theories for soil materials; and numerical methods in geotechnical engineering. The students select two of the above

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topics on which they are interested in concentrating their efforts. Bi-weekly lectures are offered on the other topics at an informal level.
CR: the former ENGI 7723
PR: ~~ENGI~~ CIV 5230 or the former ENGI 5723

7340 ~~**7706**~~ **Finite Element Structural Analysis** (same as the former ENGI 7706) includes a review of basic concepts required for FEA, basics of stiffness formulation, direct stiffness method, displacement method, one dimensional elements, trusses and frames. Topics include 1-D fluid and heat transfer elements, automated analysis and modelling concepts, higher order elements, two dimensional elements - plane stress and plane strain, introduction to 3D and other types. - introduction to advanced topics and isoparametric formulation.
CR: the former ENGI 7706
LH: at least eight 2-hour sessions per semester
PR: ~~ENGI~~ CIV 6330 or the former ENGI 6705 or approval of the ~~appropriate~~ Head of the Department

7530 ~~**7704**~~ **Design of Steel Structures** (same as the former ENGI 7704) begins with a review of design concepts, standards and products. Topics include design of members and connections, tension members, bolted joints, welded joints, compression members, stability and effective length, flexural members including beams & beam-columns, plate girders, composite beams, introduction to serviceability through deflections of beams.
CR: the former ENGI 7704
LH: five 3-hour sessions per semester
OR: twelve 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 5510 or the former ENGI 5706 and ~~ENGI~~ CIV 5320 or the former ENGI 5312, or approval of the ~~appropriate~~ Head of the Department

7540 ~~**7707**~~ **Reliability and Environmental Loading on Offshore Structures** (same as the former ENGI 7707) begins with an introduction to natural phenomena that cause loading and influence the design of marine structures. Topics include the interpretation and utilization of field data for the determination of design loads for wind, waves currents and ice and case studies of load analysis for the design of offshore structures in Atlantic Canada.
CR: the former ENGI 7707
PR: ~~ENGI~~ CIV 5320 or the former ENGI 5312

7620 ~~**7718**~~ **Environmental Geotechniques** (same as the former ENGI 6718, ENGI 7718) examines soil characteristics; soil mineralogy; soil water interaction; soil contaminant interactions; advection, adsorption and

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diffusion; non-aqueous phase liquids; geosynthetics; design of landfills; and use of waste materials. Relevant software programs are used.
CR: the former ENGI 6718, the former ENGI 7718
OR: six 1-hour tutorials per semester
PR: ~~ENGI~~ CIV 5230 or the former ENGI 5723

7730 ~~**7745**~~ **Highway Engineering** (same as the former ENGI 7745) examines highways transportation systems including driver, vehicle and road characteristics; geometric design of highways; subgrade and base materials; highway drainage features; design of flexible and rigid pavement; fundamentals of traffic flow and queuing theory; traffic control and analysis of signalized intersections; travel demand and traffic forecasting.
CR: the former ENGI 7745
LH: four 3-hour sessions per semester
PR: ~~ENGI~~ CIV 3710 or the former ENGI 3703, ~~ENGI~~ CIV 5230 or the former ENGI 5723

7820 ~~**7748**~~ **Project Planning and Control** (same as the former ENGI 7748) includes an introduction to types of contracts, project delivery approaches, and prevailing contractual relationships. The course examines basic project management techniques for network planning and scheduling (CPM and PERT); principles of resource productivity databases, preliminary estimating, and detailed bid preparation; quantitative approaches for effective control of time, cost, resource, quality, and value of constructed facilities; use of computer software for scheduling, estimating, and control.
CR: the former ENGI 7748
PR: completion of Academic Term 6 of the Civil Engineering program

8000 ~~**8700**~~ **Civil Engineering Project** (same as the former ENGI 8700) is a practically oriented design project integrated over the five areas in which Civil programs are offered. Students will operate in consultant groups and will complete a design for a typical Civil Engineering undertaking.
CR: the former ENGI 8700
LC: scheduled as required
OR: 1 client meeting per week, 1 tutorial per week
PR: completion of Term 7 of the Civil Engineering program

8150 ~~**8713**~~ **Municipal Engineering** (same as the former ENGI 8713) includes water supply system overview; water consumption estimation; groundwater and surface water sources; oxygen demand and transfer; water treatment processes; water distribution systems and design software; sewer systems and design software; wastewater treatment processes; sludge handling; decentralized and on-site wastewater treatment.

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CR: the former ENGI 8713
PR: ~~ENGI~~ CIV 7140 or the former ENGI 7716

8550 ~~**8705**~~ **Structural Building Systems** (same as the former ENGI 8705) examines geometries, loads, safety and serviceability, procedure of using the national building code for evaluating the governing loads on structural members; approximate analysis of structures; structural forms for low rise structures; design of low rise and steel buildings; lateral load-resisting elements and bracing systems.
CR: the former ENGI 8705
LH: 2
OR: 1 hour tutorial per week
PR: ~~ENGI~~ CIV 7530 or the former ENGI 7704

8560 ~~**8708**~~ **Offshore Structural Design** (same as the former ENGI 8708) examines guidelines and international codes and standards for offshore structural design; understanding design constraints and concepts of offshore fixed and floating structures; design consideration for fixed offshore concrete platform; design consideration for offshore platform and floating production system design, and analysis of various support systems of the offshore structure.
CR: the former ENGI 8708
PR: ~~ENGI~~ CIV 7540 or the former ENGI 7707

8570 ~~**8751**~~ **Coastal and Ocean Engineering** (same as the former ENGI 8751) examines the coastal and ocean environment; ocean circulation and properties; waves and tides; instrumentation and measurement. Additional topics will be drawn from the areas of hydraulic, geotechnical and structural engineering. Relevant field exercises will be conducted.
CR: the former ENGI 8751
PR: ~~ENGI~~ CIV 6120 or the former ENGI 6713

8580 ~~**8673**~~ **Subsea Pipeline Engineering** (same as the former ENGI 8673) provides an introduction to subsea pipeline engineering with a focus on the mechanical design of offshore pipelines. Stress-based, design-based and limit-states design for strength and stability are examined. Other fundamental pipeline engineering design issues such as materials specification, flow assurance and installation are reviewed. Principles of geotechnical engineering and pipeline/soil interaction analysis techniques are investigated. Special topics are also reviewed.
CR: the former ENGI 8673
LH: 2
PR: one of CIV 5320, the former ENGI 5312, Mechanical Engineering 5602, the former ENGI 5931, ~~or~~ Ocean and Naval Architectural Engineering 7002, the former ENGI 6003 ~~7002~~ or the former ENGI ~~6003~~ 7002

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8630 ~~**8717**~~ **Environmental Assessment, Monitoring and Control** (same as the former ENGI 8717) covers statistical analysis; pollution monitoring, and sampling network design; water quality and air quality modelling; environmental risk assessment; environmental impact assessment; site remediation and hazardous waste management. There are relevant field trips and case studies.
CR: the former ENGI 8717
LH: at least ten 3-hour lab sessions per semester
PR: ~~ENGI~~ CIV 4610 or the former ENGI 4717

8830 ~~**8740**~~ **Contract Law and Labour Relations** (same as the former ENGI 8740) is an introduction to law as it applies to engineering activity; the nature of law and legal processes, including standard forms; liens, bonds and insurances; the labour movement in North America; examination of union philosophies and managerial attitudes; labour law and collective bargaining; disputes and settlements.
CR: the former ENGI 6740, the former ENGI 8740
PR: completion of Term 7 of the Civil Engineering program

8900-8999 **Special Topics in Civil Engineering** will have topics to be studied announced by the Department.

11.5 Electrical and Computer Engineering

Electrical and Computer Engineering courses are designated by ECE.
ENGI indicates non-departmental Engineering courses

Courses are also identified by a four-digit numbering system, the first two digits signifying the following:

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

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

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

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

3300 ~~**3821**~~ **Circuit Analysis** (same as the former ENGI 3821) begins with a review of basic circuit analysis including dependent sources, then considers wye-delta transformation, bridge circuits, transient analysis of first- and second -order circuits, sinusoidal steady state analysis, phasor diagrams, sinusoidal steady-state power, complex power and maximum power transfer.

CO: ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may complete Mathematics 2260 as the co-requisite instead of ENGI 3424.
CR: Physics 3550, the former ENGI 3821
LH: eight 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ENGI 1040, Mathematics 1001, Mathematics 2050~~, ENGI 1040~~. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 2055 as the pre-requisite instead of ENGI 1040.

3400 ~~**3891**~~ **Foundations of Programming** (same as the former ENGI 3891) introduces fundamental concepts in object-oriented programming and develops vocational programming skills in C++. Topics include abstraction, types, contracts, object-oriented design, C++ language features including key elements of the standard library and practical programming and debugging skills.

CR: Computer Science 2510, the former ENGI 3891
LH: at least four 2-hour sessions per semester
OR: tutorial one hour per week
PR: ENGI 1020

3500 ~~**3861**~~ **Digital Logic** (same as the former ENGI 3861) includes number systems and Boolean algebra; minimization techniques for Boolean functions; basic combinational logic circuit analysis and design; flip-flops, state machine design and implementation; decoders, multiplexors, registers, counters; simple arithmetic and logic units (ALUs); digital system design of small systems.

CR: the former Computer Science 3723, the former ENGI 3861
LH: six 3-hour sessions per semester
OR: twelve 1-hour tutorial sessions per semester

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PR: ENGI 1040. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 2055 as the pre-requisite instead of ENGI 1040.

4110 ~~4424~~ **Discrete Mathematics for Computer Engineering** (same as the former ENGI 4424) is an introduction to discrete mathematics including a selection of topics such as propositional logic, introductory predicate logic, mathematical reasoning, induction, sets, relations, functions, integers, graphs, trees, and models of computation.
CR: Computer Science 1002, the former Computer Science 2740, the former ENGI 3422, the former ENGI 4424, Mathematics 2320~~, Computer Science 1002, or the former Computer Science 2740~~
OR: tutorial 1 hour per week
PR: Mathematics 2050

4300 ~~4854~~ **Electronic Circuits I** (same as the former ENGI 4854) provides an introduction to semiconductor electronic devices and circuits. Topics covered include internal structure of electronic devices; working principles, dc and small-signal models and analysis of p-n junction diodes, bipolar junction transistors and field effect transistors; introduction to digital electronics; differential and multistage amplifier circuits; Miller's theorem; frequency response of discrete amplifiers; practical applications including power supplies, amplifiers and switching circuits. CAD tools are used to illustrate the analysis and design of electronic circuits.
CR: the former ENGI 4854
LH: eight 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ECE 3300 or the former ENGI 3821, Physics 3000. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 3550 as the pre-requisite instead of ~~ENGI 3821~~ ECE 3300.

4400 ~~4892~~ **Data Structures** (same as the former ENGI 4892) examines fundamental data structures; recursive structures and generic programming techniques; modularity and reusability; time complexity and efficient data structures; procedural abstraction; data abstraction and precise documentation of data structures.
CO: ECE 4110 or the former ENGI 4424
CR: the former ENGI 4892
OR: tutorial 1 hour per week
PR: ECE 3400 or the former ENGI 3891

4500 ~~4862~~ **Microprocessors** (same as the former ENGI 4862) includes microprocessor architecture; assembly language programming: addressing modes, table look up; memory mapped devices; interfacing techniques:

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parallel, serial; timing control; analog input and output, and computer displays.
CR: the former ENGI 4862
LH: eight 3-hour sessions per semester
OR: nine 1-hour tutorial sessions per semester
PR: ECE 3500 or the former ENGI 3861

4600 ~~4823~~ **Introduction to Systems and Signals** (same as the former ENGI 4823) begins with an introduction to systems and signals, and includes mechanical and electrical analogues; principles of linear superposition and time-invariance; definitions, properties, and use of the delta function; applications of complex variables and functions; impulse and step responses; input-output relations of continuous- time systems in terms of convolution and transfer functions; frequency response plots; the Fourier transform and applications; Laplace transforms with application to filtering, communications, and controls.
CR: the former ENGI 4823
OR: tutorial 1 hour per week
PR: ~~ENGI 3424,~~ ECE 3300 or the former ENGI 3821, ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 3820 as a pre-requisite instead of ENGI 3424 and may complete Physics 3550 as a pre-requisite instead of ~~ENGI 3821~~ ECE 3300.

4800 ~~4841~~ **Electromechanical Devices** (same as the former ENGI 4841) includes an introduction to fundamental principles of energy conversion; review of single-phase AC circuits; three- phase AC circuits; magnetic fields and circuits; transformer models, performance and applications; basic concepts of rotating machines; performance and control of DC motors.
CR: the former ENGI 4841, the former ENGI 5842
LH: six 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ~~ENGI 3424,~~ ECE 3300 or the former ENGI 3821, ENGI 3424. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 3820 as a pre-requisite instead of ENGI 3424 and may complete Physics 3550 as a pre-requisite instead of ~~ENGI 3821~~ ECE 3300.

5000 ~~5800~~ **Electrical Engineering Design** (same as the former ENGI 5800) students work, normally in pairs, on small design projects that require them to follow a hierarchical design process including general product definition, specifications and requirements, functional-block diagrams, specification of functional blocks for circuit-level synthesis and implementation, system integration, simulation or modelling, testing and verification. The small projects are designed to encourage and motivate

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students to learn and practise the process of design. The course culminates in a large design project.
CO: ECE 5200 or the former ENGI 5821, ECE 5300 or the former ENGI 5854. There is no co-requisite for students completing a minor in Applied Science - Electrical Engineering
CR: the former ENGI 5800
LC: 18 lecture hours per semester
LH: ten 3-hour sessions per semester
OR: meetings with project supervisor as required
PR: ~~ENGI 4841,~~ ECE 4300 or the former ENGI 4854, ECE 4500 or the former ENGI 4862, ECE 4800 or the former ENGI 4841

5010 ~~**5895**~~ **Software Design** (same as the former ENGI 5895) examines the development process: requirement analysis, design, iterative development, design documentation; an introduction to the Unified Modelling Language: use cases, class diagrams and sequence diagrams; an introduction to software design patterns: creational patterns, structural patterns and behavioural patterns; object oriented, modular decomposition. The course includes a major design project.
CR: the former ENGI 5895
LC: 25 lecture hours per semester
LH: six 3-hour sessions per semester
OR: meetings with project supervisor as required
PR: ECE 4400 or the former ENGI 4892

5100 ~~**5420**~~ **Probability and Random Processes** (same as the former ENGI 5420) includes basic concepts in probability, random variables, multiple random variables, descriptive statistics, random processes and selected applications for engineering.
CR: the former ENGI 5420
PR: ECE 4600 or the former ENGI 4823

5200 ~~**5821**~~ **Control Systems I** (same as the former ENGI 5821) includes an introduction to control systems with negative feedback; mathematical modelling and transfer functions of electromechanical systems; block diagram and signal flow graphs; controller realization; transient response analysis; Routh's stability criterion; basic control actions and response of control systems; root locus analysis and design; frequency response analysis; Bode diagram; gain and phase margins; compensator design in frequency domain; Nyquist stability criterion; digital implementations of analog compensators; and an introduction to PID controller tuning methods.
CR: the former ENGI 5821
LH: four 3-hour sessions per semester
OR: six 1-hour tutorials per semester
PR: ECE 4600 or the former ENGI 4823

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5300 ~~**5854**~~ **Electronic Circuits II** (same as the former ENGI 5854) provides an introduction to circuits using operational amplifiers. Topics covered include operational amplifier configurations, analysis, and design; transient and frequency response of amplifier circuits; feedback amplifier analysis and design, stability and compensation techniques; noise and distortion in electronic circuits; analysis and design of data converters; and an introduction to analog filter design. CAD tools are used to illustrate the analysis and design of electronic circuits.
CR: the former ENGI 5854
LH: eight 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ~~ENGI 4823,~~ ECE 4300 or the former ENGI 4854, ECE 4600 or the former ENGI 4823

5400 ~~**5892**~~ **Algorithms: Correctness and Complexity** (same as the former ENGI 5892 and the former ENGI 6892) presents fundamental theories and practices for the design of correct and efficient computing systems, including specification of computing systems and their components, correctness with respect to specifications; methods of verification; algorithmic problem solving strategies (such as divide and conquer, dynamic programming); tractability and intractability of computational problems.
CR: the former ENGI 5892 and the former ENGI 6892
OR: tutorial one hour per week
PR: ECE 4110 or the former ENGI 4424, ECE 4400 or the former ENGI 4892

5500 ~~**5865**~~ **Digital Systems** (same as the former ENGI 5865) includes concepts, language, tools, and issues pertaining to specification, modelling, analysis, simulation, testing and synthesis of digital systems, including PLD, FPGA, and ASIC devices. Industry standard CAD tools will be used in this course to facilitate system design and testing.
CR: the former ENGI 5865
LH: ten 3-hour sessions per semester
PR: ECE 3400 or the former ENGI 3891, ECE 4500 or the former ENGI 4862

5700 ~~**5812**~~ **Basic Electromagnetics** (same as the former ENGI 5812) includes a review of relevant vector calculus, including the divergence, gradient and curl operators in Cartesian, cylindrical and spherical coordinates, divergence theorem, Stokes' theorem, and Laplace's and Poisson's equations. Topics in electrostatics include Coulomb's law, potential and energy, conductors, dielectrics, capacitance and electric field boundary conditions. Topics for magnetism include the steady magnetic field, the Biot-Savart law and Ampère's law.
CR: the former ENGI 5812, Physics 3500

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OR: tutorial 1 hour per week
PR: ECE 3300 or the former ENGI 3821, ENGI 4430

6200 ~~**6855**~~ **Industrial Controls and Instrumentation** (same as the former ENGI 6855) examines control and instrumentation system components; transducers and signal processing circuits, linear variable differential transformers, power oscillators; electromechanical actuators, solenoids, power drives; A/D and D/A conversion, standard PC interfaces; real-time operating systems; design of discrete-time feedback controllers on a PC platform; system integration, control system tweaking and troubleshooting; programming soft-PLC's using IEC61131.
CR: the former ENGI 6855, the former ENGI 7858
LH: at least eight 3-hour sessions per semester
PR: ECE 5200 or the former ENGI 5821

6400 ~~**6893**~~ **Software Development Practice** (same as the former ENGI 6893) introduces the student to software development processes, practices, and tools. It includes software project management using agile processes; development tools and practices; architectural level design; deployment and operations; and verification via static analysis, formal verification, and testing.
CR: the former ENGI 6893
LH: six 3-hour sessions per semester
PR: ~~ENGI 5892,~~ ECE 5010 or the former ENGI 5895, ECE 5400 or the former ENGI 5892

6500 ~~**6861**~~ **Computer Architecture** (same as the former ENGI 6861) begins with a review of microprocessors and computer organization. Topics include fundamentals of computer design: performance metrics and cost; instruction set architecture; memory hierarchy design: cache, main memory and virtual memory; pipelining: hazards, parallelism; special purpose processors; multiprocessors and thread-level parallelism.
CR: the former ENGI 6861
OR: tutorial 1 hour per week
PR: ECE 5500 or the former ENGI 5865

6600 ~~**6871**~~ **Communication Principles** (same as the former ENGI 6871) begins with a review of signal representation and analysis and includes distortionless signal transmission, analog modulation (AM, FM and PM), super-heterodyne receiver, sampling theorem, pulse amplitude modulation (PAM), pulse code modulation (PCM), delta modulation.
CR: the former ENGI 6871
LH: four 3-hour sessions per term
PR: ECE 4600 or the former ENGI 4823, ECE 5100 or the former ENGI 5420

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6610 ~~**6876**~~ **Communication Networks** (same as the former ENGI 6876) is an introduction to communication networks such as the telephone and computer networks. Topics include circuit and packet switching, network protocols and layered architecture, physical layer, data link layer, network layer, error control; local area networks, and internetworking.
CR: the former ENGI 6876
PR: ECE 5100 or the former ENGI 5420

6700 ~~**6813**~~ **Electromagnetic Fields** (same as the former ENGI 6813) is a continuation of the topics started in ~~ENGI 5812~~ ECE 5700, including a review of electrostatics and magnetostatics, Maxwell's equations, Lorentz force, Poynting's theorem, plane waves, and applications including two-wire transmission lines.
CR: the former ENGI 6813, Physics 4500
OR: tutorial 1 hour per week
PR: ECE 5700 or the former ENGI 5812. Students completing a Minor in Applied Science - Electrical Engineering may complete Physics 3500 as the pre- requisite instead of ~~ENGI 5812~~ ECE 5700.

6800 ~~**6843**~~ **Rotating Machines** (same as the former ENGI 6843) examines the fundamentals of rotating machines; design of machine windings; polyphase and single phase induction motor theory and applications; synchronous machine theory; stability and control of synchronous generators; introduction to permanent magnet machines; introduction to AC motor drives.
CR: the former ENGI 6843
LH: six 3-hour sessions per semester
OR: eight 1-hour tutorial sessions per semester
PR: ECE 4800 or the former ENGI 4841

6810 ~~**6856**~~ **Power Electronics** (same as the former ENGI 6856) is an overview of power semiconductor switches, an introduction to energy conversion and control techniques and examination of controlled rectifiers; phase-controlled converters; switch- mode dc/dc converters; variable frequency dc/ac inverters; ac/ac converters; gate and base drive circuits; design of driver and snubber circuits; thermal models and heat sink design.
CR: the former ENGI 6856, the former ENGI 7846
LH: eight 3-hour sessions per semester
OR: eight 1-hour tutorial sessions per semester
PR: ECE 5300 or the former ENGI 5854

7000 ~~**7803**~~ **Electrical Engineering Design Project I** (same as the former ENGI 7803) provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving an electrical engineering design problem. Students work in small

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teams with the assistance of a faculty mentor to define an appropriate design problem and propose a method of solution to the problem. The project is continued in ~~ENGI 8853~~ ECE 8000.
CR: the former ENGI 7800, the former ENGI 7803
LC: at least 10 lecture hours per semester
OR: weekly meetings with project supervisor
PR: ENGI 4102, completion of Academic Term 6 of the Electrical Engineering program

7010 ~~**7804**~~ **Computer Engineering Design Project I** (same as the former ENGI 7804) provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving a computer engineering design problem. Students work in small teams with the assistance of a faculty mentor to define an appropriate design problem and propose a method of solution to the problem. The project is continued in ~~ENGI 8854~~ ECE 8010.
CR: the former ENGI 7800, the former ENGI 7804
LC: at least 10 lecture hours per semester
OR: weekly meetings with project supervisor
PR: ENGI 4102, completion of Academic Term 6 of the Computer Engineering program

7200 ~~**7825**~~ **Control Systems II** (same as the former ENGI 7825) examines state space models for multi-input/output systems; observability, controllability; state feedback without and with integral controller structure, state observers; quadratic optimal regulator and tracking control strategies; discrete-time state equations; and an introduction to optimal control.
CR: the former ENGI 6825, the former ENGI 7825
PR: ECE 5200 or the former ENGI 5821

7210 ~~**8680**~~ **Process Control and Instrumentation** (same as the former ENGI 8680) begins with an introduction to feedback control systems, and instrumentation. Topics include modelling thermal, gas, liquid and chemical processes; sensors and transmitters, controller design and simulation in Matlab /Simulink, industrial feedback controllers; design of feedback control loops, tuning of feedback controllers; cascade, ratio, digital controller design; feedforward control; multivariable process control; fuzzy logic control and tuning, instrumentation electronics design, and process system identification using Matlab /Simulink.
CR: the former ENGI 8680
LH: twelve 3-hour sessions per semester
PR: ECE 5200 or the former ENGI 5821

7400 ~~**7894**~~ **Concurrent Programming** (same as the former ENGI 7894) surveys parallel and distributed architectures and examines patterns of

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concurrent program design; correctness of concurrent programs: safety and liveness properties, proof of properties; synchronization using locks, semaphores, and monitors; communication using message passing and remote procedures; parallelization for high-performance computation and advanced topics such as scientific applications, distributed systems, model checking, and transaction processing.
CR: the former ENGI 7894, the former ENGI 8893
PR: ECE 5400 or the former ENGI 5892 or the former ENGI 6892, ECE 6500 or the former ENGI 6861

7410 ~~**7854**~~ **Image Processing and Applications** (same as the former ENGI 7854) presents fundamental theoretical and practical concepts of image processing and analysis. These concepts include image enhancement and filtering, frequency domain analysis, morphological image operations, image segmentation, and feature extraction. The course enables the use of these concepts to automatically process and analyze images and videos from various real-world applications such as biomedical imaging, visual surveillance, and robotics.
CR: Computer Science 4756, the former ENGI 7854
LH: at least four 3-hour sessions per semester

7420 ~~**7864**~~ **Computer Security** (same as the former ENGI 7864) introduces students to key computer security concepts for applications, hosts, networks and the Web. Students will learn to employ the primitives provided by programming languages, cryptography, operating systems and network protocols for protecting engineered systems and their users.
CO: ECE 7400 or the former ENGI 7894
CR: the former ENGI 7864
PR: ECE 6500 or the former ENGI 6861, ECE 6610 or the former ENGI 6876

7500 ~~**8863**~~ **Introduction to VLSI Design** (same as the former ENGI 8863) is an introduction to ASICs and ASIC design methodology and includes basic concepts of digital logic design tools and ASIC technology libraries; partitioning for logic synthesis and VHDL coding; constraining designs, synthesizing, simulation and optimization; design for testability; layout and post-layout optimization and SDF generation; and static timing analysis.
CR: the former Computer Science 4725, the former ENGI 8863
LH: ~~eight~~ nine 3-hour sessions per semester
OR: eight 1-hour tutorial sessions per semester
PR: ECE 5500 or the former ENGI 5865

7600 ~~**7824**~~ **Introduction to Digital Signal Processing** (same as the former ENGI 7824) examines sampling theory; elementary discrete-time signals; discrete-time linear and time- invariant systems; linear constant-coefficient

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difference equations; the convolution sum; the discrete-time Fourier series; the discrete-time Fourier transform; the z-transform; the frequency response of discrete-time systems; the discrete Fourier transform; the efficient fast Fourier transform algorithm; an introduction to digital filter design techniques; and digital signal processing applications.
CR: the former ENGI 7824
OR: tutorial 1 hour per week
PR: ECE 6600 or the former ENGI 6871

7610 ~~**7855**~~ **Communications Electronics** - inactive course.

7620 ~~**8879**~~ **Digital Communications** (same as the former ENGI 8879) is a review of baseband transmission and basic digital modulation schemes, detection (optimum receiver, matched filter, correlator), error performance, intersymbol interference (ISI), equalization, the concept of information and entropy, source coding including Huffman coding and linear predictive coding, channel coding including block and convolutional error correcting codes, modulation and coding trade-offs, bandwidth and power efficiency.
CR: the former ENGI 8879
PR: ECE 6600 or the former ENGI 6871

7800 ~~**7844**~~ **Power System Analysis** (same as the former ENGI 7844) begins with an introduction to electric power systems. Topics include per unit quantities; transmission line parameters; modelling of power system components; single line diagrams; network equations formulation; bus impedance and admittance matrices; load flow analysis and control; design of reactive power compensation for power system performance enhancement; tap changing, auto and control transformers for power system application; economic dispatch and optimal power flow studies.
CR: the former ENGI 7844
LH: six 3-hour sessions per semester
PR: ECE 6800 or the former ENGI 6843

7810 ~~**7856**~~ **Renewable Energy Systems** (same as the former ENGI 7856) examines the assessment of wind energy potential, wind turbine aerodynamics, types, modelling and control strategies; hybrid energy systems; energy storage; solar energy systems; photovoltaic, PV system engineering, stand-alone and grid connected systems, sizing and maximum power tracking; solar water pumping; micro- hydro systems and control; tidal power, wave energy converters, ocean thermal systems. Applications of hybrid energy system sizing software are also included in the course.
CR: the former ENGI 7856
LH: eight 3-hour sessions per semester
PR: ECE 6800 or the former ENGI 6843

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8000 ~~**8853**~~ **Electrical Engineering Design Project II** (same as the former ENGI 8853) continues ~~ENGI 7803~~ ECE 7000 and provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving an electrical engineering design problem. Students work in small teams with the assistance of a faculty mentor to complete detailed design, implementation and testing of an electrical engineering system to solve the problem as defined in ~~7803~~ ECE 7000.
CR: the former ENGI 8800, the former ENGI 8853
LC: 0
OR: weekly meetings with project supervisor
PR: ECE 7000 or the former ENGI 7803

8010 ~~**8854**~~ **Computer Engineering Design Project II** (same as the former ENGI 8854) continues ~~ENGI 7804~~ ECE 7010 and provides an opportunity for senior students to integrate the knowledge that they have acquired through the junior terms and apply it to solving a computer engineering design problem. Students work in small teams with the assistance of a faculty mentor to complete detailed design, implementation and testing of a~~n~~ computer engineering system to solve the problem as defined in ~~7804~~ ECE 7010.
CR: the former ENGI 8800, the former ENGI 8854
LC: 0
OR: weekly meetings with project supervisor
PR: ECE 7010 or the former ENGI 7804

8210 ~~**7680**~~ **Supervisory Control and Data Acquisition** (same as the former ENGI 7680) examines data acquisition and intelligent field devices; distributed systems and fieldbus technology; programmable logic controllers and programming standards; operator control interface; supervisory control and data acquisition; and enterprise organization.
CR: the former ENGI 7680
LH: at least four 3-hour sessions per semester
PR: ECE 5200 or the former ENGI 5821

8400 ~~**8894**~~ **Real-time Operating Systems** (same as the former ENGI 8894) examines real-time process scheduling; memory and device management; I/O communications; real- time systems; operating system and hardware concurrency issues; kernel architectures; device drivers; and a survey of available real-time operating systems and embedded platforms.
CR: ~~the former ENGI 7863,~~ Computer Science 4721, the former ENGI 7863, the former ENGI 8894
LH: four 3-hour sessions per semester
PR: ECE 7400 or the former ENGI 7894

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8410 ~~**8814**~~ **Computer Vision** (same as Computer Science 4301 and the former ENGI 8814) studies how to develop methods that enable a machine to "understand" or analyze images. The course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.
CR: Computer Science 4301, the former ENGI 8814
LH: six 3-hour sessions per semester
PR: ~~ENGI 7854 or~~ Computer Science 3301 or ECE 7410 or the former ENGI 7854 or permission of the instructor

8420 ~~**8868**~~ **Cryptography** (same as the former ENGI 8868) examines the techniques used to provide security in communication networks and computer systems. The course focuses on topics in cryptography required to provide privacy, authentication, and integrity, including symmetric key ciphers, public key ciphers, message authentication, and digital signature schemes.
CR: the former ENGI 8868
PR: ECE 6610 or the former ENGI 6876

8600 ~~**8821**~~ **Design of Digital Signal Processing Systems** (same as the former ENGI 8821) is a review of introductory digital signal processing (DSP) principles, including sampling theory and discrete-time systems and signals. Topics include transform analysis of DSP systems; issues in the implementation of DSP systems; design of IIR and FIR digital filters; computable transforms and their use in the frequency analysis of digital signals; and design of DSP systems for current and emerging applications of digital signal processing.
CR: the former ENGI 8821
PR: ECE 7600 or the former ENGI 7824

8610 ~~**8826**~~ **Filter Synthesis** (same as the former ENGI 8826) ~~begins with an introduction to~~ introduces analog filters. ~~The course examines descriptive terminology,~~ Topics include transfer functions and frequency response of filters; design of first order passive and active filters; design and analysis of filter circuits such as biquad circuit, Sallen~~-k~~-Key circuit, multiple feedback circuit and state variable filter; RC-CR transformation; ~~inductance simulation circuit;~~ cascade design principle; design of Butterworth, Chebyshev and elliptic filters~~, with maximally flat magnitude response; design of filters with equal ripple magnitude response; design of~~ Bessel-Thomson filters~~:~~, ~~analysis and design of~~ switched capacitor filters; and the use of Matlab for design of analog filters.
CR: the former ENGI 8826
LH: at least four 3-hour sessions per semester
PR: ECE 5300 or the former ENGI 5854

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8620 ~~**8877**~~ **Wireless and Mobile Communications** (same as the former ENGI 8804 and the former ENGI 8877) covers the fundamentals and main concepts of wireless and mobile communication systems focusing on the system level design and performance. Main topics to be covered include Introduction to Wireless Communication Systems, Wireless Channel Models, Frequency Reuse Concept, Wireless Multiple Access Techniques (TDMA, FDMA, CDMA), Orthogonal Frequency Division Multiplexing (OFDM), Wireless Systems (GSM, 3G, LTE, etc.).
CR: the former ENGI 8804, the former ENGI 8877
PR: ECE 6600 or the former ENGI 6871, ECE 6610 or the former ENGI 6876

8700 ~~**7811**~~ **Antennas** (same as the former ENGI 7811) examines the fundamentals of electromagnetic radiation; potentials; small antennas and antenna parameters; thin linear wire antennas and antenna arrays; antenna impedance and ground effects; Friis transmission formula; and aperture antennas.
CR: the former ENGI 7811
LH: three 3-hour simulation and demonstration sessions per semester
OR: tutorial 1 hour per week
PR: ECE 6700 or the former ENGI 6813

8800 ~~**8845**~~ **Power System Operation** (same as the former ENGI 8845) examines symmetrical components; power system fault analysis; power system stability; and power system protection.
CR: the former ENGI 8845
LH: four 3-hour sessions per semester
PR: ECE 7800 or the former ENGI 7844

8900-8949 Special Topics in Computer Engineering will have topics to be studied announced by the Department.

8950-8999 Special Topics in Electrical Engineering will have topics to be studied announced by the Department.

11.6 Mechanical Engineering

Mechanical Engineering courses are designated by ME.
ENGI indicates non-departmental Engineering courses

Courses are also identified by a four-digit numbering system, the first two digits signifying the following:

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

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

1: Materials Science
2: Mechatronics
3: Dynamics
4: Thermal Science
5: Fluid Mechanics
6: Solid Mechanics
7: Design/Project courses
8: Other regular courses
9: Special Topics

3101 ~~3911~~ **Chemistry and Physics of Engineering Materials I** (same as the former ENGI 3911) is an introduction to the structure and properties of engineering materials, in particular materials, semiconductors, ceramics, glasses and polymers. Topics include a review of atomic bonding, discussion of basic crystalline and amorphous structures, point and line defects, and the role these structural features play in elastic and plastic deformations, yield, fracture, glass transition, thermal conductivity, thermal expansion, specific heat and electrical conductivity.
CR: the former ENGI 2205, the former ENGI 3911
LH: at least four 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: Chemistry 1050

3102 ~~3941~~ **Production Technology** (same as the former ENGI 3941) includes an overview of production: production strategies; dimensioning and tolerancing; basic material removal process; forming and shaping process; casting; molding, extrusion and joining processes; computer aided machining; new technologies; design for manufacture.
CR: the former ENGI 3941
LH: at least eight 3-hour sessions per semester

3301 ~~3934~~ **Dynamics** (same as the former ENGI 3934) includes kinematics and kinetics of particles using rectangular, normal/tangential and polar coordinates; relative motion using rotating axes; two-dimensional kinematics and kinetics of rigid bodies; force- acceleration, work-energy and impulse-momentum methods.
CR: the former ENGI 2313, the former ENGI 3934
OR: tutorial 1 hour per week
PR: ENGI 1010, Mathematics 1001

3401 ~~3901~~ **Thermodynamics I** (same as the former ENGI 3901) is a macroscopic approach to heat, work, and energy; properties of pure substances; conservation of mass, energy for open and closed systems; thermal efficiency and coefficient of performance; second law of

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thermodynamics; and its corollaries; entropy; second law analysis of thermodynamic systems; second law efficiency; and an introduction to simple thermodynamic cycles.
CR: the former ENGI 3901
~~LH: at least three 1-hour sessions per semester~~
OR: tutorial 1 hour per week
PR: Mathematics 1001

4302 ~~**4932**~~ **Mechanisms and Machines** (same as the former ENGI 4932) includes an overview of mechanisms within machines; analytical and computer-aided methods for position, velocity, and acceleration analysis of moving mechanisms; power transmission; kinematics and kinetics of planar mechanisms; static and dynamic loads on mechanisms and an introduction to mechanism synthesis. Students will complete an analysis project.
CR: the former ENGI 3933, the former ENGI 4932
LH: two or three 2-hour computer simulation laboratory sessions per semester
OR: tutorial 1 hour per week
PR: ME 3301 or the former ENGI 3934

4402 ~~**4901**~~ **Thermodynamics II** (same as the former ENGI 4901) examines thermodynamic cycles: power and refrigeration applications; human comfort and air conditioning: mixture of gases and vapours, humidity, psychrometrics; chemically reacting mixtures and combustion; exergy analysis.
CR: the former ENGI 4901
LH: at least three 1.5-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 3401 or the former ENGI 3901

4501 ~~**4961**~~ **Fluid Mechanics I** (same as the former ENGI 4961 and the former ENGI 5961) examines fluid statics; fluid flow phenomena; control volume analysis; conservation of mass, momentum, and energy; Bernoulli equation; head losses, applications of conservation laws: flow measurement devices; pipe networks; momentum devices, dimensional analysis, boundary layer phenomena, lift and drag.
CR: the former ENGI 4661, the former ENGI 4913, the former ENGI 4961, the former ENGI 5961
LH: five 1-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 3301 or the former ENGI 3934, ME 3401 or the former ENGI 3901

4601 ~~**4934**~~ **Mechanics of Solids I** (same as the former ENGI 4934) examines stress and strain analysis applied to bars and beams in axial,

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torsion and bending; beam deflection, plane stress and strain, stress and strain transformations in two dimensions and Mohr's circle.
CR: the former ENGI 4312, the former ENGI 4934
LH: at least four 1-hour sessions per semester
OR: tutorial 1 hour per week
PR: ENGI 1010

5103 ~~5911~~ Chemistry and Physics of Engineering Materials II (same as the former ENGI 5911) examines aspects of chemical and physical processes and microscopic structure relevant to the production and use of engineering materials, focussing on metals, alloys, silicates, Portland cement, plastics and adhesives, composites, and wood. Topics include solid-state solutions and compounds, alloy structures, phase diagrams, reaction rates, solid-state transformations, polymerization, oxidation and corrosion, hardness, creep, fatigue, fracture toughness and visco-elastic deformation.
CR: the former ENGI 3205, the former ENGI 5911
LH: at least four 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 3101 or the former ENGI 3911

5201 ~~5952~~ Mechatronics I (same as the former ENGI 5952) involves modelling of electro-mechanical systems and introduction to basic analog and digital electronic devices. Topics covered include lumped-parameter modelling of electro-mechanical systems, basic electronic components and semiconductors, introduction to op amps, digital logic and number systems, microcontroller technology and interfacing (switches, LEDs, steppers, solenoids, A/D and D/A conversion).
CR: the former ENGI 4951, the former ENGI 5952
LH: five 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ENGI 1040, ENGI 3424

5502 ~~5962~~ Fluid Mechanics II (same as the former ENGI 5962) examines differential analysis of fluid motion; conservation of mass: continuity equation; conservation of momentum: Navier-Stokes equations; conservation of energy; basic film lubrication theory, boundary layer flows; compressible flows.
CR: ~~ENGI 6661,~~ the former ENGI 5913, the former ENGI 5962, the former ENGI 6661, the former ENGI 6961
LH: at least three 1-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 4501 or the former ENGI 4961 or the former ENGI 5961

5602 ~~5931~~ Mechanics of Solids II (same as the former ENGI 5931) examines stresses due to combined loads, asymmetric bending,

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transformation of stresses and strains, principal stresses and strains (in two and three dimensions), static failure theories, stress concentration, energy methods, method of superposition, buckling of columns, thin- and thick-walled pressure vessels and contact stresses.
CR: ~~ENGI~~ the former ENGI 5312, the former ENGI 5931
LH: at least four 1-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 4601 or the former ENGI 4934

6202 ~~**6951**~~ **Control Systems I** (same as the former ENGI 6951) examines modeling, analysis and design of feedback control systems using classical controller design methods. Topics covered include linear system modelling using Laplace transforms, control system stability, time domain analysis - root locus design, frequency domain analysis - bode diagram and Nyquist design, PID Control.
CR: the former ENGI 6925, the former ENGI 6951
LH: at least three 1-hour sessions per semester
OR: 1-hour tutorial per week
PR: ME 5201 or the former ENGI 5951 ~~ENGI 5952~~ or the former ENGI 5952 ~~ENGI 5951~~

6303 ~~**6933**~~ **Mechanical Vibrations** (same as the former ENGI 6933) examines single degree of freedom systems: free vibration, energy methods, response to harmonic excitation, response to arbitrary inputs, rotating unbalance, vibration isolation; two degree of freedom systems: natural frequencies and mode shapes, vibration absorption.
CR: the former ENGI 5932, the former ENGI 6933
LH: at least four 2-hour sessions per semester
PR: ME 3301 or the former ENGI 3934

6403 ~~**6901**~~ **Heat Transfer I** (same as the former ENGI 6901) examines modes of heat transfer; conduction: steady 1-D conduction, thermal resistance, extended surfaces (fins), lumped capacitance analysis, 1-D transient conduction; convection: Newton's law of cooling, convection heat transfer coefficient, external boundary layer flows, internal flows; radiation: principles, properties, exchange factors, black body radiation, and enclosures, radiation shields.
CR: the former ENGI 5602, the former ENGI 6901
LH: at least one 3-hour session per semester
OR: tutorial 1 hour per week
PR: ME 4402 or the former ENGI 4901, ME 5502 or the former ENGI 5962

6701 ~~**6928**~~ **Computer Aided Engineering Applications** (same as the former ENGI 6928 and the former ENGI 7928) introduces a variety of Computer Aided Engineering (CAE) applications based on advanced 3D

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CAD modelling. The fundamentals of 3D modelling are covered. CAE include assembly modelling, mechanism animation and finite element analysis. Applications include Computer Aided Manufacturing (CAM); model based inspection ~~(i.e. Coordinate Measurement Machines)~~; reverse engineering; document/drawing production; data exchange; and data management. Lab exercises provide~~s~~ exposure to solid modelling and CAE applications using CAD/CAM/CAE tools.
CR: the former ENGI 6928, the former ENGI 7928, ~~or~~ the former ENGI 7962
LH~~OR~~: at least ten ~~3~~2-hour computer laboratory sessions per semester
PR: ENGI 1030, ME 3102 or the former ENGI 3941

6702 ~~6929~~ Mechanical Component Design I (same as the former ENGI 5927 and the former ENGI 6929 ~~ENGI 5927~~) examines adequacy assessment and synthesis of machine elements with a focus on failure prevention, safety factors, and strength; static failure and fatigue analysis of components. Topics include the design of power screws, bolted connections, welds, and shafts.
CR: the former ENGI 5926, ~~or~~ the former ENGI 5927, the former ENGI 6929
LH~~OR~~: at least ~~eight~~ four 3-hour computer laboratory sessions per semester
PR: ~~ENGI 4312~~ ME 5602 or the former ENGI 5931

7104 ~~7911~~ Industrial Materials (same as the former ENGI 7911) includes metals and alloy systems, strengthening mechanisms of metals, iron-carbon alloys, corrosion resistant alloys, light metals and their alloys, copper and nickel base alloys, super alloys, the function of alloying elements in metals, heat treatments, surface hardening, and surface modification.
CR: the former ENGI 6972, the former ENGI 7911
LH: at least ~~20 hours~~ five 3-hour laboratory sessions per semester
PR: ME 5103 or the former ENGI 5911

7105 ~~8971~~ Welding and Joining Processes (same as the former ENGI 8971) introduces modern welding and joining processes for metallic materials, polymers, and ceramics. Fundamentals of materials joining processes and the impact of the process parameters on the weld geometry, mechanical properties, and quality are discussed. Laboratory exercises will provide hands-on experience with some industrially significant welding processes.
CR: the former ENGI 8971
LH: ~~four~~ seven 3-hour sessions per semester
~~OR: tutorial 1 hour per week~~
PR: ME 4601 or the former ENGI 4934, ME 5103 or the former ENGI 5911

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7203 ~~7930~~ Instrumentation and Experimental Design (same as the former ENGI 7930) involves analysis and design of mechanical measurement systems and multi factor experiments. Topics covered include static and dynamic characteristics of sensors, Fourier transforms, sampling theorem and signal conditioning, uncertainty analysis of sensors, sensors for motion control, load sensing and process control, one factor vs multi factor experiments, factorial design and analysis, partial factorial design and blocking, response surface methodology (RSM).
CR: the former ENGI 7930
LH: at least four ~~five~~ 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ENGI 4421 or Statistics 2550, ME 6202 or the former ENGI 6951

7204 ~~7952~~ Robotics and Automation (same as the former ENGI 7952) provides the fundamentals in robotic manipulators and arms. The course provides basic understanding in coordinate transformations for spatial description, both kinematical and kinetic analysis, forces and dynamics and finally trajectory generations and path planning.
CR: the former ENGI 7944, the former ENGI 7952
LH: at least three 3-hour sessions per semester
PR: ENGI 4430

7205 ~~7953~~ Mechatronics II (same as the former ENGI 7953) emphasizes the integration of the core technologies on which contemporary, mechatronic designs are based. Topics covered include combinational logic circuit design, sequential logic circuit design, modelling and control of servo motors, selection, sizing, and modelling of servo valves and hydraulic actuators, microcontroller technology and interfacing (relays, timers, PWM control, interrupts, digital communication).
CR: the former ENGI 5951, the former ENGI 7953
LH: five 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ME 6202 or the former ENGI 6951 ~~ENGI 5952~~

7404 ~~7901~~ Heat Transfer II (same as the former ENGI 7901) examines advanced topics in heat transfer; multidimensional heat conduction: shape factors, numerical methods, moving heat sources; phase change heat transfer: melting, solidification, condensation, and boiling; natural convection: external flows, internal flows; multimode heat transfer; and environmental radiation.
CR: the former ENGI 7901
LH: at least three ~~3~~2-hour computer laboratory sessions per semester
PR: ME 6403 or the former ENGI 6901

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7405 ~~7903~~ Mechanical Equipment (same as the former ENGI 7903) examines performance characteristics of mechanical equipment; fluid power devices: pipes; valves; turbomachinery: pumps; fans; blowers; compressors; heat transfer devices: heat exchangers; boilers, and cooling towers.
CR: the former ENGI 7903
LH: at least ~~five~~ four 1.5-hour sessions per semester
PR: ME 6403 or Process Engineering 5002 or the former ENGI 5602 or the former ENGI 6901

7503 ~~8970~~ Gas Dynamics (same as the former ENGI 8970) begins with an introduction to compressible gas flows, then considers fundamental laws of compressible fluid flow; wave propagation in compressible fluids; isentropic flow of a perfect gas; normal and oblique shock waves; Prandtl-Meyer flows; external compressible flows; flow in ducts, flow with friction (Fanno) and heat transfer (Rayleigh); imperfect gas effects; and measurement of compressible flows.
CR: the former ENGI 8970
PR: ME 5502 or the former ENGI 5962

7603 ~~7934~~ Finite Element Analysis (same as the former ENGI 7934) includes a review of basic concepts required for FEA, basics of stiffness formulation, direct stiffness method, displacement method, one dimensional elements, trusses and frames. Topics include 1D fluid and heat transfer elements, automated analysis and modelling concepts, higher order elements, two dimensional elements - plane stress and plane strain, introduction to 3D elements, introduction to advanced topics and isoparametric formulation.
CR: the former ENGI 7934
LH: 2
OR: tutorial 1 hour per week
PR: ENGI 4430, ME 5602 or the former ENGI 5931

7703 ~~7929~~ Mechanical Component Design II (same as the former ENGI 6927 and the former ENGI 7929) is a continuation of the ~~ENGI 6929~~ ME 6702 course in analysis and synthesis of machinery, including advanced analysis of machine elements such as clutches, brakes, couplings, journal bearings and gears. Advanced machine design concepts are examined, such as reliability, optimization and techniques for stimulating innovative design. A synthesis project involving the machine elements studied is usually included.
CR: the former ENGI 6926, ~~or~~ the former ENGI 6927, the former ENGI 7929
LH~~OR~~: at least ~~one~~ five 3-hour computer laboratory ~~tutorial~~ sessions per ~~week~~ semester

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PR: ME 6702 ~~ENGI 6929~~ or the former ENGI 5927 or the former ENGI 6929

7704 ~~7926~~ Mechanical Design Project I (same as the former ENGI 7926) is the first of two capstone design courses in ~~the Department of~~ Mechanical Engineering. In this course mechanical students are organized into small groups or teams, which must complete a ~~common~~ design challenge. The project is presented as an open-ended problem statement with specific performance objectives. The system must be designed, prototyped and tested during the semester~~the course of term~~. Each team is a small consulting firm and is required to document its object planning as well as its design.
CR: the former ENGI 7926, the former ENGI 7936
LC: minimum of 2 lecture hours per week
LH: ~~3~~ at least three 2-hour sessions per semester
PR: ENGI 4102, completion of Term 6 of the Mechanical Engineering Program

8106 ~~8911~~ Corrosion and Corrosion Control (same as the former ENGI 8911) examines forms of corrosion; the electrochemical nature of the corrosion process; the mixed potential theory, Purbaix diagrams and Evan diagrams; corrosion testing, control use by use of materials, selection, cathodic protection, inhibitors, and coatings. There are case studies of selected corrosion problems.
CR: the former ENGI 8962, the former ENGI 8911
LH: at least ~~five~~ four 3-hour sessions per semester
PR: ME 5103 or Ocean and Naval Architectural Engineering 4007 or the former ENGI 4007 or the former ENGI 5911

8304 ~~8937~~ Machine Dynamics (same as the former ENGI 8937) reviews mechanism kinematics and inverse dynamics (prediction of unknown forces and torques required to create a known motion) and continues with forward dynamic analysis of mechanisms (predicting unknown motion due to applied forces and torques) using student-generated computer code and commercial software. Practical applications of dynamics are explored, such as engine shaking forces, balancing of machinery, shaft vibration, design of flywheels, and gyroscopic effects.
CR: the former ENGI 7945, the former ENGI 8937
PR: ME 4302 or the former ENGI 4932, ME 6303 or the former ENGI 6933

8305 ~~8946~~ Modelling and Simulation of Dynamic Systems (same as the former ENGI 8946) emphasizes interdisciplinary system models, equation formulation and structure, and model complexity. The bond graph modelling language will be introduced to simulate systems containing mechanical, electrical, thermal, hydraulic, and magnetic components.

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CR: the former ENGI 8946 ~~ENGI 9496~~
PR: ME 5201 or the former ENGI 5952, ME 6303 or the former ENGI 6933

8406 ~~8903~~ Design of Thermal Systems (same as the former ENGI 8903) examines thermal system design; modeling of thermal systems; steady and transient system simulation; single and multi-variable optimization; overall system performance; thermodynamic optimization; selected design case studies.
CR: the former ENGI 8903
PR: ME 7404 or the former ENGI 7901, ME 7405 or the former ENGI 7903

8407 ~~8984~~ Sustainable Energy Systems (same as the former ENGI 8984) examines thermo-fluid features of energy conversion and storage technologies. Topics include nuclear power, wind power, biorenewable and nonconventional fuels, fuel cells, carbon capture and sequestration, photovoltaics, solar thermal, energy storage, and hydroelectric power systems.
CR: the former ENGI 8984
PR: ME 4402 or the former ENGI 4901, ME 7404 or the former ENGI 7901 ~~ENGI 4961, ENGI 6901~~

8504 ~~8947~~ Computational Fluid Dynamics (same as the former ENGI 8947) begins with a review of the equations governing viscous fluid flows and heat transfer. The course includes heat conduction, convection-diffusion, and fluid flow equations; gridding, dependent variable interpolation, discretized equations, solution of the discretized equations, transients and nonlinearities; testing and validation of CFD codes, standard test problems.
CR: the former ENGI 8947 ~~ENGI 9977~~
PR: ME 5502 or the former ENGI 5962 or the former ENGI 6961, ME 7404 or the former ENGI 7901

8505 ~~8964~~ Fluid Structure Interactions (same as the former ENGI 8964) examines structural vibrations generated by fluid flow. These vibrations can be transient or they can take the form of instability or resonance. The course deals with the following fluid structure interactions: (1) Flow induced vibration of structures (2) Unsteady flow in pipe networks (3) Water wave interactions with structures.
CR: the former ENGI 8904, the former ENGI 8964
LH: at least three 3-hour sessions per semester
PR: ME 5502 or the former ENGI 5962 or the former ENGI 6961, ME 6303 or the former ENGI 6933

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8506 ~~8965~~ Advanced Fluid Dynamics (same as the former ENGI 8965) includes fluid kinematics; equations of fluid dynamics: Navier-Stokes equations, Euler's equations, Stokes' equations, vorticity transport; advanced topics in: low Reynolds flows, unsteady viscous flows, boundary layer analysis, potential flows; introduction to turbulent flow; free shear flows.
CR: the former ENGI 8965 ~~ENGI 9901~~
PR: ME 5502 or the former ENGI 5962 or the former ENGI 6961

8604 ~~8933~~ Fatigue and Fracture Mechanics (same as the former ENGI 8933) is an introduction to fatigue and fracture analysis of metallic components, failure mechanisms, fracture mechanisms, effects of cracks, notches, collapse; linear elastic fracture mechanic analysis; design of components to avoid fracture; fatigue crack propagation, fracture initiation, crack arrest; and fracture toughness measurements.
CR: the former ENGI 8933
OR: tutorial 1 hour per week
PR: ME 5602 or the former ENGI 5931

8605 ~~8935~~ Pressure Component Design (same as the former ENGI 8935) includes pressure vessel design philosophy; membrane theory of shells; stress categories; discontinuous stresses; design of pressure vessel components according to ASME Boiler and pressure vessel and piping codes. There is a design project involving pressure vessel components.
CR: the former ENGI 8935
OR: at least 1 tutorial hour per week
PR: ME 5602 or the former ENGI 5931, ME 6702 or the former ENGI 6929

8606 ~~8982~~ Mechanical Behaviour of Composites (same as the former ENGI 8982) includes stress-strain behaviour of composites, properties of matrix and reinforcing materials, mechanics of fibre-reinforced composites, lamina and laminate analysis, and an introduction to manufacturing methods.
CR: the former ENGI 8982
OR: tutorial 1 hour per week
PR: ME 5602 or the former ENGI 5931 ~~ENGI 4934~~

8705 ~~8926~~ Mechanical Design Project II (same as the former ENGI 8926) is the ~~second of two capstone design courses in the Department of Mechanical Engineering. Building~~ Mechanical Engineering capstone project, building on skills acquired in ME 7704~~the first, s~~. Student teams ~~each~~ choose a unique design challenge and ~~then~~ proceed to generate a solution. ~~The p~~Problem ~~statement~~s are often drawn from industry and, where possible, interdisciplinary interaction is encouraged ~~(for example, with business, computer science, or other engineering disciplines). In most~~

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~~cases, t~~. The problem proponent will act as the "client" and the team is expected to ~~manage the client interaction process as well. Significant e~~generate a solution. Emphasis is placed on ~~both~~ oral and written communication and technical aspects. ~~of both the process and results.~~ Wherever possible, ~~each system or a critical component of it, will~~ elements should be prototyped and tested.
CR: the former ENGI 8926, the former ENGI 8936
LC: scheduled as required
LH: scheduled as required
PR: ME 7704 or the former ENGI 7926

8801 ~~**8945**~~ **Production & Operations Management** (same as the former ENGI 8945) is an overview of production and operations management, and an examination of decision making and operations strategy; process design and improvement, process flow analysis/simulation, capacity planning; design of value chains, lean systems, plant layout and process planning; operating value chains, MIS systems, inventory and resource management; Relevant computer laboratory exercises are conducted.
CR: the former ENGI 7943, the former ENGI 8945
PR: ME 6403 or the former ENGI 6901

8900-8999 Special Topics in Mechanical Engineering will have topics to be studied announced by the Department.

11.7 Ocean and Naval Architectural Engineering

Ocean and Naval Architectural Engineering courses are designated by ONAE.
ENGI indicates non-departmental Engineering courses

Courses are also identified by a four-digit numbering system, the first two digits signifying the following:

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

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

0: Regular courses
9: Special Topics courses

3001 Ocean/Naval Design (same as the former ENGI 3001) introduces design and operation for ships and marine structures. Technology evolution in ship and offshore structures is reviewed, emphasizing service needs. Structural concepts, materials and construction methods are examined, including design for manufacturing. The design spiral and

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trade-offs between design characteristics are explored and modelling methods as tools in the design process are introduced. There is a minimum of six laboratory sessions including ship tours, a design project or research paper.
CR: the former ENGI 3001
LH: at least six 3-hour sessions per semester

3054 Ocean Engineering Hydrostatics (same as the former ENGI 3054) is an introductory course to naval architecture and marine engineering. It discusses the basic principles of the statics of rigid floating or submerged structures. These include: ships, offshore platforms and submersibles. Methods of analysis of the hydrostatics, stability and trim, damage stability and the statics of mooring systems are introduced. Applications are also discussed.
CR: the former ENGI 3054
LH: at least nine 3-hour sessions per semester
PR: ENGI 1010

4007 Marine Materials (same as the former ENGI 4007) examines the properties and uses of steel, aluminum and composite materials in marine applications. Topics include: review of mechanics of materials, Hooke's Law, material failure models; carbon steel - fundamentals, processes, preparation, design, drawings, certification; joining of aluminum; riveting and welding; corrosion phenomena; composites - classification, production, and mechanical properties.
CR: the former ENGI 4007, the former ENGI 7007
LH: at least 4 three-hour sessions per semester
PR: ~~CHEM~~ Chemistry 1050

4011 Resistance and Propulsion (same as the former ENGI 4011) examines ~~the phenomena resisting the motions of ships~~ ship resistance and some factors considered in the design of ~~the~~ marine screw propellers. T~~he t~~opics include the resistance due to friction, wave making, form appendage, wind and waves, squat, blockage, ~~and~~ shallow water effects, and ~~also include~~ the estimation of powering using methodical series and statistical methods. Topics considered in the design of ~~the~~ marine screw propellers include propeller theory, blade sections, blade strength, methodical series charts, efficiency elements, lifting line calculations, cavitation, and propellers in non-uniform flow.
CR: the former ENGI 4011, the former ENGI 5011
LH: 3
OR: tutorial 1 hour per week
PR: ONAE 3054 or the former ENGI 3054

4020 Marine Fluid Dynamics (same as the former ENGI 4020) includes fluid statics; fluid flow phenomena, in general and in marine applications;

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control volume analysis of fluid motion; conservation of mass, momentum and energy; differential approach to flow analysis; head losses; applications of conservation laws; external vs. internal flow; dimensional analysis and scaling; fluid-structure interaction concepts; potential flow theory, lift and Kutta-Joukowski theorem; viscous flow, boundary layers and drag.
CR: the former ENGI 4020
LH: at least four 3-hour sessions per semester
OR: tutorial 1 hour per week
PR: ONAE 3054 or the former ENGI 3054

5020 Marine Propulsion (same as the former ENGI 5020) is a second course in marine propellers and ship powering. Design and analysis of marine screw propellers and other propulsion devices are covered. Conventional and unconventional propulsion systems are introduced. Methods and philosophy of propeller design are included. Design of fixed-pitch propellers based on lifting line theory and the design of ducted propellers are emphasized. Design of other propulsion systems such as waterjets and sails is also incorporated.
CR: the former ENGI 5020, the former ENGI 6020
LH: at least two 3-hour sessions per semester
PR: ONAE 4020 or the former ENGI 4020

5022 Probability and Random Processes in Ocean Engineering (same as the former ENGI 5022) includes basic concepts in probability, random variables, multiple random variables, descriptive statistics. The random processes component reviews mathematics of functions; introduces system input-output relations of continuous-time systems; contrasts time vs frequency domain representations; introduces frequency response plots and the Fourier transform. A probabilistic approach to ship damage, representation of ocean waves (in time and frequency domains), Response Amplitude Operators (RAO), and acceptable levels of risk for design are introduced and applied.
CR: the former ENGI 5022
OR: tutorial one hour per week
PR: ONAE 4020 or the former ENGI 4020, Mathematics 2260 or the former Mathematics 3260

5034 Marine Vibrations (same as the former ENGI 5034) provides an introduction to mechanical vibration with a focus on vibration of marine machinery and on the dynamic response of marine structures. Topics include: single degree of freedom systems – free vibration, energy methods, response to harmonic excitation, response to arbitrary inputs; multi degree of freedom systems – natural frequencies and mode shapes, response to harmonic excitation; frequency response functions; on-board

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sources of vibration, vibration measurement techniques and instrumentation.
CR: ~~ENGI 6933,~~ the former ENGI 5034, the former ENGI 5932, the former ENGI 6933, Mechanical Engineering 6303
LH: at least four 2-hour sessions per semester
PR: Mechanical Engineering 3301 or the former ENGI 3934

6002 Ship Structures I (same as the former ENGI 6002) examines longitudinal strength, still water and wave bending moment, shear and bending moment curves, Smith Correction, section modulus calculation, torsion and racking forces; bulkhead and girder scantlings, portal frame analysis by moment distribution and energy method; finite element analysis and the use of Classification Society rules for design of midship section. Laboratory sessions cover use of analysis software to illustrate structural behaviour concepts.
CR: the former ENGI 5003, the former ENGI 6002
LH: at least five 3-hour sessions per semester
PR: Civil Engineering 4310 or the former ENGI 4312

6005 Floating Ocean Structures Design (same as the former ENGI 6005) introduces floating structures used in the offshore petroleum industry, along with functional requirements, such as drilling and production, of the platforms. Field development criteria are discussed in the context of platform concept selection and synthesis. Environmental loads are examined, focussing on wave loads and ice loads. Diffraction theory and its application on offshore structures is presented. Offshore safety is discussed in terms of major hazards, risk management, and case studies.
CR: the former ENGI 6005, the former ENGI 7005
LH: 1
PR: ONAE 3054 or the former ENGI 3054

6036 Dynamics of Ocean Vehicles (same as the former ENGI 6036) examines applications of the linearized equations of motion to ocean vehicle problems with single and multiple degrees of freedom in waves; dynamics of marine vehicles: motions in waves; hydrodynamics effects such as added mass, radiation and viscous damping; strip theory; irregular seaway and motions.
CR: the former ENGI 6030, the former ENGI 6036, the former ENGI 7035
LH: at least two 3-hour sessions per semester
OR: 1 tutorial hour per week
PR: ONAE 3054 or the former ENGI 3054, ONAE 4020 or the former ENGI 4020

6046 Marine Engineering Systems (same as the former ENGI 6046 and the former ENGI 7045) examines shafting system design; shafting system

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vibration analysis, study of exciting forces and moments, and balancing of reciprocating and rotating machinery; heat transfer and marine heat exchangers; incompressible fluid flow and piping system design and selection of appropriate pumping devices.
CH: 4
~~CO: ENGI 6933~~
CR: the former ENGI 6046, the former ENGI 7045
LC: 4
LH: 1
PR: Mechanical Engineering 3401 or the former ENGI 3901, ONAE 5034 or the former ENGI 5034

6055 Marine Cybernetics (same as the former ENGI 6055) examines propulsion and motion control of ships, submersibles and offshore structures. Building upon the student's knowledge of mathematics, mechanics and hydrodynamics provides an introduction to control systems and mathematical modeling of marine systems. Course components include: basic control actions and response of control systems; simulation and design of control systems; dynamic positioning; power management; marine automation.
CR: the former ENGI 6055
LH: at least four 2-hour sessions per semester
PR: ONAE 4011 or the former ENGI 4011

7000 Ocean Systems Design (same as the former ENGI 7000) develops concept design methods for marine systems from need definition through to solution selection, including weight, cost and power requirements estimating, selection of principal design characteristics and evaluation of alternative solutions. Students develop a proposal for a marine system design project which will include a statement of requirements, a parametric study, a work plan and schedule. This design project will be completed as a full design in ~~ENGI 8000~~ ONAE 8000.
CR: the former ENGI 7000, the former ENGI 7052
LH: 3
PR: ONAE 3001 or the former ENGI 3001, ONAE 3054 or the former ENGI 3054, ENGI 4102

7002 Ship Structures II (same as the former ENGI 7002) is an introduction to ship structural safety and rational design. Topics include local strength analysis, elastic, plastic and ultimate strength of plating, frames and grillages, buckling of columns and plates and fatigue and fracture in ships. Laboratory exercises include structural analysis software and physical experiments.
CR: the former ENGI 6003, the former ENGI 7002
LH: at least five 3-hour sessions per semester
PR: ONAE 6002 or the former ENGI 6002

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7003 Small Craft Design (same as the former ENGI 7003 and the former ENGI 8003) presents fundamentals of naval architecture and design methodology for small craft. Emphasis is on recreational craft, with special emphasis on sailing vessels. Construction materials, scantlings, performance prediction and seaworthiness are covered. Design problems unique to small craft such as mast design, sail area determination and performance prediction are covered. Students will do a small craft design of their choice. Small weekly design studies will be required.
~~CO: the former ENGI 7035~~
CR: the former ENGI 7003, the former ENGI 8003
PR: ONAE 6036 or the former ENGI 6036 or the former ENGI 7035

7033 Marine Hydrodynamics (same as the former ENGI 7033) examines the fundamental equations of hydrodynamics, boundary layers; potential flow, added mass, damping, circulation, and vorticity; numerical methods for hydrodynamic coefficients; water waves and loading for regular and irregular seas.
CR: the former ENGI 7033
LH: at least one 3-hour session per semester
OR: one tutorial hour per week
PR: ONAE 4020 or the former ENGI 4020

7036 Manoeuvring of Ocean Vehicles (same as the former ENGI 7036) examines manoeuvrability of ocean vehicles; derivation of linear and nonlinear equations of motion and hydrodynamic coefficients; stability of motion; standard maneuvers such as turning circle, turning spiral, and PMM test; modelling and simulations of engine, propulsion, rudder and transmission systems during manoeuvring; systems for course keeping, autopilot, motion control and dynamic positioning.
CR: the former ENGI 6030, the former ENGI 7035, the former ENGI 7036
LH: at least two 3-hour sessions per semester
OR: 1 tutorial hour per week
PR: ONAE 6036 or the former ENGI 6036

7046 Marine Economics and Ship Construction (same as the former ENGI 7046) examines the macro-economics of the marine transportation industry and identifies and examines the stages of project definition. The basic techniques of project management needed for large scale industrial marine projects, such as ship construction and transportation of natural resources, are introduced. This course examines methods for estimating labour hours, materials, fabrication facilities required and schedule for ship construction. The legal and social aspects of large projects are also examined.
CR: the former ENGI 7046
PR: ENGI 4102

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8000 Ocean and Naval Architectural Engineering Project (same as the former ENGI 8000) completes the design project selected and approved in ~~ENGI 7000~~ ONAE 7000. The project must illustrate the application and integration of previous design related courses, i.e., decision methods, impact assessments and application of technology. The subject may be ship or offshore structure design, marine system, directed research or a unique design solution. Lectures will be scheduled as required.
CR: the former ENGI 8000
LH: 3
PR: ONAE 7000 or the former ENGI 7000

8034 Applied Acoustics (same as the former ENGI 8034) provides an introduction to acoustic engineering. Topics include: sound in fluids and solids, wave phenomena, mathematical models of sound waves, sources of sound, frequency analysis, levels and decibels, introduction to psychoacoustics, sound waves in rooms, reverberation time, sound absorbers, sound insulation, room acoustical design, introduction to underwater acoustics, acoustic measurement techniques and instrumentation.
CR: the former ENGI 8034
LH: at least four 3-hour sessions per semester
PR: ONAE 5034 or the former ENGI 5034

8046 Marine Engineering II (same as the former ENGI 8046) builds on the fundamental marine engineering aspects covered in ENGI 6046 to include engineering factors onboard the ship, such as electrical generation, lighting, heating and air conditioning, as well as special systems needed on board the ship for operation, cargo management and navigation.
CR: the former ENGI 8046
PR: ONAE 6046 or the former ENGI 6046

8054 Advanced Marine Vehicles (same as the former ENGI 8054) examines the concepts used in the design of advanced marine vehicles. Emphasis will be given to: structural design of craft constructed from fibre reinforced plastics; high speed marine vehicles (powering, structures, seakeeping and model testing); small craft.
CR: the former ENGI 8054
LH: at least 9 hours per semester
PR: ONAE 6002 ~~ENGI 6002~~ or the former ENGI 5003 or the former ENGI 6002

8055 Design and Control of Unmanned Marine Vehicles (same as the former ENGI 8055) examines the formulation of mission statement and design constraints of unmanned marine vehicles, surface and underwater. Major subsystems, including propulsion, power, communication, navigation and control, are introduced. Principles of navigation and control

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as they pertain to unmanned systems are examined. This course includes hands on experimentation including the design of a small unmanned platform for tank experiments.
CR: the former ENGI 8055
LH: at least 12 hours per semester
PR: ONAE 3054 or the former ENGI 3054

8074 Arctic Ocean Engineering (same as the former ENGI 8074 and the former ENGI 8674) examines marine ice ~~as an environmental~~ load ~~factor in the context of~~ on ships and ~~engineered~~ marine structures designed for ice covered waters. Topics include types of naturally occurring ice; sea ice formation and characteristics; mechanical strength of sea ice under common modes of ice failure; modes of ice interaction with ships and marine structures; estimation of ice forces on offshore structures; powering requirements for ice breaking ships; regulations and standards for design of ships and offshore structures in arctic environments.
CR: the former ENGI 8074, the former ENGI 8674
LH: at least four 3-hour sessions per semester
PR: ~~ENGI 3934,~~ Civil Engineering 4310 or the former ENGI 4312, Mechanical Engineering 3301 or the former ENGI 3934

8075 Finite Element Analysis of Marine Structures (same as the former ENGI 8075) examines application of the finite element method (FEM) to the design and assessment of marine hull structures. Simulation of static, quasi-static, and impact loads on hull structures is discussed. Linear and nonlinear analyses are explored. Practical considerations for finite element model design are discussed.
CR: the former ENGI 8075
LH: 12 weekly 3-hour lab sessions
PR: ONAE 4007 or the former ENGI 4007, ONAE 7002 or the former ENGI 7002

8900-8999 Special Topics in Ocean and Naval Architectural Engineering will have topics to be studied announced by the Department.

11.8 Process Engineering

Process Engineering courses are designated by PROC.
ENGI indicates non-departmental Engineering courses

Courses are also identified by a four-digit numbering system, the first two digits signifying the following:

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

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

0: Process Engineering courses common to both technical streams
1: Process Stream
2: Petroleum Stream
9: Special Topics

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

3000 ~~3600~~ Introduction to Process Engineering (same as the former ENGI 3600) familiarizes students with the principles and the practical aspects of organic, inorganic, and biochemical processes including the major unit operations and equipment used. It emphasizes process flow sheeting, process variable identification, component and overall material balances, and process design. The course uses extensive examples from industrial processes. In laboratory sessions students are introduced to the laboratory scale process equipment and use HYSYS software to study process characteristics.
CO: Chemistry 1051
CR: the former ENGI 3600
LH: at least five 2-hour sessions per semester

4002 ~~4602~~ Process Engineering Thermodynamics (same as the former ENGI 4602) extends the study started in Mechanical Engineering 3401 ~~ENGI 3901~~ of thermodynamics, with special reference to chemical process applications: basic laws, thermodynamic properties of pure fluids and mixtures, heat engines, multicomponent systems, thermal/mechanical equilibrium, chemical equilibrium, and thermodynamics of chemical processes. Special emphasis is placed on the application of thermodynamics to practical problems in chemical engineering such as phase equilibria, solutions and reaction equilibria in separations and reaction engineering.
CR: the former Chemistry 2300, the former Chemistry 3300, the former ENGI 4602
PR: Mechanical Engineering 3401 or the former ENGI 3901

4021 ~~4621~~ Process Mathematical Methods (same as the former ENGI 4621) introduces numerical methods in chemical engineering processes, solution of sets of linear algebraic equations, solution of non-linear equations, curve fitting and interpolation, numerical integration, numerical

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differentiation, first order and higher order ordinary differential equations, boundary value problems and partial differential equations. It provides applications of the methods to different aspects of process engineering such as reactor design, separation, process modeling, equipment design and analysis.
CO: PROC 4025 or the former ENGI 4625
CR: the former ENGI 4621
LH: eight 2.5-hour sessions per semester
PR: ENGI 3424 (or Mathematics 2000, Mathematics 2050, and Mathematics 2260)

4025 ~~4625~~ Process Engineering Calculations (same as the former ENGI 4625) is an introduction to the analysis of chemical processes with an emphasis on mass and energy balances. Stoichiometric relationships, ideal and real gas behaviour are also covered. The course will help Process Engineering majors in their second year to develop a framework for the analysis of flow sheet problems and will present systematic approaches for manual and computer-aided solution of full scale balance problems.
CO: PROC 4002 or the former ENGI 4602. There is no co-requisite for students completing a minor in Applied Science - Process Engineering.
CR: the former ENGI 4625
PR: Mechanical Engineering 3401 or the former ENGI 3901. Students completing a minor in Applied Science - Process Engineering must complete Chemistry 2301 as the prerequisite instead of Mechanical Engineering 3401 ~~ENGI 3901~~.

4061 ~~4661~~ Process Fluid Dynamics I (same as the former ENGI 4661) provides process engineering students with fundamentals of fluid mechanics/dynamics. Topics covered include fluid properties; Newtonian and non-Newtonian fluids; pressure; hydrostatics; control volume and system representation; mass and momentum conservation laws; Euler and Bernoulli equations; viscous fluid flows; laminar and turbulent flow; flow through conduits and pipes; pipe networks; flow measurement devices; momentum devices; concept of boundary layers; dimensional analysis; lift and drag on objects; fluid transportation (pumps and compressors).
CR: the former ENGI 4661, ~~ENGI 4961~~, the former ENGI 4913, the former ENGI 4961, the former ENGI 5961
LH: five 1-hour sessions per semester

5001 ~~5601~~ Mass Transfer (same as the former ENGI 5601) covers diffusive as well as convective mass transfer, mass transfer correlations, and the application to absorption and membrane separations.
CR: the former ENGI 5601
LH: at least seven 2-hour sessions per semester
PR: PROC 4002 or the former ENGI 4602 (or Chemistry 2301)

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5002 ~~**5602**~~ **Process Heat Transfer** (same as the former ENGI 5602) is a study of concepts involved in heat transfer. Topics include applications of continuity and energy equations, fundamentals of heat transfer, modes of heat transfer, conduction, convection and radiation heat transfer, boiling and condensation, evaporation, and heat exchanger analysis and design.
CR: the former ENGI 5602, the former ENGI 6901
LH: one 3-hour session per semester
PR: PROC 4002 or the former ENGI 4602, PROC 4061 or the former ENGI 4661 or Mechanical Engineering 4501 or the former ENGI 4961 or the former ENGI 5961

5071 ~~**5671**~~ **Process Equipment Design I** (same as the former ENGI 5671) introduces the principles of unit operations, grouped into four sections: fluid mechanics, heat transfer, mass transfer and equilibrium stages, and operations involving particulate solids. It also includes design and operation fundamentals of unit operations: size reduction, filtration, evaporation, drying, crystallization, and humidification, and membrane separation.
CO: PROC 5001 or the former ENGI 5601
CR: the former ENGI 5671
LH: at least six 3-hour sessions per semester
PR: PROC 4021 or the former ENGI 4621, PROC 4025 or the former ENGI 4625

6021 ~~**6621**~~ **Process Modelling and Analysis** (same as the former ENGI and the former ENGI 6621) is designed to introduce the concepts of process model building and its application in design and process operations. It includes fundamentals of process modelling, lumped parameter dynamic models, distributed parameter dynamic models, advanced dynamic model development, application of process models, and computer aided process design. The course also introduces model linearization, degrees of freedom analysis, stability, stiffness, observability, and controllability.
CR: the former ENGI 5621, the former ENGI 6621
LH: five 3-hour sessions per semester
PR: PROC 4021 or the former ENGI 4621, PROC 4025 or the former ENGI 4625

6031 ~~**6631**~~ **Chemical Reaction Engineering** (same as the former ENGI 6631) will cover the fundamentals of chemical kinetics and reaction rate expressions as well as the types of reactors, homogeneous and heterogeneous (catalytic) reactors, and the interrelation between transport phenomena and reaction engineering as it applies to process design. It also includes an overview of non-ideal reactors and an introduction to bio reactors.
CR: the former ENGI 6631

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LH: four 2-hour sessions per semester
PR: PROC 4021 or the former ENGI 4621, PROC 4061 or the former ENGI 4661 or Mechanical Engineering 4501 or the former ENGI 4961 or the former ENGI 5961

6061 ~~6661~~ Process Fluid Dynamics II (same as the former ENGI 6661) builds upon the materials introduced in Process Fluid Dynamics I. The course covers important aspects of fluid dynamics principles and applications in process engineering, including; continuity equation; differential governing equations of fluid momentum; conservation laws in chemical/process engineering; ideal and non-ideal flow; compressible and incompressible flow; boundary layer theory for laminar and turbulent flow; multiphase flow; introduction to CFD; turbomachinery; fluid flow features of unit operations.
CR: ~~ENGI 5962,~~ the former ENGI 5913, the former ENGI 5962, the former ENGI 6661, the former ENGI 6961
LH: three 1-hour sessions per semester
PR: PROC 4061 or the former ENGI 4661 or Mechanical Engineering 4501 or the former ENGI 4961 or the former ENGI 5961

6071 ~~6671~~ Process Equipment Design II (same as the former ENGI 6671) will cover design and operation of equilibrium stage separation processes including distillation, extraction, and leaching. It will also cover advanced concept of equipment design such as heterogeneous system, multiphase system, absorption, and adsorption operation and computer assisted design. Course will use HYSIS and other process equipment design tools.
CR: the former ENGI 6671
LH: at least four 2-hour sessions per semester
PR: PROC 5001 or the former ENGI 5601, PROC 5071 or the former ENGI 5671

6151 ~~6651~~ Sustainable Engineering in Processing Industries (same as the former ENGI 6651) will introduce students to sustainable development and its application to processing operations. Areas such as traditional economic growth, materials cycles, methods for measuring environmental impact, life cycle analysis, waste treatment technologies and recycling technologies will be covered. In addition, the concept of industrial ecology will be included.
CR: the former ENGI 6651
PR: PROC 4025 or the former ENGI 4625, PROC 5001 or the former ENGI 5601

6202 ~~6602~~ Offshore Petroleum Geology and Technology (same as the former ENGI 6602) introduces basic concepts in geology and geophysics ~~of the offshore environment.~~, ~~An outline of petroleum geology is~~

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~~presented, following a path~~ from the origins of hydrocarbons through migration in the Earth's crust, accumulation in reservoirs and the strategies used to discover and to exploit liquids found in the subsurface. Topics include ~~an introduction to~~ the offshore oil and gas industry in harsh environment, ~~type of~~ platforms and structures, exploration phase of offshore oil development, production drilling and completion ~~processes and equipment~~, and oil and gas transportation system. ~~There are case studies and a project.~~
CR: the former ENGI 6602
PR: completion of Academic Term 5

7021 ~~7621~~ Process Dynamics and Control (same as the former ENGI 7621) familiarizes students with the scientific and engineering principles of process dynamics and control. Students will apply and integrate knowledge of chemical engineering to identify, formulate and solve process dynamics problems and develop control systems. Modern computational techniques and tools will be used for solving chemical process control problems. Also students will become familiar with industrial control systems.
CR: the former ENGI 7621
LH: at least six 2-hour sessions per semester
PR: PROC 6021 or the former ENGI 6621 or the former ENGI 5621

7040 ~~7640~~ Process Engineering Project I (same as the former ENGI 7640) gives students the opportunity to apply the knowledge gained in previous design and technical courses to complete a high-level design of a process plant or major modification to a process plant. The goal is to expose students to process design, practical design issues, and to provide experience in the complete design process as applied to real devices. Students will work in groups to design a process system. This course is a precursor to ~~ENGI 8640~~ PROC 8040.
CR: the former ENGI 7640
LC: scheduled as required
PR: ENGI 4102, completion of academic term 6 of the Process Engineering program

7077 ~~8677~~ Process Plant Design and Economics (same as the former ENGI 8677) will provide a comprehensive picture of the availability and design of both traditional and current process equipment. Economic and optimization issues relevant to investment, product-cost estimation, and profitability analysis will also be addressed. The course will provide students with tools to evaluate the economics of process industries reflecting current economic criteria, and provide helpful guidelines to approaching, defining, and solving optimization problems.
CR: the former ENGI 8677
PR: PROC 6071 or the former ENGI 6671

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7123 ~~7623~~ Process Simulation (same as the former ENGI 7623) provides students with the knowledge and experience to use a process simulator effectively for the analysis and synthesis of process flowsheets, mass and energy balances, sizing of individual component and process unit, reactor modeling, separation device modeling, heat exchanger modeling, and dynamic and steady state analysis.
CR: the former ENGI 7623
LH: at least nine 2-hour sessions per semester
PR: PROC 6021 or the former ENGI 5621 ~~ENGI 6621~~ or the former ENGI 6621 ~~ENGI 5621~~, PROC 6071 or the former ENGI 6671

7171 ~~8671~~ Safety and Risk Engineering (same as the former ENGI 8671) begins with an overview of safety and risk issues in the offshore oil and gas industry. The course examines regulatory requirements; hazards and structured analysis tools; risk terminology and quantified risk analysis (QRA) techniques; and safety assessment studies. The course includes project and case studies.
CR: the former ENGI 8671
PR: completion of Academic Term 6 or registration in the Minor in Applied Science - Process Engineering

7291 ~~8691~~ Petroleum Production Engineering (same as the former ENGI 8691) examines the procedures and equipment necessary for preparing a well to produce hydrocarbons, ~~and~~ maximizing flow rate during the life of the well; techniques for well productivity analysis in under-saturated, saturated, and natural gas reservoirs; well completion configuration tubulars; packers and subsurface flow control devices; completion and work over fluids; perforating oil and gas wells; formation damage; surfactants for well treatment; hydraulic fracturing; acidizing; scale deposition, removal, and prevention; work over and completion rigs; ~~and~~ artificial lift.
CR: the former ENGI 8691
PR: completion of Academic Term 6

7292 ~~8692~~ Drilling Engineering ~~for Petroleum Exploration & Production~~ (same as the former ENGI 8692) covers both offshore and onshore drilling operations and includes: rotary drilling rig operations, well construction sequence, drill string, drill bits, well bore hydraulics, casing and well heads, cementing, well control, directional and horizontal drilling, well planning and fishing operations, and extended reach, horizontal and multilateral well drilling techniques.
CR: the former ENGI 8692
LH: 2
PR: completion of Academic Term 6

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~~**7650 Offshore Oil and Gas Engineering Project I** is a multidisciplinary design project that illustrates the application of previous engineering science and design related courses. The project will be done by teams of students with individuals concentrating their participation in their own engineering discipline. The project topic will be from the offshore oil and gas engineering industry. Lectures will be scheduled as required. This is the Term 7 project and if the scope of the project is such that it needs to continue, then the student will have the option to continue the same project in term 8 (in ENGI 8650).~~
~~LC: 1~~
~~PR: completion of Academic Term 6~~

8040 ~~8640~~ Process Engineering Project II (same as the former ENGI 8640) is a design project that illustrates the application of previous engineering science and design related courses. Projects will be done by teams of students with individuals concentrating their participation in their own engineering discipline. The project topic will be from the process industry which includes the offshore oil and gas industry, mining and metal processing industry and chemical process industry.
CR: the former ENGI 8640
LC: scheduled as required
PR: PROC 7040 or the former ENGI 7640

8151 ~~7651~~ Industrial Pollution ~~Control/Pollution~~ Prevention and Control (same as the former ENGI 7651) is designed to introduce methods of industrial pollution assessment and control. Topics include waste characterization, water pollution assessment, water pollution control, air pollution assessment and control, solid waste assessment and control, pollution prevention, environmental risk assessment and risk based decision making.
CR: the former ENGI 7651
PR: PROC 6151 or the former ENGI 6651 ~~ENGI 6621 or the former ENGI 5621~~, PROC 6071 or the former ENGI 6671

8191 ~~7691~~ Mining and Metallurgical Process Engineering (same as the former ENGI 7691) is designed to provide students with a basic fundamental background to the mining, mineral processing, and extractive metallurgical processing industry from both traditional and modern industrial methodologies. Concepts such as a mine design, mineral flow sheets, extraction methods, and examples from industrial applications will be reviewed with problems.
CR: the former ENGI 7691
LH: at least four 2-hour sessions per semester
PR: completion of academic term 6 of the Process Engineering program

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8270 ~~**8670**~~ **Reliability Engineering** (same as the former ENGI 8670) is an introduction to reliability engineering; physics of failure and failure mechanism, reliability measures and assessment; reliability of components and parts; complex system reliability and availability analysis; and field reliability assessment. The course includes case studies and a project.
CR: the former ENGI 8670
PR: completion of Academic Term 6

8276 ~~**8676**~~ ~~**Design of**~~ **Natural Gas** ~~**Handling Equipment**~~ **Engineering** (same as the former ENGI 8676) covers process description, design methods, operating procedures, and troubleshooting aspects of gas production facilities including inlet separation operations, hydrate prevention and control, gas dehydration, NGL recovery and dew point control, gas transmission and pipeline design and transportation systems.
CR: the former ENGI 8676
PR: completion of Academic Term 6

8290 ~~**8690**~~ **Reservoir Engineering** (same as the former ENGI 8690) examines fluid pressure regimes, oil recovery factors, calculation of hydrocarbon volumes, reservoir rock characteristics, reservoir fluid properties, porosity and permeability, material balance, and well test analysis.
CR: the former ENGI 8690
PR: completion of Academic Term 6

8293 ~~**8693**~~ **Petroleum Facilities Engineering** - inactive course.

8294 ~~**8694**~~ **Downstream Processing** (same as the former ENGI 8694) includes: oil and natural gas processing, oil and gas storage facilities and their design, oil and gas separation processes, petroleum refining processes, and de-bottle necking.
CR: the former ENGI 8694
PR: completion of Academic Term 6

8296 ~~**8696**~~ **Petroleum Refining Engineering** (same as the former ENGI 8696) will cover crude and refinery products properties and specifications, process description, design methods, operating procedures, and troubleshooting aspects of modern petroleum refining. It also includes hydrorefining, catalytic reforming, hydrocracking, isomerisation, refinery machinery, and utilities.
CR: the former ENGI 8696
PR: completion of academic term 6 of the Process Engineering program

~~**8650 Offshore Oil and Gas Engineering Project II** is a multidisciplinary design project that illustrates the application of previous engineering~~

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~~science and design related courses. The project will be done by teams of students with individuals concentrating their participation in their own engineering discipline. The project topic will be from the offshore oil and gas engineering industry. Lectures will be scheduled as required.~~
~~CR: the former ENGI 8600~~
~~LC: 1~~
~~PR: ENGI 7650~~

8900-8999 Special Topics in Process Engineering will have topics to be studied announced by the Department."

Page 123, 2019-2020 Calendar, under the heading 4 Description of Program, delete the last sentence and replace with the following:

"~~All courses of the Faculty are designated by the abbreviation ENGI.~~

Courses of the Faculty are designated by the following abbreviations:
CIV are courses offered by the Department of Civil Engineering
ECE are courses offered by the Department of Electrical and Computer Engineering
ENGI are non-departmental courses offered by the Faculty
ME are courses offered by the Department of Mechanical Engineering
ONAE are courses offered by the Department of Ocean and Naval Architectural Engineering
and
PROC are courses offered by the Department of Process Engineering"

Page 123, 2019-2020 Calendar, under the heading 4.1 Program of Study, amend the first paragraph of clause 8 as follows:

"Courses offered in the Faculty of Engineering and Applied Science ~~courses~~ are restricted to students who have been admitted or promoted to the appropriate academic term and major (e.g., Academic Term 3 for 3000 level courses, restricted by major; Engineering One for 1000 level courses). Other students will be admitted to these courses only with the approval of the Head of the appropriate Department for courses at the 3000 level and higher, or the Associate Dean (Undergraduate Studies) (or delegate) for ENGI ~~1000 level~~ courses."

Page 123, 2019-2020 Calendar, under the heading 4.2 Complementary Studies, amend first and third bullets of clause 2 as follows:

- English 1090 ~~or the former English 1080 or~~ . A student whose first language is not English and who does not meet the standards for entry

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into regular first-year English courses may use English 1020 to fulfill this requirement.

- Engineering 3101

- Engineering 4102 ~~must be completed before Term 6 in the Civil and Process majors, and must be completed before Term 7 in all other majors~~ (which is a prerequisite for required courses in Term 6 in the Civil and Process majors, and for required courses in Term 7 in all other majors)

[There are no changes to the other four bullets]

Page 128, 2019-2020 Calendar, under the heading 6.1 Civil Engineering Program Regulations, amend the section as follows:

6.1 Civil Engineering Program Regulations

6.1.1 Civil Engineering Major

- The full-time 141 credit hour Bachelor of Engineering (Co-operative), Civil Engineering Major, requires eight academic terms and four work terms.
- The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 1 Civil Engineering Major**.
- Work terms shall normally be taken in the order as set out in **Table 1 Civil Engineering Major**.

Civil Engineering courses are designated by CIV.
ENGI indicates non-departmental Engineering courses

Table 1 Civil Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~ Mathematics 1000, 1001, 2050 Physics 1050, 1051	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.

In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	~~ENGI 3101, 3425, 3610, 3703, 3731, 3934~~ CIV 3210, 3440, 3710, 3720 ENGI 3101 Mechanical Engineering 3301	
Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI 4312, 4421, 4425, 4717, 4723~~ CIV 4220, 4310, 4450, 4610 ENGI 4421	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI 5312, 5434, 5706, 5713, 5723~~ CIV 5110, 5230, 5320, 5460, 5510	
Spring	ENGI 002W or 003W or 004W	
Fall **Academic Term 6**	~~ENGI 6322, 6705, 6707, 6713, 6749~~ CIV 6120, 6330, 6470, 6520, 6810	
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI 7704, 7713, 7745~~ CIV 7130, 7530, 7730	6 credit hours from: ~~ENGI 7706, 7707, 7716, 7718, 7723, 7748~~ CIV 7140, 7240, 7340, 7540, 7620, 7820 or other courses as specified by the Head of the Department of Civil Engineering
Fall	ENGI 004W or 005W (optional) or 006W (optional)	
Winter **Academic Term 8**	CIV 8000, 8830 ENGI 8152~~, 8700, 8740~~	9 credit hours from:~~ ENGI 8705, 8708, 8713, 8717, 8751~~, CIV 8150, 8550, 8560, 8570, 8630 or other courses as specified by the Head of the Department of Civil Engineering

Page 129, 2019-2020 Calendar, under the heading 6.2 Computer Engineering Program Regulations, amend the section as follows:

Faculty of Engineering and Applied Science (cont'd)

6.2 Computer Engineering Program Regulations

6.2.1 Computer Engineering Major

- The full-time 141 credit hour Bachelor of Engineering (Co-operative), Computer Engineering Major, requires eight academic terms and four work terms.
- The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 2 Computer Engineering Major**.
- Work terms shall normally be taken in the order as set out in **Table 2 Computer Engineering Major**.
- The requirements for a minor in Physics in the Computer Engineering program are detailed under **Faculty of Science, Minor in Physics**. Students wishing to undertake a minor in Physics must obtain approval from the Head of the Department of Electrical and Computer Engineering for their course selection.

Electrical and Computer Engineering courses are designated by ECE.
ENGI indicates non-departmental Engineering courses

Table 2 Computer Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~ Mathematics 1000, 1001, 2050 Physics 1050, 1051	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.
In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	~~ENGI 3101, 3424, 3821, 3861, 3891~~ ECE 3300, 3400, 3500 ENGI 3101, 3424 Physics 3000	

Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI 4424, 4823, 4854, 4862, 4892~~ ECE 4110, 4300, 4400, 4500, 4600	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI 5420, 5821, 5865, 5892, 5895~~ ECE 5010, 5100, 5200, 5400, 5500	
Spring	ENGI 002W or 003W or 004W	
Fall **Academic Term 6**	~~ENGI 6861, 6871, 6876, 6893~~ ECE 6400, 6500, 6600, 6610	**Students in the Biomedical Stream:** Human Kinetics and Recreation 2311 **All other students:** 3 credit hours from: ~~ENGI 6855~~ ECE 6200 or other courses as specified by the Head of the Department of Electrical and Computer Engineering
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI 7804, 7824, 7894~~ ECE 7010, 7400, 7600	**Students in the Biomedical Stream:** Medicine 6250 3 credit hours from: ~~ENGI 7825, 7854, 7864, 7952,~~ ECE 7200, 7410, 7420, Mechanical Engineering 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering **All other students:** 6 credit hours from: ~~ENGI 7825, 7854, 7864, 7952, 8680,~~ ECE 7200, 7210, 7410, 7420, 7500, Mechanical Engineering 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

Fall	ENGI 004W or 005W (optional) or 006W (optional)	
Winter Academic Term 8	ECE 8010, 8400 ENGI 8152~~, 8854, 8894~~	**Students in the Biomedical Stream:** Human Kinetics and Recreation 4703 6 credit hours from: ~~ENGI 8814, 8821, 8868,~~ ECE 8410, 8420, 8600, other courses as specified by the Head of the Department of Electrical and Computer Engineering **All other students:** One free elective which must be ~~a 3000-level or higher Engineering course, or~~ a 2000-level or higher course from any ~~other~~ academic unit. Selection of a course must be approved by the Head of the Department of Electrical and Computer Engineering. 6 credit hours from: ~~ENGI 7680, 8814, 8821, 8863, 8868, 8879, 8801-8805,~~ ECE 8210, 8410, 8420, 8600, 8630, 8900-8949, or other courses as specified by the Head of the Department of Electrical and Computer Engineering

Page 130, 2019-2020 Calendar, under the heading 6.3 Electrical Engineering Program Regulations, amend the section as follows:

6.3 Electrical Engineering Program Regulations

6.3.1 Electrical Engineering Major

- The full-time 141 credit hour Bachelor of Engineering (Co-operative), Electrical Engineering Major, requires eight academic terms and four work terms.
- The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 3 Electrical Engineering Major**.
- Work terms shall normally be taken in the order as set out in **Table 3 Electrical Engineering Major**.

Faculty of Engineering and Applied Science (cont'd)

• The requirements for a minor in Physics in the Electrical Engineering program are detailed under **Faculty of Science, Minor in Physics**. Students wishing to undertake a minor in Physics must obtain approval from the Head of the Department of Electrical and Computer Engineering for their course selection.

Electrical and Computer Engineering courses are designated by ECE. ENGI indicates non-departmental Engineering courses

Table 3 Electrical Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~ Mathematics 1000, 1001, 2050 Physics 1050, 1051	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.
In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	~~ENGI 3101, 3424, 3821, 3861, 3891~~ ECE 3300, 3400, 3500 ENGI 3101, 3424 Physics 3000	
Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI 4430, 4823, 4841, 4854, 4862~~ ECE 4300, 4500, 4600, 4800 ENGI 4430	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI 5420, ENGI 5800, 5812, 5821, 5854~~ ECE 5000, 5100, 5200, 5300, 5700	
Spring	ENGI 002W or 003W or 004W	

Fall **Academic Term 6**	~~ENGI 6813, 6843, 6855, 6871~~ ECE 6200, 6600, 6700, 6800	**Students in the Biomedical Stream:** Human Kinetics and Recreation 2311 **All other students:** 3 credit hours from: ~~ENGI 6856 6876,~~ ECE 6610, 6810, or other courses as specified by the Head of the Department of Electrical and Computer Engineering
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI 7803, 7824~~ ECE 7000, 7600	**Students in the Biomedical Stream:** Medicine 6250 3 credit hours from: ~~ENGI 7825, 7854, 7952,~~ ECE 7200, 7410, Mechanical Engineering 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering 3 credit hours from: ~~ENGI 7811, 7825, 7844, 7854, 7855, 7856, 7952, 8680,~~ ECE 7200, 7210, 7410, 7800, 7810, Mechanical Engineering 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering **All other students:** 6 credit hours from: ~~ENGI 7811, 7825, 7844, 7854, 7855, 7856, 7952, 8680,~~ ECE 7200, 7210, 7410, 7620, 7800, 7810, Mechanical Engineering 7204, other courses as specified by the Head of the Department of Electrical and Computer Engineering

Fall	ENGI 004W or 005W (optional) or 006W (optional)	
Winter Academic Term 8	ECE 8000, 8610 ENGI 8152~~, 8826, 8853~~	**Students in the Biomedical Stream:** Human Kinetics and Recreation 4703 6 credit hours from: ~~ENGI 8814, 8821,~~ ECE 8410, 8600, other courses as specified by the Head of the Department of Electrical and Computer Engineering **All other students:** One free elective which must be ~~a 3000-level or higher Engineering course, or~~ a 2000-level or higher course from any ~~other~~ academic unit. Selection of a course must be approved by the Head of the Department of Electrical and Computer Engineering. 6 credit hours from: ~~ENGI 5865, 7680, 8821, 8845, 8879, 8806-8809,~~ ECE 5500, 8210, 8600, 8630, 8700, 8800, 8950-8999 or other courses as specified by the Head of the Department of Electrical and Computer Engineering

6.3.2 Minor in Applied Science - Electrical Engineering for Physics Majors and Honours

~~For Physics Majors and Honours students, a Minor in Applied Science - Electrical Engineering will consist of ENGI 3821 (or Physics 3550), ENGI 4854, Physics 3000, and 15 credit hours chosen from ENGI 3861, ENGI 4823, ENGI 4841, ENGI 4862, ENGI 5800, and ENGI 6813 (or Physics 4500), or other courses subject to approval by the Head of the Department of Physics and Physical Oceanography and the Head of the Department of Electrical and Computer Engineering.~~

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

- ECE 3300 (or the former ENGI 3821 or Physics 3550),

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- ECE 4300 (or the former ENGI 4854),
- Physics 3000,

and 15 credit hours chosen from

- ECE 3500 (or the former ENGI 3861),
- ECE 4500 (or the former ENGI 4862),
- ECE 4600 (or the former ENGI 4823),
- ECE 4800 (or the former ENGI 4841),
- ECE 5000 (or the former ENGI 5800),
- ECE 6700 (or the former ENGI 6813 or Physics 4500),
- or other courses subject to approval by the Head of the Department of Physics and Physical Oceanography and the Head of the Department of Electrical and Computer Engineering.

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

Page 132, 2019-2020 Calendar, under the heading 6.4 Mechanical Engineering Program Regulations, amend the section as follows:

6.4 Mechanical Engineering Program Regulations

6.4.1 Mechanical Engineering Major

• The full-time 141 credit hour Bachelor of Engineering (Co-operative), Mechanical Engineering Major, requires eight academic terms and four work terms.

• The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 4 Mechanical Engineering Major**.

• Work terms shall normally be taken in the order as set out in **Table 4 Mechanical Engineering Major**.

Mechanical Engineering courses are designated by ME.
ENGI indicates non-departmental Engineering courses

Table 4 Mechanical Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during

	Mathematics 1000, 1001, 2050 Physics 1050, 1051	the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.
In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	~~ENGI 3101, 3424, 3901, 3911, 3934, 3941~~ ME 3101, 3102, 3301, 3401 ENGI 3101, 3424	
Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI 4430, 4901, 4932, 4934, 4961~~ ME 4302, 4402, 4501, 4601 ENGI 4430	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI 4421, 5911, 5931, 5952, 5962~~ ME 5103, 5201, 5502, 5602 ENGI 4421	
Spring	ENGI 002W or 003W or 004W	
Fall **Academic Term 6**	~~ENGI 6901, 6928, 6929, 6933, 6951~~ ME 6202, 6303, 6403, 6701, 6702	Students in the Biomedical Technical Stream must also take Human Kinetics and Recreation 2311 in Academic Term 6. Students in the Petroleum Technical Stream must also take ~~ENGI 6602~~ Process Engineering 6202 in Academic Term 6
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI 7926, 7930~~ ME 7203, 7704	6 credit hours from **Technical Stream Required Courses**, Academic Term 7 For students in the Biomedical Technical Stream or Stream, one Technical Stream Required

		Course is replaced by Human Kinetics and Recreation 2311, taken in Academic Term 6. For students in the Petroleum Technical Stream, one Technical Stream Required Course is replaced by ~~ENGI 6602~~ Process Engineering 6202, taken in Academic Term 6. 3 credit hours from **Technical Stream Elective Courses**. One free elective which must be ~~a 3000-level or higher Engineering course, or~~ a 2000-level or higher course from any ~~other~~ academic unit. Selection of a course must be approved by the Head of the Department of Mechanical Engineering and must be completed before Academic Term 8.
Fall	ENGI 004W or 005W (optional) or 006W (optional)	
Winter Academic Term 8	ME 8705 ENGI 8152~~, 8926~~	3 credit hours from **Technical Stream Required Courses**, Academic Term 8 6 credit hours from **Technical Stream Elective Courses**

6.4.1.1 Technical Streams

- A student must select one of the Technical Streams in the areas of Biomedical, Mechanics and Materials, Mechatronics, Petroleum, and Thermo-Fluids.
- Technical Stream required courses must be chosen according to the student's stream as outlined below in the **Technical Stream Required Courses Table**.
- Technical Stream elective courses must be chosen according to the student's stream as outlined below in the **Technical Stream Elective Courses Table**.
- A student must choose one course in Academic Term 7 and two courses in Academic Term 8 according to the student's stream from the **Technical Stream Elective Courses Table** or other courses as approved by the Head of the Department of Mechanical Engineering.

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• The selection of a course as a technical stream course from outside these lists requires the approval of the Head of the Department of Mechanical Engineering.

Technical Stream Required Courses Table

Term	Biomedical	Mechanics and Materials	Mechatronics	Petroleum	Thermo-Fluids
Academic Term 6	Human Kinetics and Recreation 2311			~~ENGI 6602~~ Process Engineering 6202	
Academic Term 7	Medicine 6250	~~ENGI 7911~~ ~~ENGI 7929~~ ME 7104 ME 7703	~~ENGI 7929~~ ~~ENGI 7953~~ ME 7205 ME 7703	~~ENGI 8691~~ Process Engineering 7291	~~ENGI 7901~~ ~~ENGI 7903~~ ME 7404 ME 7405
Academic Term 8	Human Kinetics and Recreation 4703	~~ENGI 8933~~ ME 8604	~~ENGI 8946~~ ME 8305	~~ENGI 8690~~ Process Engineering 8290	~~ENGI 8903~~ ME 8406

Technical Stream Elective Courses Table

Biomedical	Mechanics and Materials	Mechatronics	Petroleum	Thermo-Fluids
~~ENGI 7854~~ ~~ENGI 7934~~ ~~ENGI 7952~~ ~~ENGI 7953~~ ~~ENGI 8814~~ ~~ENGI 8947~~ ME 7204 ME 7205 ME 7603 ME 8504 Electrical and Computer Engineering 7410 Electrical and Computer Engineering 8410	~~ENGI 7934~~ ~~ENGI 8911~~ ~~ENGI 8935~~ ~~ENGI 8937~~ ~~ENGI 8971~~ ~~ENGI 8982~~ ME 7105 ME 7603 ME 8106 ME 8304 ME 8605 ME 8606	~~ENGI 7825~~ ~~ENGI 7854~~ ~~ENGI 7952~~ ~~ENGI 8814~~ ~~ENGI 8826~~ ~~ENGI 8937~~ ME 7204 ME 8304 Electrical and Computer Engineering 7200 Electrical and Computer Engineering 7410 Electrical and Computer Engineering	~~ENGI 7903~~ ~~ENGI 8671~~ ~~ENGI 8673~~ ~~ENGI 8676~~ ~~ENGI 8692~~ ~~ENGI 8694~~ ~~ENGI 8911~~ ~~ENGI 8970~~ ME 7405 ME 7503 ME 8106 Civil Engineering 8580 Process Engineering 7171 Process Engineering	~~ENGI 7934~~ ~~ENGI 8947~~ ~~ENGI 8964~~ ~~ENGI 8965~~ ~~ENGI 8970~~ ~~ENGI 8984~~ ME 7503 ME 7603 ME 8407 ME 8504 ME 8505 ME 8506

		8410 Electrical and Computer Engineering 8610	7292 Process Engineering 8276 Process Engineering 8294	

Page 134, 2019-2020 Calendar, under the heading 6.5 Ocean and Naval Architectural Engineering Program Regulations, amend the section as follows:

6.5 Ocean and Naval Architectural Engineering Program Regulations

6.5.1 Ocean and Naval Architectural Engineering Major

- The full-time 141 credit hour Bachelor of Engineering (Co-operative), Ocean and Naval Architectural Engineering Major, requires eight academic terms and four work terms.
- The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 5 Ocean and Naval Architectural Engineering Major**.
- Work terms shall normally be taken in the order as set out in **Table 5 Ocean and Naval Architectural Engineering Major**.
- Ocean and Naval Architectural Engineering students may complete a minor in Mathematics as outlined under **Faculty of Science, Mathematics, Minor in Mathematics**.

Ocean and Naval Architectural Engineering courses are designated by ONAE.
ENGI indicates non-departmental Engineering courses

Table 5 Ocean and Naval Architectural Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~ Mathematics 1000, 1001, 2050 Physics 1050, 1051	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of

		Engineering One.
In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	~~ENGI~~ ONAE 3001, 3054~~, 3101, 3901, 3934~~ ENGI 3101 Mechanical Engineering 3301, 3401 Mathematics 2000	
Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI~~ ONAE 4007, 4011, 4020~~, 4312~~ Civil Engineering 4310 Mathematics 2260	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI~~ ONAE 5020, 5022, 5034 Mathematics 3202 Physics 3300	
Spring	ENGI 002W or 003W or 004W	
Fall **Academic Term 6**	~~ENGI~~ ONAE 6002, 6005, 6036, 6046, 6055	
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI~~ ONAE 7000, 7002, 7033, 7036	3 credit hours from ~~ENGI~~ ONAE 7003, 7046, Process Engineering 7171 or other courses as specified by the Head of the Department of Ocean and Naval Architectural Engineering
Fall	ENGI 004W or 005W (optional) or 006W (optional)	

Winter Academic Term 8	~~ENGI~~ ONAE 8000, ENGI 8152	One free elective which must be ~~a 3000-level or higher Engineering course, or~~ a 2000-level or higher course from any ~~other~~ academic unit. Selection of a course must be approved by the Head of the Department of Ocean and Naval Architectural Engineering. 9 credit hours from ~~ENGI~~ ONAE 8034, 8046, 8054, 8055, 8074, 8075, ENGI 8150, ~~8671~~ or other courses as specified by the Head of the Department of Ocean and Naval Architectural Engineering

Page 135, 2019-2020 Calendar, under the heading 6.6 Process Engineering Program Regulations, amend the section as follows:

6.6 Process Engineering Program Regulations

6.6.1 Process Engineering Major

- The full-time 141 credit hour Bachelor of Engineering (Co-operative), Process Engineering Major, requires eight academic terms and four work terms.
- The 141 credit hours shall normally be taken in the academic terms and order as set out in **Table 6 Process Engineering Major**.
- Work terms shall normally be taken in the order as set out in **Table 6 Process Engineering Major**.
- Process Engineering students may complete a minor in Chemistry as outlined under **Faculty of Science, Chemistry, Minor in Chemistry**.

Process Engineering courses are designated by PROC.
ENGI indicates non-departmental Engineering courses

Table 6 Process Engineering Major

Term	Required Courses	Elective Courses
Engineering One	Chemistry 1050 ENGI 1010, 1020, 1030, 1040 English 1090 or 1020 ~~or the former 1080~~ ~~ENGI 1010, 1020, 1030, 1040~~ Mathematics 1000, 1001, 2050	Students who are expecting to complete the Engineering One requirements by the end of the Winter semester may apply to undertake a work term during the Spring semester. In this case, the prerequisite course ENGI 200W

	Physics 1050, 1051	is expected to be completed during the Fall semester. All other students are expected to complete ENGI 200W in the Winter semester of Engineering One.
In addition to meeting the requirements outlined below, a student must successfully complete four Complementary Studies courses as described under **Description of Program, Complementary Studies**.		
Fall **Academic Term 3**	PROC 3000 Chemistry 1051 ~~ENGI 3101, 3424, 3600, 3901, 3911~~ ENGI 3101, 3424 Mechanical Engineering 3101, 3401	
Winter	ENGI 001W or 002W	
Spring **Academic Term 4**	~~ENGI 4430, 4602, 4621, 4625, 4661~~ PROC 4002, 4021, 4025, 4061 ENGI 4430	
Fall	ENGI 001W or 002W or 003W	
Winter **Academic Term 5**	~~ENGI 4421, 5601, 5602, 5671, 5911~~ PROC 5001, 5002, 5071 ENGI 4421 Mechanical Engineering 5103	
Spring	ENGI 002W or 003W or 004W	
Fall **Academic Term 6**	~~ENGI 6621, 6631, 6671, 6661~~ PROC 6021, 6031, 6061, 6071	3 credit hours from Technical Streams courses, Academic Term 6
Winter	ENGI 003W or 004W or 005W (optional)	
Spring **Academic Term 7**	~~ENGI 7621, 7640, 8677~~ PROC 7021, 7040, 7077	6 credit hours from Technical Streams courses, Academic Term 7
Fall	ENGI 004W or 005W (optional) or 006W (optional)	

Winter Academic Term 8	PROC 8040 ENGI 8152~~, 8640~~	One free elective which must be ~~a 3000-level or higher Engineering course, or~~ a 2000-level or higher course from any ~~other~~ academic unit. Selection of a course must be approved by the Head of the Department of Process Engineering. 9 credit hours from Technical Streams courses, Academic Term 8

6.6.1.1 Technical Streams

- Technical Streams are available in the areas of Petroleum and Process.
- A student may experience scheduling difficulties if courses are selected from more than one Technical Stream.
- The selection of a course as a technical stream course from outside these lists requires the approval of the Head of the Department of Process Engineering.

Petroleum Technical Stream

Term	Required Courses	Elective Courses
Academic Term 6	~~ENGI 6602~~ PROC 6202	
Academic Term 7 A student must choose two courses from Academic Term 7.	~~ENGI 8692~~ PROC 7292	~~ENGI 8671, 8691~~ PROC 7171, 7291
Academic Term 8 A student must choose three courses from Academic Term 8.	~~ENGI 8690~~ PROC 8290 ~~ENGI 8694~~ PROC 8294	~~ENGI 8670, 8676~~ PROC 8270, 8276

Process Technical Stream

Term	Required Courses	Elective Courses
Academic Term 6	~~ENGI 6651~~ PROC 6151	
Academic Term 7 A student must choose two courses from Academic Term 7.	~~ENGI 7623~~ PROC 7123 ~~ENGI 8671~~ PROC 7171	
Academic Term 8 A student must choose three courses from Academic Term 8.	~~ENGI 7651~~ PROC 8151 ~~ENGI 7691~~ PROC 8191	~~ENGI 8670, 8694, 8911~~ PROC 8270, 8294 Mechanical Engineering 8106

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6.6.2 Minor in Applied Science - Process Engineering for Chemistry Majors or Honours Students

~~For Chemistry Majors or Honours students, a Minor in Applied Science - Process Engineering will consist of Chemistry 1051, ENGI 3600, ENGI 4621, ENGI 4602 (or Chemistry 2301), ENGI 4625, and ENGI 4961 and 6 credit hours chosen from ENGI 5601, ENGI 6621, ENGI 6631, ENGI 6651, ENGI 7621, and ENGI 8671.~~

For Chemistry Majors or Honours students, a Minor in Applied Science - Process Engineering will consist of

- Chemistry 1051,
- PROC 3000 (or the former ENGI 3600),
- PROC 4021 (or the former ENGI 4621),
- PROC 4002 (or the former ENGI 4602 or Chemistry 2301),
- PROC 4025 (or the former ENGI 4625), and
- PROC 4661 (or Mechanical Engineering 4501 or the former ENGI 4661 or the former ENGI 4961)

and 6 credit hours chosen from

- PROC 5001 (or the former ENGI 5601),
- PROC 6021 (or the former ENGI 6621),
- PROC 6031 (or the former ENGI 6631),
- PROC 6151 (or the former ENGI 6651),
- PROC 7021 (or the former ENGI 7621), and
- PROC 7171 (or the former ENGI 8671).

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

Page 137, 2019-2020 Calendar, under the heading 7.3.2 Probationary Promotion, amend the section as follows:

"**7.3.2 Probationary Promotion**

[No changes to clauses 1, 2, 3]

4. To change Probationary Promotion to Clear Promotion for an academic term the student must satisfy the Faculty that he or she is competent in the subject of the Engineering program ~~ENGI~~ course(s) (courses with any of the prefixes CIV, ECE, ENGI, ME, ONAE, PROC) in which the student has failed to achieve 50%. This will normally entail re-examination(s) prescribed by the Faculty as a condition of probation, after which the student will be declared to have passed or failed a test of competency in the subject(s) concerned. No numerical grade will be

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assigned in a re-examination. Upon passing a re-examination, the original grade submitted for the course will be changed to PAS, but the promotion average will not change and a note of the original grade will remain on the transcript.

[No changes to clause 5]

6. In order to qualify for a re-examination in a failed Engineering program ~~ENGI~~ course, a student must obtain a grade of at least 40% in that course and must have completed any laboratory and/or project work in that course. Re-examinations are not normally available for senior project courses or for other courses in which the final examination is worth less than 40% of the grade.

[No changes to clauses 7 or 8]

9. To change Probationary Promotion to Clear Promotion for an academic term the student must repeat successfully any non-Engineering program ~~ENGI~~ course(s) which count towards the promotion average and in which the student has failed to achieve 50%.

[No changes to clauses 10, 11 or 12]

13. A student with Probationary Promotion from any of Academic Terms 3 to 7 who does not meet the requirements for Clear Promotion by the end of the registration period for the subsequent academic term must withdraw from the program. Permission to register for Engineering program ~~ENGI~~ courses to be repeated may be subject to the approval of the ~~Faculty~~ Head of the appropriate Department. Such students may apply for readmission to the Bachelor of Engineering program when they have satisfied the requirements for Clear Promotion."

Page 81, 2019-2020 Calendar, under the heading Resource-Based Industries Management, amend the section as follows:

"**6.8 Resource-Based Industries Management**

Students electing a Resource-Based Industries Management concentration should complete the following courses:

1. BUSI 5000, BUSI 5020, BUSI 5302, BUSI 5500, BUSI 7010, and BUSI 7410; and

2. any three of the following courses: BUSI 5250, BUSI 6040, BUSI 6410, BUSI 6415, BUS1 7322, BUSI 7500, BUSI 7510, Economics 3080, Economics 4090, ~~Engineering 8671,~~ Geography 2425, Geography 3425,

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Political Science 3210, Political Science 3250, Process Engineering 7171 (or the former Engineering 8671), Sociology 4091, and Sociology 4104; at least one of which must be chosen from Economics 3080, Economics 4090, ~~Engineering 8671,~~ Geography 2425, ~~and~~ Geography 3425 and Process Engineering ~~8671~~7171 (or the former Engineering 8671).

Students completing the Bachelor of Business Administration program must either choose two courses from Economics 3080, Economics 4090, ~~Engineering 8671,~~ Geography 2425, Geography 3425, Political Science 3210, ~~and~~ Political Science 3250~~,~~ and Process Engineering 7171 (or the former Engineering 8671), or must complete a non-Business elective in addition to the courses required for their program in order to meet clause 2.f. under Regulations for the General Degree of Bachelor of Business Administration (B.B.A.), The Curriculum.

Students considering choosing to complete Process Engineering ~~8671~~7171 must consult with the Undergraduate Programs Office, Faculty of Business Administration, regarding prerequisites."

Page 82, 2019-2020 Calendar, under the heading 7 Business Electives, in Table 4 Business Electives, third row of the table, last column, amend to read as follows:

"Process Engineering ~~8671~~7171"

Page 223, 2019-2020 Calendar, under the heading 13.21 Mathematics and Statistics, amend the section as follows:

"**13.21 Mathematics and Statistics**

2320 Discrete Mathematics covers basic concepts of mathematical reasoning: logic and quantifiers, methods of proof, sets and set operations, functions and relations, equivalence relations and partial orders, countable and uncountable sets. These concepts will be illustrated through the congruence and divisibility of integers, induction and recursion, principles of counting, permutations and combinations, the Binomial Theorem, and elementary probability.

CR: the former Computer Science 2740, Electrical and Computer Engineering 4110, ~~or~~ the former Engineering 3422~~-~~and the former Engineering 4424

PR: MATH 1001 or MATH 2050"

Page 483, 2019-2020 Calendar, under the heading 13.3.3 Minor in Chemistry, amend the section as follows:

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"**11.3.3 Minor in Chemistry**

Students who take a minor in Chemistry will complete Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), Chemistry 2100, 2210, 2301 or 2302, and 2400, and 6 credit hours in other chemistry courses at the 2000 level or above.

For Engineering students completing the Process Engineering major, a minor in Chemistry will consist of Chemistry 1050, 1051, 2100, 2210, 2301 (or Process Engineering 4002 or the former Engineering 4602), 2302, 2400 and 3 credit hours chosen from the remaining Chemistry courses at the 2000 level or above."

Page 515, 2019-2020 Calendar, under the heading 12.3 Chemistry, amend the section as follows:

"**12.3 Chemistry**

3303 Statistical Thermodynamics and Rate Theories examines physical chemistry from the microscopic viewpoint. Topics include probability distributions, quantum statistical mechanics, statistical thermodynamics, ensembles, kinetics and introduction to statistical rate theories as well as an introduction to computational chemistry (lab).
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: the former CHEM 3300
LH: 3
PR: Science 1807; CHEM 2301 (or Process Engineering 4002 or the former Engineering 4602), CHEM 2302, Mathematics 2000 (or Engineering 3424)"

Page 517, 2019-2020 Calendar, under the heading 12.4.1 First Year Courses, amend the section as follows:

"**12.4 Computer Science**
12.4.1 First Year Courses

1002 Introduction to Logic for Computer Scientists introduces methods of reasoning and logic tools that underlie computer science. In particular, this course covers propositional and predicate logic, sets and other discrete structures, as well as modular arithmetic and basic counting, with emphasis on their applications in computer science.
CR: COMP 2742, Electrical and Computer Engineering 4110, the former Engineering 4424, Mathematics 2320. Students cannot

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receive credit for COMP 1002 if completed with, or subsequent to, Mathematics 2320.
LH: 3"

Page 517, 2019-2020 Calendar, under the heading 12.4.2 Second Year Courses, amend the section as follows:

"**12.4 Computer Science**
12.4.2 Second Year Courses

2510 Programming in C/C++ is a comprehensive treatment of the C/C++ programming languages. It is intended for students with some first programming experience. This course starts with a discussion of fundamentals of C and C++, moves on to the object-oriented aspects of C++, and introduces some advanced topics. It is an essential course for mastering the power of this rich programming language.
CR: Electrical and Computer Engineering 3400, the former Engineering 3891
LH: 3
PR: COMP 1510 or COMP 1550 or COMP 1700 or COMP 1710 or COMP 1000 or COMP 1001 or Engineering 1020 (or equivalent)"

Page 519, 2019-2020 Calendar, under the heading 14.4.4 Fourth Year Courses, amend the section as follows:

"**12.4 Computer Science**
12.4.4 Fourth Year Courses

4301 Computer Vision (same as Electrical and Computer Engineering 8410 and the former Engineering 8814) studies how to develop methods that enable a machine to "understand" or analyze images. The course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.
CR: Electrical and Computer Engineering 8410, the former Engineering 8814
PR: COMP 3301 or Electrical and Computer Engineering 7410 or the former Engineering 7854 or permission of the instructor

4721 Operating Systems studies the design and implementation of an operating system's kernel. The main components used in operating system implementations include: context switches, process management, memory management, interprocess communication, file systems and system calls. The data structures and algorithms used in implementing the above

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components are studied. The different architectural styles of kernel implementation are also considered. Real-time operating systems are also discussed.
CR: Electrical and Computer Engineering 8400, the former Engineering 8894
PR: COMP 3725 or COMP 2004

4756 Image Processing will centre on the key analytical and algorithmic tools and concepts of digital image processing. Topics will include Transformations, Enhancement, Encoding, Data Bases, Segmentation and Description.
CR: Electrical and Computer Engineering 7410, the former Engineering 7854
LH: 3
PR: COMP 3719"

Page 522, 2019-2020 Calendar, under the heading 12.5.3 Third Year, amend the section as follows:

"**12.5 Earth Sciences**
12.5.3 Third Year

3210 Economic Mineral Deposits is an introduction to the study of mineral deposits and definition of the basic physio-chemical parameters of ore deposit formation. The course involves a systematic review of genetic models for the principal types of metallic mineral deposits, and links these models to a common theme of the relationship between lithosphere-hydrosphere-biosphere interactions and metallogeny. Laboratory exercises involve examination of representative suites of samples from different types of metallic mineral deposits and provide an introduction to the use of reflected light microscopy.
LH: 3
PR: either EASC 2031, 2502 and 2905; or EASC 2031 and Chemistry 3211; or Civil Engineering 3210 (or the former Engineering 3610); ~~and~~ or Mechanical Engineering 5103 (or the former Engineering 3205 or the former Engineering 5911)"

Page 524, 2019-2020 Calendar, under the heading 12.8.1 Mathematics Courses, amend the section as follows:

"**12.8 Mathematics and Statistics**
12.8.1 Mathematics Courses

2320 Discrete Mathematics covers basic concepts of mathematical reasoning, sets and set operations, functions, relations including equivalence relations and partial orders as illustrated through the notions

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of congruence and divisibility of integers, mathematical induction, principles of counting, permutations, combinations and the Binomial Theorem.
CR: the former Computer Science 2740, Electrical and Computer Engineering 4110, ~~or~~ the former Engineering 3422 ~~or~~, the former Engineering 4424
PR: MATH 1001 or 2050"

Page 530, 2019-2020 Calendar, under the heading 12.10 Physics and Physical Oceanography, amend the section as follows:

"**12.10 Physics and Physical Oceanography**

3500 Electromagnetic Fields I examines the laws of electrostatic and magnetostatic fields based on vector calculus and a local formulation. Topics covered include Gauss's law, potentials, energy and work, the multipole expansion, Laplace's equation and boundary conditions, linear dielectrics, electric polarization, electric displacement, capacitance~~.~~, magnetic fields B and H~~.~~, vector potentials, Lorentz force, magnetization and Maxwell's equations.
CR: Electrical and Computer Engineering 5700, the former Engineering 5812
PR: PHYS 2055 and Mathematics 3202

3550 Electric Circuits covers circuit elements. Simple resistive circuits. Techniques of circuit analysis. Topology in circuit analysis. Operational amplifiers. Reactive circuit elements. Natural response and step response of RL, RC and RLC circuits. Circuits driven by sinusoidal sources. Mutual inductance. Series and parallel resonance. Laplace transforms in the analysis of frequency response.
CO: Mathematics 2260
CR: Electrical and Computer Engineering 3300, the former Engineering 3821
LC: 6
LH: 6
PR: Mathematics 2050, Mathematics 2260 (or ~~(~~the former Mathematics 3260), PHYS 2055

4500 Electromagnetic Fields II covers electrodynamics and the applications of Maxwell's equations. Topics covered include electrodynamics (Maxwell's equations and boundary conditions), conservation laws (continuity equation, Poynting's theorem, and momentum conservation), electromagnetic waves (wave properties, reflection and transmission, absorption and dispersion, guided waves), radiation (potential and fields, dipole radiation, and radiation from point

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charges), and relativistic electrodynamics. Selected topics in electrodynamics and applied electromagnetism may be introduced.
CR: Electrical and Computer Engineering 6700, the former Engineering 6813
PR: PHYS 3500 and 3820"

21.3 School of Pharmacy

A CASPer Pilot Proposal was received from the School of Pharmacy. The CASPer pilot provides a low risk trial of a means of increasing the efficiency of their current non-academic assessment process (behavioural event interviewing) by allowing online, written assessment of an applicant's situational judgment.

Pilot Proposal

Pilot
Although the interviews are expensive and require significant volunteer involvement, we are not prepared to lose the personal interaction with our applicants, nor are we prepared to abandon the incredibly generous volunteerism of our student body without whom the interviews would not be possible. Therefore, we are proposing to use CASPer as an additional screening tool, prior to the face-to-face interview.

All applicants would be required to complete the CASPer upon application ($40 fee for the assessment and $10 fee to have their score distributed to Memorial). The SoP Admissions Committee would receive Z-scores and any red flag commentary from Altus Assessments, identified by each applicant's MUN Student ID number.

We propose to screen out the lowest performers (Z-score ≤ 1 indicating a score at least 1 SD below the mean). The remaining applicants would then be ranked based on their Academic Scores, which would remain unchanged from the current process.

This would result in greater confidence in interviewee selection, allowing the Admissions Committee to reduce the number of interviewees from 80 to 60, reducing the volunteer commitment from 2.5 days to 2.

Evaluation
Following the pilot of CASPer in the 2020 admissions cycle, the Admissions Committee plans to evaluate the process based on a number of criteria:

- Satisfaction of the Committee with CASPer
- Satisfaction of applicants with CASPer
- Correlation between CASPer and Non-Academic (Interview) Score

School of Pharmacy (cont'd)

The results of this evaluation will determine if we continue using CASPer as a screen for all applicants, if we discontinue use of CASPer or if we replace all or part of our current face-to-face interview with CASPer.

It was moved by Dr. S. Bugden, seconded by Dr. L. Rohr, to approve this proposal.

The floor was then opened up for questions/comments from Senators which included:

- Is there an appeals mechanism?
    - No appeals mechanism.
- Is there security? How do you know if the person taking the test is the correct person?
    - There is facial recognition and webcam.
- CASPer structure may help alleviate implicit bias.
- Nursing admissions across Canada is well established.
- Goal of pilot is to reduce interviews from 80 to 60 applicants.
- Other Pharmacy programs use it and we have consulted with them. The University of Waterloo is using it the same way we want to. Medical schools are also using it with good results.
- Students will be compared to like disciplines on the day of writing.

The motion was put to a vote and carried.

22. Report of the Academic Council of the School of Graduate Studies

22.1 Human Kinetics and Recreation

It was moved by Dr. A. Surprenant, seconded by Dr. L. Rohr, and carried that on page 645, 2019-2020 Calendar, amend the section 25 Regulations Governing the Degree of Master of Physical Education as follows:

"**XX. Regulations Governing the Degree of Master of Human Kinetics and Recreation**

- www.mun.ca/sgs/contacts/sgscontacts.php
- www.mun.ca/hkr

The Degree of Master of Human Kinetics and Recreation (MHKR) is offered to qualified full-time and part-time students by the School of Human Kinetics and Recreation. The **General Regulations** of the School of Graduate Studies of Memorial University of Newfoundland outlined in the current Calendar, and the Degree Regulations of the School of Human Kinetics and Recreation outlined below will apply to the Master of Human Kinetics and Recreation program.

Human Kinetics and Recreation (cont'd)

XX. 1 Qualifications for Admission

1. The admission requirements for the Master of Human Kinetics and Recreation are as given under the **General Regulations** of the School of Graduate Studies. Admission is limited and competitive. The deadline for receipt of applications is April 1 for admission into the subsequent Fall semester. Preference for admission may be given to students with undergraduate degrees in relevant disciplines, with a minimum overall B average. Applications submitted through the School of Graduate Studies will be evaluated by the Graduate Studies Committee of the School of Human Kinetics and Recreation. Admission of a student to the program shall be made by the Dean of Graduate Studies.

2. In addition to 1 above, students applying to the coursework route will demonstrate a minimum of three years of professional experience deemed appropriate.

3. Only in exceptional circumstances, and only on the recommendation of the Dean of the School of Human Kinetics and Recreation, shall the Dean of Graduate Studies consider applicants who do not meet the requirements above.

XX. 2 Program and Degree Requirements

1. The Degree of Master of Human Kinetics and Recreation consists of two options:
   a. **Option 1 – Thesis Route**: The program shall consist of a minimum of 12 credit hours in graduate courses, completion of HKR 6314 each fall and winter semester for the first 24 months of the program, plus a thesis. The thesis shall be on an approved subject in which empirical research has been conducted by the student under the direction of the Supervisor.
   b. **Option 2 – Coursework Route**. The program shall consist of a minimum of 30 credit hours in graduate courses in the student's major area of study.

2. The program of a student for the Master of Human Kinetics and Recreation in Option 1 shall be the responsibility of the Supervisory Committee, composed of the Supervisor and at least one other faculty member recommended with the concurrence of the Supervisor by the Dean of the School, or delegate.
   a. Students in this option shall be required to complete a minimum of 12 credit hours plus a thesis. All students shall be required to completed HKR 6500 as well as either HKR 6000 or HKR 6001. In addition, all on-campus students shall be required to

Human Kinetics and Recreation (cont'd)

complete four semester-length seminars represented by registration and successful completion of HKR 6314 (a non-credit, repeatable course) in each of four semesters during their tenure in the program. Off-campus or part-time students who cannot attend the on-campus seminar series can substitute 40 hours of participation in professional development (over their two-year tenure) which can include participation at national, provincial or regional conferences, workshops, professional development seminars, or equivalent activities. The remaining course requirements will be selected, in agreement with the Supervisory Committee, to reflect the areas of specializations offered with the School.

b. It is the responsibility of the student to arrange regular meetings with their supervisory committee. An annual report, prepared by the student and submitted to the Supervisor for approval, and signed by all members of the Supervisory Committee and the student, is submitted to the Dean of the School of Human Kinetics and Recreation (or delegate) as required by the School of Graduate Studies.

c. Depending on the background of the student or the student's area of intended specialization, a student's program may be modified. Such modifications may include a reduction in course requirements where a student demonstrates that the student brings graduate level competency to their program in specific areas, or may include additional graduate or undergraduate courses, as specified by the student's Supervisory Committee. A minimum of three courses or 9 credit hours completed in the School of Human Kinetics and Recreation is mandatory.

d. A student completing this option will be required to present a thesis proposal for the student's proposed thesis normally by the end of the third semester of study. The thesis proposal shall normally consist of a full written proposal (including literature review) submitted to the Supervisory Committee, a summary to be distributed to graduate students and faculty one week prior to the presentation and a formal presentation scheduled in conjunction with the Supervisory Committee. The student may be questioned on the student's proposal by the Supervisory Committee and audience. Any deficiencies noted during the presentation should be carefully considered by the student and the Supervisory Committee prior to proceeding with the thesis.

3. The program of a student for the Master of Human Kinetics and Recreation in Option 2 shall be the responsibility of the student and the Dean of the School, or delegate.

Human Kinetics and Recreation (cont'd)

a. Students in this option shall be required to complete a minimum of 30 credit hours. HKR 6500 and one of HKR 6000 or 6001 is normally required for all student.

4. In conjunction and collaboration with other Faculties and Schools of Memorial University of Newfoundland, students may pursue their special interests through electives from departments/schools outside the School of Human Kinetics and Recreation. These courses must be approved by the Graduate Studies Committee and the Dean of Graduate Studies in the preceding semester.

5. Students may apply for transfer course credits. All course transfers require the approval of the Dean of Graduate Studies, on the recommendation of the Dean of the School of Human Kinetics and Recreation, and are subject to General Regulation **Program Requirements, Transfer of Course Credits** of the School of Graduate Studies.

XX. 3 Evaluation

1. In order to continue as a student for a Master of Human Kinetics and Recreation Degree, a student who receives a final grade of 'C' or less in a program course must repeat that course and obtain a minimum grade of 'B'. In the case of an elective course a suitable replacement course, acceptable to the Graduate Studies Committee of the School of Human Kinetics and Recreation, may be substituted for the failed course. Only one such repetition/replacement shall be permitted in the student's graduate program. Should a grade of lower than 'B' be obtained in the repeated course/replacement course, or any other program course, the student shall be required to withdraw from the program.

2. When the Graduate Studies Committee of the School of Human Kinetics and Recreation has determined, through consultation with the student, the instructors of graduate courses and the program advisor or thesis Supervisor that the student's work has fallen below satisfactory level, it may request that the Dean of the School of Human Kinetics and Recreation recommend to the Dean of Graduate Studies that the student's program be terminated.

XX.4 Period of Study

The period of study for a graduate program shall not normally exceed seven years beyond first registration.

Human Kinetics and Recreation (cont'd)

1. A student in full-time attendance may register for a maximum of 12 credit hours in any regular semester and a maximum of 6 credit hours in intersession or summer session.

2. A student in part-time attendance may register for a maximum of 6 credit hours in any semester, including intersession or summer session.

XX.5 Thesis

1. The School of Graduate Studies General Regulation describes the requirements in **Theses and Reports**.

XX.6 Courses (titles will be changed once all title changes are confirmed)

- 6000 Quantitative Research Methods
- 6001 Qualitative Research Methods
- 6003 Culture and Society in Human Kinetics & Recreation
- 6111 Canadian Delivery Systems in Physical Education, Recreation and Sport
- 6120 Curriculum Development in Physical Education
- 6121 Leadership in Human Kinetics & Recreation
- 6122 Comprehensive Community and School Health
- 6123 Coaching and Long-term Athlete Development
- 6124 Adapted Physical Activity
- 6130 Computer Applications for Physical Activity Measurement and Intervention
- 6201 Foundations of Sport Psychology and Mental Training Techniques
- 6202 Intervention and Enhancement Techniques in Mental Training Consultation
- 6203 Sport Psychology Consulting
- 6310 Exercise Physiology I
- 6314 Graduate Seminar Series (repeatable, non-credit)
- 6320 Exercise Physiology II
- 6330 The Application and Implementation of Kinesiology Technologies
- 6340 Occupational Biomechanics
- 6350 Human Error in Complex Work Systems
- 6360 Knowledge Translation: Applications to Ergonomics and Occupational Health and Safety
- 6370 Movement and Neural Science
- 6410 Sport and Society
- 6420 History of Physical Education, Recreation and Sport
- 6500 Introduction to Research in Physical Education
- 6600 Contemporary Issues and Trends in Human Kinetics & Recreation

Human Kinetics and Recreation (cont'd)

- 6710-6719: Individual Reading and Research in Special Areas of Exercise and Work Physiology
- 6720-6729: Individual Reading and Research in Special Areas of Biomechanics and Ergonomics
- 6730-6739: Individual Reading and Research in Special Areas of Human Kinetics & Recreation

~~**25.1 Qualifications for Admission**~~

~~1. Admission is limited and competitive. The deadline for receipt of applications is May 1 for admission into the subsequent Fall semester. To be considered for admission an applicant shall normally hold a Bachelor's Degree in Physical Education, Recreation and Leisure Studies, or a related discipline, with at least second class standing, from an institution recognized by Senate. In addition to the above, preference will be given to applicants with at least two years of work experience, obtained either through Cooperative Education programs or through employment deemed appropriate.~~

~~2. Any other applicant who holds a Bachelor of Physical Education or Recreation and Leisure Studies Degree or its equivalent may be considered for admission provided that:~~

~~a. the applicant's undergraduate record after the first year shows an average of at least grade B in physical education and/or recreation and leisure studies courses, OR~~

~~b. the applicant has raised the overall academic standing to second class following the completion of the undergraduate degree, through the successful completion of an approved pattern of undergraduate courses.~~

~~3. Only in exceptional circumstances and only on the recommendation of the School of Human Kinetics and Recreation shall the Dean of Graduate Studies consider applicants who do not meet these admission requirements.~~

~~**25.2 Program of Study and Research**~~

~~1. The Degree of Master of Physical Education is offered under two options:~~

~~**Option 1**. The program shall consist of a minimum of 12 credit hours in graduate courses plus a thesis. The thesis shall be on an approved subject in which systematic research has been conducted by the candidate under the direction of the Supervisor.~~

~~**Option 2**. The program shall consist of a minimum of 24 credit hours in graduate courses plus a comprehensive examination in the candidate's major area of study.~~

~~2. The candidate's major area of study shall be Administration, Curriculum, and Supervision in Physical Education.~~

~~In conjunction and collaboration with other Faculties and Schools of Memorial University of Newfoundland, students may pursue their special interests through an interdisciplinary course of study. The student's~~

Human Kinetics and Recreation (cont'd)

~~interests may be accommodated through individual reading and research in these special areas.~~

~~3. The required courses for the degree shall normally include:~~

~~**Option 1**:Candidates for the Master of Physical Education (Option 1) shall be required to complete a minimum of 12 credit hours plus a thesis. Either HKR 6000 or HKR 6001 is normally required for all candidates. In addition, all on-campus candidates shall be required to complete four semester-length seminars represented by registration and successful completion of HKR 6314 (a non-credit, repeatable course) in each of four semesters during their tenure in the program. Off-campus or part-time candidates who cannot attend the on-campus seminar series meet with the course instructor to discuss alternate evaluation. The remaining course requirements will be selected, in agreement with the Supervisory Committee, to reflect the student's area of research interests.~~

~~It is the responsibility of the student to arrange regular meetings with their supervisory committee. An annual report, prepared by the student and signed by the Supervisor and all members of the Supervisory Committee, is submitted to the Dean of the School of Human Kinetics and Recreation (or delegate) as required by the School of Graduate Studies.~~

~~A student completing a Master of Physical Education will be required to present a thesis proposal for the student's proposed thesis normally by the end of the third semester of study. The thesis proposal shall normally consist of a full written proposal (including literature review) submitted to the Supervisory Committee. A summary of the proposal is to be distributed to graduate students and faculty one week prior to the scheduled presentation. The candidate may be questioned on the candidate's proposal by the Supervisory Committee and seminar audience. Any deficiencies noted during the presentation should be carefully considered by the student and the Supervisory Committee prior to proceeding with the thesis.~~

~~Evaluation of the thesis shall be governed by School of Graduate Studies **General Regulations, Theses and Reports**. The thesis shall normally be evaluated by two examiners approved by the Dean.~~

~~When the thesis or project report has been completed to the satisfaction of the Dean, the Dean shall recommend that the candidate be awarded the degree.~~

~~**Option 2**: HKR 6500 plus 21 credit hours in HKR courses (plus comprehensive examination).~~

~~Equivalent courses may be substituted from other Faculties or Schools subject to the approval of the School of Human Kinetics and Recreation Graduate Studies Committee.~~

~~**25.3 Evaluation**~~

~~1. Candidates must obtain an A or B grade in each program course. In accordance with General Regulation **Evaluation, Evaluation of Graduate Students** only one course may be repeated.~~

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~~2. When the Dean has determined, on the basis of consultation with the candidate and the instructors, that a candidate's work has fallen below a satisfactory level, the Dean may recommend to the Dean of Graduate Studies that the candidate be required to withdraw from the program.~~

~~**25.4 Comprehensive Examinations**~~

~~1. Candidates electing to qualify for the Degree under Option 2 must write a comprehensive examination. The comprehensive examination shall examine the candidate's ability to integrate and apply material from all course work completed during study for the Degree. The candidate may be required to appear for an oral examination.~~

~~2. The comprehensive examination shall normally be constructed and evaluated by an examining committee of three examiners, at least two of whom shall be faculty members of the School of Human Kinetics and Recreation appointed by the Dean on the recommendation of the Dean of the School.~~

~~3. A candidate may not write the examination before completing the course work for the Degree.~~

~~***Note:***~~

~~*Every candidate in graduate studies shall comply with the* ***General Regulations****, the Degree Regulations and any additional requirements of the Department.*~~"

Page 668, 2019-2020 Calendar, under the heading 30.2 Program and Degree Requirements, amend the section as follows:

"**30.2 Program and Degree Requirements**

~~1. The Degree of Master of Science in Kinesiology is offered in the areas of Biomechanics/Ergonomics, Exercise and Work Physiology, Psychology of Sport, Exercise and Recreation, and Socio-cultural Studies of Physical Activity and Health.~~

2. The program of a student for the Master of Science in Kinesiology shall be the responsibility of the Supervisory Committee, composed of the Supervisor and at least one other faculty member recommended with the concurrence of the Supervisor by the Dean of the School, or delegate."

23. Report from Scholarships and Awards Committee

A memorandum dated August 20, 2019, was received from Larry Bauer, Chair, Senate Committee on Undergraduate Scholarships, Bursaries and Awards, regarding Medals of Academic Excellence.

At a meeting held on July 10, 2019, the Senate Committee on Undergraduate Scholarships, Bursaries and Awards considered a

Report from Scholarships and Awards Committee

memorandum requesting recommendations on the monetary awards associated with Medals of Academic Excellence.

Following careful discussion, the Committee felt that the monetary component of the Medals of Academic Excellence is secondary to the prestige associated with being awarded the Medal, and that the current award of $50 diminishes rather than enhances that prestige.

It was moved by Mr. T. Nault, seconded by Dr. S. Bugden, and carried that this request be approved and the $50 award be removed from university medals.

24. Remarks from the Chair

24.1 The President commented on the following:

- Research Week
- Budget Consultations to begin. November 18th at Grenfell Campus and November 19 at St. John's Campus.
- No discussions with new Government
- Received response for Joint Pension Proposal

24.2 Presentation on Post-Secondary Education Review

The President invited Ms. Victoria Collins, Executive Director, Marketing & Communications, and Ms. Sandy Brennan, Manager of Public Engagement Supports, to give a presentation on the Post-Secondary Education Review.

Ms. Collins and Ms. Brennan gave a slide presentation on Preparing for the 2018 PSE Review.

The President then opened the floor to Senators for any questions and comments regarding the Post-Secondary Education Review.

24.3 Presidential Search Committee

The President noted that when the Presidential Search Committee has concluded its work and has a recommendation for the next president, there will be a special meeting of Senate called for the Board of Regents to consult with Senate. This meeting is typically called with short notice, likely 24 to 48 hours notice, and is coordinated with a Board of Regents meeting and submission of the recommendation to lieutenant governor in council for approval. Members of Senate are asked to rearrange their schedules as needed, to attend this important meeting.

25. OTHER BUSINESS

25.1 Governance Town Hall

Dr. Ken Snelgrove noted that MUNFA is sponsoring a Town Hall on University Governance at Memorial tomorrow evening at 6:30 p.m. in A1043 and extended an invite to all Senators who would be interested in attending. It will also be broadcasted to Grenfell Campus in Room AS375.

26. ADJOURNMENT

The meeting adjourned at 5:10 p.m.

_____ _____

CHAIR SECRETARY