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, April 17, 2013, at 1 p.m. in C-2004.

AGENDA

1. Regrets

2. Adoption of the Minutes of November March 20, 2013

3. Business Arising from the Minutes

4. Correspondence: None

5. Reports of Standing Committees:
   A. Undergraduate Studies Committees:
      a. Department of Biology, proposal for new course, BIOL 4607, Models in Biology, paper 5.A.a (14 pages).
      b. Response to Senate Committee on Undergraduate Studies, Review of Honours Regulations, paper 5.A.b (1 page).

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

6. Reports of Delegates from Other Councils

7. Report of the Dean

8. Question Period

9. Adjournment

Mark Abrahams
Dean of Science
FACULTY OF SCIENCE
FACULTY COUNCIL OF SCIENCE
MINUTES OF MEETING OF MARCH 20, 2013

A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, March 20, 2013, at 1:00 p.m. in room C-2045.

FSC 2171  Present

Biochemistry
Mulligan, M.

Biology
Hooper, R.

Chemistry
Merschrod, E.  Pickup, P.

Computer Science
Banzhaf, W.  Brown, E.  Bungay, S.

Earth Sciences
Hanchar, J.

Math & Stats
Loredo-Osti, J.  Pike, D.  Radford, C.

Ocean Sciences
Fletcher, G.

Physics & PO
de Young, B.  Lewis, J.K.

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

DEMTS
St. Croix, L.

Library
Alcock, E.  Goddard, L.
Education
Vaandering, D.

Arts
Schipper, W.

Medicine
Yi, Y.

Registrar’s Office
Burry, J.

School of Music
Cook, N.

FSC 2172 Regrets
Donna Stapleton M. Jane Waples

FSC 2173 Adoption of Minutes
Moved: Minutes of the February 20, 2013, meeting be adopted as circulated (Lewis/Pickup). Carried.

FSC 2174 Business Arising: None

FSC 2175 Correspondence: None

FSC 2176 Reports of Standing Committees:
A. Undergraduate Studies Committee:
   Report presented by Andy Foster, Associate Dean (Undergraduate and Administration).
   a. Moved: Department of Physics and Physical Oceanography, proposal for new course, PHYS 2300, Introductory Oceanography (Foster/deYoung). Carried.

B. Graduate Studies Committee:
   Report presented by J. C. Loredo-Osti, Chair, Graduate Studies Committee.
   a. Department of Earth Sciences, special topics course, EASC 6943, Field Studies in Orogenic Belts, approved by the committee and included for information only.

C. Nominating Committee: None

D. Library Committee:
   Report presented by Erin Alcock, Library Representative to Faculty Council, and Lisa Goddard, Systems Librarian.
Erin Alcock advised council that journal and subscription holdings at the library are status quo. The library budget for the upcoming 2013-14 fiscal year is not known yet but major changes are expected, although there may be some reductions.

Lisa Goddard provided a power point presentation regarding open access and the opportunities available to faculty members and graduate students to have their research included in open access journals and in our research repository. The library provides $3,000 per faculty/graduate student per year to cover open access fees. More information is available at http://guides.library.mun.ca/openaccess. Lisa Goddard can be reached at l.goddard@mun.ca.

FSC 2177
Supplementary regulations for Committees

Moved: Recommendations made by committees must be signed by all committee members (Abrahams/Hanchar). Discussion occurred that confirmed an email approval would constitute a signature. Also, if a committee member does not agree with a proposal, it is acceptable to submit a minority report. One opposed, one abstention. Carried.

FSC 2178
Reports of Delegates from Other Councils: None

FSC 2179
Report of the Dean:
Presented by Dr. Mark Abrahams, Dean.

Planning Update on the Core Sciences Building
The space planning consultants will be returning to St. John’s for a second round of workshops March 25-28. Based upon the first round, 530,000 square feet of purposeful space in the Core Sciences Building was proposed but had to fit into a 300,000 square foot space. This has required some significant compromises to insure the project fits within its defined space. The next round of consultations will further examine how to make this work.

The Budget
There really isn’t any news yet on this subject. At this point, budget consultations have just begun and there is no indication about our financial situation for the upcoming year.

The First Annual Science Graduation Reception
In consultation with the Science undergraduate students, we are planning the first annual reception for graduating Science undergraduates to be held at the Marine Institute on the evening of June 1. Tickets should go on sale soon and it is hoped that we have a strong turnout for what the Dean hopes will become a tradition within the Faculty of Science.
The Science/Music Mural Project
In collaboration with the School of Music, students within the Faculty of Science will be painting a mural on the tunnel that connects the Science building to the Music building. The Dean hasn’t seen the draft mural design but understands it will be great.

FSC 2180 Question Period
The Dean was asked if the decision had been made yet of how many buildings would be constructed for the new core Sciences building. The Dean is not aware that the decision has been made yet but did say that he supports one building due to it being more cost effective and less likely to derail the project.

It was also asked whether the Canadian Council of Deans of Science had made a recommendation regarding the experimental lakes area. The Dean confirmed that a recommendation has not yet been made.

FSC 2181 Policy Consultation, Accommodations for Students with Disabilities
Council is reminded that the deadline for feedback regarding this policy is due by April 2, 2013. The Dean requested to be copied on any submissions. Some discussion was held concerning the need to be specific with course outlines and outcomes to ensure that course requirements are absolutely necessary.

FSC 2182 Adjournment:
The meeting adjourned at 1:40 p.m.
April 5, 2013

TO: All Members, Faculty Council of Science

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

SUBJECT: New Course Proposal- Department of Biology

At a meeting held on April 2, 2013, the Undergraduate Studies Committee of the Faculty of Science agreed that the proposal for a new course, Biology 4607: Models in Biology, be forwarded to Faculty Council for approval.

Joan Burry
Assistant Registrar and
Secretary, Committee
on Undergraduate Studies,
Faculty of Science
New Course – Biology 4607
Models in Biology

RESOURCE IMPLICATIONS:

This course will use teaching resources currently available in the Department of Biology.

Instructional Costs

No additional instructional costs will be required; the course will be taught by two faculty members appointed in Biology (Amy Hurford and Shawn Leroux).

RESOURCE IMPLICATIONS: Library Holdings and/or Other Resources Required

The costs associated with new course can be met from within the existing budget allocation of Biology.

Signature of Unit Head (if appropriate):

Date:

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

Date:
Course Number and Title

BIOL 4607 – Models in Biology

Abbreviated Course Title

Models in Biology

Calendar Description

Models in biology is a study of the design and analysis of statistical and mathematical models for exploring the biology of cells, genes, species, populations, communities and ecosystems. Qualitative, quantitative and graphical techniques are used to analyze models and to compare theoretical predictions with empirical data. Classic models of systems biology, population growth, species competition, predator-prey interactions, ecosystem nutrient cycling, immunology, evolutionary invasion analysis, and species distribution will be covered.

LH: 3
PR: BIOL 2060, 2600 and 2900; STAT 2550 or equivalent. It is recommended that students complete BIOL 3295

Secondary Changes (if applicable)

This course should be added to the list of recommended courses for the following majors and honours in Biology: Cell and Molecular Biology; Ecology and Conservation Biology; Marine Biology

Rationale

It is important for undergraduate students in biology to understand the theoretical underpinnings that have shaped biology, but Memorial University currently does not offer a focused course on theoretical biology. The generality of quantitative modelling highlights the common themes that unify different biological disciplines. Applications of biology (e.g. public health, chemotherapy regimes, resource management, land-use planning, species at risk, etc.) are based on theoretical foundations, therefore a thorough understanding of theoretical biology is relevant to modern society. What is more, quantitative skills needed for formulating and analysing models in biology are highly desirable for science careers in academia, government and industry. With two recent hires the biology department now has expertise in mathematical biology and is now in a position to offer a course in theoretical biology. This course could be taken as part of a major in Biology, Cell and Molecular Biology, Ecology and Conservation Biology, or Marine Biology.

This course will appeal to students interested in all aspects of biology, from conservation, ecology, evolution, microbiology, and epidemiology, looking to improve their knowledge and skills in quantitative biology. The course will combine lectures with computer-based labs and will engage students in all aspects of model development, analysis, and validation. A final research paper will encourage students to apply their new skill set to a novel problem in biology.
Consultations

Grenfell Campus:
St. John’s Campus: All Faculty of Science Departments
Marine Institute:
MUN Library

Sample Course Outline and Method of Evaluation

Models in Biology – Course Outline

Instructors: Drs. Amy Hurford and Shawn Leroux


Description: Study of the design and analysis of statistical and mathematical models for exploring the biology of cells, genes, species, populations, communities and ecosystems. Qualitative, quantitative and graphical techniques are used to analyze models and to compare theoretical predictions with empirical data. Classic models of systems biology, population growth, species competition, predator-prey interactions, ecosystem nutrient cycling, immunology, evolutionary invasion analysis, and species distribution will be covered.

Evaluation: Labs (8) – 40%; Midterm – 15%; Final project – 15%; Final Exam – 30%

Outline:

1) Why make biological models? (Textbook Chapter 1; week 1)

2) How to make biological models? (Textbook Chapter 2; week 2)

3) Classic models in biology (Textbook Chapter 3; week 3 & 4)
   Systems biology/Gene expression; Species distribution models; Competitive exclusion; Ecosystem models; Matrix population models; Markov models; Epidemiological models; Slime mold aggregation; Hodgkin-Huxley model.

4) Solving biological models (Textbook Chapter 6.9; week 5)
   Analytic and computational approaches

5) Graphical and computational approaches (Textbook Chapter 4; week 6)
   Phase-plane diagrams; vector fields; isolines; cobwebbing

6) Equilibria, linearization, stability analyses (Textbook Chapters 5,7,8,12; week 7)
   Including evolutionarily stable strategies

7) Sensitivity, reactivity, perturbation analysis (Textbook Chapters 5.4; 10.5; week 8 & 9)

8) Parameter estimation (week 10 & 11)
Biology 4607 – Models in Biology

9) Confronting models with data (week 12 & 13)

Labs:
1) Model derivation (Textbook Primer 1; week 2)
2) Solving biological models (one variable; week 3)
3) Solving biological models (multiple variables; week 4)
4) Equilibria, linearization, stability analyses (Textbook Primer 2; week 5)
5) Phase plane and vector field diagrams (week 7)
6) Sensitivity, reactivity, perturbation analysis (week 8)
7) Parameterizing biological models (Textbook Primer 3; week 10)
8) Model selection (week 12)

Final Project: Students will derive a biological model and analyze it with the techniques learned in class. Students may choose to work in groups of two or three, but each group member must produce their own written report. The final report must include an introduction, model derivation, model analysis, discussion, and references.

Text


Instructor(s)

Dr. Amy Hurford, Math & Biology, MUN
Dr. Shawn Leroux, Biology, MUN
Course Title and Number: Models in Biology – Biology 4607

Abbreviated Course Title: Models in Biology

Calendar Description: Models in biology is a study of the design and analysis of statistical and mathematical models for exploring the biology of cells, genes, species, populations, communities and ecosystems. Qualitative, quantitative and graphical techniques are used to analyze models and to compare theoretical predictions with empirical data. Classic models of systems biology, population growth, species competition, predator-prey interactions, ecosystem nutrient cycling, immunology, evolutionary invasion analysis, and species distribution will be covered.
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This course will appeal to students interested in all aspects of biology, from conservation, ecology, evolution, microbiology, and epidemiology, looking to improve their knowledge and skills in quantitative biology. The course will combine lectures with computer-based labs and will engage students in all aspects of model development, analysis, and validation. A final research paper will encourage students to apply their new skill set to a novel problem in biology.
Consultations Sought From

Grenfell Campus:
St. John’s Campus: All Faculty of Science Departments

Comments Received

Biochemistry
Chemistry
Mathematics and Statistics

No
Yes
Yes
No
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:
TO: M. Bluechardt, Vice-President (Grenfell Campus); G. Blackwood, Vice-President (Marine Institute); P. Davis, Head, Biochemistry; P. Pickup, Head, Chemistry; W. Banzhaf, Acting Head, Computer Science; J. Hanchar, Head, Earth Sciences; S. Lynch, Interim Head, Economics; C. Mather, Head, Geography; C. Radford, Head, Mathematics and Statistics; G. Fletcher, Head, Ocean Sciences; B. de Young, Head, Physics and Physical Oceanography; G. Martin, Head, Psychology; E. Alcock, Library

FROM: Karen Morris, Chair, Undergraduate Studies Committee - Biology

SUBJECT: New Course Proposal: Biology 4607- Models in Biology

DATE: February 12, 2013

Please find attached a new course proposal for Biology 4607- Models in Biology.

Would you please review the proposal and forward any concerns and/or comments to me, Karen Morris at morrisk@mun.ca.

The Biology Department would like to submit the proposal to the Faculty of Science Undergraduate Studies Committee by the middle of March.

cc. P. Marino, Head, Biology
Subject: Consultation re. New course proposal : Biology 4607- Models In Biology
From: Karen Morris <morrisk@mun.ca>
Date: 12/02/2013 12:05 PM
To: mbluecharlt@grenfell.mun.ca, Glenn.Blackwood@mi.mun.ca, pdavis@mun.ca, 'Peter Pickup' <chemhead@mun.ca>, cs-chair@mun.ca, "John M. Hanchar" <jhanchar@mun.ca>, lynch@mun.ca, Charles Mather <cmather@mun.ca>, math-head@mun.ca, "Fletcher, Garth" <fletcher@mun.ca>, Brad deYoung <bdeyoung@mun.ca>, gmartin@mun.ca, "Alcock, Erin" <ekalcock@mun.ca>
CC: "Marino, Paul" <pmarino@mun.ca>, "Everson, Christine" <everson@mun.ca>

Hi,
Please see attached memo requesting any comments or concerns that you may have regarding the new course proposal for Biology 4607 - Models in Biology (attached).
Many thanks
Karen

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

Attachments:
2013 Consultation re.New Course Proposal Biology 4607- Models in Biology.docx 34.2 KB
2012 New Course Proposal Biol 4607 Models in Biology.docx 31.1 KB
Subject: Re: Consultation re. New course proposal : Biology 4607- Models In Biology
From: pdavis@mun.ca
Date: 12/02/2013 12:17 PM
To: Karen Morris <morrisk@mun.ca>

Karen,

No concerns for us.

Phil

Quoting Karen Morris <morrisk@mun.ca>:

Hi,
Please see attached memo requesting any comments or concerns that you may have regarding the new course proposal for Biology 4607 - Models in Biology (attached).
Many thanks
Karen

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

Philip J. Davis, Ph.D.
Professor and Head
Department of Biochemistry
Memorial University
St. John's, NL
A1B 3X9
(709) 864-8529

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New biology course proposal

Subject: New biology course proposal
From: Chris Flinn <cgflinn@mun.ca>
Date: 18/02/2013 8:42 AM
To: Karen Morris <morrisk@mun.ca>

Hi Karen,

I think the new proposed biology 4607 course is a great idea! I strongly support it.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
MUN Chemistry Department

This electronic communication is governed by the terms and conditions at http://www.mun.ca/cc/policies/electronic_communications_disclaimer_2012.php
Hi Shannon.
I will bring these concerns back to the authors of the proposal. I will tell you that they are aware of this and feel they will have to monitor as the course proceeds.
Thanks
Karen

On 04/03/2013 10:26 AM, Shannon Patrick Sullivan wrote:
Hi Karen,

The Department of Mathematics & Statistics has reviewed the proposal for Biology 4607.

There was concern expressed about the low level of the mathematics prerequisites for this course. In particular, it was noted that students who have completed only Mathematics 1000 and Statistics 2550 will have had no exposure to integral calculus, a fundamental building block of the mathematical techniques considered in Biology 4607.

At the same time, it was recognised that imposing more rigorous mathematical prerequisites might nullify the audience for Biology 4607. With this in mind, the consensus within this department was to support the course as proposed, but to encourage the Department of Biology to be vigilant in monitoring student performance in this course, and consider amplyfying the prerequisites should their level of mathematical preparedness prove to be an issue.

It was also noted that, given the use of modelling software in the course, a Computing prerequisite might be appropriate.

Finally, it was felt that the course proposal should clarify the use of the term "numerical techniques" to indicate that this refers only to the students' use of computational software, and does not imply exposure to techniques arising from numerical analysis.

Regards,
Shannon
12 March 2013

To: Drs. Amy Hurford and Shawn Leroux, Department of Biology

From: Erin Alcock, Science Research Liaison Librarian

Subject: New Course Proposal, Biology 4607: Models in Biology

Upon review of the new course proposal for Biology 4607: Models in Biology I have determined that Memorial University Library system has more than sufficient resources to support the objectives of this course.

In addition to the texts and resources mentioned in the course proposal the library currently holds numerous book and periodical titles that will be of relevance to students doing research in this area. Any additional resources could be purchased under existing budget allocations for biology, as well as, computer science.
Library Holdings Summary

Table One: Course Topics

<table>
<thead>
<tr>
<th>LC Subject Headings</th>
<th># of Catalogue Entries*</th>
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<tbody>
<tr>
<td>Biotic Communities</td>
<td>361</td>
</tr>
<tr>
<td>Biology – Mathematical models</td>
<td>248</td>
</tr>
<tr>
<td>Ecology – Mathematical models</td>
<td>199</td>
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<tr>
<td>Biometry</td>
<td>186</td>
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<tr>
<td>Biometheamtics</td>
<td>165</td>
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<tr>
<td>Food chains</td>
<td>91</td>
</tr>
<tr>
<td>R (Computer Language)</td>
<td>80</td>
</tr>
<tr>
<td>Ecology – Statistical Methods</td>
<td>51</td>
</tr>
<tr>
<td>Biological Systems – Mathematical Models</td>
<td>38</td>
</tr>
<tr>
<td>Competition (Biology)</td>
<td>25</td>
</tr>
<tr>
<td>Evolution (Biology) – Mathematical Models</td>
<td>25</td>
</tr>
<tr>
<td>Biological Systems – Computer simulations</td>
<td>24</td>
</tr>
</tbody>
</table>

**Keyword Search**

- Population AND Growth 1015
- "population growth" 689
- Species AND Distribution 453
- "species distribution" 247
- Species AND Competition 102
- "species competition" 51
- "predator prey" 114
- Evolution$ AND invasion 96

*as of date of memo

Table Two: Selected Article Indexes and Databases

<table>
<thead>
<tr>
<th>Article Indexes and Databases</th>
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</thead>
<tbody>
<tr>
<td>Biological Abstracts</td>
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<tr>
<td>Compendex</td>
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<td>Scopus</td>
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<td>Web of Science</td>
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April 4, 2013

TO: All Members, Faculty Council of Science
FROM: Joan Burry, Secretary, Undergraduate Studies Committee, Faculty of Science
SUBJECT: Response to Senate Committee on Undergraduate Studies re: Review of Honours Regulations

In a March 7, 2013 memorandum, the Senate Committee on Undergraduate Studies requested input from academic units on honours regulations. Included after each question below is the response from the Undergraduate Studies Committee of the Faculty of Science.

1. Do you think a University-wide standard should be applied?
   No, the Committee did not see that this was necessary or appropriate, as it is unlikely that a single standard could be developed to meet the expectations of all faculties.

2. What elements should be used to award honours?
   The Committee felt that the current requirements for the Bachelor of Science honours degree are wholly adequate as they are; the degree requires more courses in the major subject, higher grades and a capstone course, such as a thesis or project.

3. Do you believe that honours designation influences the chances of pursuing graduate degrees?
   Yes, completion of an honours degree both prepares students for graduate studies and improves the likelihood of acceptance into graduate programs.

4. Are there other models, not current to Memorial University, you find appealing?
   None were suggested.

5. Do you think that Memorial should retain these designations?
   Yes.

Joan Burry
Assistant Registrar and
Secretary, Committee
on Undergraduate Studies,
Faculty of Science