MEETING OF THE FACULTY COUNCIL OF THE FACULTY OF SCIENCE

A regular meeting of the Faculty Council of the Faculty of Science will be held on Wednesday, November 18, 2015, at 1 p.m. in C-2045.

AGENDA

1. Regrets

2. Adoption of the Minutes of October 21, 2015

3. Business Arising from the Minutes

4. Correspondence:
   a. Letter from Senate regarding Senate Reform, feedback requested on the Draft Terms of Reference, paper 4.a (2 pages).

5. Reports of Standing Committees:
   A. Undergraduate Studies Committee:

   B. Graduate Studies Committee: None
   C. Nominating Committee: None
   D. Library Committee: None

6. Reports of Delegates from Other Councils

7. Report of the Dean

8. Question Period

9. Adjournment

Mark Abrahams
Dean of Science
FACULTY OF SCIENCE
FACULTY COUNCIL OF SCIENCE
MINUTES OF MEETING OF OCTOBER 21, 2015

A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, October 21, 2015, at 1:00 p.m. in room C-2045.

FSC 2364
Present
Biology
Leroux, S. Roncal, J.

Chemistry
Bottaro, C. Fridgen, T. Merschrod, E.

Computer Science
Tang, J.

Mathematics & Statistics
Booth, I. Loredo-Osti, J. MacLachlan, S. Merkli, M.
Sullivan, S.

Physics & Physical Oceanography
Curnoe, S. Lagowski, J. Morrow, M. Munroe, J.
Plumer, M.

Psychology
Neath, I. Thorpe, C.

Dean of Science Office
Abrahams, M. Foss, K. Foster, A. Mackenzie, T.
Rideout, J. Zedel, L.

Economics
Waples, J.

DELTS
Todd, A.

Library
Ambi, A.

Registrar’s Office
Burry, J.
School of Music
Cook, N.

Faculty of Business
Clift, T.

Undergraduate Students
Hillier, P.

FSC 2365 Regrets
Berry, M. Duan, X. Poduska, K. Stordy, M.

FSC 2366 Adoption of Minutes
Moved: Minutes of the September 16, 2015, meeting be adopted. (Sullivan/Loredo-Osti). Carried. One Abstention.

FSC 2367 Business Arising: None

FSC 2368 Correspondence:
  a. Letter from Senate Committee on Undergraduate Studies regarding Date for Submission of Calendar Changes for 2016-2017.
  b. Email from Senate Committee on Undergraduate Studies regarding the distribution list for consultation on calendar changes.
  c. Email from Marlies Rise, CFI Innovation Fund.

FSC 2369 Reports of Standing Committees:
A. Undergraduate Studies Committee
  Report presented by Shannon Sullivan, Chair, Undergraduate Studies Committee.
  a. Moved: Department of Chemistry, calendar changes, Joint Honours program in Biochemistry and Chemistry (Sullivan/Fridgen). Carried.
  b. Moved: Department of Chemistry, calendar changes, Joint Honours program in Applied Mathematics and Chemistry (Sullivan/Fridgen). Carried.
  c. Moved: Department of Mathematics and Statistics, calendar changes (Sullivan/Merkli). Carried.
  d. Moved: Department of Ocean Sciences, calendar changes, OCSC/BIOL 4122 and OCSC/BIOL 4601 (Sullivan/Fridgen). Carried.
B. Graduate Studies Committee:
Report presented by J.C. Loredo-Osti, Chair, Graduate Studies Committee.

C. Nominating Committee:
Presented by Len Zedel, Associate Dean (Graduate and Research).

D. Library Committee: None.

FSC 2370 Reports of Delegates from Other Councils:
Tom Clift, representative from the Faculty of Business, commented that they are examining tuition rates for their MBA program. He explained that rates at Memorial are the lowest in the country which presents perceptual issues for students comparing programs.

FSC 2371 Presentation on Accommodations for Students with Disabilities
Sheila Devine, Office of the General Counsel, and Ruth North, Student Affairs and Services, spoke to Council about the university’s obligation to accommodate students with disabilities. The presentation was a general overview of our contractual duty and explained through examples the concept of “undue hardship” in making reasonable accommodations. They have offered to present a more in-depth session to departments. Materials distributed at their presentation are attached.

FSC 2372 Report of the Dean
Presented by Mark Abrahams, Dean

The Science awards ceremony was held on September 22 in the Bruneau Innovation Centre. For those of you that attended, you should have noticed that we had the largest turn out ever, to the point that the audience exceeded the capacity of the room. The Dean believes that anybody who wants to participate in this celebration should be welcome to attend so we will require a bigger venue for next year. The Council will be updated when that has been determined.

Memorial University is preparing its Round 2 application for the Canada First Research Excellence Fund. This application is being led by the Faculties of Science and Arts and the Marine Institute within the theme of Sustainable Development of Marine Resources. The Dean is particularly grateful to the work that has been done to date by faculty in developing this proposal. Within the terms of this competition, we are working with partner institutions and have
scheduled a videoconference for October 22 to determine how best to collaborate with Dalhousie University on our submissions.

The Dean would like to congratulate Dr. Shannon Sullivan for being appointed Chair of the Senate Committee on Undergraduate Studies. It is his expectation that Shannon will bring the same enthusiasm and commitment to that position that he brought to his position as Chair of the Science Committee on Undergraduate Studies. On that note, the Dean also pointed out that we have rescheduled the December meeting of Science Council ahead by one week from December 16 to December 9 in order to ensure that our material requiring Calendar changes meets the Senate Committee’s deadline.

For those of you that look at the site of the future Science building, you will have noticed that excavation has now begun. Design phases of the building are now complete so you should soon see tangible outcomes of the efforts that so many have contributed.

Fall convocation for the Faculty of Science is Friday, October 23, at 3 pm in the Arts and Culture Centre. I hope that many of you will join the academic procession and honour the efforts of our graduating students.

An honorary degree recipient this year is Dr. Sylvester Gates Jr. Dr. Gates spent part of his childhood in St. John’s while his father was in the military, and it was during that time that his interest in Science was sparked. He went on to receive two bachelor degrees and his Ph.D. in supersymmetry from MIT and has been the recipient of many awards including the US National Medal of Science. He is known as an outstanding communicator and will be giving a research presentation in C-2045 at 3 pm on October 26 on “Seeing the mathematics behind supersymmetry theories”. He will also be giving a public lecture that same day at 7 pm in EN 2043 titled “From the Mathematics of Supersymmetry to the Music of Arnold Schoenberg”

FSC 2373  Question Period

FSC 2374  Adjournment
The meeting adjourned at 1:58 p.m.
Accommodations for Students with Disabilities Policy

Principle:

Memorial University of Newfoundland is committed to ensuring an environment of understanding and respect for the dignity and worth of each student and also to supporting inclusive education based on the principles of equity, accessibility and collaboration.

Purpose:

To establish principles, guidelines and responsibilities respecting access to University services, facilities and housing for students with disabilities in accordance with the Human Rights Act, 2010.

Scope:

All University students who are registered in credit or non-credit courses, and/or programs, who are participating in University events, or activities, and who have self-identified and have been documented as having a Disability, and all applicants for admission to programs at the University and those who are in the process of applying.

Definitions:

Academic Accommodation – a change to teaching or evaluation procedures, which is designed to accommodate the particular needs of a student with a Disability without compromising Academic Integrity of the course, program, or assignment.

Academic Integrity - Demonstration of acquisition of a body of knowledge or the skill normally required for passing a course and/or completing a course or program as determined by the Instructor and/or the Unit and subject to University regulations.

Accommodation – An overarching term referring to either an Academic Accommodation or Non-academic Accommodation or both. See Examples of Accommodations for Students with Disabilities.
The Act – *Human Rights Act, 2010*

**Disability** - as per The Act, section 2(c) means one or more of the following conditions:

1. degree of physical disability;
2. condition of mental impairment or a developmental disability;
3. learning disability, or a dysfunction in one or more of the processes involved in understanding or using symbols or language; and,
4. mental disorder.

**Instructors** - persons appointed by Memorial University of Newfoundland to teach/supervise students who are registered in Memorial University credit or non-credit courses or programs.

**Non-academic Accommodation** – a change to University activities and services which is designed to accommodate the particular needs of a student with a disability, that is not otherwise considered Academic Accommodation.

**Unit** – includes academic, academic support and administrative units which are engaged in the delivery of courses, programs, housing, services or in support of the delivery of courses, programs and services.

**Unit Head** – refers to Deans; Academic, non-Academic and Administrative Directors; Division Heads; School Heads; Executive Directors; the University Librarian; the University Registrar; Associate Vice-Presidents and the Vice-Presidents, as applicable to the circumstance.

**University** - Memorial University of Newfoundland.

**Policy:**

**1.0 Legal Framework**

This policy derives from The Act which:

- is premised on the principle of equality of every individual in dignity and rights;
- provides for equal rights and opportunities without discrimination; and,
- strives for a climate of understanding and mutual respect for the dignity and worth of each person.

The Act prohibits discrimination on a number of grounds including Disability. The University prohibits discrimination on the grounds of a Disability in accordance with The Act.
2.0 Accommodation and Undue Hardship

2.1 The University has a responsibility to provide Accommodation to those students with Disabilities within the scope of this policy. The responsibility is shared with students and is based on communication and mutual respect for each party's obligations. The goal of Academic Accommodation is not to lower or diminish academic standards but to enable students to meet the standards.

2.2 The obligation of the University is to provide reasonable Accommodation up to the point of undue hardship. This means some hardship may be required. The onus is on the University to demonstrate that it will suffer undue hardship if an Accommodation is granted.

2.3 Undue hardship must be considered in the context of each request for Accommodation. Factors in determining whether undue hardship exists will include:

(i) risk to public safety or a substantial risk of personal injury;

(ii) financial cost; significant costs related to a requested Accommodation shall be considered in the context of the University as a whole, not on the basis of a Unit;

(iii) the Accommodation unreasonably impedes the ability of other students to pursue their studies; or,

(iv) when Accommodation alternatives would result either in lowering academic standards or requiring substantial alteration of essential course or program requirements, of facilities, of University activities or events or of delivery methods.

3.0 Designation of Campus Co-ordinating Centres

3.1 The University has designated the following co-ordinating centres to facilitate and promote an accessible learning environment for students with Disabilities:

- Glenn Roy Blundon Centre, University Counselling Centre, Office of the Deputy Provost (Students) and Vice-President (Academic) Undergraduate Studies, St. John's campus.
- Student Affairs Office, Academic and Student Affairs, Marine Institute.
- Learning Centre, Department of Student Affairs, Grenfell Campus.

The campus coordinating centre at the campus sending students to Harlow will co-ordinate any Accommodations.

3.2 The campus coordinating centres have a responsibility to review documentation to ensure that recommendations and decisions about Accommodations are based on appropriate medical and/or psycho-educational information and diagnostic assessment in accordance with the Procedure for Documentation Regarding a Student's Accommodation Request.
3.3 In collaboration with the University community, the co-ordinating centres shall promote awareness and provide advice, information and assistance with respect to the provision of Accommodations for students with Disabilities. This includes the provision of training and education to Instructors, staff, administrators, and any committee dealing with Accommodation issues so they are knowledgeable about relevant University policies and procedures and are familiar with broader ethical and legal issues regarding persons with Disabilities. The Examples of Accommodations for Students with Disabilities and the Guidelines for Accommodations for Students with Disabilities resource documents are available to assist in the role of training and education.

3.4 There shall be two Advisory Committees for Students with Disabilities – one for the St. John’s region and one for Grenfell Campus.

4.0 Responsibilities of the University toward Students with Disabilities

The campus co-ordinating centres and the Unit have a shared responsibility to cooperatively facilitate the provision of Accommodation to students which includes the responsibility to:

4.1 Provide each student who self-identifies with a Disability, information about the specific services and Accommodations available at the respective campus and make referrals to additional services or agencies at the University and/or external to the University. With certain Disabilities, students may lack the requisite knowledge and/or insight to disclose their need for Accommodation. In such situations, it is important to seek advice on how to address this issue. In most circumstances, such advice and information is provided by the appropriate campus co-ordinating centre.

4.2 Provide qualified applicants consideration for admission to the University without discrimination. Admission to the University does not in and of itself guarantee that Accommodation for Disability will be made. Certain courses and programs require physical fitness, agility or technical standards for either admission or completion. The nature and degree of a particular Disability may mean that no reasonable accommodation would enable a student to meet the requirement of the course or program of study. It is incumbent upon Units to determine whether or not a reasonable Accommodation can be made. Reasonable options for Accommodation must be thoroughly considered before a decision regarding admission or completion is made.

4.3 Provide its services, including courses and programs, housing and facilities, accessible to students with Disabilities up to the point of undue hardship.

4.4 Ensure a social and physical environment that is diverse, inclusive and accessible to all. Where applicable, Units must: consult with the coordinating centre(s) for ensuring physical accessibility is included in designing new space, renovating existing space, and managing facility accessibility.

4.5 Provide Accommodation up to the point of undue hardship without compromising the Academic Integrity of the course, program, or assignment where the accommodation reached
is on academic grounds.

4.6 Provide guidance and assistance to students who are engaging in or engaged in Memorial University's courses or programs off campus.

4.7 Handle all information about a student's Disability as confidential and in accordance with the Access to Information and Protection of Privacy Act, other privacy legislation to which the University is subject and University policies. However, the University needs sufficient information to reasonably evaluate and respond to a student's request for Accommodation as follows:

i. The Accommodation process may require that the student, and/or the appropriate campus co-ordinating centre, with the student's knowledge, and written consent, disclose sufficient information about the nature of his/her Disability to staff and faculty beyond the campus co-ordinating centre on the basis that they have bona fide need to know this information to consider and implement Accommodation requests.

ii. Information relating to a student's Disability may be disclosed without the student's knowledge, and written consent, only when required by University policy or the law, and with the proviso that the recipient be made aware of the confidentiality of the information.

iii. When a student has been inactive at the University for more than three years, all documentation with respect to accommodation held by the appropriate campus co-ordinating centre(s) will be destroyed.

4.7 Inform decision makers (including Instructors, staff, administrators and members of various committees) of the duty to accommodate students with Disabilities.

5.0 Responsibilities of Students with Disabilities

5.1 Each student who seeks Accommodation must:

i. self-identify in accordance with the Procedure for Arranging Student Accommodation;

ii. collect and retain a copy of the necessary medical and/or psycho-educational information and diagnostic assessments for submission to the applicable campus co-ordinating centre(s);

iii. provide requests for Accommodation in a timely manner. Failure to disclose in accordance with the Procedure for Arranging Student Accommodation may result in delays in assessing the request and/or in providing any Accommodation;

iv. ensure the request for Accommodation or for a change in Accommodation needs is brought to the attention of appropriate personnel. This includes Instructors, the Disability service provider at the appropriate campus co-ordinating centre, library staff, housing staff, work placement coordinators, etc. See the Procedure for Arranging Student Accommodation;
v. cooperate with the University in exploring reasonable possibilities and options for Accommodations; and,

vi. seek, where available, potential funding sources from outside the University and assign any such funding received to the University to the extent that the services or Accommodations incur costs by the University. Students are advised to consult with the appropriate campus co-ordinating centre if they require assistance identifying potential funding sources.

6.0 Institutional Standards

6.1 Students must meet any established institutional standards in accordance with course and program requirements.

6.2 The University must ensure that essential academic, technical, and/or physical standards are not lowered or compromised. These standards refer to the knowledge and skills which must be acquired or demonstrated in order for the student to successfully meet the learning objectives of the course or program of study.

6.3 Any student with a Disability who has been reasonably accommodated and who does not meet the established academic, technical and/or physical standards may be denied admission to a course or program of study, or once in the program, may be denied continued participation or successful completion, in the same manner that any other student would be.

Related Documents:

*Human Rights Act, 2010*

*Access to Information and Protection of Privacy Act, 2002*

Examples of Accommodations for Students with Disabilities
Guidelines for Accommodations for Students with Disabilities

University Calendar
Marine Institute Calendar

Privacy Policy
Information Request Policy

Terms of Reference of the Advisory Committee on Students with Disabilities – St. John’s area
Terms of Reference of the Advisory Committee on Students with Disabilities – Corner Brook area
Procedures

- Procedure For Arranging Student Accommodation
- Procedure For Documentation Regarding A Student’s Accommodation Request
- Procedure When A Student Accommodation Request Cannot Be Arranged

Title: Accommodations for Students with Disabilities

Category: Student Life

Effective Date: 2013-07-04

Approval Date: 2013-07-04

Review Date: 2017-07-04

Authority:
Deputy Provost (Students) and Associate Vice-President (Academic) Undergraduate Studies - St. John's campus; Associate Vice-President, Academic and Student Affairs (Marine Institute); and, Associate Vice-President Academic (Grenfell)

Sponsor:
Student Life

Contact:
Glenn Roy Blundon Centre – Office of the Deputy Provost (Students) and Vice-President (Academic) Undergraduate Studies. E-mail: blundon@mun.ca Phone: 864-2156 (voice) or 864-4763 (TTY)

Previous Versions:
Please contact the Policy Office to view any of the following previous policy versions:

- 2006-07-20
- 2006-07-20
Accommodations for Students with Disabilities Policy

THIS POLICY ESTABLISHES PRINCIPLES, GUIDELINES AND RESPONSIBILITIES RESPECTING ACCESS TO UNIVERSITY SERVICES, FACILITIES AND HOUSING IN ACCORDANCE WITH THE NEWFOUNDLAND AND LABRADOR HUMAN RIGHTS ACT, 2010.

This policy helps Memorial University to ensure an environment of understanding and respect for the dignity and worth of each student and to support inclusive education based on the principles of equity, accessibility and collaboration.

This policy affects all university students who have self-identified and are documented as having a disability, as well as applicants for admission.

Policy Development
- Derives from the NL Human Rights Act, 2010, which prohibits discrimination on a number of grounds, including disability
- Endorsed by Senate May 14, 2013
- Approved by the Board of Regents July 4, 2013
- Enhances the previous July 2006 policy (which was limited to academic accommodation)

Examples of disability:
Vision loss, hearing loss, AD/HD, learning disabilities, mobility conditions, broken limbs, seasonal affective disorder, diabetes, addictions, phobias, anxiety, depression, bi-polar disorder, schizophrenia, etc.

What is an accommodation?
An accommodation is a change or modification of a rule, regulation, policy or practice that is made to enable an individual to reach an academic or non-academic standard without compromising any essential standards.

What is a disability?
A disability can be a:
- Degree of physical disability
- Condition of mental impairment or a developmental disability
- Learning disability or a dysfunction in one or more of the processes involved in understanding or using symbols or language
- Mental disorder

Accommodations are a responsibility shared by students, faculty and staff

Memorial University is responsible for:
- Providing reasonable accommodation up to the point of undue hardship
- Providing information to students with disabilities
- Providing referrals to additional services and agencies
- Handling information about a student's disability in a confidential manner
- Providing advice to units when students are unable to disclose the need for accommodation
- Considering admission without discrimination
- Providing accommodation without compromising academic integrity
- Providing guidance and assistance to those engaged in off-campus courses and programs
- Providing a social and physical environment that is diverse, inclusive and accessible

Students are responsible for:
- Self-identifying in accordance with the procedures associated with this policy
- Collecting and retaining copies of necessary medical and/or psycho-educational information and diagnostic assessments
- Providing requests in a timely way
- Ensuring requests or changes are brought to the attention of the appropriate personnel
- Co-operating in exploring reasonable accommodation
- Seeking outside sources of funding for accommodations costs, where available

mun.ca/policy
What accommodations are available at Memorial University?

Examples of accommodations:

- Academic accommodations for tests and exams, including the Math Placement Test and Distance Education courses (e.g. specified extended time)
- Sign language interpretation
- Wheelchair desks
- Note-taking assistance
- Access to TTYs and telephones with amplification
- Assistive technology (e.g., ZoomText, JAWS, Kurzweil 3000, and closed-circuit televisions)
- Alternative format materials (e.g. electronic text)

For other accommodations, or for new requests, please contact a Campus Co-ordinating Centre

Campus Co-ordinating Centres

Role
Campus Co-ordinating Centres promote awareness and provide advice, information and assistance with respect to accommodation in collaboration with the university community. The centres also provide training and education, as well as review documentation respecting accommodations.

Contact
St. John's Campus: Glenn Roy Blundon Centre
T: 709 864 2155   E: blundon@mun.ca
mun.ca/blundon

Marine Institute: Student Affairs
T: 709 757 0702   E: Charlotte.Dove@mi.mun.ca
mi.mun.ca/departments/disabilityservices

Gratefell Campus: Learning Centre
T: 709 637 6268
E: studentservices@gratefell.mun.ca
swgc.mun.ca/student-services/learning-centre

Harlow Campus: The Campus Co-ordinating Centre of the campus sending students to Harlow will co-ordinate any accommodations.

TTY service is available for individuals who are deaf or hard of hearing. A payphone TTY is available in the lobby of the QEII Library.
TTY: 709 864 4763, Blundon Centre
TTY: 709 864 7906, 24-hour service through Campus Enforcement & Patrol

What is your role?

Accommodations for Students with Disabilities Policy
mun.ca/policy
29 October 2015

TO: Chairs and Secretaries, Undergraduate Studies Committees; Chairs and Secretaries of the Academic Councils of Faculties, Schools, Grenfell Campus, Marine Institute

FROM: Sheila Singleton, Secretary of Senate

SUBJECT: Senate Reform

At its October 14, 2014, meeting the Senate approved the terms of reference and membership for an ad hoc committee on Senate reform. The ad hoc Committee, as part of its mandate, was directed by Senate to consider the effectiveness of current Senate Standing Committees and the potential usefulness of additional Standing Committees. In its Interim Report, presented at the 12 May 2015 meeting of Senate and found at www.mun.ca/senate/Interim_Report_to_Senate.pdf, the ad hoc Committee recommended the abolishment of some less active Standing Committees, maintaining the most relevant of their responsibilities by disbursing them among the remaining committees, and the adoption of a Standing Committee on Teaching and Learning, which would absorb, as appropriate, the duties of the Committees on Course Evaluation and Educational Technology.

The ad hoc Committee is now requesting feedback on the idea of the Teaching and Learning Committee and the attached draft terms of reference. I would appreciate it if you could add a discussion item regarding the Teaching and Learning Committee to your next meeting agenda. Feedback can be directed to the Secretary of Senate, c/o the Office of the Registrar, A-2002.

If you require clarification, or would like to invite some members of the ad hoc Committee on Senate Reform to join your meeting, please get in touch with me by phone at 864-4437 or via e-mail at ssinglet@mun.ca.

Sheila M. Singleton
Secretary of Senate

SMS/bjh
Senate Teaching and Learning Committee

Draft Terms of Reference:

a. To promote both Senate and university-wide discussion regarding matters of teaching and learning

b. To recommend to Senate the adoption of policies and procedures to advance teaching and learning

c. To recommend to Senate the adoption of policies and procedures to enhance the student educational experience

d. To review qualitative and quantitative data from internal and external sources on student engagement and the student educational experience, and to make recommendations to Senate regarding the same

e. To recommend to Senate the adoption of policies and procedures for student ratings of instruction or other forms of evaluation of faculty teaching (i.e., absorb the Senate Committee on Course Evaluation)

f. To monitor new developments in teaching approaches and pedagogies and to inform Senate of such developments

g. To consider and advise on academic matters and planning for areas of innovative education

h. To foster and recognize teaching excellence

i. To serve as the selection committee for any teaching awards

j. To maintain close liaison and collaborate with the Director of DELTS and others on campuses who contribute to the quality of learning and teaching at the university

k. To ensure that student perspectives are included in developing supports for faculty and graduate student teaching assistants to improve the overall student learning experience.
November 9, 2015

TO: All Members, Faculty Council of Science
FROM: Joan Burry, Secretary
       Committee on Undergraduate Studies, Faculty of Science
SUBJECT: Calendar Changes, New Course Proposal and New Minors Proposal

At a meeting held on November 2, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) “Housekeeping” Calendar Changes
   (b) Changes to Physics requirements for Chemistry majors and joint majors programs

2. Department of Chemistry- new course proposal, Chemistry 4701: Principles of Pharmaceutical Chemistry

3. Department of Chemistry- new minors proposal:
   (a) Minor in Chemistry for Process Engineering majors
   (b) Minor in Applied Science-Process Engineering for Chemistry majors

Joan Burry
Associate Registrar and
Secretary: Committee
on Undergraduate Studies,
Faculty of Science
Proposal
Minor Calendar Changes for Some Chemistry Courses
and
Allowing Physics 1021 as an Alternate Course to Physics 1051 for Chemistry Majors and Honours Programs As Well As Most Chemistry Joint Honours Programs

Executive Summary

Many of the calendar changes are simply house-keeping items. Included with these is a change to allow non calculus-based physics (PHYS 1021) to be acceptable in addition to the currently accepted calculus-based physics (PHYS 1051) for some Chemistry Honours, Majors and Joint Programs.

Resource Implications:

Instructional Costs

There are no new courses or new sections of courses, therefore no resource implications.

Library Holdings and/or Other Resources Required

There are no library or other resources required.

Signature of Unit Head (if appropriate):

Date:

Signature of Dean/Associate Vice-President (Academic)/Vice-President:

Date:
SUMMARY PAGE FOR SENATE
Approval Form

Calendar Changes:

10.3 Chemistry

2210 Introductory Inorganic Chemistry studies the chemistry of selected s, p, and d block elements. Introduction to crystal and molecular structures and to molecular orbital and crystal field theories.
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.
LH: 3
PR: minimum 60% in CHEM 1051 (or 1001 or the former 1031); Mathematics 1000

2301 Thermodynamics and Kinetics builds upon knowledge of physical chemistry from first year. It covers the three laws of thermodynamics for ideal and real systems as well as chemical kinetics. Topics in thermodynamics include the thermodynamics of ideal and real gases, phases, and solutions, the Maxwell relations, equilibria between phases, and in electrolyte solutions. The integrated rate laws for simple and complex mechanisms, and the temperature dependence of reaction rates in terms of kinetic molecular theory are some of the topics discussed in the kinetics section of the course.
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.
CO: Mathematics 2000 is recommended
CR: CHEM 2300
LH: 3
PR: minimum 60% in CHEM 1051 (or CHEM 1001 or the former CHEM 1031); Mathematics 1001, and Physics 1051 or Physics 1021 is recommended.

2440 Organic Chemistry for Biologists is an introduction to the principles of organic chemistry with an emphasis on material relevant to biological molecules. The laboratory will introduce techniques and illustrate concepts covered in the course. This course is designed primarily for Biology Majors.
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: CHEM 2400, the former 2420, the former 240A/B
LH: 3
PR: CHEM 1011 (or 1001 or 1051)
UL: may not be used for credit by Chemistry or Biochemistry Majors and is not a prerequisite for any other Chemistry course.

3211 Inorganic Chemistry is a detailed examination of the structure, bonding, and chemistry of the d block elements.
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.
LH: 3
PR: CHEM 2210, CHEM 2301 (or 2300), and CHEM 2302
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: CHEM 2301 (or 2300) and CHEM 2302 (or the former CHEM 3301), Mathematics 2000 and Mathematics 2050.
9.3.4 General Degree - Major in Chemistry
The courses required for a Major in Chemistry are:

1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, 3211, 3303, 3410, 3411, and 3500.
2. Physics 1050 (or 1020 and 1021) and 1051 (or 1021).

9.3.5 Honours Degree in Chemistry

9.3.5.1 Required Courses

1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, 3211, 3303, 3410, 3411, 3500, 490A/B and 12 credit hours selected from the remaining 4000-level Chemistry courses.
2. Physics 1050 (or 1020 and 1021) and 1051 (or 1021).

9.3.5.2 Other Information

- Those courses in which a grade of B or an average of 75% or higher are required, as specified in Regulations for the Honours Degree of Bachelor of Science, Academic Standing, clause a., are the courses beyond first year used to satisfy clause 1. under Required Courses above.

- Recommended courses: Biochemistry 2100, Biochemistry 2101, Mathematics 2051, Physics 2820 and/or 2750.

- A thesis based on a selected research topic carried out under the supervision of a member of the Department is to be submitted in the final year.

- Chemistry 490A/B will normally require the equivalent of nine hours per week for two semesters. Registration in Chemistry 490A/B is restricted to those students who have honours standing. The Honours dissertation will be assessed by a committee comprising the supervisor and one other faculty member.

- With approval of the Heads of the Chemistry and Biochemistry Departments prior to registration, a number of courses in Biochemistry may be substituted for a like number of Chemistry courses.
Six credit hours in one language are recommended: French, German or Russian should be selected in consultation with the Department Head.

Prospective Honours students in Chemistry in their first year should take

1. Six credit hours in English.
2. Chemistry 1050 and 1051 (or 1200 and 1001),
3. Physics 1050 and 1051 or 1020 and 1021.
5. Six credit hours in other courses.

Given appropriate circumstances the Honours Chemistry program may be completed in four years. Students should consult the Undergraduate Student Handbook for timetabling details.

Students completing first year requirements for any of Chemistry, Mathematics or Physics via the three course options (i.e. Chemistry 1010, 1050, 1051 (or 1010, 1011, and the former 1031), Mathematics 1090, 1000, 1001, Physics 1020, 1021, 1051) instead of the two course options (Chemistry 1050, 1051, Mathematics 1000, 1001, Physics 1050, 1051) will require the corresponding number of extra credits to obtain an Honours degree.

9.3.6 General Degree - Major in Computational Chemistry

9.3.6.1 Required Courses

1. Chemistry 1050 and 1051 (or 1010, 1011 and former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3210 or 3211, 3303, 4304, and 4305.
2. Physics 1050 (or 1020) and 1051, and 2820.
3. Mathematics 1000, 1001, 2000, 2050, 2051, 2260 (or 3260), and 3202.
4. Computer Science 1510, 1710, 2710.
5. Computer Science 2500 or 2711.
6. Computer Science 3731 or Mathematics 3132
7. English 1080 and English 1110 or equivalent.
8. A sufficient number of elective courses to bring the degree up to a total of 120 credit hours must also be completed.

9.3.6.2 Suggested Program of Study

Given appropriate circumstances the Major in Computational Chemistry program can be completed in four years. While students should consult the Undergraduate Handbook for further timetabling details, to complete the program in four years generally will require that students take the following courses in their first year:

1. English 1080 and English 1110 or equivalent.
2. Chemistry 1050 and 1051 (or 1200 and 1001).
3. Physics 1050 (or 1020) and 1051.
4. Mathematics 1000 and 1001
5. Computer Science 1510 and 1710

9.3.7 Honours Degree in Computational Chemistry
9.3.7.1 Required Courses

1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001),
   2100, 2210, 2301, 2302, 2400, 2401, 3210 or 3211, 3303, 4304, and 4305.
2. Physics 1050 (or 1020) and 1051, and 2820.
3. Mathematics 1000, 1001, 2000, 2050, 2051, 2260 (or 3260), and 3202.
4. Computer Science 1510, 1710, 2710.
5. Computer Science 2500 or 2711.
6. Computer Science 3731 or Mathematics 3132.
7. Chemistry 490A/B.
8. English 1080 and English 1110 or equivalent.
9. 3 additional credit hours in Biochemistry, Chemistry, Computer Science, Mathematics, or Physics
   at the 2000 level or above.
10. A sufficient number of elective courses to bring the degree up to a total of 120 credit hours
    must also be completed.

9.3.7.2 Suggested Program of Study
Given appropriate circumstances the Honours in Computational Chemistry program can be completed in
four years. While students should consult the Undergraduate Handbook for further timetabling details, to
complete the program in four years generally will require that students take the following courses in their
first year:

1. English 1080 and English 1110 or equivalent.
2. Chemistry 1050 and 1051 (or 1200 and 1001).
3. Physics 1050 (or 1020) and 1051.
4. Mathematics 1000 and 1001
5. Computer Science 1510 and 1710
5.1.1 Applied Mathematics and Chemistry Joint Honours (B.Sc. Only)
The following courses are required:

1. English 1080 and English 1110 (or equivalent).
2. A computing course. Computer Science 1510 is recommended.
4. Physics 1050 (or 1020 and 1021) and 1051 (or 1021).
5. Mathematics 1000, 1001, 2000, 2050, 2051, 2130, 2260 (or 3260), 3000, 3001, 3132, 3161, 3202, 3210, 4160.
6. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210 or 3211, 3303, 3500.
7. Six additional credit hours chosen from courses numbered 3000 or higher that are offered by the Department of Chemistry.
8. Mathematics 419A/B or Chemistry 490A/B.
9. A sufficient number of elective courses to bring the degree up to a total of 120 credit hours.

5.1.4 Biochemistry and Chemistry Joint Honours
The following courses are required:

1. Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and the former 1031) (or 1200 and 1001), Mathematics 1000 and 1001, Physics 1050 (or 1020) and 1051 (or 1021). 6 credit hours in first year English courses. Biology 1001 and 1002 are highly recommended.
3. Chemistry 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3211, 3303, 3410, 3411, 3500, and 6 further credit hours in Chemistry courses at the 4000 level.
4. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, Medicine 310A/B, either Biochemistry 4210 or 4211, 9 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4220, 4230-4249.
5. Either Chemistry 490A/B or Biochemistry 499A/B.
6. Other courses to complete the prescribed minimum of 135 credit hours in courses for the Joint Honours Degree. Physics 2820 and/or Physics 2750 are recommended.

5.1.12 Chemistry and Earth Sciences Joint Honours
The following courses, including prerequisites, where applicable, will be required:

1. English 1080 and 1110 (or equivalents), Mathematics 1000 and 1001, Earth Sciences 1000 and 1002, Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) or their equivalents, Physics 1050 (or 1020 and 1021) and 1051 (or 1021).
2. Earth Sciences 2030, 2031, 2401, 2502, 2702, 2905, 3420, 3600; plus 6 additional credit hours in 3000-level Earth Sciences courses, and 9 additional credit hours in 4000-level Earth Sciences courses.
3. Chemistry 2100, 2210, 2301 (or 2300), 2302, 2400, 2401, 3500; plus 3211, 3303, 3410, and 3411 with the option of substituting up to 6 credit hours of these 3000-level courses with 4000-level Chemistry courses; and at least 3 additional credit hours in 4000-level Chemistry courses.
5. Biology 2120 (or Biology 1001 and 1002) or Biochemistry 2101.
6. An Honours Dissertation (Earth Sciences 499A/B or Chemistry 490A/B). The topic of the Honours Dissertation must have the prior approval of the Heads of the two Departments. A faculty member of either Department may act as supervisor.

7. Other courses to complete the prescribed minimum of 120 credit hours.

Rationale for Change(s).

Chemistry 2210
A few years ago the requirement of a grade of at least 60% was approved and this course must have been missed. The prerequisite matches that for CHEM 2301 and CHEM 2100.

Chemistry 2301
Math 2000 is dropped as a recommended course for chemistry 2301 as the relevant calculus is minor and easily explained in class. Knowledge of first year physics is useful but not necessary for success in the course. The current practice has been to allow waivers, but this is unfair to students who do not ask for the waiver.

Chemistry 2440
The former Chemistry 2420 and the former Chemistry 240A/B have not been taught at MUN for about 20 years.

Chemistry 3211
The material covered in either Chemistry 2301 or Chemistry 2302 are not relevant to success in this course.

Chemistry 3303
The material covered in mathematics 2050 is not relevant to success in the course.

Chemistry 4350
This course has been taught from time-to-time. At present, there is no prerequisite listed in the calendar. Students would need the knowledge from the second and third year physical chemistry courses to be successful in this advanced physical chemistry course.

Physics requirements for Memorial chemistry programs
It is common practice across Canada not to require calculus based physics courses for chemistry degrees. We wish to change our requirements to allow non calculus based physics courses to count toward all chemistry degrees at MUN except for the joint chemistry/physics degree.
**Consultations Sought From**

<table>
<thead>
<tr>
<th>Department</th>
<th>Comments Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenfell</td>
<td>yes</td>
</tr>
<tr>
<td>Marine Institute</td>
<td>yes</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
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</tr>
<tr>
<td>Computer Science</td>
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<tr>
<td>Engineering</td>
<td>yes</td>
</tr>
<tr>
<td>Marine Institute</td>
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</tr>
</tbody>
</table>

**Library Report Received**

| Library Report Received | yes |

**Signature:**

Approved by Dean, Associate Vice-President (Academic) or Vice-President

**Name**

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

**Chair:**

____________________________________________________________________

**Secretary:**

____________________________________________________________________

**Date:**

____________________________________________________________________
Consultation email:

From: Chris Flinn [cflinn@mun.ca]
Sent: September 23, 2015 10:23 AM
To: associatevpooffice@grenfell.mun.ca; miugconsultations@mi.mun.ca; mathconsult@mun.ca;
Biochemistry Head; psychology_head@mun.ca; pharinfo@mun.ca; Engineering Consultations; Karen
Morris; cs-chair@mun.ca; Alison Leitch; Lagowski, Jolanta; amercier@mun.ca
Subject: Proposal, Minor Change to the Chemistry Programs Offered at the St. John’s Campus, and Minor
Calendar Changes for Some Chemistry Courses

Hello Everyone,

The chemistry department welcomes your comments and suggestions regarding the proposal attached to this email. The proposal involves a number of

Minor Changes to the Chemistry Programs Offered at the St. John’s Campus and a number of Minor Calendar Changes for Some Chemistry Courses offered on this campus.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
MUN Chemistry Department

Responses to consultation email:

Library:

Chris,

Took a closer look. You are absolutely right. These calendar changes will have little to no impact on the library.

Please get back to me with any questions.

Erin Alcock
Science Research Liaison Librarian
QE2 Library
709-864-8316

Biochemistry Department

Subject: RE: Proposal, Minor Change to the Chemistry Programs Offered at the St. John’s Campus, and Minor Calendar Changes for Some Chemistry Courses
Date: Fri, 2 Oct 2015 12:40:21 +0000
From: Berry, Mark <mberry@mun.ca>
To: Chris Flinn <cgflinn@mun.ca>

Hi Chris

The only suggestion coming out of Biochemistry is for a slight re-wording of the executive summary to something along the lines of "calendar changes including allowing non calculus-based physics along with more simple house-keeping items".

Some of our committee felt that the removal of the calculus requirement was a more major change than house-keeping and would be better separated off.

But in the grand scheme of things, no concerns here.

Mark

Mark D. Berry Ph.D.
Professor and Head
Dept. Biochemistry

Pharmacy

Hello Dr. Flinn
The School of Pharmacy has no concerns with the minor changes proposed by the Chemistry department. Thank you for the opportunity to comment.
Regards,
Csop Glew

CSOP GLEW, Hon. B.A., M.U.P.  I  MANAGER OF ACADEMIC PROGRAMS
School of Pharmacy
Memorial University of Newfoundland
St. John’s, NL  I  A1B 3V6
Health Sciences Centre  I  Room H3435
T  709 777 6963  I  F  709 777 7044

Mathematics

Hi Chris,

The chemistry department welcomes your comments and suggestions regarding the proposal attached to this email. The proposal involves a number of Minor Changes to the Chemistry Programs Offered at the St. John’s Campus and a number of Minor Calendar Changes for Some Chemistry Courses offered on this campus.

With regards to the deletion of the Math 2000 recommendation for Chemistry 2301, we wonder if this change is necessary. Given that it is a recommendation (not a corequisite) and, as the document acknowledges, there is some (minor) relevant content, we see no harm in giving students direction that
completing Math 2000 beforehand or simultaneously might be to their advantage.

Otherwise, we support the proposals.

Cheers,
Shannon

--
Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics

**Biology**

Hi Chris,
The Biology Undergraduate Studies Committee reviewed the proposed changes to the Chemistry program and some Chemistry course and have no issues or concerns with the proposal
Thanks
Karen

Karen Morris
Undergraduate Officer
Department of Biology

**Marine Institute**

Chris,

Thank you for the opportunity to review the proposed calendar changes to the Chemistry programs offered at the St. John’s Campus.

These program changes will have no impact on the programs at the Marine Institute. We are happy to support these changes as proposed.

Derek Howse

Derek Howse
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University

**Grenfell Campus**

Dear Dr. Flinn, I have received a number of comments in support of your proposal, and also the comment below, which suggests a slight change.

Cheers,
Dr. R. Gallant  
Head of Division of Science, Grenfell Campus, Memorial University

---

From: Parkinson, Don-Roger  
Sent: Wednesday, September 23, 2015 11:44 AM  
To: Gallant, Robert  
Cc: Daniels, Karen  
Subject: RE: Proposal, Minor Change to the Chemistry Programs Offered at the St. John’s Campus, and, Minor Calendar Changes for Some Chemistry Courses

Hello,

Dear Sirs,

I personally have no problems with the changes to chem 2210, 2301 and 2302 and 2440. Note also that chem 2300 is no longer offered an hence I think that that statement could be removed from chem 2301 part, and, that chem 2300 course description should be also removed from the Calendar.

Since these courses are taught at both the St. John’s and Grenfell Campuses then it is important to makes these changes to both the St. John’s and on the Grenfell sections of the Calendar.

Regards,

D-R.P.

Dr. Don-Roger Parkinson,

Associate Professor in Analytical Chemistry,

Environmental Chemistry and Chemistry, AS237

Chair of Environmental Science, Grenfell Campus

Engineering and Applied Science

Dear Dr. Flinn,

It is my normal practice to share consultation requests with my Faculty's Committee on Undergraduate Studies, but its next regular meeting is not until October 21. I have invited comments by e-mail from committee members.

The only replies are that these changes have no impact on the programs of the Faculty of Engineering and Applied Science.

Yours sincerely,
Dr. Glyn George, Chair  
Committee on Undergraduate Studies  
Faculty of Engineering and Applied Science

Physics and Physical Oceanography

Hi Chris,

Some of us in Physics have had a look the Proposal: Minor Change to the Chemistry Programs... and were wondering if you could help us to understand the motivation behind the proposal that PHYS1050/1051 no longer be required.

It is not clear how this is merely 'housekeeping'.

PHYS 1050/1051 are courses specifically designed for Scientists and Engineers, including Chemists.

PHYS 1020/1021 target students in the Life Sciences (e.g., Biology).

We (and nearly all other universities?) view these two program stream as being significantly different and require two different types of entry-level physics courses.

Could you please let us know the reasoning behind the proposed changes?

FYI- Note that the Calendar entry for PHYS 1051 specifies that PHYS 1020 can be used in place of 1050 or 1021 as a prerequisite, but only with a min grades of 65%.

http://www.mun.ca/regoff/calendar/sectionNo=SCI-1481#SCI-1574

Many thanks.

Martin Plumer

Chair, Physics and Physical Oceanography Undergraduate Studies Committee.

Thanks Chris.

Our Committee will review this.

Martin

Dear Chris and Travis,

We have a lot thought about the Phys 1020/1021 vs 1050/1051 issue and still think it is not a good idea.

Please look at our comments below. Perhaps we can meet to discuss this further, if you wish.
Cheers,

Martin

There are real differences between our Life Science streams and Physical Science streams with regard to the physics curriculum etc. Calculus is Not the main difference. (Note, for example, that for both streams, U. of Toronto requires their Chemistry majors to have done Math courses in calculus.) Note that our Engineering Faculty requires Physics 1050/1051. The textbooks we use are quite different with regard to the level of math and science aptitude required, as it should be for those majoring in Chemistry and Physics, vs those in the Life sciences. Comparison with other universities in Canada is tricky unless one knows more details about the curriculum used for their courses. We do know about our courses and think it is important that Chemistry students take Physics 1050/1051, except in special cases. Chemists are physical scientists (which includes chemists, physicists and astronomers etc), in contrast to life scientists, and P1051 is a physical science course. They will learn a lot about how to tackle science problems in general.

Physics 1020/1021 has always been an algebra based introduction to physics course with the differences between 1020 and 1050 being mainly the pace and the depth of the problems. With the exception of the one calculus based question, a good student in 1020 could do fine on the 1050 final. The difference between P1021 and 1051 is much more dramatic. While on the surface the courses look similar, a decision was made years ago to tailor P1021 towards Biology and health science students. As a consequence we introduced more topics like fluids and sound and cut back on the depth of study of electricity and magnetism in P1021. Electric field and potential is taught at a level sufficient for a biology majors, that is, we cover uniform field and the basic concept of electric potential but do not go into depth about point charge or continuous distributions. Magnetism is covered is some depth but with basic plug-in-the-numbers problem solving. In P1051 students develop key concepts related to waves, electric field, potential and magnetism and much more emphasis is placed on independent learning and math skills. Also the principles behind some magnetism and spectroscopy related techniques (MRI, UV and IR, and mass spectroscopy) used in Chemistry are covered in P1051 while they are only parenthetically or not at all mentioned in P1021. P1051 is a course where students learn to put math and physics together and to problem solve, both on assignments and in the lab. It is a big step-up for most students. A student who completes P1051 successfully has problem solving capabilities and is a much more capable problem solver. P1021 has been redesigned to work well for the Biology/health science student and was designed with the understanding that hard core science students would continue to take P1051. We don’t think that 1021 suits the requirements for a Chemistry major.

Students wishing to do a Chemistry program, can be easily accommodated by the present requirements. Note that Physics 1050 does not assume the student has taken high school physics. Physics 1051 can be taken by students from 1020 (with a 65% ave) so they can still switch to a Chemistry program in the Winter. The few students who have taken Physics 1020/1021 and then decide to do a Chemistry program can still do so with a department waiver. This option should not be encouraged by hardwiring it into the Calendar and should be available only to those who do well in Physics 1020/1021.

Chemistry responses to Physics:
From: Chris Flinn [mailto:cgflinn@mun.ca]
Sent: September-28-15 12:30 PM
To: Martin Plumer
Cc: 'Lagowski, Jolanta'; 'Rick Goulding'; Head of Chemistry
Subject: Re: a note on proposed Chemistry program changes

Hi Martin,

The motivation for allowing chem majors etc. to use physics 1020 and physics 1021 to meet the physics requirements for their degree is that most Canadian universities accept non-calculus based physics as a requirement for their chemistry degrees. Travis can confirm this. We still intend to promote physics 1050 and physics 1051 as the best option. A number of students come to MUN without any highschool physics and take physics 1020 and 1021 and then require a third physics course physics 1051 to complete their requirements. It is certainly not advisable for a lot of students to jump to physics 1051 with 65% or better in physics 1020. The best ones handle it fine.

cheers,

Chris

Hi Martin,

Yes, I have gone through many of the Chemistry department requirements in Canada (at least 15) and the only one of those that requires calculus based physics for a chemistry degree was Dalhousie (who I am told, but I have not confirmed that they have no non-calculus based physics course in first year). This includes UofT, Waterloo, UBC and many, many others. In fact many of us in chemistry did not take a calculus based physics course. I am a physical chemist and I did not have calculus based physics for the simple reason that I went to a small school (Trent) and they didn’t have it. I certainly think physics and much physical chemistry makes far more sense when calculus is used, but I don’t know if that appreciation is necessarily shared by many 17 and 18 year old first year students. Regardless, as a department we had a very hard time justifying this requirement of a chemistry student when it isn’t necessary in the rest of Canada as far as we can tell. You should note that we are recommending Physics 1050 and 1051 as the courses and it is 1020 and 1021 that are in parentheses. I doubt that this will decrease dramatically the number of students in the calculus based physics, but it will open the doors to some who choose to take 1021 (or those who cannot do 1051) the opportunity to still become chemists. As Chris pointed out, we see no reason to require students who do 1020 and 1021 to have to do another first year physics course to get a chemistry degree.

To answer your question about whether it was merely 'housekeeping' or not, much of what is in the proposal is housekeeping, but this change certainly falls under "minor" changes as is in the title of the proposal. This minor calendar change is justified in the proposal.

Take care,
Travis

Hi Joan,
I apologize on behalf of Chris and myself, it was a complete oversight that physics' response was not included in the package sent to Science Undergraduate Committee.

During the consultations Martin sent the comments from physics as you have already received. While Chemistry unanimously supported the proposal that was sent out for consultations, I felt that physics' response should be considered by chemistry; so I sent them to all chemistry faculty for their comments. I received feedback to physics' comments from Fran Kerton, Chris Kozak, Christina Bottaro and Erika Merschrod and following careful consideration, they were unchanged in their opinions that we should change the wording for our physics requirements as per the original proposal.

I would like to comment on physics' response based on the feedback I received on it, arguments that were brought up in a the chemistry faculty meeting where the proposal was unanimously passed, and the reasoning for our proposed change.

- We note that physics for "life sciences" is actually the physics course that is required in chemistry departments such as UWaterloo, McMaster, UManitoba, and many, many others. Many of the chemists in our department took non-calculus chemistry that was geared toward life sciences! Collectively we do, in fact, know details of the physics courses in Canadian Universities, having taken physics courses from them. Topics such as fluids and sound are quite important to chemists as are topics such as electricity and magnetism.

- While physics doesn't think that 1021 suits the requirements of for a Chemistry major, I should point out that the Chemistry department here at MUN does think that it suits our requirements.

- It is stated that "Physics 1051 can be taken by students from 1020 (with a 65% ave)..." we are also told that students who do this typically see a large decrease in their grade.

- As for the waiver idea, chemistry does not support this at all. This simply allows a student who asks for a waiver to get it, but those who don't know they can get a waiver don't get to do a chemistry degree. Furthermore, if some are allowed a waiver, then 1051 really isn't "necessary".

- We also noted that many of our students are mathematically gifted and are very happy to do 1050/1051. However, others struggle with the math and will, therefore, struggle with the physics. We feel that this does not mean that these students would not make great chemists and the chemistry department feels that they should not be excluded from a chemistry degree.

In summary we don't think that there will be an exodus from physics 1050 and 1051, we will continue to recommend it, but Chemistry has unanimously decided to change the wording as described in the proposal sent to the Science Undergraduate Committee.

Sincerely,
Travis Fridgen

Ocean Sciences

Hi Chris: The Department of Ocean Sciences has no objections to the proposed changes.
Regards

Garth
November 9, 2015

TO: All Members, Faculty Council of Science

FROM: Joan Burry, Secretary
       Committee on Undergraduate Studies, Faculty of Science

SUBJECT: Calendar Changes, New Course Proposal and New Minors Proposal

At a meeting held on November 2, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) "Housekeeping" Calendar Changes
   (b) Changes to Physics requirements for Chemistry majors and joint majors programs

2. Department of Chemistry- new course proposal, Chemistry 4701: Principles of Pharmaceutical Chemistry

3. Department of Chemistry- new minors proposal:
   (a) Minor in Chemistry for Process Engineering majors
   (b) Minor in Applied Science-Process Engineering for Chemistry majors

Joan Burry
Associate Registrar and
Secretary, Committee
on Undergraduate Studies,
Faculty of Science
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

New Course Proposal
Chemistry 4701 Principles of Pharmaceutical Chemistry

Executive Summary

We propose a new 4th year chemistry elective course that could be used for students to fulfill electives in the Chemistry Honours and Majors, Biochemistry-Chemistry Joint Honours and Biochemistry Honours programs.

Resource Implications: Instructional Costs

This course will use teaching resources available in the Department of Chemistry, without any additional instructional cost. It is anticipated that the course will be offered every two years.

Library Holdings and/or Other Resources Required

The library holdings will be available in either hard copy or electronic version. The costs, if any, associated with this change can be met from within the existing budget allocation or authorized new funding for [The Department of Chemistry.]

Yes

Signature of Unit Head (if appropriate):

Date:

Signature of Dean/Associate Vice-President (Academic)/Vice-President:

Date:
New Course: CHEM 4701 Principles of Pharmacutical Chemistry

Course Outline

Lecture Hours: (2 * 75 min sessions)

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<thead>
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<th>Subject</th>
<th>Required time (tentative)</th>
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<tbody>
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</tr>
<tr>
<td>Drug-like molecules and pharmacophores</td>
<td>1 week</td>
</tr>
<tr>
<td>Drug-receptor interactions</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Enzymatic reactions, inhibition and inhibitory mechanism</td>
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<td>CYPs and metabolic reaction paths</td>
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<tr>
<td>Stability of drugs and prodrugs</td>
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<td>Drug resistance and side effects</td>
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<td>Case study</td>
<td>2 weeks</td>
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<tr>
<td>An overview of drug approval protocol</td>
<td>1 session</td>
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Method of Evaluation

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<td>A. 10%</td>
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<td>B. Oral presentation (held last three weeks of the semester)</td>
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<td>3. Assignments</td>
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<td>4. Final Exam</td>
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*: A list of project topics will be available to the students on the first day of class. Students will be however encouraged to search for a new research idea, suggest and choose their topics of interest in consultation with the instructor.
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Texts: None required. Several will be available in the library in hard cover or electronic versions as reference books.

Reference Books

   Bruce B. Silverman
   Graham L. Patrick, Oxford University Press
3. Foye’s Principles of Medicinal Chemistry (7th Edition), 2012
   Thomas L. Lemke, David A. Williams, Victoria F. Roche, and S. William Zito
   Wolters Kluwer/ Lippincot Williams & Wilkins
   (12th Edition), 2011
   John H. Block and John M. Beale, Jr.
   Wolters Kluwer/Lippincot Williams & Wilkin

*: Main
Additional background material and notes will be also provided.

Instructor

Laleh Alisaraie, Dr. rer. nat.
Assistant Professor
School of Pharmacy
Cross-appointed to Department of Chemistry
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title: Chemistry 4701 Principles of Pharmaceutical Chemistry

Abbreviated Course Title: Pharmaceutical Chemistry

Calendar Change(s)

None

Secondary Calendar Changes

None

Calendar Description

4701 Principles of Pharmaceutical Chemistry will provide the necessary foundation of knowledge to enable students to understand the principles of drug discovery, the main pharmacokinetics properties of drugs, the relationships between the chemical structure of drugs and their biological actions, their toxicity and side-effects, and the kinetics of inhibitory mechanisms and the metabolic reactions of drugs. It will also provide an overview of pharmaceutical regulatory affairs.

PR: CHEM 3410 or Biochemistry 3105 or permission of the instructor

Rationale

The course emphasizes the main principles of drug discovery and action from the perspectives of both chemistry and chemical biology. The course creates a bridge of knowledge between existing courses during the first three years of the chemistry and biochemistry undergraduate programs, and some of their applications in drug discovery. This course is necessary for those students interested in pursuing graduate studies in medicinal chemistry or pharmaceutical sciences. Furthermore, the course will be beneficial to those entering the job market after graduation as it will enhance their job prospects in the pharmaceutical industry.

It is expected that 5-10 students will enrol in this course.
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

<table>
<thead>
<tr>
<th>Subject</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenfell</td>
<td>yes</td>
</tr>
<tr>
<td>Marine Institute</td>
<td>yes</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
<td>no</td>
</tr>
<tr>
<td>Computer science</td>
<td>no</td>
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<tr>
<td>Physics</td>
<td>yes</td>
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<tr>
<td>Biology</td>
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<td>Biochemistry</td>
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<td>Psychology</td>
<td>no</td>
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<tr>
<td>Ocean Sciences</td>
<td>yes</td>
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<tr>
<td>Earth Sciences</td>
<td>no</td>
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<tr>
<td>Pharmacy</td>
<td>yes</td>
</tr>
<tr>
<td>Engineering</td>
<td>yes</td>
</tr>
</tbody>
</table>

Library Report Received: Yes

Signature: Dean, Associate Vice-President (Academic) or Vice-President

Name

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Memo sent to university units etc. for consultations.

On 17/09/2015 3:56 PM, Chris Flinn wrote:
Hello Everyone,

The chemistry department invites you to review the new course proposal chemistry 4701, Principles of Pharmaceutical Chemistry. We welcome your comments and suggestions.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
MUN Chemistry Department

Responses:

Library:

Collection Development Division
Queen Elizabeth II Library

24 June 2015

To: Laleh Alisaraie, Department of Chemistry
From: Erin Alcock, Science Research Liaison Librarian
Subject: Principles of Pharmaceutical Chemistry Course Proposal

Upon review of the course proposal for Principles of Pharmaceutical Chemistry (CHEM XXXX), to be offered by the Department of Chemistry, I have determined that the Memorial University of Newfoundland Library System has more than sufficient resources to support this course. I have reviewed the proposed course topics and have found that there are numerous holdings in the library system on most of the subjects contained in the course outline.

The book holdings on these topics will be mainly held in the Health Sciences Library, with some contained in the Queen Elizabeth II Library. Additionally, a large majority of the books in this subject area are in our catalogue in electronic format. The Library system also subscribes to hundreds of journals in this subject area along with access to these and more through numerous databases. Additional materials could be added to the collection under existing budgetary allocations.
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Library Holdings Summary

Table One: General Course Subject Themes (from course outline)

<table>
<thead>
<tr>
<th>Course Topic</th>
<th>LCSH/MESH</th>
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<tr>
<td>Pharmaco*</td>
<td>2127</td>
<td>4417</td>
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<tr>
<td>Pharmacokinetics</td>
<td>244</td>
<td>407</td>
</tr>
<tr>
<td>Drug* AND resist*</td>
<td>260</td>
<td>594</td>
</tr>
<tr>
<td>Drug* AND side effect*</td>
<td>258</td>
<td>382</td>
</tr>
<tr>
<td>Enzym* AND inhibit*</td>
<td>104</td>
<td>238</td>
</tr>
<tr>
<td>Drug* AND approv*</td>
<td>65</td>
<td>210</td>
</tr>
<tr>
<td>Drug* AND stabil*</td>
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<tr>
<td>Physico* AND drug*</td>
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<td>Drug receptor interactions</td>
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<td>28</td>
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<td>CYP</td>
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<td>Physicochemical AND drug*</td>
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<td>ADMET</td>
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<td>7</td>
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</tbody>
</table>

*as of date of memo

Department of Physics and Physical Oceanography:

Dear Chris,

The Undergraduate Studies Committee (USC), and Department Head, in Physics and Physical Oceanography have reviewed the proposed new course Chemistry 4701.

We approve of this proposal.

Best,
Martin Plumer
Chair, USC, Physics and Physical Oceanography.

School of Pharmacy:

Hello Dr. Flinn
The School of Pharmacy has had a chance to review the proposed calendar changes re: new Pharmaceutical Chemistry course - and we are in support of the proposal. However, we would like to suggest for your consideration some minor changes to the wording of the course description. Please see the attached.
Thanks for the opportunity to comment.
Regards,
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Csop Glew

CSOP GLEW, Hon. B.A., M.U.P. 1 MANAGER OF ACADEMIC PROGRAMS
School of Pharmacy
Memorial University of Newfoundland
St. John's, NL A1B 3V6
Health Sciences Centre 1 Room H3435
T 709 777 6963  F 709 777 7044

Calendar Description suggestions from Pharmacy

4701 Principles of Pharmaceutical Chemistry provides the necessary foundation of knowledge to enable students to understand the principles of drug discovery, the main pharmacokinetic properties of drugs, the relationships between the chemical structure of drugs and their biological actions, their toxicities and adverse side effects, and the kinetics of inhibitory mechanisms and the metabolic reactions of drugs. It also provides an overview of pharmaceutical regulatory affairs.

Marine Institute

Chris,

Thank you for the opportunity to review the proposed new course Principles of Pharmaceutical Chemistry. This course will have no impact on the programs at the Marine Institute. We are happy to support this proposal as presented.

Derek Howse

Derek Howse
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0586
FAX: 709-778-0394
Derek.Howse@mi.mun.ca

Biology Department

Hi Chris,

The Biology Undergraduate Studies Committee reviewed the new course proposal Chemistry 4701 Principles of Pharmaceutical Chemistry and have no issues or concerns with the proposal. The content of the course would be of interest to many of our students in the Cell and Molecular Biology Major.

Thanks
Karen
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Karen Morris  
Undergraduate Officer  
Department of Biology  
Memorial University of Newfoundland  
St. John's, NL A1B 3X9  
709-864-8021

Engineering

Dear Dr. Flinn,

It is my normal practice to share consultation requests with my Faculty's Committee on Undergraduate Studies, but its next regular meeting is not until October 21. I have invited comments by e-mail from committee members.

The only reply beyond "no impact" was from the Head of the Department of Process Engineering, Dr. Faisal Khan, who sees possibilities for some graduate and senior undergraduate students in the Process Engineering programs to take CHEM 4701 as an elective.

Yours sincerely,

--

Dr. Glyn George, Chair  
Committee on Undergraduate Studies  
Faculty of Engineering and Applied Science  
Memorial University of Newfoundland  
St. John's NL A1B 3X5

Grenfell

Dear Dr. Flinn, I am passing along this comment verbatim. Cheers,

Dr. R. Gallant  
Head of Division of Science, Grenfell Campus, Memorial University

From: Dust, Julian. M  
Sent: Friday, September 18, 2015 11:16 AM  
To: Gallant, Robert  
Subject: Fw: Consultations on new Pharmaceutical Chemistry proposal
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Dear Dr. Gallant,

This looks like a very interesting and useful course to add to the St. John's Campus Chemistry curriculum. It should appeal both to students who are interested in synthetic Organic Chemistry generally, as well as those interested in Physical Organic Chemistry. It may be of interest as well to some biochemistry students.

I support the proposal and look forward to the introduction of the course in St. John's.

Sincerely,

Julian M. Dust,

Assoc. Prof. Chemistry and Environmental Science.

Biochemistry

Hi Chris

Thanks for the clarification.

Given that, we suggest that some strategic re-wording would be beneficial. Both myself and our undergraduate people read this as the intent was for it to be available for Biochemistry degrees, the joint honours degree, as well as a Chemistry degrees. The inclusion of Physical Biochemistry as an alternative pre-requisite to the Organic Chemistry course probably also contributed to that misunderstanding. Given your subsequent explanation of the intent of this course, the Physical Biochemistry alternate pre-requisite seems, on the surface, redundant. It certainly wouldn't substitute for advanced organic courses, although could substitute for physical chemistry. With respect to the joint honours, this should go through our undergraduate committee and Department for approval. If this is the intent, let me know and we will expedite that process as much as possible.

We were also a little confused as to whether the intent was for this just to be available for honours students, as the wording (but not the pre-requisites) appears to suggest, or to all majors (which is what we assume given the pre-requisites and that it is only to be offered every second year).

Our committee also wondered about secondary changes that would result from this course.

As I said before, we are definitely supportive of the concept of this course, and indeed see such a course as potentially beneficial to Biochemistry majors. If this were available to Biochemistry students then we suspect the interest would far exceed the 5-10 students indicated. Related to this, given Lalch's primary affiliation is there any intention for Pharmacy students to also be taking this course? For this to be an option for the Biochemistry degrees though we'd need to chat with Lalch directly about specifics, and time may be too short for that this year.
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Anyway, that's our two cents worth. Hope this all makes sense. I'm in and out the next day or so, but I'm sure Valerie or Martin would be happy to chat if you need more specifics and I'm not around.

Mark

Mark D. Berry Ph.D.
Professor and Head
Dept. Biochemistry
Memorial University of Newfoundland
St. John's, NL, Canada
A1B 3X9

Tel: +1-709-864-8529
E-mail: mberry@mun.ca; biohead@mun.ca

From: Chris Flinn [cgflinn@mun.ca]
Sent: September 28, 2015 3:42 PM
To: Biochemistry Head
Cc: Martin Mulligan; vbooth@mun.ca; Fridgen, Travis; Alisaraie, Laleh
Subject: Re: Consultations on new Pharmaceutical Chemistry proposal

Hi Mark,

It seems as if the proposal for course in pharmaceutical chemistry has given you the wrong impression of its intended purpose. The proposed Pharmaceutical Chemistry course is not really "intended" to be used for the biochemistry degree although we would welcome any biochemistry students who wish to take the course. The course has been designed and developed for chemistry students by Laleh Alisaraie from Pharmacy who plans to cover the course content mainly from perspective of chemistry and to look into the organic chemistry of drug bioactivity. The course content has already been approved by the chemistry undergraduate committee and at a recent chemistry faculty meeting. We welcome constructive criticism of the proposal as it stands but do not wish to change its proposed content.

sincerely,

Chris

On 24/09/2015 10:56 AM, Biochemistry Head wrote:
Hi Chris
New Course: CHEM 4701 Principles of Pharmaceutical Chemistry

Biochemistry is certainly supportive of this in principal. However, would it be possible for a few of us (including Laleh) to meet face-to-face to chat about a few points. Given the proposal that this be available for Biochemistry degrees we'd like to play a little more active role in the course. I'm actually a pharmacist by training, so it is certainly something I'd be interested in participating in. Our undergrad people also had a couple of other questions that are probably easiest to address face to face.

Just let me know.

Cheers

Mark

Mark D. Berry Ph.D.
Professor and Head
Dept. Biochemistry
Memorial University of Newfoundland
St. John's, NL, Canada
A1B 3X9

Tel: +1-709-864-8529
E-mail: mberry@mun.ca; biochead@mun.ca

Ocean Sciences

Hi Chris: The Department of Ocean Sciences has no objections to the new course proposal, CHEM 4701 entitled Principles of Pharmaceutical Chemistry. It looks like a very interesting useful course to me.

Best regards

Garth
November 9, 2015

TO: All Members, Faculty Council of Science

FROM: Joan Burry, Secretary
      Committee on Undergraduate Studies, Faculty of Science

SUBJECT: Calendar Changes, New Course Proposal and New Minors Proposal

At a meeting held on November 2, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) "Housekeeping" Calendar Changes
   (b) Changes to Physics requirements for Chemistry majors and joint majors programs

2. Department of Chemistry- new course proposal, Chemistry 4701: Principles of Pharmaceutical Chemistry

3. Department of Chemistry- new minors proposal:
   (a) Minor in Chemistry for Process Engineering majors
   (b) Minor in Applied Science-Process Engineering for Chemistry majors

Joan Burry
Associate Registrar and
Secretary, Committee
on Undergraduate Studies,
Faculty of Science
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

Proposals for a
1) New Minor in Chemistry for Process Engineering Majors
2) New Minor in Applied Science-Process Engineering for Chemistry Majors and Honours

Executive Summary
This initiative aims to allow students in Process Engineering or Chemistry to take selected electives in the other Faculty to obtain a Minor in the other discipline.

Resource Implications:
Instructional Costs
There are no new courses or new sections of existing courses and, therefore, no new instructional costs. Existing courses can accommodate any increases in enrolments due to students taking these proposed new minors.

Library Holdings and/or Other Resources Required
With no new courses required for these programs, no other resources are required.

Signatures
Head of the Department of Chemistry: Head of the Department of Process Engineering:

Date: __________________________ Date: __________________________

Dean of the Faculty of Science: Dean of the Faculty of Engineering and Applied Science:

Date: __________________________ Date: __________________________
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

Possible Timetables:

**Process Engineering With a Minor in Chemistry**

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<thead>
<tr>
<th>2F Term 3</th>
<th>2W WWT</th>
<th>2S Term 4</th>
<th>3F FWT</th>
<th>3W Term 5</th>
<th>3S SWT</th>
<th>4F Term 6</th>
<th>4W WWT</th>
<th>4S Term 7</th>
<th>5F FWT</th>
<th>5W Term 8</th>
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<td>CHEM 1051</td>
<td>CHEM 2100</td>
<td>ENGI 4421</td>
<td>ENGI 5601</td>
<td>ENGI 6901</td>
<td>ENGI 7640</td>
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<td>ENGI 3600</td>
<td>CHEM 2210</td>
<td>ENGI 4621</td>
<td>ENGI 5961</td>
<td>ENGI 6961</td>
<td>ENGI 7621</td>
<td>ENGI 8671</td>
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<tr>
<td>ENGI 3911</td>
<td>CHEM 2302</td>
<td>ENGI 4717</td>
<td>ENGI 5621</td>
<td>ENGI 6631</td>
<td>ENGI 7623</td>
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<td>ENGI 3424</td>
<td>CHEM 2610</td>
<td>ENGI 4625</td>
<td>ENGI 5671</td>
<td>ENGI 6671</td>
<td>ENGI 7651</td>
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<td>elective</td>
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<td>ENGI 3901</td>
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<td>CHEM 2610</td>
<td>CHEM 3211</td>
<td>CHEM 3303*</td>
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<td>CHEM 3303*</td>
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</tbody>
</table>

This is only one of many possible timetables, and will allow a Process Engineering student to complete the Minor in Chemistry concurrently with the Bachelor of Engineering degree. Beyond CHEM 1051 students are required to take CHEM 2100, 2210, 2302, and 2400. Students must also choose at least one of the courses listed in blue to achieve the Chemistry minor.

*The CHEM 2301 (Thermodynamics and Kinetics) prerequisite for process engineering students will be met with ENGI 4602 (Process Engineering Thermodynamics).

**Major or Honours in Chemistry with a Minor in Applied Science-Process Engineering**

<table>
<thead>
<tr>
<th>2nd year</th>
<th>Fall</th>
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<th>Spring</th>
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<tbody>
<tr>
<td>2nd year</td>
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<td>CHEM 2301</td>
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<td>ENGI 4625</td>
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<td>MATH 2050</td>
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<td>ENGI 3600</td>
<td>elective</td>
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<tr>
<td>3rd year</td>
<td>CHEM 3110</td>
<td>CHEM 3211</td>
<td>ENGI 7621</td>
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<td>CHEM 3210</td>
<td>CHEM 3303</td>
<td></td>
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<tr>
<td></td>
<td>CHEM3410</td>
<td>CHEM3411</td>
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<td>CHEM 3500</td>
<td>elective (ENGI 5601)</td>
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<td>CHEM 490b</td>
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<td>4 x CHEM 4XXX</td>
<td>4 x electives</td>
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<td>ENGI 6621</td>
<td>ENGI 8671*</td>
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</tr>
<tr>
<td></td>
<td>ENGI 6852</td>
<td>ENGI 8671</td>
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</table>

This timetable will allow a Chemist to complete a Chemistry major or honours and a Minor in Applied Science-Process Engineering in four years. Students must consult the calendar for prerequisites. Chemistry major and honours students are required to take ENGI 3600, 4621, 4625, and 4961 along with 6 credit hours (2 courses) chosen from ENGI 5601, 6621, 6631, 6651, 7621, and 8671 (highlighted in blue) in order to fulfill a Minor in Applied Science-Process Engineering. Chemists are given credit for CHEM 2301 (Thermodynamics and Kinetics) in place of ENGI 4602 (Process Engineering Thermodynamics).
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

Course title (for minor in Chemistry)
CHEM 2100 - Analytical Chemistry I
CHEM 2210 - Introductory Inorganic Chemistry
CHEM 2302 - Quantum Chemistry and Spectroscopy
CHEM 2400 - Introductory Organic Chemistry I
CHEM 2610 - Introductory Chemical Oceanography
CHEM 3211 - Inorganic Chemistry
CHEM 3303 - Statistical Thermodynamics and Rate Theories

Course title (for a minor in Applied Science-Process Engineering)
ENGI 3600 - Introduction to Process Engineering
ENGI 4621 - Process Mathematical Methods
ENGI 4625 - Process Engineering Calculations
ENGI 4961 - Fluid Mechanics I
ENGI 5601 - Mass Transfer
ENGI 6621 - Process Modeling and Analysis
ENGI 6631 - Chemical Reaction Engineering
ENGI 6651 - Sustainable Engineering in Processing Industries
ENGI 7621 - Process Modelling and Analysis
ENGI 8671 - Safety and Risk Engineering

Evidence of Consultation

E-mail sent on 2015 Sep. 09

Attached is a proposal from the Department of Chemistry and the Department of Process Engineering for a pair of new minors, one in each department for students who are taking majors in the other department. In order to reduce unnecessary duplication, the Faculty of Engineering and Applied Science is initiating the consultation process on behalf of both departments.

We welcome comments from your unit on this proposal. We would appreciate a reply by Tuesday October 13.

Yours sincerely,

Dr. Glyn George, Chair
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's NL A1B 3X5
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

Responses

From the School of Music, 2015 Sep. 09:

The School of Music has no objections.
Maureen

From the Faculty of Business Administration, 2015 Sep. 09:

Hello:

Thank you for the opportunity to comment on this proposal. The Faculty of Business Administration has no concerns with the proposed changes.

--larry

From the Faculty of Medicine, 2015 Sep. 10:

Dear Dr. George

I have reviewed the attached proposed and it appears fine from the Faculty of Medicine's point of view.

Cathy Vardy
Vice Dean
Faculty of Medicine
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

From the Marine Institute, 2015 Sep. 14:

Thank you for the opportunity to review the proposal for new reciprocal minors in Chemistry and Applied Science-Process Engineering.

I do have a couple of comments:

1. On page 5 of the submission in the secondary calendar changes section 9.3 lists the program options. I am wondering why the new minor is listed only for the Chemistry and Physics joint honours program. Would not a student in any of the Chemistry major or honours options be eligible to take this minor? In fact since this is simply a list of program options would it not be simpler to have a new item 8 added?

Suggested:
9.3 Chemistry
www.chem.mun.ca
The following undergraduate programs are available in the Department:
1. Applied Mathematics and Chemistry Joint Honours
2. Biochemistry and Chemistry Joint Honours
3. Chemistry and Earth Sciences Joint Honours
4. Chemistry and Physics Joint Honours
5. Major or Honours in Chemistry
6. Minor in Chemistry
7. Major or Honours in Computational Chemistry
8. Minor in Applied Science-Process Engineering (Available to Major or Honours students only)

[Note: "(Option for Minor in Applied Science - Process Engineering)" was moved from item 4 to item 5 as a result of this consultation reply.]

2. On page 7 of the submission the course description for ENGI 4625 lists the following CO and PR:
CO: ENGI 4602 (or Chemistry 2301)
PR: ENGI 3901 (or Chemistry 2301)

So Chemistry 2301 is potentially both a PR and CO?

[Note: Yes. After consultation with the Calendar editor, the pre/co-requisite list was amended to its present form.]

Overall these new program options will have no impact on the programs at the Marine Institute. We are happy to support these new programs.

Derek Howse
Division of Academic and Student Affairs
Fisheries and Marine Institute
of Memorial University of Newfoundland
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

From the Faculty of Science, Department of Mathematics & Statistics, 2015 Sep. 21:

The Department of Mathematics and Statistics supports the proposed new minors in Chemistry and Process Engineering.

Regards,
Shannon

--
Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science

From the Faculty of Science, Department of Physics and Physical Oceanography, 2015 Oct. 03:

The Undergraduate Studies Committee (USC), and Department Head, in Physics and Physical Oceanography have reviewed the proposed minor programs in chemistry and process engineering.

We have only a minor comment.

On page 5, Sect. 9.3, the parenthetical statement

'(Option for Minor in Applied Science-Process engineering)'

Should be moved from program 4, Chemistry and Physics Joint Honours, to appear after the Chemistry programs 5.

Best,
Martin Plumer
Chair, USC, Physics and Physical Oceanography.

[Note: this change has been made]
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

From the School of Pharmacy, 2015 Oct. 06:

The School of Pharmacy has reviewed the proposed calendar change re: Minors in Chemistry & Process Engineering and we are in support of the proposal. Having said that, we would like point out that Chemistry 2400 will be a required first year course in the new PharmD program anticipated to start in September 2017. Therefore, we hope that we can work with the Chemistry department to ensure there is sufficient enrolment capacity in CHEM 2400 for both process engineers doing a minor in chemistry and the Doctor of Pharmacy students.

Finally, one minor correction is needed -> page 7, under 6.6.1, the last sentence in the last bullet, the "I" in "In" should not be capitalized. Thanks for the opportunity to comment.

Regards,
Csop Glew

Csop

CSOP GLEW, Hon. B.A., M.U.P. I MANAGER OF ACADEMIC PROGRAMS
School of Pharmacy

[Note: the minor correction has been made]

Reply from Dr. Travis Fridgen, Head of the Department of Chemistry:

We are aware of the new PharmD program and the requirement for CHEM 2400 and CHEM 2401. Chemistry fully supports this program.

The Minor in Chemistry for Process Engineers and the new PharmD program are completely separate entities. We have accounted for and have space available for potentially 10ish Process students who want a Minor in Chemistry. We have also responded to the requirement for PharmD students to take 2400 and 2401 and that this would require extra resources from somewhere to run this program. This is reflected in the PharmD proposal that will be discussed at SCUGS this afternoon [Oct. 08]:

"Some additional teaching resources will be required in delivering the new program (e.g., a sessional will be required for one new course, support for the delivery of Chemistry 2400 and 2401)."
Collections Development Division
Queen Elizabeth II Library
St. John’s, Newfoundland, Canada
A1B 3Y1

7 October 2015

TO: Dr. Glyn George, Chair - Committee on Undergraduate Studies,
   Faculty of Engineering & Applied Science
   Lorraine Busby, University Librarian
FROM: Dianne Taylor-Harding, Collection Development Librarian, Engineering & Applied Science

SUBJECT: Library Resources Review –
Proposed Minors: Minor in Chemistry for Process Engineers and Minor in Applied Science-Process Engineering for Chemistry Majors and Honours

The Department of Process Engineering and the Department of Chemistry are proposing two new minors:

1. Minor in Chemistry for Process Engineers.
   "Process Engineers who wish to take a minor in chemistry will take five chemistry courses beyond first year: CHEM 2100, 2210, 2302, 2400, and at least 3 credit hours in at the 2000 level or above. Process Engineers are given credit for ENGI 4602 (Process Engineering Thermodynamics) in place of CHEM 2301 (Thermodynamics and Kinetics)."

   "Chemistry students (Majors or Honours) who wish to take a minor in Applied Science-Process Engineering would complete six courses: ENGI 3600, 4621, 4625, and 4961 and six credit hours in term 5 or above. Chemists are given credit for CHEM 2301 (Thermodynamics and Kinetics) in place of ENGI 4602 (Process Engineering Thermodynamics)."

No additional library materials will be required to support these two new minors. The Memorial University Libraries currently collect materials in all areas of Process Engineering at the Advanced Study or Instructional Support Level; the collection comprises resources adequate for imparting and maintaining knowledge about all aspects of the topic; it supports master's degree level programs as well as other specialized inquiries. The Libraries collect Chemistry materials at the Research Level; the collection comprises the major published source materials required for doctoral study and independent research, including materials reporting new findings, scientific
experimental results, and other information useful to researchers.

These proposed new Minors and their necessary calendar changes will have no impact on collections activities at the Memorial University Libraries; they will continue to collect materials to support instruction and research in all areas of Process Engineering and Chemistry.

10/7/2015

X D.E. Taylor-Harding
Dianne E. Taylor-Harding
Collections Librarian, Process Engineering

10/7/2015

X Erin Alcock
Erin K. Alcock
Library Liaison Librarian for Chemistry
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

SUMMARY PAGE FOR SENATE Approval Form

Program Title

Minor in Chemistry for Process Engineers.
Minor in Applied Science-Process Engineering for Chemistry Majors and Honours.

Course Additions

No new courses.

Summary of Calendar Changes

Process Engineers who wish to take a minor in chemistry will take five chemistry courses beyond first year: CHEM 2100, 2210, 2302, 2400, and at least 3 credit hours in at the 2000 level or above. Process Engineers are given credit for ENGI 4602 (Process Engineering Thermodynamics) in place of CHEM 2301 (Thermodynamics and Kinetics).

Chemistry students (Majors or Honours) who wish to take a minor in Applied Science-Process Engineering would complete six courses: ENGI 3600, 4621, 4625, and 4961 and six credit hours in term 5 or above. Chemists are given credit for CHEM 2301 (Thermodynamics and Kinetics) in place of ENGI 4602 (Process Engineering Thermodynamics).

Necessary changes are proposed to the lists of prerequisites in the courses that constitute the minors.

Calendar Changes
1. Under Faculty of Science

9.3.3 Minor in Chemistry
Candidates 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 Process Engineering students, a minor in Chemistry will consist of Chemistry 1050, 1051, 2100, 2210, 2301 (or Engineering 4602), 2302, 2400, and 3 credit hours chosen from the remaining Chemistry courses at the 2000 level or above.
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

2. Under Faculty of Engineering and Applied Science

For Chemistry Majors or Honours Students, a Minor in Applied Science-Process Engineering will consist of Chemistry 1051, ENGI 3600, 4621, 4602 (or Chemistry 2301), 4625, and 4961 and six credit hours chosen from ENGI 5601, 6621, 6631, 6651, 7621, and 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.

Secondary Calendar Changes
1. Under Faculty of Science

9.3 Chemistry
www.chem.mun.ca
The following undergraduate programs are available in the Department:
1. Applied Mathematics and Chemistry Joint Honours
2. Biochemistry and Chemistry Joint Honours
3. Chemistry and Earth Sciences Joint Honours
4. Chemistry and Physics Joint Honours
5. Major or Honours in Chemistry (Option for Minor in Applied Science-Process Engineering)
6. Minor in Chemistry
7. Major or Honours in Computational Chemistry

9.3.4 General Degree - Major in Chemistry
The courses required for a Major in Chemistry are:
1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, 3211, 3303, 3410, 3411, and 3500.
2. Physics 1050 (or 1020 and 1021) and 1051.
Recommended courses: Biochemistry 2101, Mathematics 2051, Physics 2820 and/or 2750, and 6 credit hours in one of the following languages: French, German, or Russian.

Students considering declaring Chemistry as their Major are encouraged to contact either the Department Head or the Deputy Head (Undergraduate Studies).

Reciprocal Minors in Chemistry and Applied Science-Process Engineering

9.3.5 Honours Degree in Chemistry

9.3.5.1 Required Courses

1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, 3211, 3303, 3410, 3411, 3500, 490A/B and 12 credit hours selected from the remaining 4000-level Chemistry courses.
2. Physics 1050 (or 1020 and 1021) and 1051.


10.3 Chemistry

3211 Inorganic Chemistry is a detailed examination of the structure, bonding, and chemistry of the d block elements.
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.
LH: 3
PR: CHEM 2210, CHEM 2301 (or 2300 Engineering 4602), and CHEM 2302

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: CHEM 2301 (or 2300 Engineering 4602), and CHEM 2302, (or the former CHEM 2301) Mathematics 2000 (or Engineering 3424) and Mathematics 2050.
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

2. Under Faculty of Engineering and Applied Science

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.
- Beginning in Academic Term 6, a student will follow either the Process Stream or Petroleum Stream with elective course options as outlined in Table 6 Process Engineering Major.
- Work terms shall normally be taken in the order as set out in Table 6 Process Engineering Major.
- The requirements for a minor in Chemistry in the Process Engineering program are detailed under Faculty of Science, Minor in Chemistry.

11 Course Descriptions:

4621 Process Mathematical Methods introduces numerical methods in chemical engineering processes, sets of linear algebraic equations, simultaneous non-linear equations, polynomial functions, numerical integration, numerical differentiation, higher order ordinary differential equations, stiff equations, Runge-Kutta methods, boundary value problems and applications of eigenvalue problems (numerical solutions). It provides applications of the methods to different aspects of process engineering such as reactor design, separation, process modeling, equipment design and analysis.

CO: ENGI 4625
LH: 3
PR: ENGI 3424 (or Mathematics 2000, Mathematics 2050 and Mathematics 2260)

4625 Process Engineering Calculations 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: ENGI 4602. There is no corequisite for students undertaking a minor in Applied Science – Process Engineering.
PR: ENGI 3901. The prerequisite for students undertaking a minor in Applied Science – Process Engineering is Chemistry 2301 instead of ENGI 3901 and ENGI 4602.

5601 Mass Transfer covers diffusive as well as convective mass transfer, mass transfer correlations, and the application to absorption and dehumidification.
LH: at least seven 2-hour sessions per semester
PR: ENGI 4602 (or Chemistry 2301)

8671 Safety and Risk Engineering 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.
PR: completion of Academic Term 6 or registration in the Minor in Applied Science-Process Engineering.
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

Rationale

Increasingly in the workplace, engineers and scientists are working with others of different educational backgrounds as part of multi-disciplinary teams. In particular, there exists an obvious connection between Chemistry and Process Engineering. Exposure of Chemistry students to the discipline of Process Engineering, and to Chemistry for Process Engineering students, is beneficial for students to broaden and enrich their educational experience. A Process Engineer who can effectively communicate and better understand Chemistry will certainly be valuable in the workplace. Likewise, a Chemist with a background in Process Engineering will bring unique training to, and be better equipped to bridge the gap between, fundamental and more applied chemistry research.

The two first year courses Chemistry 1050 and 1051 are required in both programs. This differs from the other engineering majors where only CHEM 1050 is required. In the Process Engineering major CHEM 1051 is normally taken in Academic Term 3, during the second year, as a required course. CHEM 1051 is therefore listed as one of the eight courses required for the minor in Applied Science - Process Engineering.

Both departments have indicated strong support for this initiative. Informal discussions with students now in the Chemistry major and students now in the Process Engineering major suggest significant student interest in these proposed minors.

<table>
<thead>
<tr>
<th>Consultations Sought From</th>
<th>Comments Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenfell Campus</td>
<td>No</td>
</tr>
<tr>
<td>Marine Institute</td>
<td>Yes</td>
</tr>
<tr>
<td>Office of the Registrar (Calendar Editor)</td>
<td>Yes</td>
</tr>
<tr>
<td>Faculty of Arts</td>
<td>No</td>
</tr>
<tr>
<td>Faculty of Business Administration</td>
<td>Yes</td>
</tr>
<tr>
<td>Faculty of Education</td>
<td>No</td>
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<tr>
<td>Faculty of Engineering and Applied Science</td>
<td>Yes (joint proposal with this Faculty)</td>
</tr>
<tr>
<td>Faculty of Medicine</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Human Kinetics and Recreation</td>
<td>No</td>
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<tr>
<td>School of Music</td>
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<tr>
<td>School of Nursing</td>
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<tr>
<td>School of Social Work</td>
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<tr>
<td>University Library</td>
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<tr>
<td>Biochemistry</td>
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<tr>
<td>Biology</td>
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<tr>
<td>Chemistry</td>
<td>Yes (joint proposal with this Department)</td>
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<tr>
<td>Computer science</td>
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<tr>
<td>Earth Sciences</td>
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<tr>
<td>Mathematics and Statistics</td>
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<td>Ocean Sciences</td>
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<tr>
<td>Physics and Physical Oceanography</td>
<td>Yes</td>
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<tr>
<td>Psychology</td>
<td>No</td>
</tr>
</tbody>
</table>
Reciprocal Minors in Chemistry and Applied Science-Process Engineering

The signatures of the Deans and Heads are on the cover page of this proposal.

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair

Secretary

Date