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, October 21, 2015, at 1 p.m. in C-2045.

AGENDA

1. Regrets
2. Adoption of the Minutes of September 16, 2015
3. Business Arising from the Minutes
4. Correspondence:
   a. Letter from Senate Committee on Undergraduate Studies regarding Date for Submission of Calendar Changes for 2016-2017, paper 4.a (1 page).
   b. Email from Senate Committee on Undergraduate Studies regarding the distribution list for consultation on calendar changes, paper 4.b (3 pages).
   c. Email from Marlies Rise, CFI Innovation Fund, paper 4.c (1 page).

5. Reports of Standing Committees:
   A. Undergraduate Studies Committee:
      d. Department of Ocean Sciences, calendar changes, OCSC/BIOL 4122 and OCSC/BIOL 4601, paper 5.A.d (17 pages).
   B. Graduate Studies Committee:
   C. Nominating Committee:
      a. Approval of committee matrix, paper 5.C.a (3 pages).
   D. Library Committee: None

6. Reports of Delegates from Other Councils
7. Presentation on Accommodations for Students with Disabilities, Blundon Centre
8. Report of the Dean
9. Question Period
10. Adjournment

[Signature]
Mark Abrahams
Dean of Science
A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, September 16, 2015, at 1:00 p.m. in room C-2045.

FSC 2354  Present  
Biochemistry  
Berry, M.  
McGowan, R.  

Biology  
Chapman, T.  
Hooper, R.  

Chemistry  
Bottaro, C.  
Fridgen, T.  
Kerton, F.  

Computer Science  
Banzhaf, W.  
Bungay, S.  
Hu, T.  
Vidyasankar, K.  

Earth Sciences  
Hanchar, J.  

Mathematics & Statistics  
Booth, I.  
Haynes, R.  
Loredo-Osti, J.C.  
Pike, D.  
Radford, C.  
Merkli, M.  
Sullivan, S.  

Ocean Sciences  
Fletcher, G.  

Physics & Physical Oceanography  
Curnoe, S.  
Evstigneev, M.  
Lagowski, J.  
Morrow, M.  
Munroe, J.  
Plumer, M.  
Saika-Voivod, I.  

Psychology  
Neath, I.  
Thorpe, C.  

Dean of Science Office  
Abrahams, M.  
Foster, A.  
Rideout, J.  
Zedel, L.  


Economics
Waples, J.

Geography
Edinger, E.

DELS
Todd, A.

Library
Ambi, A.

Engineering
Duan, X.

Medicine
Kendall, E.

Registrar’s Office
Burry, J.

Faculty of Business
Clift, T.

Marine Institute
Westcott, J.

Undergraduate Students
Diamond, C. Hillier, P.

FSC 2355
Regrets
Norm Catto Sukhinder Cheema

FSC 2356
Adoption of Minutes
Moved: Minutes of the April 15, 2015, meeting be adopted. (Morrow/Sullivan). Carried. One abstention.

FSC 2357
Business Arising: The Dean noted that he forwarded a memo to all faculty members of the Faculty of Science at the beginning of the fall semester that stressed the importance of Faculty Council and encouraged attendance.

FSC 2358
Correspondence: None

FSC 2359
Reports of Standing Committees:

A. Undergraduate Studies Committee
Shannon Sullivan, previous Chair of the Undergraduate Studies Committee, informed Council that calendar changes should be submitted to departmental committees by the end of October to be processed in time for the 2016/17 academic calendar.

B. **Graduate Studies Committee:** None

B. **Nominating Committee:**
Presented by Andy Foster, Associate Dean (Undergraduate and Administration).
   a. **Moved:** Approval of committee matrix as presented in paper 5.C.a. (Foster/Sullivan). **Carried.**

D. **Library Committee:** None.

**FSC 2360** **Reports of Delegates from Other Councils:**
The Faculty of Medicine representative, Ed Kendall, informed Council that accreditation was recently achieved.

Tom Clift, representative from the Faculty of Business, shared that a new program is being developed in the area of social enterprise or entrepreneurship. It will either be a Masters or an MBA degree.

**FSC 2361** **Report of the Dean**
Presented by Mark Abrahams, Dean.

Changes are being considering to the Science constitution. Dr. Andy Foster elaborated by saying that the content in the constitution and by-laws are dated and have not been reviewed in many years. An ad hoc committee will be formed in the near future to undertake the needed revisions.

Next week is Science Literacy week. For those involved, there is a full slate of events planned. The Dean thanked Dr. Suprenant in her role as Interim Associate Dean for her work on this event, and welcomed back Dr. Foster to his next term as Associate Dean.

For those that have the time, there is an open house today at The Landing that allows you to meet the designers of the Core Science Building, see renderings of the exterior and interior of the building, and a scale model that shows you how the building will fit with the rest of campus. In terms of construction progress, the tender for excavation has been awarded and it is expected that work will begin shortly.

Consolidation of Science Stores will take place from October 9 to 19. This date was selected because Thanksgiving is October 12, meaning that Stores will be
closed for five business days (October 9 and 13 – 16). Please insure that you have sufficient stock within your labs for that time period.

The Faculty of Science, along with the Faculty of Arts and DELTS, has been provided support for two embedded teaching support positions. These positions are intended to provide support that will allow faculty to enhance their teaching. It is anticipated we will have the position available at the beginning of November.

The Faculty of Science awards ceremony will take place on the evening of Tuesday, September 22. As you should know, this event celebrates the accomplishments of our faculty, staff, and students and all are encouraged to attend. It is always a wonderful event.

The annual Bayley Nutrition Lecture was held yesterday evening. The presentation was made by Dr. Lamarche and attracted a large audience. The Dean congratulated Drs. Brunton and Bertolo for organizing this event and looks forward to next year’s speaker.

As a reminder, the Faculty of Science also has funding for the Laird Lecture. Nominations will be sought for this year’s speaker in the coming weeks.

FSC 2362 Question Period

FSC 2363 Adjournment

The meeting adjourned at 1:15 p.m.
30 September 2015

TO: Deans and Department Heads (St. John's Campus), Vice-President (Grenfell Campus and Marine Institute) Chairpersons and Secretaries, Academic Councils (Faculties/Schools/Grenfell Campus/Marine Institute)

FROM: Secretary, Senate Committee on Undergraduate Studies

SUBJECT: Date for Submission of Calendar Changes – 2016-2017

I am writing to advise you about deadlines for submission of changes for the 2016-2017 University Calendar. In order to meet deadlines for publication, all calendar changes, including changes to existing courses and programs and proposals for new courses and programs, must be presented to Senate for approval not later than the February meeting which is scheduled for 9 February 2016. As you know, items must go through a number of stages of approval from faculty/school/campus/institute undergraduate studies committees and academic councils, to the Senate Committee on Undergraduate Studies before being submitted to the Executive Committee of Senate for Senate. This means that submissions intended for next year's calendar should be forwarded to your undergraduate studies committees as soon as possible. Meeting times for Senate, the Executive Committee of Senate and the Senate Committee on Undergraduate Studies are as follows and I have indicated the dates by which submissions must be received by the Senate Committee on Undergraduate Studies in order to be included on the Senate agenda for its meeting in February.

Senate: Executive Committee of Senate:
Senate Committee on Undergraduate Studies:

Meets 9 February 2016
Meets 28 January 2015
Meets 7 January 2016; items to be considered at this meeting must be received by the Secretary of the Committee no later than Tuesday, 15 December 2015, and must be approved without revisions at that meeting. Any calendar changes requiring revisions or further consultation cannot meet publication deadlines.

In order to expedite the approval process, Senate asks that the Senate Committee on Undergraduate Studies seek uniformity in submissions. In that end, four individual forms are available for submission of calendar changes. These forms have been designed to provide guidance regarding the information that is required for approval of academic proposals and must be used by academic units for any changes being submitted for the University Calendar. When preparing calendar changes, special attention should be given to the Executive Summary, Library Holdings and Consultation sections of the forms.

The forms are available in both Word Perfect and MS-Word versions at www.mun.ca/regoff/home/ under Related Links (Forms for Calendar Changes) and (Forms) (Other Forms)(Forms for Calendar Changes). Samples of calendar changes that have been approved by the Senate Committee on Undergraduate Studies are also available for information and guidance in preparing calendar changes. A distribution list to use for consultation on calendar changes has also been posted on the website. Should you encounter difficulties accessing these documents, please contact Linda Noseworthy, Recording Secretary of the Senate Committee on Undergraduate Studies (lnosewor@mun.ca; phone 864-4421).

In order to further expedite the approval process and to provide documentation to Senate that is clear and concise, the Senate Committee on Undergraduate Studies is asking that calendar changes be forwarded for approval from one level to the next electronically in both MS-Word/Word Perfect and PDF versions.

If you have any questions regarding the above, please get in touch with me by phone at 864-4410 or by e-mail at scugs@mun.ca.

Thank you,

Jennifer Porter
Deputy Registrar and Secretary to the Committee

JP/mnn

cc: Chairpersons and Secretaries, Undergraduate Studies Committees

PS: Please forward this memorandum to all staff in your academic unit who are involved in the preparation of calendar changes.
Good Morning:

Please find attached a revised distribution list for consultation on calendar changes.

I am also including the following notes regarding consultation:

1. Consultation between St. John’s Campus, Grenfell Campus and the Marine Institute, as well as inter-campus consultation, is reasonable for all calendar changes submitted for consideration and approval. Proposed calendar changes should be forwarded to the attached distribution list. In order to provide a reasonable opportunity for input while not introducing untenable delays, **four weeks** will be allowed for consultation.

2. A Library report is required for new course proposals, new program proposals and proposals for changes to prerequisites/corequisites or course descriptions (if they alter the focus of the course). **Six weeks** should be allowed for the Library to complete the assessment and produce the report. For all other proposals, including but not limited to changes to course titles or editorial changes to the calendar entry, no separate Library report is needed. The Library can be consulted during the regular consultation process as outlined in #1 above.

3. A copy of the letter/memo sent to other units seeking consultation, as well as letters or memos received back from units consulted, **must** be submitted to the Senate Committee on Undergraduate Studies. While consultation does not require agreement and resolution, the Terms of Reference for Senate Committee on Undergraduate Studies does indicate that “... the Committee shall confirm that consultation has been undertaken ...”.

4. Evidence of consultation and explicit agreement by affected units **must** be presented in support of secondary calendar changes. Secondary calendar changes may include, but are not limited to cross-listed courses (“same as”), courses common at more than one campus, introduction of or changes to credit restricted courses, etc. Evidence of consultation should also exist when there is a reference to a course/program within another section of the University Calendar.

If you have any questions regarding the approval process for calendar changes, please get in touch with me by phone at 864-4410 or by e-mail at scugs@mun.ca. Linda Noseworthy, Recording Secretary of the Senate Committee on Undergraduate Studies (lnosewor@mun.ca; phone 864-4421) is also available to assist you.

Please forward this information to all staff in your unit who are involved in the preparation of calendar changes.

Thank you,
Jennifer Porter
Deputy Registrar and Secretary
Senate Committee on Undergraduate Studies
## Distribution List

**Consultation on Calendar Changes**

<table>
<thead>
<tr>
<th>Academic Unit</th>
<th>E-Mail Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td>staceytmun.ca</td>
</tr>
<tr>
<td>Business</td>
<td><a href="mailto:fba.ad.undergrad@mun.ca">fba.ad.undergrad@mun.ca</a></td>
</tr>
<tr>
<td>Education</td>
<td><a href="mailto:shicks@mun.ca">shicks@mun.ca</a></td>
</tr>
<tr>
<td>Engineering</td>
<td><a href="mailto:bfraize@mun.ca">bfraize@mun.ca</a></td>
</tr>
<tr>
<td>Grenfell Campus</td>
<td><a href="mailto:engrconsult@mun.ca">engrconsult@mun.ca</a></td>
</tr>
<tr>
<td>Human Kinetics and Recreation</td>
<td><a href="mailto:associatevpoffice@grenfell.mun.ca">associatevpoffice@grenfell.mun.ca</a></td>
</tr>
<tr>
<td>Marine Institute</td>
<td><a href="mailto:mehickey@mun.ca">mehickey@mun.ca</a></td>
</tr>
<tr>
<td>Medicine</td>
<td><a href="mailto:miugconsultations@mi.mun.ca">miugconsultations@mi.mun.ca</a></td>
</tr>
<tr>
<td>Music</td>
<td><a href="mailto:cvardy@mun.ca">cvardy@mun.ca</a></td>
</tr>
<tr>
<td>Nursing</td>
<td><a href="mailto:Sherry.caines@med.mun.ca">Sherry.caines@med.mun.ca</a></td>
</tr>
<tr>
<td>Pharmacy</td>
<td><a href="mailto:mvolk@mun.ca">mvolk@mun.ca</a></td>
</tr>
<tr>
<td>Science</td>
<td><a href="mailto:deanNurse@mun.ca">deanNurse@mun.ca</a></td>
</tr>
<tr>
<td>Social Work</td>
<td><a href="mailto:pharminfo@mun.ca">pharminfo@mun.ca</a></td>
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<td><a href="mailto:deansci@mun.ca">deansci@mun.ca</a></td>
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<td></td>
<td><a href="mailto:adeanugradswk@mun.ca">adeanugradswk@mun.ca</a></td>
</tr>
<tr>
<td></td>
<td><a href="mailto:univlib@mun.ca">univlib@mun.ca</a></td>
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</tbody>
</table>
Good afternoon Mary,

As discussed with Mark, can you please add to the upcoming agenda for the Science Council the following item for discussion:

• $552,000,000* for the next Innovation Fund competition, to be launched in early 2016, with funding decisions expected in June 2017. This represents an investment of approximately $425 million in research infrastructure and $127 million in Infrastructure Operating Funds in the next competition; Based on discussions with the CFI, CCCS understands that CFI may launch the opportunity around February or March 2016, and LOIs would then likely be due around June 2016 (with full proposals due in the next few months that follow). Accordingly, groups are encouraged to begin to consider infrastructure projects as soon as possible. We anticipate that Memorial will receive an allocation of funding against which it may apply, and accordingly, we will need to launch an internal EOI and selection process (once we receive our allocation) to prioritize projects we will seek to develop into full applications.

Best regards,

Marlies

Marlies Rise, Ph.D.
Director, CREATI, CRC and CFI Services
Memorial University
St. John’s, NL A1C 5S7
Tel: 709.864.3213  Fax: 709.864.6193
October 8, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes

At a meeting held on October 5, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) Changes to Joint Honours program in Biochemistry and Chemistry
   (b) Changes to Joint Honours program in Applied Mathematics and Chemistry

2. Department of Mathematics and Statistics: "housekeeping" Calendar changes

3. Department of Ocean Sciences: prerequisites changes to OCSC/BIOL 4122 and OCSC/BIOL 4601

Joan Burry
Associate Registrar and
Secretary, Committee
on Undergraduate Studies,
Faculty of Science
Proposal
To Modify the Biochemistry Chemistry Joint Honours Program

Resource Implications: Instructional Costs
None.

Resource Implications: Library Holdings and/or Other Resources Required
None.

Signature of Unit Head (if appropriate): ________________________________

Date: __________________________________________________________________

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

Date: __________________________________________________________________
RATIONALE FOR CHANGES

The present Biochemistry Chemistry Joint Honours program requires too many courses and, as a result, has had few takers over the last 20 years. It consists of a total of 45 courses (135 credit hours) which means a student cannot finish the program in 4 years. Almost all of the Joint Honours programs in the calendar have been reduced from 45 courses to 40 courses over the last 10 years to address this problem. An increased amount of choice was added to improve flexibility to further increase interest in the program.

CONSULTATIONS

Grenfell
Marine Institute
Mathematics and Statistics
Computer science
Physics
Biology
Psychology
Ocean Sciences
Earth Sciences
Pharmacy
Engineering
Human Kinetics
Library
COURSE DELETIONS AND ADDITIONS

5.1.4 Biochemistry and Chemistry Joint Honours

*Delete:*
A total of five courses from the program.
The following are no longer required courses
Mathematics 2050
Chemistry 3303
Chemistry 3411
Chemistry 3500
Biochemistry 3107
Biochemistry 3108
Medicine 310A/B

CHANGES TO CALENDAR REGULATIONS

None.

CALENDAR REVISIONS

5.1.4 Biochemistry and Chemistry Joint Honours

The following courses (or their equivalents) are required:

1. Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and the former 1031) (or Chemistry 1200 and 1001) or their equivalents, Mathematics 1000 and 1001, Physics 1050 and 1051, 6 credit hours in first year English courses. Biology 1001 and 1002 are highly recommended.
3. Chemistry 2100, 2210, 2300 or 2301, 2302, 2400, 2401, 3110, 3211, 3303, 3410 3411, 3500, and 6 further credit hours in Chemistry courses at the 4000 level.
4. Nine further credit hours in Chemistry courses numbered 3000 or higher, at least 6 credit hours of which must be in courses numbered 4000 or higher.
5. Biochemistry 2100, 2101, 3105, 3106, and either 3107, 3108, or Medicine 310A/B
6. 12 credit hours either Biochemistry 4210 or 4211, 9 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4220, 4230-4249.
   a. *Note:* Only one of Biochemistry 4105, 4220 may be chosen.
7. Either Chemistry 490A/B or Biochemistry 499A/B.
8. A sufficient number of elective courses to bring the degree to a total. Other courses to complete the prescribed minimum of 120 436 credit hours in courses for the Joint Honours Degree. Physics 2820 and/or Physics 2750 are recommended.

Note: Students should check prerequisites for 4000 level courses before making decisions about their 3000 level courses and seek academic advice if necessary.

Template for choosing courses to finish the program in four years:

For use by the chemistry and biochemistry advising offices but NOT for inclusion in the calendar:
<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CHEM1050</td>
<td>CHEM1051</td>
</tr>
<tr>
<td></td>
<td>PHYS1050 or 1020</td>
<td>PHYS1051 or 1021</td>
</tr>
<tr>
<td></td>
<td>MATH1000</td>
<td>MATH1001</td>
</tr>
<tr>
<td></td>
<td>A first English course</td>
<td>A second English course</td>
</tr>
<tr>
<td></td>
<td>Free elective *</td>
<td>Free elective *</td>
</tr>
<tr>
<td>2</td>
<td>CHEM2301</td>
<td>CHEM2210</td>
</tr>
<tr>
<td></td>
<td>CHEM2400</td>
<td>CHEM2302</td>
</tr>
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<td></td>
<td>CHEM2100</td>
<td>CHEM2401</td>
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<tr>
<td></td>
<td>MATH2000</td>
<td>BIOC2100</td>
</tr>
<tr>
<td></td>
<td>Free elective *</td>
<td>BIOC2101</td>
</tr>
<tr>
<td>3</td>
<td>CHEM3110 or BIOC 3106</td>
<td>CHEM3211</td>
</tr>
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<td></td>
<td>CHEM3410</td>
<td>BIOC3105</td>
</tr>
<tr>
<td></td>
<td>BIOC3107 (or elective** if 3108 in W)</td>
<td>BIOC3108 (or elective if 3107 in F)</td>
</tr>
<tr>
<td></td>
<td>elective **</td>
<td>2 electives ***</td>
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<tr>
<td>4</td>
<td>CHEM3110 OR BIOC3106</td>
<td>CHEM490B (or BIOC499B)</td>
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<tr>
<td></td>
<td>(whichever one was not taken in 3rd year)</td>
<td>4 electives ***</td>
</tr>
<tr>
<td></td>
<td>CHEM490A (or BIOC499A)</td>
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</tbody>
</table>

Free elective * Biology 1001 and Biology 1002 are highly recommended

Students must choose additional biochemistry and chemistry courses from the available fall semester courses designated as elective(s) ** and winter semester courses designated as elective(s) ***. They must fulfill the following program requirements:

Students must take a minimum of 3 credit hours from remaining 3000 level chemistry courses and 6 credit hours from 4000 level chemistry courses. As well, students must take 12 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4230-4249.

Students should plan accordingly, carefully choosing the desired remaining required chemistry and biochemistry elective courses from the table below which lists the available courses in the semesters that they are offered. To do this properly, students should check the prerequisites for any of the 4th year courses in chemistry or biochemistry that they may want to take. For example, BIOC4103 requires BIOC3107, CHEM3411 is required for all CHEM44XX courses, CHEM4304 requires MATH2260, and CHEM4303 requires CHEM3303.

<table>
<thead>
<tr>
<th>Third year Chemistry Courses: Students must choose at least one.</th>
<th>Fall**</th>
<th>Winter***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>CHEM3303</td>
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<tr>
<td></td>
<td>CHEM3500</td>
<td>CHEM3411</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year Chemistry Courses: Students must choose at least two.</th>
<th>CHEM4XXX courses being offered in any given year are normally announced in the previous June.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>BIOC4101</td>
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<tr>
<td></td>
<td>BIOC4104</td>
</tr>
<tr>
<td></td>
<td>BIOC4210</td>
</tr>
<tr>
<td></td>
<td>BIOC4211</td>
</tr>
<tr>
<td></td>
<td>BIOC4230</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year Biochemistry Courses: Students must choose must choose at least four.</th>
<th>BIOC4101</th>
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<tr>
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<td>BIOC4200</td>
</tr>
<tr>
<td></td>
<td>BIOC4230</td>
<td>BIOC4201</td>
</tr>
</tbody>
</table>
SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Biochemistry and Chemistry Joint Honours

Summary of Changes

The number of courses in the program is to be reduced to 40 from 45. One required math course and two required courses in each of chemistry and biochemistry were removed from the program. Increased choice in the remaining chemistry and biochemistry courses was also introduced to further increase flexibility.

Consultations Sought From

<table>
<thead>
<tr>
<th>Consultations Sought From</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>
<td>No</td>
</tr>
<tr>
<td>Computer Science</td>
<td>No</td>
</tr>
<tr>
<td>Physics</td>
<td>Yes</td>
</tr>
<tr>
<td>Biology</td>
<td>Yes</td>
</tr>
<tr>
<td>Psychology</td>
<td>No</td>
</tr>
<tr>
<td>Ocean Sciences Centre</td>
<td>No</td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>Yes</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>Yes</td>
</tr>
<tr>
<td>Engineering</td>
<td>Yes</td>
</tr>
<tr>
<td>Human Kinetics and Recreation</td>
<td>No</td>
</tr>
</tbody>
</table>

Library Report Received

Yes

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

Yes/No

Name

-------------------------------------------------------------------------------------------------------------------------------------

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES
Initial consultation email sent by chemistry: April 24, 2015

Note: this proposal has been approved by both the Chemistry and Biochemistry Departments.

Original Message-----
From: Chris Flinn [mailto:cgflinn@mun.ca]
Sent: April-24-15 2:45 PM
To: "": associatevpoffice"@grenfell.mun.ca; miugconsultations@mi.mun.ca; cs-chair@mun.ca; Engineering Consultations; Karen Morris; jhanchar@mun.ca; Fletcher, Garth; Psychology.Head@mun.ca; pharminfo@mun.ca; bdeyoung@mun.ca; Alcock, Erin; Mercer, Stacey; dinnes@mun.ca

Subject: consultation on a proposal to modify the biochemistry chemistry joint honours program

Hello everyone,

The chemistry and biochemistry departments request your feedback on a proposal to modify the biochemistry chemistry joint honours program. All comments/feedback are welcome.

Thanks,

Chris Flinn
Deputy Head, Undergraduate Studies
MUN Chemistry Department

Consultation email responses

Library

Dr. Flinn,

Extremely sorry for the delay in responding. I got swallowed whole organizing a conference and am only just emerging.

I have read the proposal and see no reason why this would impact the MUN Library system in any way. We are currently supporting students taking all of these courses. A redistribution in the requirements for this Honours program, is acceptable from the point of view of the Library.

Thanks,

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

School of Pharmacy

Hi Dr. Flinn  
The School of Pharmacy has no concerns with the above proposed change to the joint  
Biochemistry/Chemistry degree requirements.  
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

Marine institute

Chris,

Thank you for the opportunity to review the proposed changes to the Biochem Chem joint honours  
program. These changes will have no impact on the programs at the Marine Institute.

We are happy to support these changes as presented.

Derek

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

Faculty of Engineering

Dear Dr. Flinn,

Prof. Fisher, the Associate Dean (Undergraduate Studies) and I have reviewed the proposed changes to the Biochemistry and Chemistry Joint Honours program. They seem to have no impact on our Faculty.

I do have one question. Is it the intent that students must do one  
more 3xxx CHEM course and two 4xxx, or is it acceptable for a student to do three 4xxx courses instead? If the latter is intended, then
some minor re-wording may be needed.

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

Department of Earth Sciences

Hi Chris,

With regard to the proposed changes to the Biochemistry-Chemistry Joint Honours program, Earth Sciences has no problem with these changes. We have two minor suggestions:

1) In 5.1.4 point 1, since the demise of Chemistry 1031, isn't it possible for students to take Chemistry 1010, 1011 and 1051?
2) In the second of your tables for faculty advisors, it would be helpful to include another column with the prerequisites for each course.

Regards,

Alison
(UGMC Earth Sciences)

Grenfell

Hello Dr. Flinn. I have received a comment about the proposed changes that I am passing on verbatim.

I agree with the suggestion.

... I generally agree with the notion to stream-line this Joint Honours program to 120 credit hours (40 courses) from the current 135 credit hours; this change should make the program more attractive to students. However, I note that under 5.1.4 the first note (1.) formerly read: Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and 1031) or their equivalents. In the proposal it reads: Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and the former 1031). The phrase "or their equivalents" is to be removed. Since Chemistry 1200 and 1001 are offered at Grenfell and only 1050 is offered at Grenfell Campus, essentially in support of the Engineering One program here, the change would appear to prevent or, at the least, dissuade, students at Grenfell from pursuing this Joint Honours program. I would recommend either adding "or Chemistry 1200 and 1001" or the list or retaining the phrase "or their equivalents", assuming that that applies to Chemistry 1200 and 1001.

Thanks

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

Physics department

Physics has no objections to the proposed modification to the chemistry/biochemistry joint honours program.

Best wishes

Michael Morrow

Biology department

Hi Chris,
I am sorry that this response is so late as the proposal did go out to the committee. Biology has no issues or concerns with the proposed changes to the Joint honours in Biochemistry and Chemistry.

Thanks
Karen
October 8, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes

At a meeting held on October 5, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) Changes to Joint Honours program in Biochemistry and Chemistry
   (b) Changes to Joint Honours program in Applied Mathematics and Chemistry

2. Department of Mathematics and Statistics: "housekeeping" Calendar changes

3. Department of Ocean Sciences: prerequisites changes to OCSC/BIOL 4122 and OCSC/BIOL 4601

Joan Burry
Associate Registrar and
Secretary: Committee
on Undergraduate Studies,
Faculty of Science
Proposal

To Modify the Applied Mathematics and Chemistry Joint Honours Program

Resource Implications: Instructional Costs
None.

Resource Implications: Library Holdings and/or Other Resources Required
None.

Signature of Unit Head (if appropriate):

Date:

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

Date:
RATIONALE FOR CHANGES

Joint programs, especially joint honours programs, are very demanding and anything which would increase the flexibility of such programs would make them more appealing. The 2011 CSC Accreditation Committee Site Visit team acknowledged that Chemistry 3410 could serve as a biochemistry course for the chemistry major and honours program or any of the joint programs with chemistry. Allowing students in the applied Mathematics Chemistry joint honours program to choose between Biochemistry 2101 and Chemistry 3410 as one of the core courses in the program would improve flexibility for students. This can only help increase the appeal of this joint program for future students.

CONSULTATIONS

Grenfell
Marine Institute
Mathematics and Statistics
Biochemistry
Computer science
Physics
Biology
Psychology
Ocean Sciences
Earth Sciences
Pharmacy
Engineering
Human Kinetics
Library
COURSE DELETIONS AND ADDITIONS

5.1.4 Applied Mathematics and Chemistry Joint Honours

Delete:

None

Addition:

Chem 3410 as an alternative course to Biochemistry 2101

CHANGES TO CALENDAR REGULATIONS

None.

CALENDAR REVISIONS

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.
3. Biochemistry 2101 or Chemistry 3410.
4. Physics 1050 (or 1020) and 1051.
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 1031), 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.
SUMMARY PAGE FOR SENATE

Approval Form

Program Title
Applied Mathematics and Chemistry Joint Honours

Summary of Changes
Chemistry 3410 is added as an alternative course to Biochemistry 2101.

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<tr>
<td>Human Kinetics and Recreation</td>
<td>No</td>
</tr>
</tbody>
</table>

Library Report Received
Yes

Approved by Dean, Associate Vice-President (Academic) or Vice-President
Yes/No

Name

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair: __________________________________________

Secretary: _______________________________________

Date: __________________________________________
Initial consultation email sent by chemistry:

From: Chris Flinn <cqflinn@mun.ca>
Sent: March 27, 2015 5:28 PM
To: Associate VP Office - Academic; miugconsultations@mi.mun.ca; cs-chair@mun.ca; Engineering Consultations; Karen Morris; jhanchar@mun.ca; fletcher@mun.ca; Psychology.Head@mun.ca; pharminfo@mun.ca; bdeyoung@mun.ca; Alcock, Erin; stacevm@mun.ca; dinners@mun.ca; biohead@mun.ca
Subject: consultation on a minor change to the Applied Math Chemistry joint honours program

Hello everyone,

Please send any comments to me regarding the attached proposal which is a minor change to the Applied Math Chemistry joint honours program.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
Chemistry Department

Consultation email responses

Library

Hi Chris,

You are right. This will have no impact on the MUN Library system. Makes good sense for the students impacted.

Erin

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

Department of Mathematics and Statistics

Forwarded Message -------
Subject: Re: Potential change to the Applied Mathematics and Chemistry Joint Honours program
Date: Wed, 14 Jan 2015 14:10:59 -0330
From: Shannon Patrick Sullivan <shannon@mun.ca>
To: Chris Flinn <cqflinn@mun.ca>
Email from Chris Flinn, Chemistry, to Shannon Sullivan, Mathematics and Statistics

I thought I should check with math first regarding a possible change in the Applied Mathematics and Chemistry Joint Honours program approved by our undergraduate studies committee. Biochemistry 2101 is presently listed as a required course. We no longer require Biochemistry 2101 in our majors andhonours program (it is listed as a recommended course). We would like tochange the joint program to give students a choice between Biochemistry2101 and chem 3410 Bio-organic Chemistry. I'd appreciate your feedbackbefore taking this to the department for approval.

Hi Chris,

At its Departmental Meeting today, the Department of Mathematics & Statistics voted in favour of the proposed amendment to the Joint Honours program in Applied Mathematics and Chemistry.

Cheers,
Shannon

Grenfell

Dr. Flynn, a comment from a faculty member in Environmental Science in support of the change:

"This looks like a reasonable change to this program that should introduce the flexibility desired. As proposed it may also make the joint Major program more attractive to students. I support the change."

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

Department of Biochemistry

Hi Chris

Ignoring the question of whether bioc2101 and chem3410 should be thought of as equivalents, which I suspect is a bigger discussion that would open up various other "equivalence" pairs (although at least at this end I believe the 2101/3410 discussion has started with respect to the joint chem/biochem honours), biochemistry is fine going along with the current proposal in the interests of increased flexibility.

Mark

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

Marine Institute
Chris,

Thank you for the opportunity to review the proposed change to the Applied Math Chemistry joint honours program.

This change will have no impact on the programs at the Marine Institute.

We are happy to support this proposal as presented.

Derek

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

Faculty of Engineering and Applied Science

Dear Dr. Flinn,

The proposed minor changes to the Applied Math and Chemistry Joint Honours Program has been reviewed by myself and Prof. Andy Fisher, Associate Dean (Undergraduate Studies), Faculty of Engineering and Applied Science. The proposed changes have no direct impact on Engineering programs and we have no concerns with the proposal.

Dr. Howard Heys, Vice-Chair  
Committee on Undergraduate Studies  
Faculty of Engineering and Applied Science  
Memorial University of Newfoundland

Department of Biology

Hi Chris,  
The Biology Undergraduate Studies Committee reviewed the proposed calendar change to the Applied Math Chemistry joint honours program. We have no concerns or issues with the proposed change.  
Thanks  
Karen

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

Department of Earth Sciences

Hi Chris,  

With regard to the proposal to modify the Applied Mathematics
and Chemistry Joint Honours Program by adding Chem 3410 as an alternative
course to Biochemistry 2101, Earth Sciences has no problem with this change.

Regards,
Alison
(UGMC Earth Sciences)

School of Pharmacy

Hi Dr. Flinn
The School of Pharmacy has no concerns with the proposed change to the Applied Math Chemistry joint
honours program.
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
October 8, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes

At a meeting held on October 5, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) Changes to Joint Honours program in Biochemistry and Chemistry
   (b) Changes to Joint Honours program in Applied Mathematics and Chemistry

2. Department of Mathematics and Statistics: "housekeeping" Calendar changes

3. Department of Ocean Sciences: prerequisites changes to OCSC/BIOL 4122 and OCSC/BIOL 4601

Joan Burry
Associate Registrar and
Secretary: Committee
on Undergraduate Studies,
Faculty of Science
Proposal
Calendar Changes to Existing Courses:
Mathematics 1001, 1050, 1051, 2000, 2050, 2260
Statistics 2501, 2560

Executive Summary

The Department of Mathematics and Statistics is proposing to delete credit restrictions which pertain to courses last offered in the 1995-1996 academic year or earlier.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from Grenfell Campus, the Marine Institute, the Faculty of Arts, the Faculty of Engineering and Applied Science, the Department of Chemistry, the Department of Computer Science, the Department of Earth Sciences, the Department of Ocean Sciences, and the Department of Physics and Physical Oceanography. As requested by Grenfell Campus, secondary changes have been added to reflect this proposal in the Grenfell section of the Calendar, where applicable.

Library Holdings and/or Other Resources Required

As indicated in the attached memo from Alison Ambi, Collections Librarian (Mathematics and Statistics), these changes will not require additional library holdings.

The costs, if any, associated with this change/these changes can be met from within the existing budget allocation or authorized new funding for the Faculty of Science.

Signature of Unit Head (if appropriate):

Date:

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Mathematics 1001 Calculus II

Abbreviated Course Title
Calculus II

Calendar Change

Under the Faculty of Science, page 527, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), delete the credit restriction for Mathematics 1001:

"1001 Calculus II is an introduction to integral calculus, including Riemann sums, techniques of integration and improper integrals. Applications include exponential growth and decay, areas between curves and volumes of solids of revolution.

CR: the former Engineering 1411 or the former Engineering 2413
PR: MATH 1000 or the former MATH 1081"

Secondary Calendar Change

Under Grenfell Campus, page 353, 2015-2016 Calendar, 12.21 (Mathematics and Statistics), delete the credit restriction for Mathematics 1001:

"1001 Calculus II is an introduction to integral calculus, including Riemann sums, techniques of integration and improper integrals. Applications include exponential growth and decay, area between curves and volumes of solids of revolution.

CR: the former Engineering 1411, the former Engineering 2413
PR: MATH 1000 or the former MATH 1081"

Rationale

Engineering 1411 (Calculus I) has not been offered since Fall 1988. Engineering 2413 (Calculus II) has not been offered since Winter 1989.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science

Comments Received

Yes
Yes
Yes
Yes
5. Department of Biochemistry  No
6. Department of Biology  No
7. Department of Chemistry  Yes
8. Department of Computer Science  Yes
9. Department of Earth Sciences  Yes
10. Department of Ocean Sciences  Yes
11. Department of Physics and Physical Oceanography  Yes
12. Department of Psychology  No

Library Report Received  Yes

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

Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Mathematics 1050 Finite Mathematics I

Abbreviated Course Title
Finite Mathematics I

Calendar Change

Under the Faculty of Science, page 527, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), delete the credit restriction for Mathematics 1050:

"1050 Finite Mathematics I covers topics which include sets, logic, permutations, combinations and elementary probability.

CR: the former MATH 1150
LC: 4
PR: a combination of placement test and high school mathematics scores acceptable to the department or MATH 103F
UL: At most 9 credit hours in Mathematics will be given for courses completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, the former 1080, the former 1081, 1090, the former 1150 and 1151. With the exception of those already admitted at the time of registration in this course to a Bachelor of Education program that requires this course, students who already have obtained credit for 6 or more Mathematics credit hours numbered 2000 or above are not permitted to register for this course nor can they receive credit for it."

Secondary Calendar Change

Under Grenfell Campus, page 353, 2015-2016 Calendar, 12.20 (Mathematics and Statistics), amend the credit restriction for Mathematics 1050 as follows:

"1050 Finite Mathematics I covers topics which include sets, logic, permutations, combinations, and elementary probability.

CR: the former MATH 1150 With the exception of those already admitted at the time of registration in this course to a Bachelor of Education program that requires this course, students who already have obtained credit for 6 or more Mathematics credit hours numbered 2000 or above are not permitted to register for this course nor can they receive credit for it.

LC: 4
PR: a combination of placement test and high school mathematics scores acceptable to the Department, or MATH 103F"
Rationale

Mathematics 1150 (Mathematics for Primary and Elementary Teachers I) has not been offered since Spring 1988.

Consultations Sought From

<table>
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Library Report Received

Yes

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

Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Mathematics 1051 Finite Mathematics II

Abbreviated Course Title

Finite Mathematics II

Calendar Change

Under the Faculty of Science, page 527, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), delete the credit restriction for Mathematics 1051:

"1051 Finite Mathematics II covers topics which include elementary matrices, linear programming, elementary number theory, mathematical systems, and geometry.

CR: the former MATH 1151
LC: 4
PR: a combination of placement test and high school mathematics scores acceptable to the department or MATH 103F
UL: At most 9 credit hours in Mathematics will be given for courses completed from the following list subject to normal credit restrictions: Mathematics 1000, 1031, 1050, 1051, the former 1080, the former 1081, 1090, the former 1150 and 1151. With the exception of those already admitted at the time of registration in this course to a Bachelor of Education program that requires this course, students who already have obtained credit for 6 or more Mathematics credit hours numbered 2000 or above are not permitted to register for this course nor can they receive credit for it."

Secondary Calendar Change

Under Grenfell Campus, page 353, 2015-2016 Calendar, 12.20 (Mathematics and Statistics), amend the credit restriction for Mathematics 1051 as follows:

"1051 Finite Mathematics II covers topics which include elementary matrices, linear programming, elementary number theory, mathematical systems and geometry.

CR: the former MATH 1151. With the exception of those already admitted at the time of registration in this course to a Bachelor of Education program that requires this course, students who already have obtained credit for 6 or more Mathematics credit hours numbered 2000 or above are not permitted to register for this course nor can they receive credit for it.
LH: 1.5
PR: a combination of placement test and high school mathematics scores acceptable to the Department, or MATH 103F"
Rationale

Mathematics 1151 (Mathematics for Primary and Elementary Teachers II) has not been offered since Spring 1989.

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Library Report Received

Yes

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

Name

__________________________________________________________

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Mathematics 2000 Calculus III

Abbreviated Course Title
Calculus III

Calendar Change

Under the Faculty of Science, page 527, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), delete the credit restriction for Mathematics 2000:

"2000 Calculus III is an introduction to infinite sequences and series, and to the differential and integral calculus of multivariate functions. Topics include tests for the convergence of infinite series, power series, Taylor and Maclaurin series, complex numbers including Euler's formula, partial differentiation, and double integrals in Cartesian and polar coordinates.

CR: the former Engineering 1411, the former Engineering 1412, the former Engineering 2412,
or the former Engineering 2413
PR: MATH 1001"

Secondary Calendar Change

Under Grenfell Campus, page 353, 2015-2016 Calendar, 12.20 (Mathematics and Statistics), delete the credit restriction for Mathematics 2000:

"2000 Calculus III is an introduction to infinite sequences and series, and to the differential and integral calculus of multivariate functions. Topics include tests for the convergence of infinite series, power series, Taylor and Maclaurin series, complex numbers including Euler's formula, partial differentiation, and double integrals in Cartesian and polar coordinates.

CR: the former Engineering 1411, the former Engineering 1412, the former Engineering 2412,
or the former Engineering 2413
LH: 1.5
PR: MATH 1001"

Rationale

Engineering 1411 (Calculus I) has not been offered since Fall 1988. Engineering 1412 (Intermediate Calculus) has not been offered since Fall 1995. Engineering 2412 (Intermediate Calculus) has not been offered since Winter 1991. Engineering 2413 (Calculus II) has not been offered since Winter 1989.
**Consultations Sought From**

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</table>

**Library Report Received**

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

Name

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**FOR OFFICE USE ONLY**

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Mathematics 2050 Linear Algebra I

Abbreviated Course Title
Linear Algebra I

Calendar Change

Under the Faculty of Science, page 527, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), delete the credit restriction for Mathematics 2050:

"2050 Linear Algebra I includes the topics: Euclidean n-space, vector operations in 2- and 3-space, complex numbers, linear transformations on n-space, matrices, determinants, and systems of linear equations.

CR: the former Engineering 2402
PR: A combination of placement test and high school Mathematics scores acceptable to the Department or 3 credit hours in first year Mathematics courses"

Secondary Calendar Change

Under Grenfell Campus, page 353, 2015-2016 Calendar, 12.20 (Mathematics and Statistics), delete the credit restriction for Mathematics 2050:

"2050 Linear Algebra I includes the topics: Euclidean n-space, vector operations in 2- and 3-space, complex numbers, linear transformations on n-space, matrices, determinants, and systems of linear equations.

CR: the former Engineering 2402
PR: A combination of placement test and high school Mathematics scores acceptable to the Department or 3 credit hours in first year Mathematics courses."

Rationale

Engineering 2402 (Vectors II) has not been offered since Winter 1989.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts

Comments Received

Yes
Yes
Yes
4. Faculty of Engineering and Applied Science  Yes
5. Department of Biochemistry  No
6. Department of Biology  No
7. Department of Chemistry  Yes
8. Department of Computer Science  Yes
9. Department of Earth Sciences  Yes
10. Department of Ocean Sciences  Yes
11. Department of Physics and Physical Oceanography  Yes
12. Department of Psychology  No

Library Report Received  Yes

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

Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Mathematics 2260 Ordinary Differential Equations I

Abbreviated Course Title
Ordinary Diff Equations I

Calendar Change(s)

Under the Faculty of Science, page 528, 2015-2016 Calendar, 10.8.3 (Mathematics Courses), amend the credit restriction for Mathematics 2260 to read:

"2260 Ordinary Differential Equations I examines direction fields, equations of first order and first degree, higher order linear equations, variation of parameters, methods of undetermined coefficients, Laplace transforms, systems of differential equations. Applications include vibratory motion, satellite and rocket motion, pursuit problems, population models and chemical kinetics.

CR: MATH 3260, the former Engineering 3444
PR: MATH 2000"

Secondary Calendar Changes

Under Grenfell Campus, page 354, 2015-2016 Calendar, 12.20 (Mathematics and Statistics), amend the credit restriction for Mathematics 3260 to read:

"3260 Ordinary Differential Equations I is direction fields, equations of first order and first degree, higher order linear equations, variation of parameters, methods of undetermined coefficients, Laplace transforms, systems of differential equations. Applications include vibratory motion, satellite and rocket motion, pursuit problems, population models and chemical kinetics.

CR: MATH 2260 or the former Engineering 3444
PR: MATH 2000"

Rationale

Engineering 3411 (Applied Differential Equations) has not been offered since Fall 1996. [Grenfell Campus is currently proposing a Calendar change which will renumber Mathematics 3260 as Mathematics 2260. If that proposal is approved by Senate, this document will be updated to reflect the amendment.]
<table>
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<tbody>
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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:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title
Statistics 2501 Further Statistics for Business and Arts Students

Abbreviated Course Title
Further Stat Busi&Arts Stud

Calendar Change

Under the Faculty of Science, page 530, 2015-2016 Calendar, 10.8.4 (Statistics Courses), amend the credit restriction for Statistics 2501 as follows:

"2501 Further Statistics for Business and Arts Students covers power calculation and sample size determination, analysis of variance, multiple regression, nonparametric statistics, time series analysis, introduction to sampling techniques.

CR: STAT 2560, the former 2544, Psychology 2911, 2950, and the former 2901
LH: one 90 minute lab per week. Statistical computer package will be used in the laboratory.
PR: STAT 2500 or the former 2510"

Rationale

Statistics 2511 (Statistics for Science Students II) has not been offered since Winter 1996.

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

Name

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Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Statistics 2560 Further Statistics for Science Students

Abbreviated Course Title

Further Stats Science Students

Calendar Changes

Under the Faculty of Science, page 530, 2015-2016 Calendar, 10.8.4 (Statistics Courses), amend the course description and credit restriction for Statistics 2560 as follows:

"2560 Further Statistics for Science Students (formerly STAT 2544) covers estimation and hypothesis testing in the two-sample and paired sample cases, one way and two way analysis of variance, simple and multiple linear regression, chi-square tests, non-parametric tests including sign test, Wilcoxon signed rank test and Wilcoxon rank test.

CR: STAT 2501, the former 2514, Psychology 2911, 2950, and the former 2901
LH: one 90 minute lab per week. Statistical computer packages will be used in the laboratory, but no prior computing experienced is assumed.
PR: STAT 1510 or 2500 or 2550 or the former 2510, Mathematics 1000 or the former 1081"

Rationale

Statistics 2511 (Statistics for Science Students II) has not been offered since Winter 1996.

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Library Report Received

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

Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Subject: Request for Consultation: Mathematics and Statistics courses
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 16/04/2015 11:22 AM
To: aambi@mun.ca

Hi Alison,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

I am forwarding them to you for your comments on the availability of appropriate Library resources to support these proposals.

Thanks,
Shannon

--
Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science
Memorial University of Newfoundland
St. John's · NL · Canada
shannon@mun.ca · www.mun.ca/~shannon

Attachments:

Math and Stats - Credit Restrictions.pdf  61.6 kB
21 September 2015

TO: Dr. Shannon Patrick Sullivan

FROM: Alison Ambi, Liaison Librarian, Mathematics & Statistics

SUBJECT: Calendar change to existing courses

Upon review of the proposal to delete credit restrictions which pertain to courses last offered in the 1995-1996 academic year, I have determined that the changes will have no impact on the collections activities of the Memorial University Libraries.

Alison Ambi
Science Research Liaison Librarian
Subject: Request for Consultation: Mathematics and Statistics courses
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 16/04/2015 11:20 AM
To: associatevpoffice@grenfell.mun.ca, miugconsultations@mi.mun.ca, staceyhm@mun.ca, chemhead@mun.ca, cs-chair@mun.ca, bdeyoung@mun.ca, engconsult@mun.ca, biochehead@mun.ca, dinnes@mun.ca, jhanchar@mun.ca, fletcher@mun.ca, psychology.head@mun.ca

Greetings,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

If you have any comments on this proposal, we would appreciate receiving your responses no later than Thursday, May 14th.

Thanks,
Shannon

--
Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science
Memorial University of Newfoundland
St. John's · NL · Canada
shannon@mun.ca · www.uces.mun.ca/~shannon

Attachments:

Math and Stats - Credit Restrictions.pdf 61.6 kB
Subject: Re: Credit Restriction Deletions
From: "Howell, Jared" <jahowell@grenfell.mun.ca>
Date: 15/04/2015 8:28 PM
To: Shannon Patrick Sullivan <shannon@mun.ca>

Shannon,

I had sent this around and asked for any objections. I don't think I got any. These can be carried over to our section as well.

Jared
Subject: RE: Consultation: Math and Stats Credit Restrictions  
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>  
Date: 22/04/2015 2:04 PM  
To: "Shannon Patrick Sullivan (shannon@mun.ca)" <shannon@mun.ca>

Shannon,

Thank you for the opportunity to review the proposed changes to the Existing Courses: Mathematics 1001, 1050, 1051, 2000, 2050, 2260 and Statistics 2501, 2560.

These changes will have no impact on the programs at the Marine Institute.

We are happy to support this proposal as presented.

Derek

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

From: Mercer, Stacey [mailto:staceym@mun.ca]  
Sent: Friday, April 17, 2015 4:00 PM  
To: Aboriginal Studies Minor- Doug Wharram; Arts Heads; Catto, Norm; Film Studies Minor- Alec Brookes; Grenfell Campus; Law & Society Major and Minor- Pat Dold; MIUG Consultations; Medieval Studies Major and Minor- Suma Rajiva; Mosdell, Wendy; Newfoundland Studies Minor- Paul De Decker; Police Studies Major- Alan Hall; Shute, Renee S.; Warkentin, Erwin  
Subject: Consultation: Math and Stats Credit Restrictions

Forwarded on behalf of Dr. Alex Marland, Associate Dean of Arts (Undergraduate):

Dear Academic Unit Head (and coordinators of undergraduate interdisciplinary programs)

I am writing so that you may have an opportunity to provide feedback on the attached proposal. If available, a proposal's executive summary has been inserted below for your convenience or else some other topline information.

Please share this information with members of your unit's undergraduate committee and/or all members of your academic unit, as you deem appropriate.

Comments, if any, should be sent to Stacey Mercer at staceym@mun.ca as soon as possible. Written feedback received within 14 days of the date of this request will be appended to the proposal's submission to the Faculty of Arts Committee on Undergraduate Studies (CUGS), St. John's campus. If you need more time, please advise Stacey straight away.
Alex Marland
Associate Dean (Undergraduate)
Faculty of Arts

Mathematics 1001, 1050, 1051, 2000, 2050, 2260, Statistics 2501, 2560

The Department of Mathematics and Statistics is proposing to delete credit restrictions which pertain to courses last offered in the 1995-1996 academic year or earlier.

STACEY MERCER | SECRETARY
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
T 709-864-8255 | F 709-864-2135

This email is governed by the Terms and Conditions found in our Disclaimer.
Thank you for the opportunity to provide feedback. The Associate Dean of Arts (Undergraduate) wishes to indicate that in his opinion there are unlikely to be significant concerns about this proposal among members of the Faculty of Arts.

STACEY MERCER  | SECRETARY
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
T 709-864-8255  |  F 709-864-2135

-----Original Message-----
From: Shannon Patrick Sullivan [mailto:shannon@mun.ca]
Sent: April 16, 2015 11:21 AM
To: associatevpooffice@grenfell.mun.ca; miugconsultations@mi.mun.ca; Mercer, Stacey; chemhead@mun.ca; cs-chair@mun.ca; bdeyoung@mun.ca; engrcconsult@mun.ca; Biochemistry Head; dinnes@mun.ca; jhanchar@mun.ca; Fletcher, Garth; psychology.head@mun.ca
Subject: Request for Consultation: Mathematics and Statistics courses

Greetings,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

If you have any comments on this proposal, we would appreciate receiving your responses no later than Thursday, May 14th.

Thanks,

Shannon

--

Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science Memorial University of Newfoundland St. John's * NL * Canada shannon@mun.ca<mailto:shannon@mun.ca> *
www.u.cs.mun.ca/~shannon<http://www.u.cs.mun.ca/~shannon> *

Attachments:

winmail.dat 8.4 kB
Subject: Re: Request for Consultation: Mathematics and Statistics courses
From: Engineering Consultations <engrconsult@mun.ca>
Date: 17/04/2015 9:32 AM
To: Shannon Patrick Sullivan <shannon@mun.ca>
CC: Andrew Fisher <adfisher@mun.ca>, Jayde Edmunds <edmundsj@mun.ca>

Dear Dr. Sullivan,

I prefer to run any consultation requests by our Committee or Undergraduate Studies, in order to improve the likelihood of detection of any impact of proposed Calendar changes on our Faculty or the offer of other relevant comments. However, our CUGS is next scheduled to meet on May 20 and the proposed Calendar changes are very straightforward housekeeping.

Prof. Fisher, the Associate Dean (Undergraduate Studies) and I have reviewed the package. We offer strong support for the removal of the obsolete credit restrictions between the ENGI and MATH courses and we are happy to support the other changes for the MATH and STAT courses.

I add the observation that I am a former instructor of all four of the courses ENGI 1411, 1412, 2412 and 2413.

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

Quoting Shannon Patrick Sullivan <shannon@mun.ca>:

Greetings,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

If you have any comments on this proposal, we would appreciate receiving your responses no later than Thursday, May 14th.

Thanks,
Shannon

--

Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science
Memorial University of Newfoundland
St. John's • NL • Canada
shannon@mun.ca • www.ucs.mun.ca/~shannon
Subject: Request for Consultations: Department of Mathematics and statistics
From: Chris Flinn <cgflinn@mun.ca>
Date: 20/04/2015 9:48 AM
To: shannon@mun.ca

Hi Shannon,

The chemistry department strongly supports the deletion of obsolete and unnecessary calendar language by the Department of Mathematics and Statistics.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
MUN Chemistry Department
Subject: Re: Request for Consultation: Mathematics and Statistics courses
From: CS-Chair <cs-chair@mun.ca>
Date: 16/04/2015 11:48 AM
To: Shannon Patrick Sullivan <shannon@mun.ca>
CC: Computer Science Chair <cs-chair@mun.ca>

Dear Shannon,

Computer Science does not have any problems with these changes.

Wolfgang

Wolfgang Banzhaf, Head
Department of Computer Science

On 2015-04-16 11:20 AM, Shannon Patrick Sullivan wrote:

Greetings,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

If you have any comments on this proposal, we would appreciate receiving your responses no later than Thursday, May 14th.

Thanks,
Shannon
Subject: Consultation request from Mathematics and Statistics
From: Dr Alison Leitch <aleitch@mun.ca>
Date: 06/05/2015 1:30 PM
To: Shannon Patrick Sullivan <shannon@mun.ca>

Hi Shannon,

With regard to the recent proposal from Mathematics and Statistics to delete credit restrictions to Mathematics 1001, 1050, 1051, 2000, 2050, 2260 and Statistics 2501, 2560 for courses that have not been offered for 20 years or more, the Undergraduate Committee of the Department of Earth Sciences is wholeheartedly in support.

Regards,

Alison
(UGMC - Earth Sciences)

--
Alison Leitch
Associate Professor
Department of Earth Sciences
Memorial University
St John’s NL A1B 3X5

ph: 709-864-3306
Hi Shannon: I ran this by Chris Parrish for advice and he concludes as follows: "This is really housekeeping to delete credit restrictions with courses that have not been offered for a decade. We have no issues."
I concur with Chris' opinion.
Regards
Garth

-----Original Message-----
From: Shannon Patrick Sullivan [mailto:shannon@mun.ca]
Sent: April-16-15 11:21 AM
To: associatevpoffice@grenfell.mun.ca; miugconsultations@mi.mun.ca; Mercer, Stacey; chemhead@mun.ca; cs-chair@mun.ca; bdeyoung@mun.ca; enerconsult@mun.ca; Biochemistry Head; dinnes@mun.ca; jhanchar@mun.ca; Fletcher, Garth; psychology_head@mun.ca
Subject: Request for Consultation: Mathematics and Statistics courses

Greetings,

Attached is a proposal to delete a number of obsolete credit restrictions from the Calendar entries for the Department of Mathematics and Statistics.

If you have any comments on this proposal, we would appreciate receiving your responses no later than Thursday, May 14th.

Thanks,
Shannon

--
Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science Memorial University of Newfoundland St. John's * NL * Canada shannon@mun.ca * www.ucs.mun.ca/~shannon

Attachments:

winmail.dat 4.0 kB
Subject: Request for Consultation: Mathematics and Statistics Courses - Deletion of Obsolete Credit Restrictions
From: Michael Morrow <mmorrow@mun.ca>
Date: 21/04/2015 8:36 AM
To: "Dr. Shannon Sullivan" <shannon@mun.ca>, deansci@mun.ca, Brad deYoung <bdeyoung@mun.ca>, Rick Goulding <rgoulding@mun.ca>

Shannon

No concerns with this from Physics

Michael Morrow

--

******************************************************************************
Department of Physics and Physical Oceanography
Memorial University of Newfoundland
St. John's, Newfoundland Phone: (709) 864 4361
Canada, A1B 3X7 FAX: (709) 864 8739

******************************************************************************
October 8, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes

At a meeting held on October 5, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry:
   (a) Changes to Joint Honours program in Biochemistry and Chemistry
   (b) Changes to Joint Honours program in Applied Mathematics and Chemistry

2. Department of Mathematics and Statistics: 'housekeeping' Calendar changes

3. Department of Ocean Sciences: prerequisites changes to OCSC/BIOL 4122 and OCSC/BIOL 4601

Joan Burry
Associate Registrar and
Secretary, Committee on Undergraduate Studies, Faculty of Science
Proposal
Calendar Changes to Existing Course OCSC/Biology 4122

Executive summary

Biology 4122 came under the administration of the Department of Ocean Sciences and was then registered as an Ocean Sciences course cross listed with the Department of Biology. After consulting with the Department of Biology we now propose a modification to bring the course more in line with Ocean Sciences programming.

Resource implications

There will be no resource implications, no additional costs associated with this change and no change in library holdings.

Signature of Unit Head

Date

Signature of the Dean

Date
Proposal
Calendar Changes to Existing Course OCSC/Biology 4122

Course numbers and titles

OCSC/ BIOL4122 Advanced Studies in Marine Animal Diversity

Proposed Changes and to Calendar Description under 10.9 Ocean Sciences

4122 Advanced Studies in Marine Animal Diversity (same as Biology 4122) provides an in-depth examination of cellular, physiological, behavioural and ecological adaptations in marine animals. Lectures will be combined with discussions of relevant papers from the primary literature on topics of current interest which may relate morphology, ecology, evolution, natural history, species interactions and practical applications. Students will also gain hands-on experience by designing and conducting research projects involving live or preserved animals.

CR: Biology 4122

LC: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time

LH: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time

PR: Biology 2122, and Biology 2600, and Biology 2900

Secondary Changes

Proposed Changes to Calendar Description under 10.2 Biology

4122 Advanced Studies in Marine Animal Diversity (same as Ocean Sciences 4122) provides an in-depth examination of cellular, physiological, behavioural and ecological adaptations in marine animals. Lectures will be combined with discussions of relevant papers from the primary literature on topics of current interest which may relate morphology, ecology, evolution, natural history, species interactions and practical applications. Students will also gain hands-on experience by designing and conducting research projects involving live or preserved animals.

CR: Ocean Sciences 4122

LC: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time

LH: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time

PR: BIOL 2122, and BIOL 2600, and Biology 2900

Rationale for Change

OCSC 4122 Advanced Studies in Marine Animal Diversity is an elective in two minor programs offered by the Department of Ocean Sciences. In order to make this course more widely available we wish to remove one prerequisite. After consulting with the current instructor and the Biology Undergraduate Studies Committee we wish to remove Principles of Evolution and Systematics.
## Approval Form

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Approved by Dean, Associate Vice-President (Academic) or Vice President  Yes / No

Name

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Appendix: Consultations

Comments from the Marine Institute
From: Dawn King [mailto:Dawn.King@mi.mun.ca] On Behalf Of MIUG Consultations
Sent: March-18-15 1:38 PM
To: Fletcher, Garth
Cc: Derek Howse
Subject: RE: Calendar changes for OCSC/BIOL 4122

Garth,

Thank you for the opportunity to review the proposed changes to OCSC-Biology 4122.

Just a slight change suggested to the secondary changes section. You presently have in the documentation:

Proposed Changes to Calendar Description under 10.2 Biology

4122 Advanced Studies in Marine Animal Diversity (same as Biology 4122) provides an in-depth examination of cellular, physiological, behavioural and ecological adaptations in marine animals. Lectures will be combined with discussions of relevant papers from the primary literature on topics of current interest which may relate morphology, ecology, evolution, natural history, species interactions and practical applications. Students will also gain hands-on experience by designing and conducting research projects involving live or preserved animals.

CR: Biology 4122
LC: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time
PR: Biology 2122, and Biology 2600, and Biology 2900

I believe it should read:

Proposed Changes to Calendar Description under 10.2 Biology

4122 Advanced Studies in Marine Animal Diversity (same as Ocean Sciences 4122) provides an in-depth examination of cellular, physiological, behavioural and ecological adaptations in marine animals. Lectures will be combined with discussions of relevant papers from the primary literature on topics of current interest which may relate morphology, ecology, evolution, natural history, species interactions and practical applications. Students will also gain hands-on experience by designing and conducting research projects involving live or preserved animals.

CR: Ocean Sciences 4122
LC: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week intensive course that embodies equivalent instructional time
PR: Biology 2122, and Biology 2600, and Biology 2900

We are happy to support these changes with this slight modification.

Derek Howse
Derek Howse
Chair, Undergraduate Studies Committee
Response to the Marine Institute
From: Fletcher, Garth
Sent: Thursday, March 19, 2015 4:48 PM
To: MIUG Consultations
Cc: Parrish, Chris
Subject: RE: Calendar changes for BIOL 4601

Hi Derek: Thanks for your edits to the secondary changes sections in OCSC/BIOL 4601 and 4122. We have now incorporated them into the documents.

Best regards

Garth

Comments from Biochemistry
From: Biochemistry Head
Sent: Friday, March 13, 2015 09:47 AM Newfoundland Standard Time
To: Fletcher, Garth
Subject: RE: Calendar changes for OCSC/BIOL 4122 and 4601

Garth

No worries from a Biochemistry standpoint.

Mark

Mark D. Berry Ph.D.
Professor and Head
Dept. Biochemistry
Memorial University of Newfoundland
St. John's, NL, Canada A1B 3X9
Tel: (709) 864-8529
E-mail: biochead@mun.ca; mberry@mun.ca

Comments from Geography
From: Catto, Norm
Sent: Tuesday, March 10, 2015 04:44 PM Newfoundland Standard Time
To: Fletcher, Garth
Subject: RE: Calendar changes for OCSC/BIOL 4122 and 4601

Dear Garth:

Geography is fine with this.

Best wishes
Comments from the Department of Mathematics and Statistics
From: Math Consult [mailto:mathconsult@mun.ca]
Sent: March-10-15 2:51 PM
To: Fletcher, Garth
Subject: Re: Calendar changes for OCSC/BIOL 4122 and 4601

Hello Dr. Fletcher:

The Department of Mathematics and Statistics has no objection to these proposals

H. Johnson
Dept of Math and Stats

NEW – COMMENTS FROM ENGINEERING
From: Howard Heys [mailto:hheys@mun.ca]
Sent: March-23-15 2:55 PM
To: Fletcher, Garth
Cc: Fisher, Andrew; George,Glyn; Edmunds, Jayde
Subject: Feedback on Changes to OCSC/BIOL 4122 and 4601

Dear Dr. Fletcher,

Thank you for the opportunity to comment on the proposed Calendar changes for the courses OCSC/BIOL 4122 and 4601. The proposed changes were discussed at last week’s regular meeting of the Faculty’s Committee on Undergraduate Studies and no concerns were raised as these changes have no direct impact on our programs.

Sincerely,

Dr. Howard Heys, Vice-Chair
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland

NEW – COMMENTS FROM BIOLOGY
Subject: Re: Calendar changes to existing courses
Date: Fri, 25 Sep 2015 10:39:40 -0230
From: Karen Morris <morrisk@mun.ca>
To: Fletcher, Garth <fletcher@mun.ca>
CC: Annie Mercier <amercier@mun.ca>, Marino, Paul <pmarino@mun.ca>

Hi Garth,

The Biology Undergraduate Studies Committee discussed the proposed change in prerequisites for BIOL/OCSC 4122 and 4601 that were brought forward by the Ocean Science Undergraduate Studies Committee at one of our joint meetings.
We brought the suggested changes to a departmental meeting on April 4th and the Department agreed to such changes. Paul Snelgrove, who is a member of the Ocean Science Undergraduate Studies Committee, was in attendance at the April 4th meeting.

Yesterday was the first time I received the formal proposals so they were not distributed to our undergrad committee and hence no formal response was sent. Not sure what happened to your original email as we would certainly respond to any and all consultations that have relevance and impact on our program.

Biology has no issues or concerns with the proposed changes in prerequisites for BIOL/OCSC 4122 and 4601. Thanks
Karen

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

On 24/09/2015 4:47 PM, Fletcher, Garth wrote:
Hi Karen: As requested by Annie I have attached our proposed calendar changes to existing courses. I did send out these proposed changes for review by various departments in March 2015 and I've been told that they were discussed and agreed upon at one of our joint Biology/Ocean Sciences Undergraduate Studies Committee meetings.
I hope this is OK
Best regards
Garth

Garth L. Fletcher
Head and Professor Emeritus
Department of Ocean Sciences
Ocean Sciences Centre
0 Marine Lab Road
St John's NL
Canada
AiC 5S7

Tel: 709-864-3276
Fax: 709-864-3220

ORIGINAL REQUEST FOR COMMENTS

Subject: Calendar changes for OCSC/BIOL 4122 and 4601
Date: Tue, 10 Mar 2015 16:59:23 +0000
From: Fletcher, Garth <fletcher@mun.ca>
To: Marland, Alex <amarland@mun.ca>, Biochemistry Head <biohead@mun.ca>, 'Brad de Young'
<bdeyoung@mun.ca>, Business Undergrad Help <busihelp@mun.ca>, 'cs-chair@mun.ca' <cs-chair@mun.ca>, David Innes <dinnes@mun.ca>, Economics <wlocke@mun.ca> <wlocke@mun.ca>, Galway, Gerald J. <rgalway@mun.ca>, Engineering <en engconsult@mun.ca>, Alcock, Erin <ekalcock@mun.ca>, Gerard Martin <Psychology.Head@mun.ca>, 'glenner@mun.ca' <glenner@mun.ca>, 'mathconsult@mun.ca' <mathconsult@mun.ca>, 'miugconsultations@mi.mun.ca' <miugconsultations@mi.mun.ca>, Catto, Norm <ncatto@mun.ca>, 'Peter Pickup, Chemistry' <chemhead@mun.ca>, 'vpoffice@grenfell.mun.ca' <vpoffice@grenfell.mun.ca>
CC:Parrish, Chris <cpparrish@mun.ca>

Colleagues I have attached our proposal for calendar changes to OCSC/BIOL 4122 and OCSC/BIOL 4601 for you to review prior its submission to the Faculty of Science Undergraduate Studies Committee. Please send me your thoughts on these proposals as soon as you are able.

Best regards

Garth

Garth L. Fletcher
Head and Professor Emeritus
Department of Ocean Sciences
Ocean Sciences Centre
0 Marine Lab Road
St John’s NL
Canada
AiC 5S7

Tel: 709-864-3276
Fax: 709-864-3220
Proposal
Calendar Changes to Existing Course OCSC/Biology 4601

Executive summary

Biology 4601 came under the administration of the Department of Ocean Sciences and was then registered as an Ocean Sciences course cross listed with the Department of Biology. After consulting with the Department of Biology we now propose modifications to bring the course more in line with Ocean Sciences programming.

Resource implications

There will be no resource implications, no additional costs associated with this change and no change in library holdings.

Signature of Unit Head

Date

Signature of the Dean

Date
Proposal
Calendar Changes to Existing Course OCSC/Biology 4601

Course numbers and titles

OCSC/ BIOL4601 Functional Biology of Fish

Proposed Changes and to Calendar Description under 10.9 Ocean Sciences

4601 Functional Biology of Fish (same as Biology 4601) is an introduction to anatomical physiological and cellular processes in the life cycle of fishes.
CR: Biology 4601
PR: Biology 2060, Biology 2210 or 3202, and Biology 3401 or 3640

Secondary Changes

Proposed Changes to Calendar Description under 10.2 Biology

4601 Functional Biology of Fish (same as Ocean Sciences 4601) is an introduction to anatomical physiological and cellular processes in the life cycle of fishes.
CR: Ocean Sciences 4601
PR: BIOL 2060, BIOL 2210 or 3202, and BIOL 3401 or 3640

Rationale for Change

OCSC 4601 Functional Biology of Fish is an elective in two minor programs offered by the Department of Ocean Sciences. In order to make this course more widely available we wish to introduce more flexibility in the prerequisites by providing equivalent courses as alternatives to the previous prerequisites. After consulting with the current instructor and the Biology Undergraduate Studies Committee we wish to provide BIOL 3202 Comparative Vertebrate Anatomy as an alternative to BIOL 2210 Biology of Vertebrates, and BIOL/OCSC 3640 Environmental Physiology of Animals as an alternative to BIOL 3401 Comparative Animal Physiology.

Approval Form

<table>
<thead>
<tr>
<th>Consultations Sought From</th>
<th>Comments Received</th>
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<tbody>
<tr>
<td>1. Marine Institute</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Grenfell campus</td>
<td>Yes / No</td>
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<td>3. Department of Biochemistry</td>
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<td>5. Department of Chemistry</td>
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<td>7. Department of Earth Sciences</td>
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<td>8. Department of Economics</td>
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<td>Department of Geography</td>
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<td>17.</td>
<td>Library Report Received</td>
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Approved by Dean, Associate Vice-President (Academic) or Vice President  Yes / No

Name

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Appendix: Consultations

Comments from the Marine Institute

From: Dawn King [mailto:Dawn.King@mi.mun.ca] On Behalf Of MIUG Consultations
Sent: March-18-15 1:41 PM
To: Fletcher, Garth
Subject: RE: Calendar changes for BIOL 4601

Garth,

Thank you for the opportunity to review the proposed changes to OCSC-Biology 4601.

Just a couple of small points for you to address. In the Secondary changes you have listed:

4601. Functional Biology of Fish (same as Biology 4601) is an introduction to anatomical physiological and cellular processes in the life cycle of fishes.
CR: Biology 4601
PR: Biology 2060, Biology 2210 or 3202, and Biology 3401 or 3640

Whereas it should read:
4601. Functional Biology of Fish (same as Ocean Sciences 4601) is an introduction to anatomical physiological and cellular processes in the life cycle of fishes.
CR: Ocean Sciences 4601
PR: Biology 2060, Biology 2210 or 3202, and Biology 3401 or 3640

We are happy to support these changes with these items addressed.

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

Response to the Marine Institute

From: Fletcher, Garth
Sent: Thursday, March 19, 2015 4:48 PM
To: MIUG Consultations
Cc: Parrish, Chris
Subject: RE: Calendar changes for BIOL 4601

Hi Derek: Thanks for your edits to the secondary changes sections in OCSC/BIOL 4601 and 4122. We have now incorporated them into the documents.

Best regards
Garth

**Comments from Biochemistry**

*From:* Biochemistry Head  
*Sent:* Friday, March 13, 2015 09:47 AM Newfoundland Standard Time  
*To:* Fletcher, Garth  
*Subject:* RE: Calendar changes for OCSC/BIOL 4122 and 4601

Garth

No worries from a Biochemistry standpoint.

Mark

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

Tel: (709) 864-8529  
E-mail: biohead@mun.ca; mberry@mun.ca

---

**Comments from Geography**

*From:* Catto, Norm  
*Sent:* Tuesday, March 10, 2015 04:44 PM Newfoundland Standard Time  
*To:* Fletcher, Garth  
*Subject:* RE: Calendar changes for OCSC/BIOL 4122 and 4601

Dear Garth:

Geography is fine with this.

Best wishes  
Norm

---

**Comments from the Department of Mathematics and Statistics**

*From:* Math Consult [mailto:mathconsult@mun.ca]  
*Sent:* March-10-15 2:51 PM  
*To:* Fletcher, Garth  
*Subject:* Re: Calendar changes for OCSC/BIOL 4122 and 4601

Hello Dr. Fletcher:

The Department of Mathematics and Statistics has no objection to these proposals

H. Johnson  
Dept of Math and Stats
**NEW - COMMENTS FROM ENGINEERING**
*From:* Howard Heys [mailto:hheys@mun.ca]  
*Sent:* March-23-15 2:55 PM  
*To:* Fletcher, Garth  
*Cc:* Fisher, Andrew; George, Glyn; Edmunds, Jayde  
*Subject:* Feedback on Changes to OCSC/BIOL 4122 and 4601  

Dear Dr. Fletcher,

Thank you for the opportunity to comment on the proposed Calendar changes for the courses OCSC/BIOL 4122 and 4601. The proposed changes were discussed at last week's regular meeting of the Faculty's Committee on Undergraduate Studies and no concerns were raised as these changes have no direct impact on our programs.

Sincerely,

Dr. Howard Heys, Vice-Chair  
Committee on Undergraduate Studies  
Faculty of Engineering and Applied Science  
Memorial University of Newfoundland

---

**NEW - COMMENTS FROM BIOLOGY**

*Subject:* Re: Calendar changes to existing courses  
*Date:* Fri, 25 Sep 2015 10:39:40 -0230  
*From:* Karen Morris <morrisk@mun.ca>  
*To:* Fletcher, Garth <fletcher@mun.ca>  
*CC:* Annie Mercier <amercier@mun.ca>, Marino, Paul <pmarino@mun.ca>

Hi Garth,

The Biology Undergraduate Studies Committee discussed the proposed change in prerequisites for BIOL/OCSC 4122 and 4601 that were brought forward by the Ocean Science Undergraduate Studies Committee at one of our joint meetings.

We brought the suggested changes to a departmental meeting on April 4th and the Department agreed to such changes. Paul Snellgrove, who is a member of the Ocean Science Undergraduate Studies Committee, was in attendance at the April 4th meeting.

Yesterday was the first time I received the formal proposals so they were not distributed to our undergrad committee and hence no formal response was sent. Not sure what happened to your original email as we would certainly respond to any and all consultations that have relevance and impact on our program.

Biology has no issues or concerns with the proposed changes in prerequisites for BIOL/OCSC 4122 and 4601.

Thanks  
Karen

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

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Hi Karen: As requested by Annie I have attached our proposed calendar changes to existing courses. I did send these proposed changes for review by various departments in March 2015 and I've been told that they were discussed and agreed upon at one of our joint Biology/Ocean Sciences Undergraduate Studies Committee meetings.
I hope this is OK
Best regards
Garth

Garth L. Fletcher
Head and Professor Emeritus
Department of Ocean Sciences
Ocean Sciences Centre
0 Marine Lab Road
St John's NL
Canada
AiC 5S7

Tel: 709-864-3276
Fax: 709-864-3220

ORIGINAL REQUEST FOR COMMENTS

-------- Forwarded Message --------

Subject: Calendar changes for OCSC/BIOL 4122 and 4601
Date: Tue, 10 Mar 2015 16:59:23 +0000
From: Fletcher, Garth <fletcher@mun.ca>
To: Marland, Alex <amarland@mun.ca>, Biochemistry Head <biochead@mun.ca>, 'Brad de Young' <bddeyoung@mun.ca>, Business Undergrad Help <busihelp@mun.ca>, 'cs-chair@mun.ca' <cs-chair@mun.ca>, David Innes <dinnes@mun.ca>, Economics <wlocke@mun.ca> <wlocke@mun.ca>, Galway, Gerald J. <ggalway@mun.ca>, Engineering <engrconsult@mun.ca>, Alcock, Erin <ekalcock@mun.ca>, Gerard Martin <Psychology Head@mun.ca> <gjlenner@mun.ca> <gjlenner@mun.ca>, 'mathconsult@mun.ca' <mathconsult@mun.ca>, 'miugconsultations@mi.mun.ca' <miugconsultations@mi.mun.ca>, Catto, Norm <ncatto@mun.ca>, 'Peter Pickup, Chemistry' <chemhead@mun.ca>, 'vpooffice@grenfell.mun.ca' <vpooffice@grenfell.mun.ca>
CC: Parrish, Chris <cparrish@mun.ca>

Colleagues I have attached our proposal for calendar changes to OCSC/BIOL 4122 and OCSC/BIOL 4601 for you to review prior to its submission to the Faculty of Science Undergraduate Studies Committee. Please send me your thoughts on these proposals as soon as you are able.

Best regards
Garth
Garth L. Fletcher  
Head and Professor Emeritus  
Department of Ocean Sciences  
Ocean Sciences Centre  
0 Marine Lab Road  
St John's NL  
Canada  
A1C 5S7  

Tel: 709-864-3276  
Fax: 709-864-3220
Request for Approval of a Graduate Course

Adobe Reader, minimum version 8, is required to complete this form. Download the latest version: http://get.adobe.com/reader. (1) Save the form by clicking on the diskette icon on the upper left side of the screen; (2) Ensure that you are saving the file in PDF format; (3) Specify where you would like to save the file, e.g. Desktop; (4) Fill in the required data and save the file; (5) Submit the completed form to:

School of Graduate Studies; Memorial University of Newfoundland; IIC-2012 (Bruneau Centre for Research and Innovation); St. John’s, NL A1C 5S7 Canada  Fax: 709.864.4702  eMail: sgs@mun.ca

To: Dean, School of Graduate Studies
From: Faculty/School/Department/Program
Subject:  ✔ Regular Course  ☐ Special/Selected Topics Course

Course No.: Math 6204

Course Title: Iterative Methods in Numerical Linear Algebra

I. To be completed for all requests:

A. Course Type:  ✔ Lecture course
☐ Laboratory course
☐ Directed readings

☐ Lecture course with laboratory
☐ Undergraduate course
☐ Other (please specify)

B. Can this course be offered by existing faculty?  ☐ Yes  ☐ No

C. Will this course require new funding (including Payment of instructor, labs, equipment, etc.)?  ☐ Yes  ☐ No

If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   See attached.

G. Method of evaluation:

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</tbody>
</table>

1 Must specify the additional work at the graduate level
II. To be completed for special/selected topics course requests only

For special/selected topics courses, there is no evidence of:

   Instructor’s initials

1. duplication of thesis work
2. double credit
3. work that is a faculty research product
4. overlap with existing courses

Recommended for offering in the    Fall    Winter    Spring    20

Length of session if less than a semester:

III. This course proposal has been prepared in accordance with General Regulations governing the School of Graduate Studies

Scott T. Tschlin
Course instructor

Approval of the head of the academic unit

Oct 9, 2015
Date

Oct 7, 2015
Date

IV. This course proposal was approved by the Faculty/School/Council

Secretary, Faculty/School/Council

Date

Updated October 2011
Math 6204: Iterative Methods in Numerical Linear Algebra

In many areas of computational science and engineering, a key bottleneck is the solution of the large linear systems of equations that arise from discretization, linearization, and other parts of the simulation process. In many practical cases, these systems of equations are far too large to allow for solution by classical, “direct” methods such as Gaussian Elimination. As such, iterative methods have become a powerful tool for approximately solving such systems of equations. This course will provide an overview of iterative methods in numerical linear algebra, including Krylov methods and multiscale methods, such as domain decomposition and multigrid.

Objectives: This course is intended for graduate students in Mathematics, Computer Science, and other applied science and engineering disciplines where large linear systems arise in numerical simulations. We will discuss applicability of and fundamental limitations on direct methods, and explore several families of tools that lead to optimal iterative methods. The goal of this course is to provide students with the “building blocks” of iterative methods, in order for them to use such methods in practical situations.

Prerequisites: Undergraduate linear algebra at the level of MATH2051, experience with programming (Matlab or Python preferred), experience with computer simulation. Completion of Math 6210 and/or 6201 is certainly sufficient, but not strictly necessary.

Tentative Outline:

1. Sparse Direct Methods: Gaussian elimination, reordering schemes, nested dissection. (2 weeks)

2. Classical Iterative Methods: matrix splittings, incomplete factorizations. (2 weeks)

3. Polynomial and Krylov Methods: Krylov spaces, optimality and quasi-optimality properties (3 weeks)

4. Domain Decomposition Methods: classical and optimized Schwarz, overlapping and two-level methods (2 weeks)

5. Multigrid Methods: geometric multigrid, variational methods, algebraic multigrid (3 weeks)

Library Resources:
The following texts are either freely available online or as e-books through the library’s existing subscriptions:

- Saad, Iterative methods for sparse linear systems, SIAM 2003
- Greenbaum, Iterative methods for solving linear systems, SIAM 1997
- Varga, Matrix iterative analysis, Springer 2000
- Elman, Silvester, & Wathen, Finite elements and fast iterative solvers with applications in incompressible fluid dynamics, Oxford University Press 2005
• Olshanskii & Tyryshnikov, Iterative methods for linear systems: theory and applications, SIAM 2014

• George & Liu, Computer solution of large sparse positive-definite systems, Prentice-Hall 1981

• Briggs, Henson, & McCormick, A multigrid tutorial, SIAM 2000

• Vassilevski, Multilevel block factorization preconditioners: matrix-based analysis and algorithms for solving finite element equations, Springer 2008

• Toselli & Widlund, Domain decomposition methods: algorithms and theory, Springer 2006

• Dolean, Jolivet, & Nataf, An introduction to domain decomposition methods: algorithms, theory, and parallel implementation, SIAM 2015

Hard-copy books available through the library include:

• Trottenberg, Oosterlee, & Schüller, Multigrid, Academic Press 2001


**Evaluation:** Course grades will be composed of

• Assignments: 30%. One assignment every 2-3 weeks, including analysis and programming components.

• Final project: 20%. Each student will prepare both a written final project and an oral presentation, to be given on the last day of class, on a topic relevant to the course and their own interests. Each component (written and oral) is worth 10% of the final grade.

• Final exam: 50%. The final exam will be composed of both a written and oral component. The written component will be scheduled by the department during the formal final exam period and last two hours. This will be followed by an oral exam covering materials related to the written exam.
Hello Gail,

the committee is now satisfied with the corrections. Please, forward the request to be tabled for the approval of the Faculty Council.

-j

--
JC Loredo-Osti, Professor
Department of Mathematics and Statistics
Memorial University
Phone: +(709) 864 8729

"Wisdom comes to us when it can no longer do any good."
--Gabriel Garcia Marquez (Love in the time of cholera).
Kenny, Gail

From: Ronald Haynes <rhaynes@mun.ca>
Sent: October-09-15 5:15 PM
To: Ivan
Cc: JC Loredo-Osti; Sukhinder Kaur Cheema; ktahlan@mun.ca; Christina Bottaro; Matthew Rise; harold@mun.ca; curnoe@mun.ca; bsnook@play.psych.mun.ca; ratanac@mun.ca; Joseph S Wroblewski; Cyr Couturier; Carolyn Walsh; Kenny, Gail
Subject: Re: Math-6204 (revised)

Looks fine to me - but so did the original :-) 

R Haynes

Ivan

Looks good to me.

Ivan

On October 9, 2015 2:02:12 PM JC Loredo-Osti <jclroredoosti@mun.ca> wrote:

Kenny, Gail

My apologies, everyone. It should be THURSDAY, October 8 @ 11:00 a.m.

Gail

From: Kenny, Gail
Sent: October-02-15 9:26 AM
To: 'Sukhinder Kaur Cheema'; 'ktahlan@mun.ca'; 'Christina Bottaro'; 'jcloredoosti@mun.ca'; 'Matthew Rise'; 'Ronald Haynes'; 'harold@mun.ca'; 'curnoe@mun.ca'; 'bsnook@play.psych.mun.ca'; 'ratanac@mun.ca'; 'Joseph S Wroblewski'; 'Cyr Couturier'; 'Ivan'; Carolyn Walsh
Subject: RE: Faculty of Science Faculty Council Graduate Studies Committee - first meeting

Hello everyone,

The first meeting of this committee will take place on Wednesday, October 8 at 11:00 a.m. in C-2001, Dean of Science boardroom. Unfortunately, there was no time during the week when everyone was available. We’ll see you then.

Gail
From: Kenny, Gail
Sent: September-30-15 11:52 AM
To: Sukhinder Kaur Cheema; 'ktahlan@mun.ca'; 'Christina Bottaro'; 'jcioredoost@mum.ca'; 'Matthew Rivo';
'Ronald Haynes'; 'harold@mun.ca'; 'curnoe@mun.ca'; 'bsnook@play.psych.mun.ca'; 'ratanac@mun.ca'
Subject: Faculty of Science Faculty Council Graduate Studies Committee
Importance: High

Hello everyone,

I have been asked to set up a meeting of the graduate studies committee of Faculty Council. I would appreciate it if you would forward to me your schedule for this fall so I can take care of that. Many thanks.

Gail

Gail Kenny
Dean of Science Office (C-2001)
Memorial University of Newfoundland
St. John's, NL  A1B 3X7
gkenny@mun.ca

--
Dr. Ronald D. Haynes
Professor, Department Mathematics and Statistics
Memorial University of Newfoundland
email: rhaynes@mun.ca
web: www.math.mun.ca/~rhaynes
phone: (709) 864-8825
Looks good to me.

Ivan

On October 9, 2015 2:02:12 PM JC Loredo-Osti <jcloredoosti@mun.ca> wrote:

> Dear All,
> > attached is the revised version of Math-6204, approved subject to
> > amendments in our last meeting.
> > -j
> > --
> > JC Loredo-Osti, Professor
> > Department of Mathematics and Statistics Memorial University
> > Phone: +(709) 864 8729
> > "Wisdom comes to us when it can no longer do any good."
> --Gabriel Garcia Marquez (Love in the time of cholera).
25.18.3 Courses
A selection of the following graduate courses will be offered to meet the requirements of candidates, as far as the resources of the Department will allow:

- Mathematics
  - 6100 Dynamical Systems
  - 6101 Modern Perturbation Theory
  - 6102 Mathematical Biology
  - 6104 Infinite Dimensional Dynamical Systems
  - 6110 Advanced General Relativity
  - 6112-6119 Special Topics in Applied Mathematics
  - 6120 Theoretical Fluid Dynamics
  - 6121 Functional Differential Equations
  - 6130 Introduction to General Relativity (credit restricted with former 6106)
  - 6160 Partial Differential Equations (credit restricted with former 6109)
  - 6201 Numerical Methods for Partial Differential Equations
  - 6204 Iterative Methods in Numerical Linear Algebra
  - 6205-6209 Special Topics in Numerical Analysis
  - 6210 Numerical Solution of Differential Equations
  - 6212 Numerical Methods for Initial Value Problems
  - 6230 Differentiable Manifolds and Riemannian Geometry
  - 6299 Masters Project

---

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

- Mathematics
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  - 6101 Modern Perturbation Theory
  - 6102 Mathematical Biology
  - 6104 Infinite Dimensional Dynamical Systems
  - 6110 Advanced General Relativity
  - 6112-6119 Special Topics in Applied Mathematics
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  - 6212 Numerical Methods for Initial Value Problems
  - 6230 Differentiable Manifolds and Riemannian Geometry
  - 6299 Masters Project

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<th>Graduate Studies</th>
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<td>Len Zedel</td>
<td>Andy Foster</td>
<td>Len Zedel</td>
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<tr>
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| Raylene Noftall | Hillary Bellows |

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