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, December 9, 2015, at 1 p.m. in C-2045.

AGENDA

1. Regrets

2. Adoption of the Minutes of November 18, 2015

3. Business Arising from the Minutes

4. Correspondence: None

5. Reports of Standing Committees:
   A. Undergraduate Studies Committee:
      a. Department of Computer Science, proposals for six new major programs, paper 5.A.a (38 pages).
      b. Department of Computer Science, proposals for thirty-six new courses and deletion of thirteen existing courses, paper 5.A.b (215 pages).
      c. Department of Computer Science, calendar changes to existing major and joint major programs, paper 5.A.c. (26 pages).
      d. Department of Chemistry, deletion of CHEM 3500 and resulting calendar changes, paper 5.A.d (13 pages).
      e. Department of Chemistry, calendar changes, amendment to course description of CHEM 2100, paper 5.A.e (8 pages).
      g. Department of Mathematics and Statistics, calendar change, pre-requisite for Statistics 3410, paper 5.A.g (8 pages).
      i. Department of Physics and Physical Oceanography, calendar changes, paper 5.A.i (19 pages).
      j. Department of Biology, calendar changes, paper 5.A.j (21 pages).
      k. Department of Biochemistry, calendar changes, paper 5.A.k (15 pages).
      l. Department of Psychology, calendar change, course description of PSYC/BIOL 4770, paper 5.A.l (7 pages).
m. Department of Psychology, general calendar changes, paper 5.A.m (22 pages).

n. Department of Psychology, modifications to Psychology majors programs, paper 5.A.n (21 pages).

o. Department of Psychology, modification to Psychology joint majors programs, paper 5.A.o (10 pages).

p. Faculty of Science, proposal to add Science 1807 as a pre-requisite to laboratory courses, paper 5.A.p (28 pages).

B. Graduate Studies Committee:

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 NOVEMBER 18, 2015

A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, November 18, 2015, at 1:00 p.m. in room C-2045.

FSC 2375 Present
Biochemistry
Berry, M.    Booth, V.    Cheema, S.    Mulligan, M.

Chemistry
Bottaro, C.    Fridgen, T.

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

Mathematics & Statistics
Merkli, M.    Sullivan, S.

Ocean Sciences
Fletcher, G.

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

Psychology
Neath, I.    Thorpe, C.

Dean of Science
Abrahams, M.    Foss, K.    Mackenzie, T.    Zedel, L.

Economics
Waples, J.

Engineering
Duan, X.

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

Faculty of Business
Clift, T.

Marine Institute
Westcott, J.

Undergraduate Students
Diamond, C.

FSC 2376
Regrets
Amy Todd Andy Foster
Kris Poduska JC Loredo-Osti

FSC 2377
Adoption of Minutes
Moved: Minutes of the October 21, 2015, meeting be adopted. (Sullivan/Zedel). Wording change required to the third paragraph of the Report from the Dean which stated, “It is his expectation that Shannon will bring the same enthusiasm and commitment to that position that he brought to his position of Chair of the Science Committee on Undergraduate Studies.” It should state, “It is his expectation that Shannon will bring the same enthusiasm and commitment to that position that he continues to bring to his position of Chair of the Science Committee on Undergraduate Studies.” Carried. Two Abstentions.

FSC 2378
Business Arising: None

FSC 2379
Correspondence:
a. Letter from Senate regarding Senate Reform, feedback requested on the Draft Terms of Reference.

The Undergraduate Studies Committee discussed the Draft Terms of Reference and did not have many comments. Some felt that the Terms were broadly defined, but it was agreed that this was probably intentional and similar to the Terms of Reference for other committees. A comment was made concerning the composition of the committee and whether there would be former award winners serving that would be involved in the selection of future award recipients since one responsibility of the committee is to select winners of teaching awards. Wording was also questioned that indicated the committee would serve as the selection committee for “any teaching awards”; if they are going to select all teaching awards it would mean the dissolution of other committees. These comments will be included in the Faculty of Science response to Senate.
FSC 2380  Reports of Standing Committees:

A.  Undergraduate Studies Committee
Report presented by Shannon Sullivan, Chair, Undergraduate Studies Committee.
  c.  Moved: Department of Chemistry, proposal for two new minors, Minor in Chemistry for Process Engineering Majors, and Minor in Applied Science-Process Engineering for Chemistry Majors and Honours (Sullivan/Fridgen). Xili Duan, representative from the Faculty of Engineering, noted that on October 23, 2015, the Faculty of Engineering discussed and approved the minor. Carried.

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

FSC 2381  Reports of Delegates from Other Councils: None

FSC 2382  Report of the Dean
Presented by Mark Abrahams, Dean.

Much of the Dean's time since our last Science council meeting has been devoted to the Canada First Research Excellence Fund Application. The major issue dealt with was overlap between our application and that being developed by Dalhousie University. Ultimately, it was agreed to partner with Dalhousie in developing a joint proposal that also included expertise from UPEI, resulting in a single application from three provinces. At this point, a five page letter of intent has been submitted, with a decision being made in December to determine whether we can proceed to a full application.

The Canada Foundation for Innovation visited the MUN campus on October 28 to seek input on their current programs and new areas that should be considered for support. Issues that were discussed were the use of the John R. Evans Leaders Fund and its relative importance for recruitment and retention, improvements to the application process for the Innovation Fund, the Cyberinfrastructure Initiative, and the role for CFI in insuring infrastructure is useable and affordable.

The Dean has received a request from UQAR to determine whether Memorial University would support their application for a CFI MSI grant for the 50 metre Coriolis II research vessel. Information has been distributed to units inside and outside the Faculty of Science to gauge interest to determine if we are prepared to
do so. If UQAR is successful, this should provide a reduced cost for the use of the Coriolis II.

We continue to have ongoing issues with Grenfell regarding their courses and the ability of students to easily transfer between the St. John’s and Corner Brook campuses. The Dean has met with the Provost to discuss this issue but would like to hear from different departments on the extent of the problem and potential resolutions.

Phase One of the Memorial Researcher Portal is scheduled to launch on November 30. The portal is a mechanism whereby faculty can upload applications for external funding online to the university’s Research Grant and Contract Services. It will also permit researchers to apply online to the human research ethics boards which is the part that will begin on November 30. Requests for portal accounts began on November 20, and training will be provided beginning the week of November 23. More information is available on the VPR website (www.mun.ca/research/).

A reminder that the December meeting of Science council will be held one week early on December 9 to insure that we meet senate deadlines for the next academic year.

**FSC 2383 Question Period**

The Dean was asked what method of correspondence should be used for forwarding comments regarding the Coriolis II research vessel. Comments should be forwarded via email by Friday, November 20, 2015.

**FSC 2384 Adjournment**
The meeting adjourned at 1:25 p.m.
December 1, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to prerequisite for Statistics 3410
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1007 as a prerequisite to laboratory courses.

Joan Burry
Associate Registrar and Secretary
Proposal
Calendar Changes to Existing Program
Bachelor of Computer Science

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a number of changes are proposed to these offerings. The thrust of these changes is to bring the program offerings in Computer Science up-to-date, as the discipline of Computer Science is developing very quickly. The changes follow the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision and constitute a once-in-a-decade change to our undergraduate program offerings.

These changes encompass:

- A revision of the required courses for all students majoring in Computer Science ("core"), accompanied by a reduction in the number of these required courses.
- An increase in the number of elective courses for the general B.Sc. and B.A. degree in Computer Science compensating for this reduction in the core and resulting in the same number of credit hours as before.
- The introduction of additional majoring streams in Computer Science with a defined set of required courses allowing students to specialize earlier into sub-fields of Computer Science.
- The introduction of a number of new courses comprising of new core courses, new required stream courses and new elective courses in Computer Science.
- The adjustment of all current joint majors and honours degrees offered in collaboration with other units in the University.

Besides the general B.Sc./B.A. degrees in Computer Science and the changes to joint degrees, the Department proposes to offer:

1. A Major in Computer Science (Net-centric Computing) (B.Sc. only)
2. A Major in Computer Science (Smart Systems) (B.Sc. only)
3. A Major in Computer Science (Visual Computing and Games) (B.Sc. only)
4. A Major in Computer Science (Data Science) (B.Sc. only)
5. A Major in Computer Science (Scientific Computing) (B.Sc. only)
6. A Major in Computer Science (Theory of Computation) (B.Sc. only)

December 1, 2015
New Program Proposal - Computer Science

Computer Science has become such a broad discipline that it is difficult for an individual to follow all developments in all branches of this discipline. As a result, it has become mainstream to offer Computer Science programs with a particular focus ("streams"). This better serves the students as it is a guideline when planning their coursework. It also helps employers screen large numbers of applicants. As well, it facilities the Department’s allocation of resources. However, if a student cannot decide in which stream to specialize, the general degree will still be available.

The particular topics chosen for streams by the Department are the result of the initiative of groups of faculty members. The selection process was inclusive and emphasized innovation and practicality, and resulted from studying what is done at other Computer Science Departments across the country.

More detailed descriptions of the streams can be found in the accompanying pages.

The revised core will include the following courses:

COMP 1000 Computer Science - An Introduction
COMP 1001 Introduction to Programming
COMP 1002 Introduction to Logic for Computer Science
COMP 2001 Object-Oriented Programming and Human-Computer Interaction
COMP 2002 Data Structures and Algorithms
COMP 2003 Computer Architecture
COMP 2004 Operating Systems
COMP 2005 Software Engineering
COMP 2006 Computer Networking*
COMP 2007 Information Management*
COMP 2008 Social Issues and Professional Practice*

* one-credit hour courses

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department’s resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR. The transition will be carefully managed so as to phase out older courses with the introduction of new program offerings, and to accommodate students in the transition phase so that duplication of offerings can be avoided. After the four-year phase-in of the new program, older courses, that are no longer needed, will be deleted.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the

December 1, 2015
New Program Proposal - Computer Science

introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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Library Report Received: Yes

Library Holdings and/or Other Resources Required

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

December 1, 2015
New Program Proposal - Computer Science

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 Department of Computer Science.

Signature of Unit Head (if appropriate): ____________________________

Date: ____________________________

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

Date: ____________________________

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Computer Science

Calendar Change(s)

See attached pages

Secondary Calendar Changes

See attached pages

Rationale

The program changes proposed here follow the recommendations of the last Academic Program Review of undergraduate program offerings in Computer Science. The revisions follow the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision and constitute a once-in-a-decade revamping of our undergraduate program offerings.

After study of programs offered at other Canadian universities, our Department decided to offer a program which allows students to select their program with a particular focus or "stream." The particular topics chosen for streams by the Department are the result of the initiative of groups of faculty members, was inclusive, and emphasized innovation and practicality.

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December 1, 2015
New Program Proposal - Computer Science

Consultations Sought From

Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Faculty of Arts  Yes
Faculty of Business Administration  No
Faculty of Education  No
Faculty of Engineering and Applied Science  Yes
Faculty of Medicine  Yes
School of Human Kinetics and Recreation  Yes
School of Music  Yes
School of Nursing  No
School of Pharmacy  Yes
School of Social Work  Yes
Grenfell Campus  No
Marine Institute  Yes

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:  

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science (Net-centric Computing) (B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of network, internet, and web-related computing. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Net-centric Computing is achieved by reducing the core requirements that all Computer Science students have to take from 36 to 27 credit hours, in favour of courses in the area of Net-centric computing. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Four additional courses are required for a Major in Computer Science (Net-centric Computing):

1. COMP 2100: Social Web Analysis (also elective in Visual Computing and Games)
2. COMP 3100: Web Programming
3. COMP 4100: Web Services (also an elective in Data Science stream)
4. COMP 4101: Search Engines

These courses are introduced for this new stream, but can also be chosen by other students as electives. In addition, students declaring their major in Net-centric Computing select two courses out of a set of six electives which already exist or are introduced in the context of another proposed stream.

Electives (two must be chosen):

1. COMP 3202: Introduction to Machine Learning (required in Smart Systems and Data Science streams)
2. COMP 3400: Introduction to Databases (required in Data Science stream)
New Program Proposal - Computer Science

3. COMP 3401: Introduction to Data Mining (required in Data Science stream and elective in Smart Systems stream)
4. COMP 4304: Data Visualization (elective in Visual Computing and Games stream, as well as in the Data Science and Scientific Computing streams)
5. COMP 4759: Computer Networks (already exists)
6. COMP 4768: Software Development for Mobile Devices (already exists)

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department's resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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December 1, 2015
New Program Proposal - Computer Science

Consultations Sought From

School of Social Work
Grenfell Campus
Marine Institute

Comments Received
Yes
No
Yes

Library Report Received
Yes

Library Holdings and/or Other Resources Required

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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 Department of Computer Science.

Signature of Unit Head (if appropriate): ____________________________

Date: ____________________________

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

Date: ____________________________

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Major in Computer Science (Net-centric Computing)

Course Additions

COMP 2100  Social Web Analysis
COMP 3100  Web Programming
COMP 4100  Web Services
COMP 4101  Search Engines

Calendar Entry

See attached regulations document

Secondary Calendar Changes

See attached regulations document

Rationale

The internet, its technological backbone and its user interface have taken on an enormous importance in our society. Students of this Computer Science stream will be prepared to deal with the design, development and analysis of web-based software systems. The required courses of this stream will cover web-oriented programming languages and architectures, web technologies, search engines, the analysis of network data and web services like the cloud.

Consultations Sought From

| Department of Biochemistry | Yes |
| Department of Biology | Yes |
| Department of Chemistry | Yes |
| Department of Earth Sciences | No |
| Department of Economics | Yes |
| Department of Geography | Yes |
| Department of Mathematics and Statistics | Yes |
| Department of Ocean Sciences | No |

December 1, 2015
New Program Proposal - Computer Science

Consultations Sought From | Comments Received
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Department of Physics and Oceanography | Yes
Department of Psychology | Yes
Department of Computer Engineering | Yes
Faculty of Arts | Yes
Faculty of Business Administration | No
Faculty of Education | No
Faculty of Engineering and Applied Science | Yes
Faculty of Medicine | Yes
School of Human Kinetics and Recreation | Yes
School of Music | Yes
School of Nursing | No
School of Pharmacy | Yes
School of Social Work | Yes
Grenfell Campus | No
Marine Institute | Yes

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: 

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science (Smart Systems)  
(B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of artificial intelligence–Smart Systems. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Smart Systems is achieved by reducing the core requirements that all Computer Science students have to take from 36 to 27 credit hours, in favour of courses in the area of Smart Systems. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Four additional courses are required for a Major in Computer Science (Smart Systems):

1. COMP 3200: Algorithmic Techniques for Smart Systems (also an elective in the Data Science stream)
2. COMP 3201: Introduction to Nature-inspired Computing (also an elective in the Scientific Computing stream)
3. COMP 3202: Introduction to Machine Learning (also required for Data Science stream and an elective in Net-centric Computing stream)
4. COMP 3301: Visual Computing and Applications (also required in the Visual Computing and Games stream)

The first three of these courses are introduced for this new stream, but can also be chosen by other students as electives. The last course is introduced in the context of another stream (Visual Computing and Games) but constitutes a required course for Smart Systems, too. In addition, students declaring their major in Smart Systems can select two courses out of a set of six electives which already exist or are introduced in the context of another proposed stream.

December 1, 2015
New Program Proposal - Computer Science

Electives (two must be chosen):

1. COMP 3401: Introduction to Data Mining (required in Data Science stream and an elective in the Net-centric Computing stream)
2. COMP 3550: Introduction to Bioinformatics (already exists)
3. COMP 4301: Computer Vision (elective in Visual Computing and Games stream)
4. COMP 4303: Artificial Intelligence in Computer Games (elective in Visual Computing and Games stream)
5. COMP 4750: Natural Language Processing (already exists)
6. COMP 4766: Introduction to Autonomous Robotics (already exists)

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department’s resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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December 1, 2015
**New Program Proposal - Computer Science**

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Yes

**Library Holdings and/or Other Resources Required**

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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 Department of Computer Science.

**Signature of Unit Head (if appropriate):**

______________________________

**Date:**

______________________________

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

______________________________

**Date:**

______________________________

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Major in Computer Science (Smart Systems)

Course Additions

COMP 3200: Algorithmic Techniques for Smart Systems
COMP 3201: Introduction to Nature-inspired Computing
COMP 3202: Introduction to Machine Learning
COMP 3301: Visual Computing and Applications

Calendar Entry

See attached regulations document

Secondary Calendar Changes

See attached regulations document

Rationale

Computing devices are everywhere. As they are being embedded in more and more everyday products and services, there is an increasing demand for such computing to understand and adapt to both user needs and requests, as well as dynamic real-world environments, in a more human-like and human-comprehensible fashion. Handling the complexity and uncertainty that characterizes both human beings and dynamic real-world environments in a manner that is efficient, robust, and intelligent requires special techniques, many of which are both inspired by and operate well within limits imposed by nature. The aim of the Smart Systems stream is to give an overview of the growing body of algorithmic and mathematical techniques that have proven practical in allowing computer systems to deal intelligently with the complexities and uncertainties of both human beings and the real world in an efficient and robust manner.

Consultations Sought From

Department of Biochemistry
Department of Biology
Department of Chemistry

Comments Received

Yes
Yes
Yes

December 1, 2015
**New Program Proposal - Computer Science**

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**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: ____________________________

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science
(Visual Computing and Games) (B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of Visual Computing and Games. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Visual Computing and Games is achieved by reducing the core requirements that all Computer Science students have to take from 36 to 27 credit hours, in favour of courses in the area of visual computing and game programming. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Three additional courses are required for a major in Computer Science (Visual Computing and Games):

1. COMP 3300: Interactive Technologies
2. COMP 3301: Visual Computing and Applications (also required in the Smart Systems stream)
3. COMP 4300: Game Programming Algorithms and Techniques

These courses are introduced for this new stream, but can also be chosen by other students as required courses or electives. In addition, students declaring their major in Visual Computing and Games can select two courses out of a set of five electives which already exist or are introduced in the context of this or other streams.

Elective courses (two must be chosen):

1. COMP 2300: Introduction to Multimedia Programming
2. COMP 4301: Computer Vision (also an elective in the Smart Systems stream)
3. COMP 4302: 3D Computer Graphics

December 1, 2015
New Program Proposal - Computer Science

4. COMP 4303: Artificial Intelligence in Computer Games (also an elective in the Smart Systems stream)
5. COMP 4304: Data Visualization (also an elective in the Net-centric Computing, Data Science, and Scientific Computing streams)

A final elective can be chosen from all Computer Science elective courses, but three electives are recommended in particular.

Recommended electives (one must be chosen):

1. COMP 2100: Social Web Analysis (required for Net-centric Computing stream)
2. COMP 4766: Introduction to Autonomous Robotics (already exists)
3. COMP 4768: Software Development for Mobile Devices (already exists)

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department’s resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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Yes

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While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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

Signature of Unit Head (if appropriate):


Date:


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


Date:


December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Major in Computer Science (Visual Computing and Games)

Course Additions

Core Courses
COMP 3300 Interactive Technologies
COMP 3301 Visual Computing and Applications
COMP 4300 Game Programming Algorithms and Techniques

Elective Courses
COMP 2300 Introduction to Multimedia Programming
COMP 4301 Computer Vision
COMP 4302 3D Computer Graphics
COMP 4303 Artificial Intelligence in Computer Games
COMP 4304 Data Visualization

Calendar Entry

See attached regulations document

Secondary Calendar Changes

See attached regulations document

Rationale

Visual perception is responsible for most of our impressions about the world around us. The field of Visual Computing in Computer Science studies how to use computers to both mimic humans' visual processing power (e.g., object recognition) and to create visual content (e.g., games and movies). Computer games offer a great opportunity for computer scientists to learn and apply fundamental concepts of the design and creation of interactive experiences and visual content. The courses in the Visual Computing and Games stream cover a variety of sub-fields that are related to visual computing and interaction, including image processing, computer vision, multimedia, and game development. The stream has a strong emphasis on hands-on learning and exploration of applied aspects of visual computing and games. Students in this stream will be

December 1, 2015
New Program Proposal - Computer Science

equipped with skills that will allow them to develop professionally in these visually oriented fields. They will also be prepared for graduate studies in computer graphics, vision and human-computer interaction.

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Library Report Received: Yes

December 1, 2015
New Program Proposal - Computer Science

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: ________________________

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science (Data Science) (B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of Data Science. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Data Science is achieved by reducing the core requirements that all Computer Science students have to take from 36 to 27 credit hours, in favour of courses in the area of Data Science. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Four additional courses are required for a major in Computer Science (Data Science):

1. COMP 3202: Introduction to Machine Learning (also required in the Smart Systems stream, and an elective in the Net-centric Computing stream)
2. COMP 3400: Introduction to Databases (also an elective in the Net-centric Computing stream)
3. COMP 3401: Introduction to Data Mining (also an elective in the Net-centric and Smart Systems streams)
4. COMP 4405: Privacy and Security - An Introduction (also an elective in Theory of Computation stream)

These courses are introduced for this new stream, but can also be chosen by other students as required or elective courses. In addition, students declaring their major in Data Science can select two courses out of a set of six electives which already exist or are introduced in the context of this or other streams.

December 1, 2015
New Program Proposal - Computer Science

Elective courses (two must be chosen):

1. COMP 3200: Algorithmic Techniques for Smart Systems (required in Smart Systems stream)
2. COMP 3550: Introduction to Bioinformatics (already exists)
3. MATH 3585: Computational Statistics (already exists, offered by the Department of Mathematics and Statistics)
4. COMP 4100: Web Services (required in Net-centric Computing stream)
5. COMP 4304: Data Visualization (elective in Visual Computing and Games stream, as well as Data Science and Scientific Computing streams)
6. COMP 4401: High-performance Computing

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department’s resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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December 1, 2015
New Program Proposal - Computer Science

Consultations Sought From  Comments Received
School of Human Kinetics and Recreation  Yes
School of Music  Yes
School of Nursing  No
School of Pharmacy  Yes
School of Social Work  Yes
Grenfell Campus  No
Marine Institute  Yes

Library Report Received  Yes

Library Holdings and/or Other Resources Required

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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 Department of Computer Science.

Signature of Unit Head (if appropriate):

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

Date:

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title
Major in Computer Science (Data Science)

Course Additions
COMP 3202 Introduction to Machine Learning
COMP 3400 Introduction to Databases
COMP 3401 Introduction to Data Mining
COMP 4405 Privacy and Security - An Introduction
COMP 4401 High-performance Computing

Calendar Entry
See attached regulations document

Secondary Calendar Changes
See attached regulations document

Rationale
Data play a vital role in decision-making in many areas such as social sciences, business, biomedical science, and government policy. Data are of different types, volume, arrival rates and granularity ranges, for example, from pulses from sensors to large area maps from satellites. Some data are stored and processed, and others may be processed without storing. Majors in the Data Science program will acquire essential background for every stage of data processing, from collection of raw data from heterogeneous resources to secure transmission, reliable and safe storage, to fast and intelligent analysis, ending in comprehensible interpretation and delivery of derived information.

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Chair: 

Secretary: 

Date: 

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science (Scientific Computing)
(B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of Scientific Computing. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Scientific Computing is achieved by reducing the core requirements that all Computer Science students have to take from 36 to 27 credit hours, in favour of courses in the area of Scientific Computing. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Eight additional courses are required for a major in Computer Science (Scientific Computing):

1. COMP 3500: Introduction to Scientific Computing
2. COMP 3501: Computational Linear Algebra with Applications
3. COMP 4500: Computational Linear Optimization with Applications
4. COMP 4501: Numerical Algorithms for Shared and Distributed Memory Architectures
5. MATH 2260: Ordinary Differential Equations I
6. MATH 3202: Vector Calculus
7. MATH 4160: Partial Differential Equations I
8. MATH 4162: Numerical Methods for Differential Equations

Four courses are introduced for this new stream, and four are offered by the Department of Mathematics and Statistics. In addition, students declaring their major in Scientific Computing can select two courses out of a set of nine electives which already exist or are introduced in the context of this stream.

December 1, 2015
New Program Proposal - Computer Science

Elective courses:

1. COMP 3201: Introduction to Nature-inspired Computing (required for the Smart Systems stream)
2. COMP 3550: Introduction to Bioinformatics (already exists)
3. COMP 3600: Design and Analysis of Algorithms (required for the Theory of Computation stream)
4. COMP 3710: Vocational Languages (already exists)
5. COMP 4304: Data Visualization (elective in Visual Computing and Games stream, as well as Net-centric Computing and Data Science streams)
6. COMP 4550: Bioinformatics: Biological Data Analysis (already exists)
7. COMP 4737: Special Topics in Numerical Computation (already exists)
8. COMP 4762: Introduction to Computational Molecular Biology (already exists)
9. COMP 4766: Introduction to Autonomous Robotics (already exists)

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department’s resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

Consultations Sought From

| Department of Biochemistry | Yes |
| Department of Biology | Yes |
| Department of Chemistry | Yes |
| Department of Earth Sciences | No |
| Department of Economics | Yes |
| Department of Geography | Yes |
| Department of Mathematics and Statistics | Yes |
| Department of Ocean Sciences | No |
| Department of Physics and Oceanography | Yes |
| Department of Psychology | Yes |
| Department of Computer Engineering | Yes |
| Faculty of Arts | Yes |
| Faculty of Business Administration | No |

December 1, 2015
New Program Proposal - Computer Science

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<td>Yes</td>
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Library Report Received: Yes

Library Holdings and/or Other Resources Required

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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

Signature of Unit Head (if appropriate):

Date:

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

Date:

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Major in Computer Science (Scientific Computing)

Course Additions

COMP 3500 Introduction to Scientific Computing
COMP 3501 Computational Linear Algebra with Applications
COMP 4500 Numerical Optimization with Applications
COMP 4501 Numerical Algorithms for Shared and Distributed Memory Architectures

Calendar Entry

See attached regulations document

Secondary Calendar Changes

See attached regulations document

Rationale

Scientific Computing combines the elegance and reasoning of mathematics with today’s powerful computers to solve mathematically modeled physical, engineering and industrial problems. This program provides concrete knowledge and skills in both mathematics and computational methods, preparing its graduates to fill positions as mathematical analysts, scientific programmers, software engineers, systems analysts, etc. Students will learn the most effective numerical algorithms for important as well as useful mathematical problems. They will learn why these algorithms generate accurate results despite the limited accuracy of computer arithmetic and how to implement these algorithms efficiently on conventional as well as high-performance computers.

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December 1, 2015
New Program Proposal - Computer Science

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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:

December 1, 2015
New Program Proposal - Computer Science

Major in Computer Science (Theory of Computation) (B.Sc. only)

Executive Summary

Following the recommendations of the most recent Academic Program Review of the undergraduate programs offered by the Department of Computer Science, a stream-based program is proposed in the area of theoretical Computer Science. The proposal ties in with and is a variant of the changes to our general degree (B.Sc. and B.A.) in Computer Science, and follows the newest (2013) curriculum recommendations prepared by a joint international ACM/IEEE committee (ACM and IEEE are the main professional organizations of the discipline) on curriculum revision. Due to many changes in the discipline of Computer Science, this revision constitutes a once-in-a-decade revamping of our undergraduate program offerings.

The focus on Theory of Computation is achieved by reducing the core requirements that all Computer Science students have to take from 38 to 27 credit hours, in favour of courses in the area of Theory of Computation. As a result of this reduction of the core, nine credit hours are now available, in addition to the nine credit hours that were previously available for Computer Science electives. These 18 credit hours are now distributed among stream-required and stream-elective courses in the following way.

Three additional courses are required:

1. COMP 3600: Design and Analysis of Algorithms (also an elective in Scientific Computing stream)
2. COMP 3601: Mathematical Methods in Theory of Computation
3. COMP 3602: Introduction to the Theory of Computation

These courses are introduced for this new stream, but can also be chosen by other students as elective courses. In addition, students declaring their major in Theory of Computation can select three courses of seven elective courses which already exist.

Electives (three must be chosen):

1. COMP 4405: Privacy and Security - An Introduction (required in Data Science stream)
2. COMP 4711: Structure of Programming Languages (already exists)
3. COMP 4712: Compiler Construction (already exists)
4. COMP 4742: Computational Complexity (already exists)
5. COMP 4743: Graph Algorithms and Combinatorial Optimization (already exists)

December 1, 2015
New Program Proposal - Computer Science

6. COMP 4745: Introduction to Computational Geometry (already exists)
7. COMP 4746: Principles of Distributed Computing (already exists)

Resource Implications: Instructional Costs

During the transition into the new program offerings, the Department's resources will be strained. However, no new faculty (other than replacement of retiring/resigning faculty) will be necessary. It is hoped that the new program offerings will make the University and the Department more attractive to students, fulfilling a key requirement of the last APR.

The Department has taken care that as many courses as possible can be used in different streams and that teaching sections are grouped together to offer courses in the most efficient manner possible. As noted, older courses will be phased out in step with the introduction of the new program and streams. If necessary, accommodations will be made for students currently in the program.

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Library Report Received: Yes

December 1, 2015

Page 34
New Program Proposal - Computer Science

Library Holdings and/or Other Resources Required

While the library holdings can adequately meet the needs of the proposed courses, a few areas of the collection should be supplemented or refreshed.

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 Department of Computer Science.

Signature of Unit Head (if appropriate):

Date:

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

Date:

December 1, 2015
New Program Proposal - Computer Science

SUMMARY PAGE FOR SENATE

Approval Form

Program Title
Major in Computer Science (Theory of Computation)

Course Additions
COMP 3600 Design and Analysis of Algorithms
COMP 3601 Mathematical Methods in Theory of Computation
COMP 3602 Introduction to the Theory of Computation

Calendar Entry
See attached regulations document

Secondary Calendar Changes
See attached regulations document

Rationale
This program can be a choice for students with mathematical aptitude who are interested in an in-depth understanding of the fundamental concepts of Computer Science. Students will have an opportunity to "look under the hood" of the process of computation, to see what various computational devices do when they compute, and what their limits are and their capabilities. Students will become proficient in describing problems with precision and in designing algorithms to solve them.

Consultations Sought From                      Comments Received
Department of Biochemistry                      Yes
Department of Biology                            Yes
Department of Chemistry                          Yes
Department of Earth Sciences                     No
Department of Economics                          Yes
Department of Geography                           Yes
Department of Mathematics and Statistics         Yes
Department of Ocean Sciences                     No
Department of Physics and Oceanography           Yes
Department of Psychology                         Yes

December 1, 2015
New Program Proposal - Computer Science

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</table>

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: ___________________________________________
Proposal
New Course – COMP 1000
Computer Science – An Introduction

Course Number and Title
1000 Computer Science – An Introduction

Abbreviated Course Title
Computer Science – An Intro

Calendar Description

1000 Computer Science – An Introduction is a gentle introduction to computer science. In a breadth-first overview approach it discusses important aspects of computer science including fundamentals in algorithms, binary data representation, Boolean logic and its implementation, machine architecture, systems software, networking concepts, programming languages, databases, and selected Computer Science subfields.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Credit Restrictions
CR with COMP 1700

Secondary Calendar Changes

Department of Computer Science

1700 Introduction to Computer Science lays the foundation for the art and the science of computing. The course contains fundamental and topical issues in computers, languages, programming and applications. This course is designed for potential Computer Science majors without a background in programming, but is also available for non majors.

CR: COMP 1000
LH: 3

9.2.3.1 Major in Biology
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2659 1000 or 1600.

9.2.3.2 Major in Biology (Cell and Molecular)
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2659-1000 or 1600.

9.2.3.3 Major in Biology (Ecology and Conservation)
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2659 1000 or 1600.
9.2.3.4 Major in Biology (Marine)

It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.

Rationale

As part of the revamping of the Department's undergraduate program, this course is introduced as the first course for computer science majors and minors. It follows a breadth-first approach given starting computer science students exposure to the breadth of computer science.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

1. Definition and importance of Computer Science (1 hour)
2. Introduction to algorithms (6 hours)
   1. Definition and properties
   2. Representation (pseudocode) of different types of operations
   3. Examples of simple algorithms (e.g., sequential search)
   4. Efficiency
3. Binary representation of data (3 hours)
4. Boolean logic, gates and circuits (2 hours)
5. Machine architecture (3 hours)
6. System software (operating systems) (2 hours)
7. Network fundamentals (3 hours)
   1. Basic networking concepts
   2. Layered structure of the Internet
   3. Basic network protocols (e.g., ARQ)
8. Programming languages (2 hours)
9. Basic software engineering concepts (2 hours)
10. Database fundamentals (2 hours)
11. Selected CS sub-field (e.g., graphics, AI, theory of computation) (2 hours)

Method of Evaluation:

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Texts


Instructor(s)
L. Peña-Castillo, T. Hu
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 1000 Computer Science – An Introduction

Abbreviated Course Title Computer Science – An Intro

Calendar Change (new course)

1000 Computer Science – An Introduction is a gentle introduction to computer science. In a breadth-first overview approach it discusses important aspects of computer science including fundamentals in algorithms, binary data representation, Boolean logic and its implementation, machine architecture, systems software, networking concepts, programming languages, databases, and selected Computer Science subfields.
CR: COMP 1700
LH: 3

Credit Restrictions

CR with COMP 1700

Secondary Calendar Changes

Department of Computer Science

1700 Introduction to Computer Science lays the foundation for the art and the science of computing. The course contains fundamental and topical issues in computers, languages, programming and applications. This course is designed for potential Computer Science majors without a background in programming, but is also available for non majors.
LH: 3
CR: COMP 1000

9.2.3.1 Major in Biology
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.

9.2.3.2 Major in Biology (Cell and Molecular)
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.

9.2.3.3 Major in Biology (Ecology and Conservation)
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.

9.2.3.4 Major in Biology (Marine)
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650-1000 or 1600.
Rationale

As part of the revamping of the Department's undergraduate program, this course is introduced as the first course for computer science majors and minors. It follows a breadth-first approach given starting computer science students exposure to the breadth of computer science.

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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:
Proposal
New Course – COMP 1001
Introduction to Programming

Course Number and Title
1001 Introduction to Programming

Abbreviated Course Title
Introduction to Programming

Calendar Description

1001 Introduction to Programming is an introduction to fundamental programming techniques, primitive data types, and to simple algorithms and their design concepts.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Pre-requisite(s)
None

Credit Restrictions
CR with COMP 1710

Secondary Calendar Changes

Department of Mathematics and Statistics

2130 Technical Writing in Mathematics is a project oriented course combining mathematical investigation and technical writing. By using computer programming, graphical and typesetting tools, students will explore mathematical concepts and will produce technical reports of professional quality. The latter will combine elements of writing and graphics to convey technical ideas in a clear and concise manner.

PR: admission to Applied or Pure Mathematics major and MATH 1001 and (Computer Science 1510 or 4740 or 2740 or 2692 1001 or 2001; or permission of the Head of Department)

UL: qualifies as a Research Writing course in the Faculty of Arts

Faculty of Arts
Department of Geography

7.7.4 Course List
Computer Science 4740 Computer Science 1001
12.12 Geography
4261 Advanced Methods in Geographic Information Systems (GIS) explores the nature and use of advanced GIS algorithms, discrete and continuous data structures, computational methods and analysis of error for the purpose of analysing and modelling spatial patterns and processes. Laboratory exercises permit students to use GIS software to explore as well as develop problem solving and modelling skills for a wide variety of real world applications.
LH: 3
PR: GEOG 3260; Mathematics 2050; Computer Science 4740 1001; (or equivalent, with permission of instructor and the Head of Department).

Department of Chemistry
9.3.6 General Degree - Major in Computational Chemistry
4. Computer Science 1510, 4740, and 2740 and 1001.

9.3.6.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

9.3.7 Honours Degree in Computational Chemistry
4. Computer Science 1510, 4740 and 2740 and 1001.

9.3.7.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

Department of Computer Science

1710 Object-Oriented Programming I is an introduction to fundamental programming techniques, primitive data types and operations, program control structures and the use of objects, classes and methods.
CR: if previously completed, or currently registered for COMP 2710; and COMP 1001
LH: 3

Rationale
As part of the revamping of the Department's undergraduate program, this course is introduced as the first course in programming for Computer Science majors and minors.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Fundamental programming constructs (6 hours)
- Fundamental data structures, incl. strings, arrays, and array lists (6 hours)
- Algorithms and problem solving (9 hours)
- Fundamental design concepts and principles (2 hours)
- Developing methods incl. correctness, debugging, testing, documentation (3 hours)
- Modern programming environments, incl. APIs (2 hours)

Method of Evaluation:

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Texts


Instructor(s)

L. Peña-Castillo, T. Hu
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 1001 Introduction to Programming

Abbreviated Course Title  Introduction to Programming

Calendar Change (new course)

1001 Introduction to Programming is an introduction to fundamental programming techniques, primitive data types, and to simple algorithms and their design concepts.
CR:  COMP 1710
LH:  3

Secondary Calendar Changes

Department of Mathematics and Statistics

2130 Technical Writing in Mathematics is a project oriented course combining mathematical investigation and technical writing. By using computer programming, graphical and typesetting tools, students will explore mathematical concepts and will produce technical reports of professional quality. The latter will combine elements of writing and graphics to convey technical ideas in a clear and concise manner.
PR: admission to Applied or Pure Mathematics major and MATH 1001 and
(Computer Science 1510 or 4740 or 2740 or 2602 1001 or 2001; or permission of the Head of Department)
UL: qualifies as a Research Writing course in the Faculty of Arts

Faculty of Arts
Department of Geography

7.7.4 Course List
Computer Science 1740 Computer Science 1001

12.12 Geography
4261 Advanced Methods in Geographic Information Systems (GIS) explores the nature and use of advanced GIS algorithms, discrete and continuous data structures, computational methods and analysis of error for the purpose of analysing and modelling spatial patterns and processes.
Laboratory exercises permit students to use GIS software to explore as well as develop problem solving and modelling skills for a wide variety of real world applications.
LH: 3
PR: GEOG 3260; Mathematics 2050; Computer Science 4740 1001; (or equivalent, with permission of instructor and the Head of Department).

Department of Chemistry
9.3.6 General Degree - Major in Computational Chemistry
4. Computer Science 1510, 4740, and 2740 and 1001.
9.3.6.2 Suggested Program of Study
5. Computer Science 1510 and 4740 *1001*

9.3.7 Honours Degree in Computational Chemistry
4. Computer Science 1510, 4710 and 2710 and *1001*.  
5. Computer Science 2500 or 2744 and *2001*.

9.3.7.2 Suggested Program of Study
5. Computer Science 1510 and 4740 *1001*

Department of Computer Science

*1710 Object-Oriented Programming I* is an introduction to fundamental programming techniques, primitive data types and operations, program control structures and the use of objects, classes and methods.
CR: if previously completed, or currently registered for COMP 2710; *and COMP 1001*

LH: 3

**Rationale**

As part of the revamping of the Department's undergraduate program, this course is introduced as the first course in programming for Computer Science majors and minors.

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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:
Proposal
New Course – COMP 1002
Introduction to Logic for Computer Scientists

Course Number and Title
1002 Introduction to Logic for Computer Scientists

Abbreviated Course Title
Introductory Logic

Calendar Description

1002 Introduction to Logic for Computer Scientists introduces methods of reasoning and logic tools that underlie computer science. In particular, this course covers propositional and predicate logic, sets and other discrete structures, as well as modular arithmetic and basic counting, with emphasis on their applications in computer science.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Credit Restrictions

CR with COMP 2742, ENGI 4424, MATH 2320. Students cannot receive credit for COMP 1002 if completed with, or subsequent to, MATH 2320.

Secondary Calendar Changes

2742 Logic for Computer Science is an introduction to propositional and predicate logic with applications. The use of the system of boolean logic in reasoning and circuit design, as well as basic proof techniques and the resolution principle, for both propositional and predicate logic, will be covered. Concepts involving sets will be used to illustrate different types of proof techniques. The probable intractability of boolean logic and Goedel's incompleteness theorem will be presented.
CR: COMP-1002
PR: COMP 1710 and Mathematics 1000

Rationale

As part of the revamping of the Department's undergraduate program, this course provides a mathematical foundation on which subsequent computer science courses can build.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Propositional and predicate logic (9 hours)
- Set theory, functions, relations and incomputability (4 hours)
- Proof techniques including induction (10 hours)
- Basic counting and modular arithmetic (5 hours)

Method of Evaluation:

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<th>Component</th>
<th>Percentage</th>
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<td>Quizzes</td>
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Texts


Instructor(s)

A. Kolokolova, M. Mata-Montero
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  1002 Introduction to Logic for Computer Scientists

Abbreviated Course Title Introductory Logic

Calendar Change (new course)

1002 Introduction to Logic for Computer Scientists introduces methods of reasoning and logic tools that underlie computer science. In particular, this course covers propositional and predicate logic, sets and other discrete structures, as well as modular arithmetic and basic counting, with emphasis on their applications in computer science.

CR: COMP 2742, ENGI 4424, MATH 2320. Students cannot receive credit for COMP 1002 if completed with, or subsequent to, MATH 2320.

LH: 3
PR: COMP 1000

Secondary Calendar Changes

2742 Logic for Computer Science is an introduction to propositional and predicate logic with applications. The use of the system of boolean logic in reasoning and circuit design, as well as basic proof techniques and the resolution principle, for both propositional and predicate logic, will be covered. Concepts involving sets will be used to illustrate different types of proof techniques. The probable intractability of boolean logic and Gödel's incompleteness theorem will be presented.

CR: COMP-1002
PR: COMP 1710 and Mathematics 1000

Rationale

As part of the revamping of the Department's undergraduate program, this course provides a mathematical foundation on which subsequent computer science courses can build.

Consultations Sought From    Comments Received

Department of Biochemistry    Yes
Department of Biology         Yes
Department of Chemistry       Yes
Department of Earth Sciences  No
Department of Economics       Yes
Department of Geography       Yes
Department of Mathematics and Statistics Yes
Department of Ocean Sciences  No
Department of Physics and Oceanography Yes
Department of Psychology      Yes
Department of Computer Engineering Yes
Faculty of Arts                Yes
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<td>Marine Institute</td>
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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:
Proposal
New Course – COMP 2001
Object-Oriented Programming and Human-Computer Interaction

Course Number and Title
2001 Object-Oriented Programming and Human-Computer Interaction

Abbreviated Course Title
Object-Oriented Programming

Calendar Description

2001 Object-Oriented Programming and Human-Computer Interaction advances from Introduction to Programming and studies object-oriented programming. Additional topics include event-driven programming, program correctness and simple refactoring, as well as interfaces and human-computer interaction. A brief overview of programming languages is also provided.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Pre-requisite(s)
COMP 1001, MATH 1000

Credit Restrictions
CR with COMP 2710

Secondary Calendar Changes

Department of Mathematics and Statistics

2130 Technical Writing in Mathematics is a project oriented course combining mathematical investigation and technical writing. By using computer programming, graphical and typesetting tools, students will explore mathematical concepts and will produce technical reports of professional quality. The latter will combine elements of writing and graphics to convey technical ideas in a clear and concise manner.

PR: admission to Applied or Pure Mathematics major and MATH 1001 and (Computer Science 1510 or 4740 or 2740 or 2662 1001 or 2001; or permission of the Head of Department)

UL: qualifies as a Research Writing course in the Faculty of Arts
Department of Chemistry

9.3.6 General Degree - Major in Computational Chemistry
4. Computer Science 1510, 4740, and 2740 and 1001.

9.3.6.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

9.3.7 Honours Degree in Computational Chemistry
4. Computer Science 1510, 4740 and 2740 and 1001.

9.3.7.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

Department of Biology

3951 Introduction to Bioinformatics (same as Computer Science 3550) deals with the development and application of computational methods to address biological problems. The course will focus on the fundamental concepts, ideas and related biological applications of existing bioinformatics tools. This course will provide hands-on experience in applying bioinformatics software tools and online databases to analyze experimental biological data, and it will also introduce scripting language tools typically used to automate some biological data analysis tasks.
CR: Computer Science 3550
LH: 3
PR: BIOL 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding Computer Science 1400, or Computer Science 1600 and Computer Science 2000; or Computer Science 2500 or Computer Science 2740 2001, and one Biology course at the 1000-level or above excluding BIOL 2040 and BIOL 2041; or permission of the course instructor

3550 Introduction to Bioinformatics (same as Biology 3951) deals with the development and application of computational methods to address biological problems. The course will focus on the fundamental concepts, ideas and related biological applications of existing bioinformatics tools. This course will provide hands-on experience in applying bioinformatics software tools and online databases to analyze experimental biological data, and it will also introduce scripting language tools typically used to automate some biological data analysis tasks.
CR: Biology 3951
LH: 3
PR: Biology 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding COMP 1400, COMP 1600 and COMP 2000; or COMP 2500 or COMP 2749, 2001 and one Biology course at the 1000-level or above excluding Biology 2040 and Biology 2041; or permission of the course instructor

Department of Computer Science

2710 Object-Oriented Programming II continues from Object-Oriented Programming I, and studies object-oriented and event-driven programming. Additional topics include: recursion, basic analysis of algorithms, fundamental data structures such as simple linked structures and
stacks, and fundamental computing algorithms such as binary search and quadratic time sorting. A brief overview of programming languages, virtual machines and language translations is also provided.

CR: COMP 2001
LH: 3
PR: COMP 1710 and Mathematics 1000

Rationale

As part of the revamping of the Department's undergraduate program, this course is introduced as the second course in programming for Computer Science majors and minors.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Object-oriented programming (10 hours)
- Event-driven programming (2 hours)
- An overview of programming languages (3 hours)
- Program correctness and simple testing and refactoring (4 hours)
- User interfaces, and human-computer interaction (8 hours)

Method of Evaluation:

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<th>Component</th>
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Texts


Instructor(s)

D. Batten, R. Byrne
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2001 Object-Oriented Programming and Human-Computer Interaction

Abbreviated Course Title  Object-Oriented Programming

Calendar Change (new course)

2001 Object-Oriented Programming and Human-Computer Interaction advances from Introduction to Programming and studies object-oriented programming. Additional topics include event-driven programming, program correctness and simple refactoring, as well as interfaces and human-computer interaction. A brief overview of programming languages is also provided.
CR: COMP 2710
LH: 3
PR: COMP 1001, MATH 1000

Secondary Calendar Changes

Department of Mathematics and Statistics

2130 Technical Writing in Mathematics is a project oriented course combining mathematical investigation and technical writing. By using computer programming, graphical and typesetting tools, students will explore mathematical concepts and will produce technical reports of professional quality. The latter will combine elements of writing and graphics to convey technical ideas in a clear and concise manner.
PR: admission to Applied or Pure Mathematics major and MATH 1001 and (Computer Science 1510 or 4740 or 2740 or 2602 1001 or 2001; or permission of the Head of Department)
UL: qualifies as a Research Writing course in the Faculty of Arts

Department of Chemistry

9.3.6 General Degree - Major in Computational Chemistry
4. Computer Science 1510, 4740, and 2740 and 1001.

9.3.6.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

9.3.7 Honours Degree in Computational Chemistry
4. Computer Science 1510, 4740 and 2740 and 1001.

9.3.7.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001
Department of Biology

3951 Introduction to Bioinformatics (same as Computer Science 3550) deals with the development and application of computational methods to address biological problems. The course will focus on the fundamental concepts, ideas and related biological applications of existing bioinformatics tools. This course will provide hands-on experience in applying bioinformatics software tools and online databases to analyze experimental biological data, and it will also introduce scripting language tools typically used to automate some biological data analysis tasks.
CR: Computer Science 3550
LH: 3
PR: BIOL 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding Computer Science 1400, or Computer Science 1600 and Computer Science 2000; or Computer Science 2500 or Computer Science 2740 2001, and one Biology course at the 1000-level or above excluding BIOL 2040 and BIOL 2041; or permission of the course instructor

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CR: Biology 3951
LH: 3
PR: Biology 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding COMP 1400, COMP 1600 and COMP 2000; or COMP 2500 or COMP 2740, 2001 and one Biology course at the 1000-level or above excluding Biology 2040 and Biology 2041; or permission of the course instructor

Department of Computer Science

2710 Object-Oriented Programming II continues from Object-Oriented Programming I, and studies object-oriented and event-driven programming. Additional topics include: recursion, basic analysis of algorithms, fundamental data structures such as simple linked structures and stacks, and fundamental computing algorithms such as binary search and quadratic time sorting. A brief overview of programming languages, virtual machines and language translations is also provided.
CR: COMP 2001
LH: 3
PR: COMP 1710 and Mathematics 1000

Rationale

As part of the revamping of the Department's undergraduate program, this course is introduced as the second course in programming for Computer Science majors and minors.
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Library Report Received: Yes

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:
Proposal
New Course – COMP 2002
Data Structures and Algorithms

Course Number and Title
2002 Data Structures and Algorithms

Abbreviated Course Title
Data Structures & Algorithms

Calendar Description

2002 Data Structures and Algorithms covers fundamental data structures, algorithms and algorithm design techniques. A problem-driven course, it focuses on computational problem solving from designing an efficient algorithm to implementing it using appropriate data structures.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Pre-requisite(s)
COMP 1001, COMP 1002

Credit Restrictions
CR with COMP 2711

Secondary Calendar Changes

2711 Introduction to Algorithms and Data Structures includes the study of standard ways of organizing and manipulating data in computer storage. Fundamental concepts in the design and analysis of algorithms are also discussed.
CR: COMP 2002
LH: 3
PR: COMP 2710. It is recommended that students complete COMP 2742 prior to registering for COMP 2711

Rationale

As part of the revamping of the Department's undergraduate program, this course provides knowledge in basic building blocks of computer science: algorithms and data structures, as well as continuing programming practice.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Algorithm analysis (5 hours)
- Algorithm design techniques: brute-force, greedy, divide-and-conquer, backtracking, dynamic programming (5 hours)
- Data structures (stacks, queues, binary search trees, hash tables, graphs) (6 hours)
- Fundamental algorithms: sorting, searching, BFS/DFS, MST, shortest paths (12 hours)

Method of Evaluation:

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<td>Lab Quizzes</td>
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<td>Final Exam</td>
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Texts


Instructor(s)

M. Bartha, A. Kolokolova, M. Mata-Montero
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2002 Data Structures and Algorithms

Abbreviated Course Title  Data Structures & Algorithms

Calendar Change (new course)

2002 Data Structures and Algorithms covers fundamental data structures, algorithms and algorithm design techniques. A problem-driven course, it focuses on computational problem solving from designing an efficient algorithm to implementing it using appropriate data structures.
CR: COMP 2711
LH: 3
PR: COMP 1001, COMP 1002

Secondary Calendar Changes

2711 Introduction to Algorithms and Data Structures includes the study of standard ways of organizing and manipulating data in computer storage. Fundamental concepts in the design and analysis of algorithms are also discussed.
CR: COMP 2002
LH: 3
PR: COMP 2710. It is recommended that students complete COMP 2742 prior to registering for COMP 2711

Rationales

As part of the revamping of the Department's undergraduate program, this course provides knowledge in basic building blocks of computer science: algorithms and data structures, as well as continuing programming practice.

Consultations Sought From

Department of Biochemistry  Yes
Department of Biology  Yes
Department of Chemistry  Yes
Department of Earth Sciences  No
Department of Economics  Yes
Department of Geography  Yes
Department of Mathematics and Statistics  Yes
Department of Ocean Sciences  No
Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Faculty of Arts  Yes
Faculty of Business Administration  No

Comments Received
### Consultations Sought From

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| Library Report Received   | Yes                   |

### 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:
Proposal
New Course – COMP 2003
Computer Architecture

Course Number and Title
2003 Computer Architecture

Abbreviated Course Title
Computer Architecture

Calendar Description

2003 Computer Architecture introduces computer architecture at the digital logic implementation level, at the instruction set level, and at the level where programming languages are translated into the underlying machine instructions. The course provides an overview of computer architecture at these levels.

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Pre-requisite(s)
COMP 1001, COMP 1002

Credit Restrictions
CR with COMP 3724

Secondary Calendar Changes

3724 Computer Organization can be studied at the digital logic implementation level, the instruction set architecture level, and the translation of programming languages to the underlying machine instruction level. This course studies computer organization at these levels.
CO: Mathematics 2320
CR: COMP 2003
PR: COMP 2711 and COMP 2742

Rationale

As part of the revamping of the Department’s undergraduate program, this course is introduced as the course in fundamental hardware principles for Computer Science majors and minors.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Computer components (CPU, ALU, buses, memory, I/O devices) (5 hours)
- Integer arithmetic, bitwise operations (3 hours)
- State machines (4 hours)
- Instruction set architecture (5 hours)
- Boolean algebra and logic design (2 hours)
- Register transfer level (3 hours)
- Memory management (3 hours)
- Interruption and IO (1 hour)
- Multiprocessiong and alternative architectures (2 hours)

Method of Evaluation:

Assignments  30%
In-class exam  20%
Final exam    50%

Texts


Instructor(s)

W. Banzhaf, J. Shieh
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2003 Computer Architecture

Abbreviated Course Title  Computer Architecture

Calendar Change (new course)

2003 Computer Architecture introduces computer architecture at the digital logic implementation level, at the instruction set level, and at the level where programming languages are translated into the underlying machine instructions. The course provides an overview of computer architecture at these levels.
CR: COMP 3724  
LH: 3  
PR: COMP 1001, COMP 1002

Secondary Calendar Changes

3724 Computer Organization can be studied at the digital logic implementation level, the instruction set architecture level, and the translation of programming languages to the underlying machine instruction level. This course studies computer organization at these levels.
CO: Mathematics 2320  
CR: COMP 2003  
PR: COMP 2711 and COMP 2742

Rationale

As part of the revamping of the Department's undergraduate program, this course is introduced as the course in fundamental hardware principles for Computer Science majors and minors.

Consultations Sought From  

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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:**
Proposal
New Course – COMP 2004
Introduction to Operating Systems

Course Number and Title
2004 Introduction to Operating Systems

Abbreviated Course Title
Intro to Operating Systems

Calendar Description

2004 Introduction to Operating Systems introduces fundamental techniques for interfacing between computer software and hardware platforms, including the composition of and connections within a multilevel operating system. Students learn how to design substantial parts of an operating system.

Pre-requisite(s)
COMP 2002, COMP 2003

Credit Restrictions
CR with COMP 3725

Secondary Calendar Changes

3725 Computer Architecture and Operating Systems covers system design and the architectural implementations of these designs. The objective is to develop the basic concepts of processor design, memory management, operating systems, and I/O devices and their interactions.
CR: COMP 2004
PR: COMP 3724

Rationale

As part of the revamping of the Department’s undergraduate program, this course introduces necessary knowledge about foundation software systems.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Introduction, overview, and history (2 hours)
- Process management (5 hours)
- Process coordination (4 hours)
- Memory hierarchy and management (4 hours)
- File management (2 hours)
- Interface communication (3 hours)
- Protection (2 hours)
- Performance evaluation (3 hours)

Method of Evaluation:

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Texts


Instructor(s)

J. Shieh
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2004 Introduction to Operating Systems

Abbreviated Course Title  Intro to Operating Systems

Calendar Change (new course)

2004 Introduction to Operating Systems introduces fundamental techniques for interfacing between computer software and hardware platforms, including the composition of and connections within a multilevel operating system. Students learn how to design substantial parts of an operating system.
CR: COMP 3725
PR: COMP 2002, COMP 2003

Secondary Calendar Changes

3725 Computer Architecture and Operating Systems covers system design and the architectural implementations of these designs. The objective is to develop the basic concepts of processor design, memory management, operating systems, and I/O devices and their interactions.
CR: COMP 2004
PR: COMP 3724

Rationale

As part of the revamping of the Department's undergraduate program, this course introduces necessary knowledge about foundation software systems.

Consultations Sought From               Comments Received
Department of Biochemistry               Yes
Department of Biology                    Yes
Department of Chemistry                  Yes
Department of Earth Sciences             No
Department of Economics                  Yes
Department of Geography                  Yes
Department of Mathematics and Statistics Yes
Department of Ocean Sciences             No
Department of Physics and Oceanography   Yes
Department of Psychology                 Yes
Department of Computer Engineering       Yes
Faculty of Arts                          Yes
Faculty of Business Administration      No
Faculty of Education                     No
Faculty of Engineering and Applied Science Yes
Faculty of Medicine                      Yes
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**Chair:**

**Secretary:**

**Date:**
Proposal
New Course – COMP 2005
Software Engineering

Course Number and Title
2005 Software Engineering

Abbreviated Course Title
Software Engineering

Calendar Description

2005 Software Engineering introduces students to the different software process models, to project management and the software requirements engineering process, as well as to systems analysis and design as a problem-solving activity.

Pre-requisite(s)

COMP 2001

Credit Restrictions

CR with COMP 3716

Secondary Calendar Changes

3716 Software Methodology studies the development of software by gathering the requirements of the software program, analysing the requirements to create a development model, and creating the software and documents for the software product. This course studies techniques for all three software development activities.

CR: COMP 2005
PR: COMP 2711

Rationale

As part of the revamping of our undergraduate program, this course is introduced to provide the foundations for software engineering for computer science majors and minors.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Software development process definitions (3 hours): Software lifecycles, activities within software lifecycles, systems level considerations, i.e., the interaction of software with its intended environment, Introduction & evaluation of software process models, programming in the large vs. individual programming.
- Use cases and UML use case notation (2 hours)
- Applying use case for requirement capture (2 hours)
- Design patterns (8 hours)
- Software construction (2 hours)
- Software project management (2 hours)
- Software verification and validation (4 hours)
- Software evolution (1 hours)
- Software reliability (1 hours)
- Professional communication (1 hours)
- Professional ethics (1 hours)
- Defensive programming (1 hours)
- Optional: Software tools, cvs, ant, junit

Method of Evaluation:

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Texts


Instructor(s)

A. Fiech
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2005 Software Engineering

Abbreviated Course Title  Software Engineering

Calendar Change (new course)

2005 Software Engineering introduces students to the different software process models, to project management and the software requirements engineering process, as well as to systems analysis and design as a problem-solving activity.
CR: COMP 3716
PR: COMP 2001

Secondary Calendar Changes

3716 Software Methodology studies the development of software by gathering the requirements of the software program, analysing the requirements to create a development model, and creating the software and documents for the software product. This course studies techniques for all three software development activities.
CR: COMP 2005
PR: COMP 2711

Rationale

As part of the revamping of the Department’s undergraduate program, this course introduces necessary knowledge about foundation software systems.

Consultations Sought From  Comments Received
Department of Biochemistry  Yes
Department of Biology  Yes
Department of Chemistry  Yes
Department of Earth Sciences  No
Department of Economics  Yes
Department of Geography  Yes
Department of Mathematics and Statistics  Yes
Department of Ocean Sciences  No
Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Faculty of Arts  Yes
Faculty of Business Administration  No
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Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
New Course – COMP 2006
Computer Networking

Course Number and Title
2006 Computer Networking

Abbreviated Course Title
Computer Networking

Calendar Description
2006 Computer Networking introduces students to the use of programming interfaces for computer networking and to understand how the Internet works on the level of protocols. It focuses on the most commonly used of those protocols that are in the vast majority of modern computer systems.
CH: 1

Pre-requisite(s)
COMP 2001, COMP 2002, COMP 2004 (co-requisite)

Credit Restrictions
CR with COMP 3715

Secondary Calendar Changes
3715 Network Computing with WEB Applications studies how distributed applications (e.g., client/server Web applications) are constructed using the Internet. Topics covered include: the socket interface for network communication, client/server applications, browser scripting using Javascript, content generation for web applications (e.g., jsp, php), html/css documents, and the use of cryptography to handle security.
CR: 2006
PR: COMP 2711

Rationales
As part of the revamping of the Department's undergraduate program, this course introduces students to how to use programming interfaces for computer networking and to understand how the Internet works on the level of protocols.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Introduction and protocol stack layering (1 hour)
- Essential application-layer protocols (1 hour)
- Programming with socket (1 hour)
- Transport layer, reliable data transfer, and TCP/UDP (2 hours)
- Network layer, switching, routing, and IP (2 hours)
- Link and access technologies (2 hours)

Method of Evaluation:

Assignments: 30%
Project: 20%
Final exam: 50%

Texts


Instructor(s)

Y. Chen, J. Tang
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2006 Computer Networking

Abbreviated Course Title  Computer Networking

Calendar Change (new course)

2006 Computer Networking introduces students to the use of programming interfaces for computer networking and to understand how the Internet works on the level of protocols. It focuses on the most commonly used of those protocols that are in the vast majority of modern computer systems.

CH: 1
CO: COMP 2004
CR: COMP 3715
PR: COMP 2001, COMP 2001

Secondary Calendar Changes

3715 Network Computing with WEB Applications studies how distributed applications (e.g., client/server Web applications) are constructed using the Internet. Topics covered include: the socket interface for network communication, client/server applications, browser scripting using Javascript, content generation for web applications (e.g., jsp, php), html/css documents, and the use of cryptography to handle security.

CR: 2006
PR: COMP 2711

Rationale

As part of the revamping of the Department’s undergraduate program, this course introduces students to how to use programming interfaces for computer networking and to understand how the Internet works on the level of protocols.

Consultations Sought From

Department of Biochemistry
Department of Biology
Department of Chemistry
Department of Earth Sciences
Department of Economics
Department of Geography
Department of Mathematics and Statistics
Department of Ocean Sciences
Department of Physics and Oceanography
Department of Psychology
Department of Computer Engineering
Faculty of Arts

Comments Received

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**APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES**

**Chair:**

**Secretary:**

**Date:**
Proposal
New Course – COMP 2007
Introduction to Information Management

Course Number and Title
2007 Introduction to Information Management

Abbreviated Course Title
Intro to Info Management

Calendar Description
2007 Introduction to Information Management introduces the basic knowledge needed for managing large volumes of data. It covers topics in information management and database systems from storage and retrieval to security and privacy of data.
CH: 1

Pre-requisite(s)
COMP 2002, COMP 2004 (co-requisite)

Credit Restrictions
CR with COMP 3754

Secondary Calendar Changes

3754 Introduction to Information and Intelligent Systems introduces students to application areas that are away from usual number-based and text-based processing. Students will learn the basic concepts and become aware of the historical developments and social and ethical issues related to the application areas such as intelligent systems and information management. This exposure will help students to become knowledgeable about managing large volumes of data and dealing with problems that are well defined but whose algorithmic solutions are not feasible or problems that are fuzzily defined.
CR: COMP-2007
PR: COMP 2711 and COMP 2742

Rationale
As part of the revamping of the Department's undergraduate program, this course provides an introduction to the area of information management.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Basic information storage and retrieval, capture and representation (1 hour)
- Queries and links, analysis, indexing, quality issues such as scalability (2 hours)
- Database systems, core DBMS function design, architecture, use of a declarative query language (3 hours)
- Data modeling (2 hours)
- Security and privacy (1 hour)

Method of Evaluation:

- Assignments 20%
- 2 Projects 50%
- Final exam 30%

Texts


Instructor(s)

Y. Chen, J. Tang
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2007 Introduction to Information Management

Abbreviated Course Title  Intro to Info Management

Calendar Change (new course)

2007 Introduction to Information Management introduces the basic knowledge needed for managing large volumes of data. It covers topics in information management and database systems from storage and retrieval to security and privacy of data.

CH: 1
CO:  COMP 2004
CR:  COMP 3754
PR:  COMP 2002

Secondary Calendar Changes

3754 Introduction to Information and Intelligent Systems introduces students to application areas that are away from usual number-based and text-based processing. Students will learn the basic concepts and become aware of the historical developments and social and ethical issues related to the application areas such as intelligent systems and information management. This exposure will help students to become knowledgeable about managing large volumes of data and dealing with problems that are well defined but whose algorithmic solutions are not feasible or problems that are fuzzily defined.

CR:  COMP-2007
PR:  COMP 2711 and COMP 2742

Rationale

As part of the revamping of the Department’s undergraduate program, this course provides an introduction to the area of information management.

Consultations Sought From                                      Comments Received
Department of Biochemistry               Yes
Department of Biology                   Yes
Department of Chemistry                 Yes
Department of Earth Sciences            No
Department of Economics                  Yes
Department of Geography                 Yes
Department of Mathematics and Statistics Yes
Department of Ocean Sciences             No
Department of Physics and Oceanography   Yes
Department of Psychology                Yes
Department of Computer Engineering      Yes
Faculty of Arts                          Yes
Faculty of Business Administration      No
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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:
Proposal
New Course – COMP 2008
Social Issues and Professional Practice

Course Number and Title
2008 Social Issues and Professional Practice

Abbreviated Course Title
Social Issues & Prof Practice

Calendar Description
2008 Social Issues and Professional Practice covers ethical and social considerations of computing to provide students with the basis to address these issues by ethical and technical actions. Case studies are used to illustrate ethical and social issues of computing.
CH: 1

Pre-requisite(s)
COMP 1000

Credit Restrictions
CR with COMP 2760

Secondary Calendar Changes
2760 Encountering the Computer: Society and the Individual examines social, ethical, legal and cultural issues surrounding the use of computers in modern society. These broader social issues are followed by an examination of the use of social and individual psychology in user interface design. Students will be expected to demonstrate an understanding of these issues both directly (through verbal and written discourse) and practically, as applied to the creation of actual software artifacts.
CO: COMP 2710
CR: COMP-2008
PR: two 1000-level English courses, or equivalent

Rationale
Nowadays computers are everywhere and have dramatically transformed society; computer science students need to understand social implications of computer science, and have an ethical framework to make decisions regarding professional and social conduct.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Social implication of computing (both positive and negative) (1 hour)
- Fundamentals of ethical analysis (3 hours)
  - Ethical argumentation and theories
  - Analysis of case studies
- Professional ethics (2 hours)
  - Professional codes of ethics
  - Ethical responsibilities in software development
- Intellectual property (IP rights, copyright, plagiarism, software piracy, open source) (1 hour)
- Privacy and civil liberties (1 hour)
- Sustainability (1 hour)

Method of Evaluation:

- In-class participation 10%
- Assignments 30%
- Midterm exam 20%
- Final exam 40%

Texts


Instructor(s)

E. Brown, L. Pena-Castillo
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2008 Social Issues and Professional Practice

Abbreviated Course Title  Social Issues & Prof Practice

Calendar Change (new course)

2008 Social Issues and Professional Practice covers ethical and social considerations of computing to provide students with the basis to address these issues by ethical and technical actions. Case studies are used to illustrate ethical and social issues of computing.

CH: 1
CR: COMP 2760
PR: COMP 1000

Secondary Calendar Changes

2760 Encountering the Computer: Society and the Individual examines social, ethical, legal and cultural issues surrounding the use of computers in modern society. These broader social issues are followed by an examination of the use of social and individual psychology in user interface design. Students will be expected to demonstrate an understanding of these issues both directly (through verbal and written discourse) and practically, as applied to the creation of actual software artifacts.

CO: COMP 2710
CR: COMP-2008
PR: two 1000-level English courses, or equivalent

Rationale

Nowadays computers are everywhere and have dramatically transformed society; computer science students need to understand social implications of computer science, and have an ethical framework to make decisions regarding professional and social conduct.

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

### Name

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Chair:

Secretary:

Date:
Proposal
New Course – COMP 2100
Social Web Analysis

Course Number and Title
2100 Social Web Analysis

Abbreviated Course Title
Social Web Analysis

Calendar Description

2100 Social Web Analysis covers the analysis of social network structures, the flow of data within them and the methods to extract useful information about these networks, their participants and the content of their communication. Security and trust issues are also covered.

Pre-requisite(s)

COMP 1000

Credit Restrictions

None

Secondary Calendar Changes

None

Rationale

This course will introduce the underpinnings of social networks and how to measure their influence on our daily life. It is a foundation of understanding the Web qualitatively and quantitatively. The knowledge obtained in this course can also be applied to understanding many other types of networked structures.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Network Structures and Measures (6 hours)
- Network Visualization (4 hours)
- Understanding Structure through User Attributes and Behaviour (4 hours)
- Propagation in Networks (5 hours)
- Location Based Social Interaction (4 hours)
- Security and Privacy (2 hours)
- Trust, Social Issues and Other Topics (2 hours)

Method of Evaluation:

Assignments (6) 30%
Project 10%
Midterm exam 20%
Final exam 40%

Texts


Research papers.

Instructor(s)

W. Banzhaf, K. Vidyasankar, Y. Chen
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  2100 Social Web Analysis

Abbreviated Course Title  Social Web Analysis

Calendar Change (new course)

2100 Social Web Analysis covers the analysis of social network structures, the flow of data within them and the methods to extract useful information about these networks, their participants and the content of their communication. Security and trust issues are also covered.
PR: COMP 1000

Secondary Calendar Changes

None

Rationale

This course will introduce the underpinnings of social networks and how to measure their influence on our daily life. It is a foundation of understanding the Web qualitatively and quantitatively. The knowledge obtained in this course can also be applied to understanding many other types of networked structures.

Consultations Sought From

Department of Biochemistry  Yes
Department of Biology  Yes
Department of Chemistry  Yes
Department of Earth Sciences  No
Department of Economics  Yes
Department of Geography  Yes
Department of Mathematics and Statistics  Yes
Department of Ocean Sciences  No
Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Faculty of Arts  Yes
Faculty of Business Administration  No
Faculty of Education  No
Faculty of Engineering and Applied Science  Yes
Faculty of Medicine  Yes
School of Human Kinetics and Recreation  Yes
School of Music  Yes
School of Nursing  No
School of Pharmacy  Yes
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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:
Proposal
New Course – COMP 3100
Web Programming

Course Number and Title
3100 Web Programming

Abbreviated Course Title
Web Programming

Calendar Description

3100 Web Programming studies the Web information system from a programming perspective. It teaches how Web data are transferred across the network, how to design interactive browser contents, and how to provide dynamic pages from the server.

Pre-requisite(s)
COMP 2006

Credit Restrictions
COMP 3715

Secondary Calendar Changes

3715 Network Computing with WEB Applications studies how distributed applications (e.g., client/server Web applications) are constructed using the Internet. Topics covered include: the socket interface for network communication, client/server applications, browser scripting using Javascript, content generation for web applications (e.g., jsp, php), html/css documents, and the use of cryptography to handle security.
CR: COMP-3100
PR: COMP 2711

Rationale

This is an essential course for programming the Web in order for automated information processing with computers. The World Wide Web has become the most important platform for digital information exchange despite its short history. The generation of digital contents by machines and human users, and consumption of them in Web browsers entail a full spectrum of practical skills computer science.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Web information systems foundation (3 hours)
  - HTTP
  - Web servers
  - Browsers and other clients
- Client side scripting: dynamic HTML (9 hours)
  - HTML
  - CSS
  - DOM
  - JavaScript
  - Mash-ups
- Server side scripting [select from:] (9 hours)
  - CGI
  - Servlets
  - PHP
  - Node.js
- Data transfer with Ajax (2 hours)
  - Ajax
  - Json and XML
- Application frameworks (3 hours)

Method of Evaluation:

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Texts


Instructor(s)

R. Byrne, A. Fiech, Y. Chen
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3100 Web Programming

Abbreviated Course Title  Web Programming

Calendar Change (new course)

3100 Web Programming studies the Web information system from a programming perspective. It teaches how Web data are transferred across the network, how to design interactive browser contents, and how to provide dynamic pages from the server.
CR: COMP 3715
PR: COMP 2006

Secondary Calendar Changes

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PR: COMP 2711

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## Library Report Received

- Yes

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**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:**
Proposal
New Course – COMP 4100
Web Services

Course Number and Title
4100 Web Services

Abbreviated Course Title
Web Services

Calendar Description

4100 Web Services covers the conceptual and technological aspects of designing, publishing, discovering and invoking Web services. Topics include BPMN, WSDL, UDDI, SOAP, ontology, Web services composition, and cloud computing.

Pre-requisite(s)
COMP 2100 and COMP 3100

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale

This course will cover the principle of Services Computing, Service Oriented Architecture, and creation and management of Web services. This will be a good introduction to Cloud Computing.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- The Principle of Services and Services Computing (2 hours)
- Service-Oriented Architecture (3 hours)
- Web Services Modeling (2 hours)
- Web Services Publishing and Discovery (2 hours)
- SOA and Web Services Standards (2 hours)
- Service Coordination protocols (3 hours)
• Service Composition (5 hours)
• Software as Services and Services as Software (2 hours)
• Ontology (2 hours)
• Introduction to Cloud Computing (3 hours)
• Security and Privacy (2 hours)

Method of Evaluation:

Assignments (4-6) 40%
Midterm 20%
Project 40%

Texts


Several research papers.

Instructor(s)

K. Vidyasankar
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4100 Web Services

Abbreviated Course Title  Web Services

Calendar Change (course)

4100 Web Services covers the conceptual and technological aspects of designing, publishing, discovering and invoking Web services. Topics include BPMN, WSDL, UDDI, SOAP, ontology, Web services composition, and cloud computing.
PR: COMP 2100 and COMP 3100

Secondary Calendar Changes

None

Rationale

This course will cover the principle of Services Computing, Service Oriented Architecture, and creation and management of Web services. This will be a good introduction to Cloud Computing.

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Library Report Received: Yes

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Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:
Secretary:
Date:
Proposal
New Course – COMP 4101
Search Engines

Course Number and Title
4101 Search Engines

Abbreviated Course Title
Search Engines

Calendar Description

4101 Search Engines provides a comprehensive introduction to the theory and practice of building a Web search engine. It is intended for Computer Science majors wishing to obtain technical background in the search engine technology.

Pre-requisite(s)

COMP 2005, COMP 2007, COMP 2100, and COMP 3100

Credit Restrictions

None

Secondary Calendar Changes

None

Rationale

This course provides a comprehensive introduction to the theory and practice of building a Web search engine, which is the next most exciting innovation after the Web itself.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Understanding advanced search (3 hours)
- Search engine architecture (4 hours)
- Crawling (3 hours)
  - design and performance factors of a crawler, such as speed, politeness, duplicate detection, continuous crawling for frequently changing contents, etc.
  - text representation
• Indexing, web graphs, and link analysis (7 hours)
  o page popularity scoring, e.g. PageRank
  o working with file formats and language/media encoding
• Query processing (3 hours)
• Result presentation (3 hours)
  o e.g. visualization
• Advanced topics (5 hours)
  o media search
  o targeted advertising
  o recommendation

Method of Evaluation:

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Texts


Instructor(s)

R. Byrne, Y. Chen
### SUMMARY PAGE FOR SENATE

**Approval Form**

**Course Number and Title**  4101 Search Engines

**Abbreviated Course Title**  Search Engines

**Calendar Change (new course)**

**4101 Search Engines** provides a comprehensive introduction to the theory and practice of building a Web search engine. It is intended for Computer Science majors wishing to obtain technical background in the search engine technology.  
PR: COMP 2005, COMP 2007, COMP 2100, COMP 3100

**Secondary Calendar Changes**

None

**Rationale**

This course provides a comprehensive introduction to the theory and practice of building a Web search engine, which is the next most exciting innovation after the Web itself.

**Consultations Sought From**

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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:
Proposal
New Course – COMP 3200
Algorithmic Techniques for Smart Systems

Course Number and Title
3200 Algorithmic Techniques for Smart Systems

Abbreviated Course Title
Alg. Tech for Smart Systems

Calendar Description
3200 Algorithmic Techniques for Smart Systems covers basic algorithmic techniques and data structures that are used to embed basic intelligent behaviors, such as problem solving, reasoning and learning in software systems and agents.

Pre-requisite(s)
COMP 2001 and COMP 2002, and STAT 1510 or STAT 2550

Credit Restrictions
COMP 4753

Secondary Calendar Changes
4753 Artificial Intelligence has selected topics from AI programming languages; heuristic searching; problem solving; game-playing; knowledge representations; knowledge-based systems; reasoning in uncertainty situations; planning; natural language understanding; pattern recognition; computer vision; and machine learning.
CR: COMP3200
PR: COMP 3719 and 3754

Rationale
Smart systems rely on algorithms handling uncertainty, learning from the environment and reasoning. This course will introduce the basics of these algorithms for intelligent behavior.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Background: AI and Agents (3 hours)
  - AI definition and areas
  - Agent definition, structure and types
- Search (10 hours)
  - Exhaustive search
  - Heuristic search
  - Local search (e.g., hill-climbing)
  - Constraint satisfaction
  - Adversarial search
  - Search under uncertainty
- Logical Reasoning (9 hours)
  - Knowledge-based systems
  - Reasoning
  - Planning
  - Fuzzy logic
- Probabilistic Reasoning (8 hours)
  - Quantifying uncertainty
  - Bayesian networks
  - Dynamic Bayesian networks

Method of Evaluation:

- Assignments (5) 45%
- Tests (2) 30%
- Final exam 25%

Texts


Instructor(s)

T. Wareham, L. Pena-Castillo
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3200 Algorithmic Techniques for Smart Systems

Abbreviated Course Title  Alg Tech for Smart Systems

Calendar Change (new course)

3200 Algorithmic Techniques for Smart Systems covers basic algorithmic techniques and data structures that are used to embed basic intelligent behaviors, such as problem solving, reasoning and learning in software systems and agents.
CR: COMP 4753
PR: COMP 2001 and COMP 2002, and STAT-1510 or STAT-2550

Secondary Calendar Changes

4753 Artificial Intelligence has selected topics from AI programming languages; heuristic searching; problem solving; game-playing; knowledge representations; knowledge-based systems; reasoning in uncertainty situations; planning; natural language understanding; pattern recognition; computer vision; and machine learning.
CR: COMP 3200
PR: COMP 3719 and 3754

Rationale

Smart systems rely on algorithms handling uncertainty, learning from the environment and reasoning. This course will introduce the basics of these algorithms for intelligent behavior.

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### Consultations Sought From

- School of Music
- School of Nursing
- School of Pharmacy
- School of Social Work
- Grenfell Campus
- Marine Institute

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**APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES**

Chair:

Secretary:

Date:
Proposal
New Course – COMP 3201
Introduction to Nature-Inspired Computing

Course Number and Title

3201 Introduction to Nature-Inspired Computing

Abbreviated Course Title

Nature-Inspired Computing

Calendar Description

3201 Introduction to Nature-Inspired Computing is an introductory course which gives an overview of nature-inspired computing methods as they have been introduced over the past decades. Students will develop a firm understanding of the motivations, approaches and achievements of these methods.

Pre-requisite(s)

COMP 2002

Credit Restrictions

COMP 4752

Secondary Calendar Changes

4752 Introduction to Computational Intelligence provides an introduction to four of the fundamental computational intelligence methods: artificial neural networks, evolutionary computation, swarm intelligence and fuzzy systems. The integration of these techniques for problem solving will also be introduced.
CR: COMP 3201
PR: COMP 3719 and COMP 3754

Rationale

Nature-inspired methods of computing have been proposed since the 1950s. They have now gained prominence due to the wide availability of computational power that allows them to be fruitfully applied in our uncertain and complex world where traditional methods of exact computation have reached their limits.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Introduction to nature-inspired computing (1 hour)
  o History
  o Major tasks
  o Natural paradigms

- Cellular automata (1 hour)
  o Dynamical systems simulation
  o Self-replication

- Neural Networks (8 hours)
  o Background and history of artificial neural networks (ANNs)
  o Learning algorithms based on ANNs
  o Optimization with ANNs
  o Selected applications of ANNs

- Evolutionary Computing (8 hours)
  o Background and history of evolutionary computation (EC)
  o Different branches of EC: GA, GP, EA, EP, DE
  o Selected applications of EC methods

- Swarm Intelligence (8 hours)
  o Background and history of collective and swarm intelligence
  o Examples of swarm intelligence in biology
  o Mechanisms of swarm behavior (e.g., recruitment, quorum sensing)
  o Selected application of swarm methods

- Artificial Life (2 hours)
  o Background and history of Artificial Life research
  o Self-organizing systems
  o Artificial Chemistry

- Complex networks and emergence (2 hours)
  o Background and history of network science
  o Random networks, small-world networks and networks in nature
  o Artificial networks and their features
  o Selected phenomena in network science

Method of Evaluation:

Assignments (5) 30%
Midterm Exam 25%
In-class participation 10%
Final Exam 35%

Texts

Instructor(s)

A. Vardy, W. Banzhaf
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3201 Introduction to Nature-inspired Computing

Abbreviated Course Title  Nature-inspired Computing

Calendar Change (new course)

3201 Introduction to Nature-Inspired Computing is an introductory course which gives an overview of nature-inspired computing methods as they have been introduced over the past decades. Students will develop a firm understanding of the motivations, approaches and achievements of these methods.
CR: COMP 4752
PR: COMP 2002

Secondary Calendar Changes

4752 Introduction to Computational Intelligence provides an introduction to four of the fundamental computational intelligence methods: artificial neural networks, evolutionary computation, swarm intelligence and fuzzy systems. The integration of these techniques for problem solving will also be introduced.
CR: COMP 3201
PR: COMP 3719 and COMP 3754

Rationale

Smart systems rely on algorithms handling uncertainty, learning from the environment and reasoning. This course will introduce the basics of these algorithms for intelligent behavior.

Consultations Sought From        Comments Received
Department of Biochemistry          Yes
Department of Biology               Yes
Department of Chemistry             Yes
Department of Earth Sciences        No
Department of Economics             Yes
Department of Geography              Yes
Department of Mathematics and Statistics  Yes
Department of Ocean Sciences        No
Department of Physics and Oceanography Yes
Department of Psychology            Yes
Department of Computer Engineering  Yes
Faculty of Arts                      Yes
Faculty of Business Administration  No
Faculty of Education                 No
Faculty of Engineering and Applied Science  Yes
Faculty of Medicine                  Yes
Consultations Sought From

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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:
Proposal
New Course – COMP 3202
Introduction to Machine Learning

Course Number and Title
3202 Introduction to Machine Learning

Abbreviated Course Title
Intro to Machine Learning

Calendar Description

3202 Introduction to Machine Learning introduces concepts and algorithms in machine learning for regression and classification tasks. The course gives the student the basic ideas and intuition behind model selection and evaluation, and selected machine learning methods such as random forests, support vector machines, and hidden Markov models.

Pre-requisite(s)
COMP 3200; or COMP 2001 and COMP 2002 and STAT 2550

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale
Machine learning has become one of the primary means to achieve artificial intelligence with computers. With the ubiquity of data, statistical methods of learning by machines have become widespread. This course will introduce machine learning and its applications.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to Machine Learning (3 hours)
  - Definition and examples of machine learning tasks, e.g., classification
  - Types of learning: supervised, unsupervised and reinforcement
- Linear methods for regression and classification (5 hours)
- Model Assessment and Selection (3 hours)
  - Bias, variance, overfitting, and model complexity
- Measuring classifier performance (3 hours)
  - Cross-validation
  - Precision / Recall
  - Area under ROC curve
- Supervised learning (6 hours)
  - Nearest-neighbor
  - Decision Trees
- Combining classifiers (6 hours)
  - Boosting
  - Random Forests
- Other approaches such as support vector machines, hidden Markov models, etc (4 hours)

**Method of Evaluation:**

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<th>Assignments (5)</th>
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<td>Midterm exam</td>
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<td>In-class participation</td>
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<td>Final exam</td>
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**Texts**


**Instructor(s)**

L. Pena-Castillo, T. Hu
SUMMARY PAGE FOR SENATE
Approval Form

Course Number and Title  3202 Introduction to Machine Learning

Abbreviated Course Title  Intro to Machine Learning

Calendar Change (new course)

3202 Introduction to Machine Learning introduces concepts and algorithms in machine learning for regression and classification tasks. The course gives the student the basic ideas and intuition behind model selection and evaluation, and selected machine learning methods such as random forests, support vector machines, and hidden Markov models.
PR:  COMP 3200; or COMP 2001 and COMP 2002 and STAT-2550

Secondary Calendar Changes

None

Rationale

Machine learning has become one of the primary means to achieve artificial intelligence with computers. With the ubiquity of data, statistical methods of learning by machines have become widespread. This course will introduce machine learning and its applications.

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
New Course – COMP 2300
Introduction to Multimedia Programming

Course Number and Title
2300 Introduction to Multimedia Programming

Abbreviated Course Title
Intro Multimedia Programming

Calendar Description

2300 Introduction to Multimedia Programming is an introduction to programming and computer science with an emphasis on the development of multimedia applications. The course introduces the fundamental principles of programming, including object-oriented and event-driven programming. Students will develop an understanding of how to use and create classes and methods and combine them with multimedia libraries to produce animations, handle input from keyboard and mouse, and import sounds and videos to produce multimedia applications which can be directly deployed on the Internet.

Pre-requisite(s)
COMP 1000

Credit Restrictions
CR with COMP 1550

In addition to three weekly one-hour lectures there is a structured laboratory as scheduled in the university timetable. Attendance at these laboratory sessions is compulsory.

Secondary Calendar Changes

1550 Introduction to Multimedia Application Development is an introduction to programming and computer science with an emphasis on the development of multimedia applications. The course introduces the fundamental principles of programming, including object-oriented and event-driven programming, how to use and create classes and methods and combine them with multimedia libraries to produce animations, handle input from keyboard and mouse, and import sounds and videos to produce multimedia applications which can be directly deployed on the Internet.
CR: COMP 2300
LH: 3
Rationale

Multimedia applications are present in cartoons, electronic books for young audiences, videos, games, web advertisement and interactive applications. Computer science students who are interested in visual computing and graphic interfaces should have a good idea of how most multimedia content is digitally represented and implemented, and this course is meant to provide it.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction: definitions of multimedia, digital data fundamentals, multimedia authoring overview
- Flash and ActionScript: overview of Flash, ActionScript syntax overview
- Using objects: getting familiar with variables, using objects, calling methods, using properties and events
- Datatypes: primitive datatypes, expressions, strings, string manipulation
- Conditionals: if statement, boolean expressions, switch-case statements, nesting conditionals
- Loops: while, do and for loops
- Arrays and Functions: using arrays, defining functions
- Object References: understanding objects vs. object references, calling objects from the library, defining the document class
- Implementing Object Classes: implementing methods, understanding constructors, instance fields, and local variables
- Events and Event Handling: ActionScript event basics, assessing objects through event handlers, event listeners
- Style and HCI Guidelines for Multimedia: fonts, color, user feedback, splash screens, loaders and publishing

Method of Evaluation:
In-class evaluations 15%
Laboratory Work 25%
Midterm exam 30%
Final exam 30%
Texts


Instructor(s)

E. Brown, R. Gupta, O. Meruvia-Pastor
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 2300 Introduction to Multimedia Programming

Abbreviated Course Title  Intro Multimedia Programming

Calendar Change (new course)

2300 Introduction to Multimedia Programming is an introduction to programming and computer science with an emphasis on the development of multimedia applications. The course introduces the fundamental principles of programming, including object-oriented and event-driven programming. Students will develop an understanding of how to use and create classes and methods and combine them with multimedia libraries to produce animations, handle input from keyboard and mouse, and import sounds and videos to produce multimedia applications which can be directly deployed on the Internet.
CR: COMP 1550
LH: 3
PR: COMP 1000

Secondary Calendar Changes

1550 Introduction to Multimedia Application Development is an introduction to programming and computer science with an emphasis on the development of multimedia applications. The course introduces the fundamental principles of programming, including object-oriented and event-driven programming, how to use and create classes and methods and combine them with multimedia libraries to produce animations, handle input from keyboard and mouse, and import sounds and videos to produce multimedia applications which can be directly deployed on the Internet.
CR: COMP 2300
LH: 3

Rationale

Multimedia applications are present in cartoons, electronic books for young audiences, videos, games, web advertisement and interactive applications. Computer science students who are interested in visual computing and graphic interfaces should have a good idea of how most multimedia content is digitally represented and implemented, and this course is meant to provide it.

Consultations Sought From

| Department of Biochemistry  | Yes |
| Department of Biology    | Yes |
| Department of Chemistry  | Yes |
| Department of Earth Sciences | No |
| Department of Economics  | Yes |
| Department of Geography  | Yes |
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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:**
Proposal
New Course – COMP 3300
Interactive Technologies

Course Number and Title
3300 Interactive Technologies

Abbreviated Course Title
Interactive Technologies

Calendar Description
3300 Interactive Technologies provides exposure to traditional desktop, mobile and games contexts with respect to interaction design. Practical application of interaction design principles in this course involves introductory programming in the contexts of desktop interfaces, mobile devices and video/computer gaming. These different contexts for interaction design are compared and contrasted.

Pre-requisite(s)
COMP 2001

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale
Supports the Visual Computing and Games Stream, and exposes students to skills and tools relevant to end user application development.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to interaction design
  - Interaction Design goals, guidelines and principles (3 hours)
  - Cognate areas of impact: cognitive psychology, graphic design, industrial design, ergonomics, human-computer interaction, media studies, user-interface design (3 hours)
- Design methodology (2 hours)
- Prototyping tools (1 hour)

- Desktop Context
  - Desktop design constraints and objectives (1 hour)
  - Introduction to a Desktop GUI builders (WindowBuilder/Eclipse) (3 hours)
  - GUI component frameworks and systems (3 hours)

- Mobile Context
  - Mobile device design constraints and objectives (1 hour)
  - Introduction to a Mobile App development suite (Android Studio) (3 hours)
  - Mobile App programming (6 hours)

- Games Context
  - Games design space and objectives (1 hour)
  - Introduction to a game design suite (Unity3D) (3 hours)
    - Games programming (6 hours)

Method of Evaluation:

Original implementation assignments (3)  60%
Tests and Design Problems (3)  40%

Texts


Instructor(s)

E. Brown, M. Gong, O. Meruvia-Pastor
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  COMP 3300 Interactive Technologies

Abbreviated Course Title  Interactive Technologies

Calendar Change (new course)

3300 Interactive Technologies provides exposure to traditional desktop, mobile and games contexts with respect to interaction design. Practical application of interaction design principles in this course involves introductory programming in the contexts of desktop interfaces, mobile devices and video/computer gaming. These different contexts for interaction design are compared and contrasted.
PR: COMP 2001

Secondary Calendar Changes

None

Rationale

Supports the Visual Computing and Games Stream, and exposes students to skills and tools relevant to end user application development.

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Consultations Sought From

Grenfell Campus
Marine Institute

Library Report Received

Comments Received

No
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:
Proposal
New Course – COMP 3301
Visual Computing and Applications

Course Number and Title
3301 Visual Computing and Applications

Abbreviated Course Title
Visual Comput and App

Calendar Description
3301 Visual Computing and Applications provides students with the fundamental knowledge and skills in the fields of computer vision, computer graphics, and visualization. Visual perception is responsible for most of our impressions about the world around us. This course introduces how computers are used to both mimic the human visual system (e.g., recognize shapes) and to create visual content (e.g. synthesize images). Related techniques on image synthesis, processing and analysis are discussed under a unified framework. How visual computing principles were used to create visual effects in movies and commercials is also examined.

Pre-requisite(s)
COMP 2002

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale
This course is introduced to provide students with the fundamental knowledge and skills in the fields of computer vision, computer graphics, and visualization.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction (4 hours)
  human perception; intensity & color; display hardware
• Image basics (4 hours)
  imaging capture; image representation & sampling; 2D transformations; image warping
• Raster graphics (4 hours)
  line & circle drawing; line clipping; polygon filling
• Image processing (8 hours)
  per-pixel operation; histogram; filtering; Fourier transformation
• Image analysis (6 hours)
  edge detection; Hough transform; thresholding; segmentation; template matching
• Image synthesis (6 hours)
  alpha compositing; matting; halftoning; feature-based warping; morphing

Method of Evaluation:

Assignments (4)  40 %
Midterm  20 %
Final exam  40%

Texts


http://people.csail.mit.edu/hasinoff/320/

http://www.cs.toronto.edu/~kyros/courses/320/

http://www.ics.uci.edu/~majumder/VC/CS211.htm

Instructor(s)

M. Gong, O. Meruvia-Pastor, A. Vardy
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3301 Visual Computing and Applications

Abbreviated Course Title  Visual Comput and App

Calendar Change (course)

3301 Visual Computing and Applications provides students with the fundamental knowledge and skills in the fields of computer vision, computer graphics, and visualization. Visual perception is responsible for most of our impressions about the world around us. This course introduces how computers are used to both mimic the human visual system (e.g., recognize shapes) and to create visual content (e.g. synthesize images). Related techniques on image synthesis, processing and analysis are discussed under a unified framework. How visual computing principles were used to create visual effects in movies and commercials is also examined.
PR:  COMP 2002

Secondary Calendar Changes

None

Rationale

This course is introduced to provide students with the fundamental knowledge and skills in the fields of computer vision, computer graphics, and visualization.

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Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
New Course – COMP 4300
Introduction to Game Programming

Course Number and Title
4300 Introduction to Game Programming

Abbreviated Course Title
Intro to Game Programming

Calendar Description

4300 Introduction to Game Programming is an introductory course for students interested in learning the fundamentals of game programming. Topics include vector math for games, fundamentals of rendering, introduction to animation and artificial intelligence, collision detection, game physics and user-interfaces. Students are required to write a fully functional game during the course.

Pre-requisite(s)
COMP 2001

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale

Game programming courses offer a good training ground for some important concepts of computer science, including memory and system resource management, computer graphics, multimedia, artificial intelligence and machine learning. In addition, game programming has always been a popular topic for some computer science students who are interested in game playing and participating in the gaming industry, which is a very important industry in Canada.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Course Introduction, Game Programming Basics (3 hours)
- Vector Math and Games (3 hours)
- Rendering (3 hours)
- Quaternions and Input/Sound (3 hours)
- Artificial Intelligence (3 hours)
- Collision Detection and Game Physics (3 hours)
- Camera Systems (3 hours)
- User Interface Systems (3 hours)
- Event-Based Systems and Scripting Languages (3 hours)
- Animation and Assorted Gameplay (3 hours)
- Basic Networking (3 hours)

Method of Evaluation:

- Laboratory work (10) 15%
- In-class evaluations (every lecture) 15%
- Midterm Examinations (2) 30%
- Final Exam 20%
- Final Game Project 20%

Texts


Instructor(s)

E. Brown, O. Meruvia-Pastor
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4300 Introduction to Game Programming

Abbreviated Course Title  Intro to Game Programming

Calendar Change (new course)

4300 Introduction to Game Programming is an introductory course for students interested in learning the fundamentals of game programming. Topics include vector math for games, fundamentals of rendering, introduction to animation and artificial intelligence, collision detection, game physics and user-interfaces. Students are required to write a fully functional game during the course.
PR:  COMP 2001

Secondary Calendar Changes

None

Rationale

Game programming courses offer a good training ground for some important concepts of computer science, including memory and system resource management, computer graphics, multimedia, artificial intelligence and machine learning. In addition, game programming has always been a popular topic for some computer science students who are interested in gaming and participating in the gaming industry, which is a very important industry in Canada.

Consultations Sought From

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Library Report Received

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:
Proposal
New Course – COMP 4301/ENGI 8814
Computer Vision

Course Number and Title
4301 Computer Vision

Abbreviated Course Title
Computer Vision

Calendar Description

4301 Computer Vision studies how to develop methods that enable a machine to “understand” or analyze images. This course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.

Pre-requisite(s)
COMP 3301 or ENGI 7854

Credit Restrictions
ENGI 8814

Secondary Calendar Changes
None

Rationale

This course teaches students the fundamental problems in computer vision and major approaches that address them.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Unit 1: Grouping and fitting (4 hours)
  K-means, Hough transform, RANSAC
- Unit 2: Feature detection and matching (4 hours)
  Interest point detection (corners/blobs), SIFT, HOG
• Unit 3: Geometric and multi-view vision (4 hours)
  Geometric transformation, Camera model and camera calibration, Image stitching
• Unit 4: Feature based alignment (4 hours)
  2D and 3D feature based alignment, Pose estimation
• Unit 5: Structure from X (4 hours)
  Epipolar geometry, Stereo vision, Essential and fundamental matrix, Structure from motion
• Unit 6: Segmentation and tracking (4 hours)
  Foreground segmentation in video, Optical flow, Tracking
• Unit 7: Recognition (4 hours)
  Introduction to recognition, Object detect and recognition (face detection, pedestrian recognition), General category recognition (bags of features)

Method of Evaluation:

  Assignment(s) (2)  20 %
  Midterm            20 %
  Project            30 %
  Final exam         30 %

Texts


Selected state-of-the-art Journal publications

Instructor(s)

M. Shehata, A. Vardy, M. Gong
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4301 Computer Vision

Abbreviated Course Title  Computer Vision

Calendar Change (new course)

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CR:  ENGI 8814
PR:  COMP 3301 or ENGI 7854

Secondary Calendar Changes

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Rationale

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:
Secretary:
Date:
Proposal
New Course – COMP 4302
3D Computer Graphics

Course Number and Title
4302 3D Computer Graphics

Abbreviated Course Title
3D Computer Graphics

Calendar Description

4302 3D Computer Graphics introduces the students to the state-of-the-art concepts and developments in the field of 3D computer graphics. The underlying algorithms, as well as the basic techniques to develop interactive 3D graphics systems including games and simulators, are presented. Topics of the course include 3D geometrical transformations, 3D projections, 3D modeling and rendering, 3D graphics languages and systems. Advanced photorealistic rendering and image-based rendering techniques may also be covered.

Pre-requisite(s)

COMP 3301

Credit Restrictions

COMP 4751

Secondary Calendar Changes

4751 Computer Graphics examines display devices, display processors, display file compilers, display transformations, structured display files, graphical input devices, perspective, hidden line elimination, languages and graphics systems.

COMP-3301
LH: 3
PR: COMP 3719 and Mathematics 2050

Rationale

The newly introduced Visual Computing course covers some basic topics in 2D raster graphics and image handling. By having Visual Computing as a pre-requisite, 3D Computer Graphics will focus on the development of 3D graphics applications and on the coverage of topics that are specific to 3D graphics.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to 3D Graphics (1 hour)
- Graphics Pipelines (1 hour)
  fixed & programmable pipelines
- Graphic APIs (1-4 hours)
- Processing input for 3D graphics systems (1 hour)
- Geometrical Transformation (4 hours)
  Math Preliminary, 3D Transformations, 3D Projections, 3D Viewing
- 3D Modeling (3-6 hours)
  Geometric Primitives, Defining 3D Geometry, Parametric Curve, Parametric Surface,
  Solid Modeling, Point Set Surface
- Shading (3 hours)
- 3D Rendering (3-6 hours)
  Visibility Determination, Rasterization and Rendering Buffers, Illumination Model,
  Polygon Shading, Texture Mapping, Anti-Aliasing
- Photorealistic Rendering (1-4 hours)
  Global Illumination, Ray Casting, Ray Tracing, Radiosity Rendering, Photon Mapping

Method of Evaluation:

- Midterm exam 25%
- Assignments (3-4) 45%
- Final exam 30%

Texts


Selected state-of-the-art Journal publications

Instructor(s)

M. Gong, O. Meruvia-Pastor
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4302 3D Computer Graphics

Abbreviated Course Title 3D Computer Graphics

Calendar Change (new course)

4302 3D Computer Graphics introduces the students to the state-of-the-art concepts and developments in the field of 3D computer graphics. The underlying algorithms, as well as the basic techniques to develop interactive 3D graphics systems including games and simulators, are presented. Topics of the course include 3D geometrical transformations, 3D projections, 3D modeling and rendering, 3D graphics languages and systems. Advanced photorealistic rendering and image-based rendering techniques may also be covered.
CR: COMP 4751
PR: COMP 3301

Secondary Calendar Changes

4751 Computer Graphics examines display devices, display processors, display file compilers, display transformations, structured display files, graphical input devices, perspective, hidden line elimination, languages and graphics systems.
COMP-3301
LH: 3
PR: COMP 3719 and Mathematics 2050

Rationale

The newly introduced Visual Computing course covers some basic topics in 2D raster graphics and image handling. By having Visual Computing as a pre-requisite, 3D Computer Graphics will focus on the development of 3D graphics applications and on the coverage of topics that are specific to 3D graphics.

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Department of Biology
Department of Chemistry
Department of Earth Sciences
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Department of Mathematics and Statistics
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Department of Physics and Oceanography
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Department of Computer Engineering

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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:
Proposal
New Course – COMP 4303
Artificial Intelligence in Computer Games

Course Number and Title
4303 Artificial Intelligence in Computer Games

Abbreviated Course Title
AI in Computer Games

Calendar Description

4303 Artificial Intelligence in Computer Games provides an introduction to specific state-of-the-art algorithmic techniques and data structures that are used to efficiently implement human-like abilities (e.g., awareness, memory, rational decision-making (under uncertainty), movement, co-operation in groups) in computer game agents.

Pre-requisite(s)
COMP 3200

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale

As the programming of computer games becomes more sophisticated, Artificial Intelligence methods are increasingly employed to produce appealing game experiences. This course introduces current techniques of the artificial intelligence for games.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Background: Computer Games (3 hours) [Chapter 1]
- Basic Decision-Making (12 hours) [Part II]
  (Scripting; Finite-state Automata; Rule-based systems; Utility systems)
- Movement (6 hours) [Part III]
- Advanced Decision-Making (6 hours) [Part IV]
  (strategy and tactics; group activities)
- Awareness and Memory (6 hours) [Part V]
- Learning from Experience (3 hours)

The listed chapters and parts refer to the textbook below. As this is an edited volume, only certain chapters in each part will be covered. The above will where appropriate be augmented with readings covering relevant material not treated in the textbook, e.g., group activities, neural network agent architectures, reinforcement learning.

**Method of Evaluation:**

- Assignments (4) 40 %
- Tests (2) 30 %
- Course project 30%

**Texts**


**Instructor(s)**

T. Wareham
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4303 Artificial Intelligence in Computer Games

Abbreviated Course Title  AI in Computer Games

Calendar Change (new course)

4303 Artificial Intelligence in Computer Games provides an introduction to specific state-of-the-art algorithmic techniques and data structures that are used to efficiently implement human-like abilities (e.g., awareness, memory, rational decision-making (under uncertainty), movement, co-operation in groups) in computer game agents.

PR: COMP 3200

Secondary Calendar Changes

None

Rationale

As the programming of computer games becomes more sophisticated, Artificial Intelligence methods are increasingly employed to produce appealing game experiences. This course introduces current techniques of the artificial intelligence for games.

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Name:

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
New Course – COMP 4304
Data Visualization

Course Number and Title
4304 Data Visualization

Abbreviated Course Title
Data Visualization

Calendar Description

4304 Data Visualization covers interactive representation of data using a modern programming library. Topics include an introduction to the software platform and the principles for data selection, analysis, design and creation of dynamic visualizations. Students produce interactive web-based objects, addressing problems in the presentation and understanding of large data collections. The techniques discussed are applicable to different sources and types of data.

Pre-requisite(s)
COMP 2001, COMP 2002

Credit Restrictions
COMP 4767

Secondary Calendar Changes

4767 Information Visualization and Applications focuses on the design and implementation of interactive visualization techniques for the analysis, comprehension, exploration, and explanation of large collections of abstract information. Topics to be covered include principles of visual perception, information data types, visual encodings of data, representation of relationships, interaction methods, understanding user goals and tasks, and evaluation techniques. Case studies of accepted techniques and the current state-of-the-art in information visualization will be presented.
CR: COMP-4304
PR: COMP 2760 and COMP 3719

Rationale

Data visualization is a developing area with cross-disciplinary application, drawing on different applied areas in computer science. The material is pertinent to Computer Science generally, to visual and data related program streams and to data analysis in applied disciplines.
Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to visual design
  - Visual representations of data (3 hours)
  - Human visual perception (2 hours)
  - Visual encoding and representation (4 hours)
  - Evaluation techniques (2 hours)
- Software techniques and tools
  - Introduction to a data visualization toolkit (D3.js) (6 hours)
  - Interaction techniques and extensions (3 hours)
- Big Data Visualization
  - Types of data / multidimensional data (2 hours)
  - Finding relationships in data (3 hours)
  - Data analysis objectives (1 hour)
  - Data selection and filtering (2 hours)
  - Interaction with data sets (4 hours)

Method of Evaluation:

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Texts
Scott Marray, *Interactive Data Visualization for the Web*, O'Reilly, 2013

Instructor(s)
E. Brown, M. Gong
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4304 Data Visualization

Abbreviated Course Title Data Visualization

Calendar Change (new course)

4304 Data Visualization covers interactive representation of data using a modern programming library. Topics include an introduction to the software platform and the principles for data selection, analysis, design and creation of dynamic visualizations. Students produce interactive web-based objects, addressing problems in the presentation and understanding of large data collections. The techniques discussed are applicable to different sources and types of data.
CR: COMP 4767
PR: COMP 2001, COMP 2002

Secondary Calendar Changes

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PR: COMP 2760 and COMP 3719

Rationale

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Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal

New Course – COMP 3400
Introduction to Databases

Course Number and Title

3400 Introduction to Databases

Abbreviated Course Title

Intro to Databases

Calendar Description

3400 Introduction to Databases covers database processing, database design and database management systems. Advances in database technology as well as applications of database systems' concepts in non-database applications are covered. Students have an opportunity for hands-on experience with database design.

Pre-requisite(s)

COMP 2007

Credit Restrictions

COMP 4754

Secondary Calendar Changes

4754 Database Systems introduces students to database processing, database management systems and database design considerations. It will cover the theory and methodologies essential for the relational database design, implementation, manipulation, optimization and management.

CR: COMP 3400

PR: COMP 3725 and 3754

Rationale

This course will introduce methods for collecting, storing and processing large amounts of related data.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Introduction to databases and database management systems (2 hours)
- Entity relationship model (2 hours)
- Requirement analysis (1 hour)
- Conceptual modelling (2 hours)
- Implementation design (2 hours)
- Physical design and storage structures (2 hours)
- Dependencies, normal forms and other database design considerations (3 hours)
- Sample query languages and query processing (3 hours)
- Query optimization (2 hours)
- Transaction concepts, concurrency control and recovery (3 hours)
- Distributed databases (2 hours)
- Introduction to Workflow management systems (1 hour)
- Web services and cloud computing (1 hour)
- Security and privacy (2 hours)

Method of Evaluation:

Assignments (4-6) 40%
Midterm exam 20%
Project 40%

Texts


Several research papers.

Instructor(s)

K. Vidyasankar, J. Tang, J. Shieh
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title 3400 Introduction to Databases

Abbreviated Course Title Intro to Databases

Calendar Change (new course)

3400 Introduction to Databases covers database processing, database design and database management systems. Advances in database technology as well as applications of database systems' concepts in non-database applications are covered. Students have an opportunity for hands-on experience with database design.
CR: COMP 4754
PR: COMP 2007

Secondary Calendar Changes

4754 Database Systems introduces students to database processing, database management systems and database design considerations. It will cover the theory and methodologies essential for the relational database design, implementation, manipulation, optimization and management.
CR: COMP 3400
PR: COMP 3725 and 3754

Rationale

This course will introduce methods for collecting, storing and processing large amounts of related data.

Consultations Sought From

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Consultations Sought From

School of Music  
School of Nursing  
School of Pharmacy  
School of Social Work  
Grenfell Campus  
Marine Institute

Library Report Received

Comments Received

Yes  
No  
Yes  
Yes  
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:
Proposal
New Course – COMP 3401
Introduction to Data Mining

Course Number and Title
3401 Introduction to Data Mining

Abbreviated Course Title
Intro to Data Mining

Calendar Description

3401 Introduction to Data Mining introduces students to the basic concepts and techniques for data mining and knowledge discovery. Students will develop an understanding of the essential data mining technologies, and be able to design and evaluate methods for simple data mining applications.

Pre-requisite(s)
COMP 2002, COMP 2007 and STAT 2550

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale

The huge amount of data being generated in many areas such as the life sciences, social sciences and social networks makes it a necessity to be able to automatically extract (mine) useful patterns or knowledge from these data. This course provides a comprehensive introduction to data mining.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Basic concepts for data mining (3 hours)
- Attributes (4 hours)
- Data pre-processing (3 hours)
• Mining frequent patterns (4 hours)
• Classification (9 hours)
• Clustering (6 hours)

Method of Evaluation:

Assignments (5) 15%
Midterm exam 25%
Project 10%
Final exam 50%

Texts

Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining, Concepts and Techniques* 3rd Edition, Morgan Kaufmann Publishers, 2012.

Instructor(s)

J. Tang, L. Pena-Castillo
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3401 Introduction to Data Mining

Abbreviated Course Title  Intro to Data Mining

Calendar Change (new course)

3401 Introduction to Data Mining introduces students to the basic concepts and techniques for data mining and knowledge discovery. Students will develop an understanding of the essential data mining technologies, and be able to design and evaluate methods for simple data mining applications.
PR: COMP 2002, COMP 2007 and STAT-2550

Secondary Calendar Changes

None

Rationale

The huge amount of data being generated in many areas such as the life sciences, social sciences and social networks makes it a necessity to be able to automatically extract (mine) useful patterns or knowledge from these data. This course provides a comprehensive introduction to data mining.

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Department of Biochemistry
Department of Biology
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Department of Earth Sciences
Department of Economics
Department of Geography
Department of Mathematics and Statistics
Department of Ocean Sciences
Department of Physics and Oceanography
Department of Psychology
Department of Computer Engineering
Faculty of Arts
Faculty of Business Administration
Faculty of Education
Faculty of Engineering and Applied Science
Faculty of Medicine
School of Human Kinetics and Recreation
School of Music
School of Nursing
School of Pharmacy

Comments Received

Yes
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Yes
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Yes
Consultations Sought From
School of Social Work
Grenfell Campus
Marine Institute

Library Report Received

Comments Received
Yes
No
Yes
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:
Proposal
New Course – COMP 4405
Privacy and Security – An Introduction

Course Number and Title

4405 Privacy and Security – An Introduction

Abbreviated Course Title

Privacy and Security

Calendar Description

4405 Privacy and Security – An Introduction reviews various cryptography techniques to preserve data security and privacy, examine system threats and vulnerabilities from the perspectives of programs, operating systems and programming languages, and discuss database security, internet security, privacy and security breaches, as well as privacy-preserving data mining and machine learning methods. It reviews security and privacy issues in some applications in health, business and government.

Pre-requisite(s)

COMP 3400, COMP 3401, and COMP 1001 or COMP 2510

Credit Restrictions

None

Secondary Calendar Changes

None

Rationale

This course provides an introduction to security and privacy aspects of a variety of systems.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction (3 hours)
  - Why Security and Privacy?
  - Definitions and Terminology
• Security issues in computing

  • Review of Cryptography (8 hours)
    • Basic Encryption and Decryption
    • Symmetric and asymmetric cryptosystems
    • Digital signature
    • Secret Sharing

  • Privacy-Preserving Methods (5 hours)
    • Privacy-Preserving Approaches
    • Data Configuration and Distribution
    • Privacy-preserving data mining and machine learning
    • Secure Multi-party Computation (SMC)
    • Anonymization and Randomization
      • k-Anonymity
      • l-Diversity
      • t-Closeness
    • Attacks on different approaches
      • Cryptanalysis
      • Collusion attacks
      • Data de-anonymization and re-identification

• Program Security (4 hours)
  • Secure Programs
  • Types of Flaws
  • Classic Errors
  • Viruses and Other Malicious Code
  • Trapdoors
  • Controls Against Program Threats

• Database Security and inference controls (4 hours)
  • Security Requirements
  • Reliability and Integrity
  • Sensitive Data
  • Inference and Controls for Statistical Inference Attacks
  • Multilevel Databases and Security
  • Designs of Multilevel Secure Databases

• Security and privacy on internet (4 hours)
  • Networks
    • Characteristics
    • Dimensions
    • Protocols
    • Types
    • Threats and Attacks
    • Vulnerabilities
    • Security Controls
  • Firewalls
  • Intrusion Detection Systems
  • Secure E-Mail

• Information Privacy & Policies (1 hour)
  • Privacy, Dimensions, Issues, and Principles
  • Policies and Acts
Method of Evaluation:

- Assignments (4) 25%
- Midterm exam 15%
- Final exam 35%
- Class discussions 5%
- Project 20%

Texts


Instructor(s)

S. Samet
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4405 Privacy and Security – An Introduction

Abbreviated Course Title  Privacy and Security

Calendar Change (new course)

4405 Privacy and Security – An Introduction reviews various cryptography techniques to preserve data security and privacy, examine system threats and vulnerabilities from the perspectives of programs, operating systems and programming languages, and discuss database security, internet security, privacy and security breaches, as well as privacy-preserving data mining and machine learning methods. It reviews security and privacy issues in some applications in health, business and government.
PR: COMP 3400, COMP 3401, and COMP 1001 or COMP 2510

Secondary Calendar Changes

None

Rationale

This course provides an introduction to security and privacy aspects of a variety of systems.

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Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Faculty of Arts  Yes
Faculty of Business Administration  No
Faculty of Education  No
Faculty of Engineering and Applied Science  Yes
Faculty of Medicine  Yes
School of Human Kinetics and Recreation  Yes
School of Music  Yes
School of Nursing  No
School of Pharmacy  Yes
School of Social Work  Yes
Consultations Sought From
Grenfell Campus
Marine Institute

Library Report Received

Comments Received
No
Yes
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:
Proposal
New Course – COMP 3500
Introduction to Scientific Computing

Course Number and Title
3500 Introduction to Scientific Computing

Abbreviated Course Title
Intro to Scientific Comput

Calendar Description

3500 Introduction to Scientific Computing studies the development of efficient algorithms for the numerical solution of some generic mathematical problems and their implementation on conventional computers. The efficiency of these algorithms with respect to speed (computation and data communication), and storage requirements, but more importantly accuracy, is considered. Problems such as: systems of linear equations (gaussian elimination); curve fitting (interpolation approximation, the linear least squares problem, normal equations); numerical integration; numerical solution of nonlinear equations are considered.

Pre-requisite(s)

COMP 1001 or COMP 1510 or equivalent, MATH 2000, MATH 2050

Credit Restrictions

COMP 3731 and MATH 3132

Secondary Calendar Changes

Department of Computer Science

3731 Introduction to Scientific Computing main objectives are the development of algorithms for the numerical solution of mathematical problems and the study of the numerical stability of these algorithms. The efficiency of these algorithms with respect to speed and storage requirements is considered as well. Emphasis is also placed on the study of the sensitivity of selected problems to perturbations in the data. There is also a brief introduction to the development of numerical algorithms that take advantage of advanced computer architectures, such as pipeline processors, array processors and parallel processors.
CR: COMP 3500 and Mathematics 3132
PR: Mathematics 2000 and Mathematics 2050, and one of COMP 2602 or COMP 2710

Department of Mathematics and Statistics

3132 Numerical Analysis I includes a discussion of round-off error, the solution of linear systems, iterative methods for nonlinear equations, interpolation and polynomial approximation,
least squares approximation, fast Fourier transform, numerical differentiation and integration, and numerical methods for initial value problems.
CR: Computer Science 3500 and Computer Science 3731
LH: 1.5
PR: MATH 2000, MATH 2050, and a computing course (Computer Science 1510 is recommended)

Rationale

This is the first of two courses that cover the foundation of the Scientific Computing area.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to Matlab (1 hour)
- Floating Point Arithmetic, Errors in Computations (4 hours)
- Vector and Matrix Norms (2 hours)
- Stability of Algorithms and Conditioning of Problems (4 hours)
- Synthetic Division (Horner's Rule) (2 hours)
- Systems of Linear Equations (Gaussian Elimination) (4 hours)
- Curve Fitting (Interpolation; Approximation; The Linear Least squares problem, Normal Equations) (4 hours)
- Numerical Integration (2 hours)
- Numerical Solution of Nonlinear Equations. (5 hours)

Method of Evaluation:

Assignments (7) and projects  40%
Midterm exam 20%
In-class participation 10%
Final exam 30%

Texts


Instructor(s)

G. Miminis, S. Bungay
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3500 Introduction to Scientific Computing

Abbreviated Course Title  Intro to Scientific Comput

Calendar Change (new course)

3500 Introduction to Scientific Computing studies the development of efficient algorithms for the numerical solution of some generic mathematical problems and their implementation on conventional computers. The efficiency of these algorithms with respect to speed (computation and data communication), and storage requirements, but more importantly accuracy, is considered. Problems such as: systems of linear equations (gaussian elimination); curve fitting (interpolation approximation, the linear least squares problem, normal equations); numerical integration; numerical solution of nonlinear equations are considered.

CR: COMP 3731 and MATH 3132
PR: COMP 1001 or COMP 1510 or equivalent, MATH 2000, MATH 2050

Secondary Calendar Changes

Department of Computer Science

3731 Introduction to Scientific Computing main objectives are the development of algorithms for the numerical solution of mathematical problems and the study of the numerical stability of these algorithms. The efficiency of these algorithms with respect to speed and storage requirements is considered as well. Emphasis is also placed on the study of the sensitivity of selected problems to perturbations in the data. There is also a brief introduction to the development of numerical algorithms that take advantage of advanced computer architectures, such as pipeline processors, array processors and parallel processors.

CR: COMP 3500 and Mathematics 3132
PR: Mathematics 2000 and Mathematics 2050, and one of COMP 2602 or COMP 2710

Department of Mathematics and Statistics

3132 Numerical Analysis I includes a discussion of round-off error, the solution of linear systems, iterative methods for nonlinear equations, interpolation and polynomial approximation, least squares approximation, fast Fourier transform, numerical differentiation and integration, and numerical methods for initial value problems.

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Rationale

This is the first of two courses that cover the foundation of the Scientific Computing area.
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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:
Proposal
New Course – COMP 3501
Computational Linear Algebra with Applications

Course Number and Title
3501 Computational Linear Algebra with Applications

Abbreviated Course Title
Comp Lin Alg with App

Calendar Description
3501 Computational Linear Algebra with Applications is an introduction to the techniques of Matrix Computations (or Numerical Linear Algebra). Emphasis is placed upon developing the most recent and reliable numerical algorithms on conventional computer architectures. Problems such as: systems of linear equations (Cholesky decomposition, banded and special systems, iterative methods); the QR decomposition and the linear least squares problem; the eigenvalue problem; the singular value decomposition are considered.

Pre-requisite(s)
COMP 3500

Credit Restrictions
COMP 4734, MATH 4131

Secondary Calendar Changes

Department of Mathematics and Statistics
4131 Numerical Linear Algebra - inactive course.
CR: COMP 3501

Department of Computer Science
4734 Matrix Computations and Applications is an introduction to linear algebra; solution to linear systems; scaling, improving and estimating accuracy; the linear least squares problem; the eigenvalue problem; singular value decomposition of a matrix; the generalized eigenvalue problem.
CR: COMP 3501
PR: COMP 3731

Rationale
This is the second of two courses that cover the foundation of the Scientific Computing area.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- An introduction to essential topics of Linear Algebra (5 hours)
- Systems of Linear Equations (Cholesky decomposition, Banded and Special systems, Iterative methods) (10 hours)
- The QR Decomposition and the Linear Least Squares Problem (5 hours)
- The Eigenvalue Problem (5 hours)
- The Singular Value Decomposition (3 hours)

Method of Evaluation:

Assignments (7) and projects 40%
Midterm exam 20%
In-class participation 10%
Final exam 30%

Texts


Instructor(s)

G. Miminis, S. Bungay
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3501 Computational Linear Algebra with Applications
Abbreviated Course Title  Comp Lin Alg with App

Calendar Change (new course)

3501 Computational Linear Algebra with Applications is an introduction to the techniques of Matrix Computations (or Numerical Linear Algebra). Emphasis is placed upon developing the most recent and reliable numerical algorithms on conventional computer architectures. Problems such as: systems of linear equations (Cholesky decomposition, banded and special systems, iterative methods); the QR decomposition and the linear least squares problem; the eigenvalue problem; the singular value decomposition are considered.
CR: COMP 4734, MATH 4131
PR: COMP 3500

Secondary Calendar Changes

Department of Mathematics and Statistics

4131 Numerical Linear Algebra - inactive course.
CR: COMP 3501

Department of Computer Science

4734 Matrix Computations and Applications is an introduction to linear algebra; solution to linear systems; scaling, improving and estimating accuracy; the linear least squares problem; the eigenvalue problem; singular value decomposition of a matrix; the generalized eigenvalue problem.
CR: COMP 3501
PR: COMP 3731

Rationale

This is the second of two courses that cover the foundation of the Scientific Computing area.

Consultations Sought From

Department of Biochemistry
Department of Biology
Department of Chemistry
Department of Earth Sciences
Department of Economics
Department of Geography
Department of Mathematics and Statistics
Department of Ocean Sciences

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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:
Proposal
New Course – COMP 4500
Numerical Optimization with Applications

Course Number and Title
4500 Numerical Optimization with Applications

Abbreviated Course Title
Num Opt with App

Calendar Description

4500 Computational Optimization with Applications analyzes the linear programming problem (LPP) and investigates the recent developments of the respective theory. The development of algorithms that operate efficiently on large sparse problems are included. Some of these algorithms will be applied to selected real life problems. Numerical algorithms for the solution of nonlinear optimization problems are also introduced. Topics include: geometric understanding of the LPP; the simplex algorithm; sparse matrix techniques for the simplex algorithm; duality and post-optimality analysis; extensions of the simplex algorithm; constraint and unconstraint optimization problems; principles of interior algorithms for the LPP.

Pre-requisite(s)

COMP 3501

Credit Restrictions

MATH 4132 and MATH 4133.

Secondary Calendar Changes

Department of Mathematics and Statistics

4132 Introduction to Optimization - inactive course
CR: COMP 4500

4133 Numerical Optimization - inactive course.
CR: COMP 4500

Rationale

Linear and nonlinear optimization is an extremely important topic in Scientific Computing. This course examines thoroughly the linear side of the topic and gives a good introduction to the nonlinear side of the topic.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Introduction to the linear programming problem (LPP) (3 hours)
- The Simplex algorithm (2 hours)
- Sparse matrix techniques for the Simplex algorithm (6 hours)
- Selected applications (3 hours)
- Using the Simplex algorithm to solve nonstandard LPPs (1 hour)
- Unconstrained nonlinear optimization (4 hours)
- Constraint nonlinear optimization (4 hours)
- Global optimization (1 hour)
- Duality and post-optimality analysis (1 hour)
- Principles of interior algorithms for the LPP. (3 hours)

Method of Evaluation:

Assignments (7) and projects 40%
Midterm exam 20%
In-class participation 10%
Final exam 30%

Texts


Instructor(s)

G. Miminis, S. Bungay
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4500 Numerical Optimization with Applications

Abbreviated Course Title  Num Opt with App

Calendar Change (new course)

4500 Computational Optimization with Applications analyzes the linear programming problem (LPP) and investigates the recent developments of the respective theory. The development of algorithms that operate efficiently on large sparse problems are included. Some of these algorithms will be applied to selected real life problems. Numerical algorithms for the solution of nonlinear optimization problems are also introduced. Topics include: geometric understanding of the LPP; the simplex algorithm; sparse matrix techniques for the simplex algorithm; duality and post-optimality analysis; extensions of the simplex algorithm; constraint and unconstraint optimization problems; principles of interior algorithms for the LPP.
PR: COMP 3501
CR:  MATH 4132, MATH 4133

Secondary Calendar Changes

4132 Introduction to Optimization - inactive course
CR:  COMP 4500

4133 Numerical Optimization - inactive course.
CR:  COMP 4500

Rationale

Linear and nonlinear optimization is an extremely important topic in Scientific Computing. This course examines thoroughly the linear side of the topic and gives a good introduction to the nonlinear side of the topic.

Consultations Sought From

Department of Biochemistry
Department of Biology
Department of Chemistry
Department of Earth Sciences
Department of Economics
Department of Geography
Department of Mathematics and Statistics
Department of Ocean Sciences
Department of Physics and Oceanography
Department of Psychology

Comments Received

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

Name

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Chair:

Secretary:

Date:
Proposal
New Course – COMP 4501
Numerical Algorithms for Shared and Distributed Memory Architectures

Course Number and Title
4501 Numerical Algorithms for Shared and Distributed Memory Architectures

Abbreviated Course Title
Num Alg Shared Dist Mem Arch

Calendar Description
4501 Numerical Algorithms for Shared and Distributed Memory Architectures aims to provide students interested in scientific computing with basic but adequate knowledge of computer architectures, data structures, algorithmic design as well as programming techniques for the effective solution of scientific problems and the efficient implementation of these solutions on distributed or shared memory computers. Some concepts regarding efficient implementation of algorithms on uniprocessors will also be considered.

Pre-requisite(s)
COMP 3501

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale
Scientists and engineers, in their continuous effort to effectively solve numerical problems, have heavily used shared and Distributed Memory Architectures for at least 25 years. This course provides an introduction to this topic.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

- Overview, concepts, terminology and history of Parallel Computing (2 hours)
- Parallel computer memory architectures (2 hours)
- Parallel programming models (2 hours)
- Designing parallel programs (2 hours)
- Algorithmic efficiency on Uniprocessors (Data reuse, exploiting structure, pipelining) (2 hours)
- Matrix data structures for parallel architectures (2 hours)
- Numerical algorithms on parallel architectures (16 hours)
  - Gaxpy update
  - Cholesky decomposition
  - Heat equation
  - Other numerical problems

Method of Evaluation:

- Assignments (7) and projects 40%
- Midterm exam 20%
- In-class participation 10%
- Final exam 30%

Texts


Kaminsky A., *Building Parallel Programs: SMPs, Clusters & Java*, Course Technology, 2010


Instructor(s)

G. Miminis
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  4501 Numerical Algorithms for Shared and Distributed Memory Architectures

Abbreviated Course Title  Num Alg Shared Dist Mem Arch

Calendar Change (new course)

4501 Numerical Algorithms for Shared and Distributed Memory Architectures aims to provide students interested in scientific computing with basic but adequate knowledge of computer architectures, data structures, algorithmic design as well as programming techniques for the effective solution of scientific problems and the efficient implementation of these solutions on distributed or shared memory computers. Some concepts regarding efficient implementation of algorithms on uniprocessors will also be considered.
PR:  COMP 3501

Secondary Calendar Changes

None

Rationale

Scientists and engineers, in their continuous effort to effectively solve numerical problems, have heavily used shared and Distributed Memory Architectures for at least 25 years. This course provides an introduction to this topic.

Consultations Sought From

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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:
Proposal
New Course – COMP 3600
Algorithm Design and Analysis

Course Number and Title
3600 Algorithm Design and Analysis

Abbreviated Course Title
Alg Design and Analysis

Calendar Description

3600 Algorithm Design and Analysis covers a range of advanced algorithm design techniques, including divide-and-conquer, greedy algorithms, dynamic programming and network flows. The emphasis is on algorithmic problem solving and algorithm design and analysis methodologies, rather than on specific algorithms. The concept of NP-hardness and methods for dealing with intractability are also discussed.

Pre-requisite(s)
COMP 2002

Credit Restrictions
COMP 4740

Secondary Calendar Changes

4740 Design and Analysis of Algorithms will give an overview of techniques for the design of efficient optimal-solution and heuristic algorithms. It will include an introduction to various advanced data structures for set and string processing that are used to further optimize algorithm efficiency.
CR: COMP 3600
PR: COMP 3719

Rationale

COMP 3600 is intended to refine the student's ability to solve computational problems algorithmically; it goes beyond specific algorithms to cover general methods of algorithm design and analysis and algorithmic problem solving.

Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.
Sample Course Outline and Method of Evaluation

Greedy algorithms (4 hours)

- Divide and conquer (including FFT) (6 hours)
- Dynamic programming (5 hours)
- Network flows (4 hours)
- Notion of NP-hardness, examples of reductions (6 hours)
- Dealing with intractability: approximation algorithms, heuristics, randomized algorithms (5 hours)

Method of Evaluation:

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<th>Assessment</th>
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<td>Final exam</td>
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Texts


Instructor(s)

M. Mata-Montero, A. Kolokolova, C. Wang, T. Wareham
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title  3600 Algorithm Design and Analysis

Abbreviated Course Title  Alg. Design and Analysis

Calendar Change (new course)

3600 Algorithm Design and Analysis covers a range of advanced algorithm design techniques, including divide-and-conquer, greedy algorithms, dynamic programming and network flows. The emphasis is on algorithmic problem solving and algorithm design and analysis methodologies, rather than on specific algorithms. The concept of NP-hardness and methods for dealing with intractability are also discussed.

CR: COMP 4740
PR: COMP 2002

Secondary Calendar Changes

4740 Design and Analysis of Algorithms will give an overview of techniques for the design of efficient optimal-solution and heuristic algorithms. It will include an introduction to various advanced data structures for set and string processing that are used to further optimize algorithm efficiency.

CR: COMP 3600
PR: COMP 3719

Rationale

COMP 3600 is intended to refine the student's ability to solve computational problems algorithmically; it goes beyond specific algorithms to cover general methods of algorithm design and analysis and algorithmic problem solving.

Consultations Sought From

Department of Biochemistry
Department of Biology
Department of Chemistry
Department of Earth Sciences
Department of Economics
Department of Geography
Department of Mathematics and Statistics
Department of Ocean Sciences
Department of Physics and Oceanography
Department of Psychology
Department of Computer Engineering
Faculty of Arts

Comments Received

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

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
New Course – COMP 3601
Mathematical Methods in Theory of Computation

Course Number and Title
3601 Mathematical Methods in Theory of Computation

Abbreviated Course Title
Math Meth in Theory of Comp

Calendar Description
3601 Mathematical Methods in Theory of Computation presents a selection of mathematical theories relevant in theoretical Computer Science such as graph theory, number theory, logic and basic algebra.

Pre-requisite(s)
COMP 1002 or MATH 2320, and COMP 2002

Credit Restrictions
None

Secondary Calendar Changes
None

Rationale
COMP 3601 covers a variety of mathematical concepts and techniques useful for algorithm design and analysis, and in theory of computation in general.

Consultations
Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

Graphs and relations (colourings, matchings, isomorphism, planarity, Euler cycles) (8 hours)

• Logic (more on proofs, compactness, completeness, Gödel incompleteness theorem) (8 hours)
• Number theory (primality, Chinese remainder theorem, Fermat’s little theorem) (6 hours)
• Abstract algebra (groups, (finite) fields, vector spaces) (8 hours)

Method of Evaluation:

- Assignments (6) 40%
- Test 20%
- Final exam 40%

Texts

None

Instructor(s)

M. Bartha, M. Mata-Montero
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title 3601 Mathematical Methods in Theory of Computation

Abbreviated Course Title Math Meth in Theory of Comp

Calendar Change (new course)

3601 Mathematical Methods in Theory of Computation presents a selection of mathematical theories relevant in theoretical Computer Science such as graph theory, number theory, logic and basic algebra.

PR: COMP 1002 or MATH 2320, and COMP 2002

Secondary Calendar Changes

None

Rationale

COMP 3601 covers a variety of mathematical concepts and techniques useful for algorithm design and analysis, and in theory of computation in general.

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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:
Proposal
New Course – COMP 3602
Introduction to the Theory of Computation

Course Number and Title
3602 Introduction to the Theory of Computation

Abbreviated Course Title
Intro Theory of Computation

Calendar Description
3602 Introduction to the Theory of Computation examines various models of computation and their computational power. In addition, several measures of problem's computational difficulty are discussed.

Pre-requisite(s)
COMP 2002

Credit Restrictions
COMP 3719

Secondary Calendar Changes
3719 Theory of Computation and Algorithms is an introduction to formal algorithmic problem solving. Various algorithm design techniques that sometimes yield efficient solutions are studied. Deterministic and nondeterministic machines (finite state automata, pushdown automata and Turing machines) are discussed and used to efficiently solve problems such as the String Matching Problem, the parsing of Context-free Languages, and to introduce the theory of NP-completeness. In addition, Turing machines are used to prove the unsolvability of certain problems. Tractable, intractable and undecidable problems are contrasted. Basic issues related to parallelization are discussed as well.
CR: COMP 3602, the former COMP 3711 and the former COMP 3740
PR: COMP 2711 and Mathematics 2320

Rationale
COMP 3602 addresses complexity and limitations of algorithmic problem solving relative to a variety of computational resources and machine models. It provides a formal introduction to theory of computation, presenting abstract machine models, the basics of computability theory and complexity theory.
Consultations

Distributed to Faculties of Science, Arts, Business Administration, Education, Engineering and Applied Science, Medicine, School of Human Kinetics and Recreation, Music, Nursing, Pharmacy, Social Work, Grenfell Campus and Marine Institute.

Sample Course Outline and Method of Evaluation

- Regular languages and finite automata (6 hours)
- Context-free languages and pushdown automata (5 hours)
- Turing machines, undecidability, many-one reductions (6 hours)
- Complexity theory, polynomial-time reductions, P vs. NP (6 hours)
  - Other topics, including recursion theorem, space complexity, circuit complexity, parameterized complexity, basic cryptography (6 hours)

Method of Evaluation:

Assignments (6)  40%
Test  20%
Final exam  40%

Texts


Instructor(s)

M. Mata-Montero, A. Kolokolova, T. Wareham
SUMMARY PAGE FOR SENATE
Approval Form

Course Number and Title  3602 Introduction to the Theory of Computation

Abbreviated Course Title  Intro Theory of Computation

Calendar Change (new course)

3602 Introduction to the Theory of Computation examines various models of computation and their computational power. In addition, several measures of problem's computational difficulty are discussed.
CR: COMP 3719
PR: COMP 2002

Secondary Calendar Changes

3719 Theory of Computation and Algorithms is an introduction to formal algorithmic problem solving. Various algorithm design techniques that sometimes yield efficient solutions are studied. Deterministic and nondeterministic machines (finite state automata, pushdown automata and Turing machines) are discussed and used to efficiently solve problems such as the String Matching Problem, the parsing of Context-free Languages, and to introduce the theory of NP-completeness. In addition, Turing machines are used to prove the unsolvability of certain problems. Tractable, intractable and undecidable problems are contrasted. Basic issues related to parallelization are discussed as well.
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Department of Biology  Yes
Department of Chemistry  Yes
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Department of Economics  Yes
Department of Geography  Yes
Department of Mathematics and Statistics  Yes
Department of Ocean Sciences  No
Department of Physics and Oceanography  Yes
Department of Psychology  Yes
Department of Computer Engineering  Yes
Consultations Sought From

Faculty of Arts
Faculty of Business Administration
Faculty of Education
Faculty of Engineering and Applied Science
Faculty of Medicine
School of Human Kinetics and Recreation
School of Music
School of Nursing
School of Pharmacy
School of Social Work
Grenfell Campus
Marine Institute

Comments Received

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Library Report Received

Yes

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Chair:

Secretary:

Date:
DEPARTMENT OF COMPUTER SCIENCE

Calendar changes are noted in the attached document (2015-2016 University Calendar).

As well, as a result of the new proposed program in Computer Science and general housekeeping following review of all courses, the following courses are to be deleted from the University Calendar:

COMP-2602  
COMP-2650  
COMP-2752  
COMP-2801  
COMP-3714  
COMP-3717  
COMP-3723  
COMP-3751  
COMP-3790  
COMP-4719  
COMP-4725  
COMP-4735  
COMP-4761
10.4 Computer Science

Computer Science courses are designated by COMP.

10.4.1 First Year Courses

1400 Computing In the 20th Century and Beyond will give an overview of the development of computing technologies over the last 75 years as well as both the perception of these technologies by, and their impact on, society. The course will be organized chronologically by decade, and within each decade will examine the dominant computing developments, their image in various print and pictorial media, and their social impact. The aim is to give students of all disciplines an appreciation of the abilities and limitations of computer technology and how such technologies interact with society.

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

1550 Introduction to Multimedia Application Development is an introduction to programming and computer science with an emphasis on the development of multimedia applications. The course introduces the fundamental principles of programming, including object-oriented and event-driven programming, how to use and create classes and methods and combine them with multimedia libraries to produce animations, handle input from keyboard and mouse, and import sounds and videos to produce multimedia applications which can be directly deployed on the internet. CR: COMP 2000

1600 Basic Computing and Information Technology offers an overview of information technology. It provides students with an understanding of basic concepts and necessary skills required to use spreadsheet, database and presentation software to manage, analyze, and present data. CR: Business 2700, the former COMP 2650 or the former COMP 2801

1700 Introduction to Computer Science lays the foundation for the art and the science of computing. The course contains fundamental and topical issues in computers, language, programming and applications. This course is designed for potential Computer Science majors without a background in programming, but is also available for non-majors. CR: COMP 1000

1710 Object-Oriented Programming I is an introduction to fundamental programming techniques, primitive data types and operations, program control structures and the use of objects, classes and methods. CR: if previously completed or currently registered for COMP 2710 or COMP 1001

AR = Attendance requirement; CH = Credit hours are 3 unless otherwise noted; CO = Co-requisite(s); CR = Credit can be retained for only one course from the set(s) consisting of the course being described and the course(s) listed; LC = Lecture hours per week are 3 unless otherwise noted; LH = Laboratory hours per week; OR = Other requirements of the course such as tutorials, practical sessions, or seminars; PR = Prerequisite(s); UL = Usage limitation(s).

10.4.2 Second Year Courses

2000 Collaborative and Emergent Behaviour is a survey of computation as a means of understanding, modeling, and describing artificial and natural systems. The emergence of complex behaviour from the interaction of simple rules governing individual components is illustrated and discussed, as well as the role of communication between system components. Selected systems to be studied will be drawn from different topic areas which may include the worldwide web, the mind (cognitive science), formal logic, autonomous robotics, chaos and fractals, and bioinformatics. Each topic will incorporate an associated laboratory experience.

LH: 3 hours bi-weekly

2500 Data Analysis with Scripting Languages introduces the use of scripting languages to solve common data analysis tasks. The control structures and expressions of the language are first discussed. Script solution to storing/retrieving data sets, searching data sets, and performing numeric and statistical calculation are covered. Plotting and visualization for data sets are also presented.

PR: COMP 1510 or COMP 1700 or COMP 1710 or COMP 2602 or COMP 1000 or COMP 1001 or COMP 2300 (or equivalent)

2510 Programming in C/C++ is a comprehensive treatment of the C/C++ programming languages. It is intended for students with some first programming experience. This course starts with a discussion of fundamentals of C and C++, moves on to the object-oriented aspects of C++, and introduces some advanced topics. It is an essential course for mastering the power of this rich programming language.

CR: Engineering 3891 LH: 3

PR: COMP 1510 or COMP 1550 or COMP 1700 or COMP 1710 or COMP 1000 or COMP 1001 or COMP 2300 or Engineering 1020 (or equivalent)

2602 Computer Programming in FORTRAN is an inactive course.

2650 Problem Solving with Personal Computers is an overview of tools and techniques that current computer technology offers in a PC-based-networked environment. The emphasis is on conceptual understanding of the
software, from exploring capabilities of the existing software tools to learning methods of extending these capabilities. The key topics include problem solving strategies, visual programming, macro language operations, object linking and embedding, digital communication, and developing interactive web pages. The course has a practical flavor in structured laboratory sessions, students gain proficiency in using personal computers to solve common problems.

CO: Mathematics 1000
CR: COMP 1600, COMP 2801, or the former Business 3700 LH 3
PR: Level III Advanced Mathematics or Mathematics 1000 or Mathematics 1000 (or equivalent)

2710 Object-Oriented Programming II continues from Object-Oriented Programming I, and studies object-oriented and event-driven programming. Additional topics include recursion, basic analysis of algorithms, fundamental data structures such as simple linked structures and stacks, and fundamental computing algorithms such as binary search and quadratic time sorting. A brief overview of programming languages, virtual machines and language translations is also provided.

CR: COMP 2001
LH: 3
PR: COMP 1710 and Mathematics 1000

2711 Introduction to Algorithms and Data Structures includes the study of standard ways of organizing and manipulating data in computer storage. Fundamental concepts in the design and analysis of algorithms are also discussed.

CR: COMP 2002
LH: 3
PR: COMP 2710. It is recommended that students complete COMP 2742 prior to registering for COMP 2711

2718 Development Tools, Work Flows and Concepts covers tools, work flows and concepts used in software development in a concentrated introductory set of topics. The essential work flows (with their underlying concepts) used to edit, build, test, combine with existing software and find existing software are introduced. The tools covered include text editors, programming language translators, file management tools, debuggers, scripting tools, source control tools, and building, testing and deployment tools. The architecture and use of an Integrated Development Environment are discussed.

LH: 3
PR: COMP 1510 or COMP 1550 or COMP 1700 or COMP 1710 or COMP 2660 or COMP 1000 or COMP 1001 or COMP 2300

2742 Logic for Computer Science is an introduction to propositional and predicate logic with applications. The use of the system of boolean logic in reasoning and circuit design, as well as basic proof techniques and the resolution principle, for both propositional and predicate techniques, will be covered. Concepts involving sets will be used to illustrate different types of proof techniques. The probable intractability of boolean logic and Gödel's incompleteness theorem will be presented.

CR: COMP 1002
PR: COMP 1710 or COMP 1001, and Mathematics 1000

3553 Introduction to Business Data Processing—inactive course.

2760 Encountering the Computer: Society and the Individual examines social, ethical, legal and cultural issues surrounding the use of computers in modern society. These broader social issues are followed by an examination of the use of social and individual psychology in user interface design. Students will be expected to demonstrate an understanding of these issues both directly (through verbal and written discourse) and practically, as applied to the creation of actual software artifacts.

CR: COMP 2004
CO: COMP 2710 or 2001
PR: two 1000-level English courses, or equivalent

2801 Introductory Computing for Business introduces students to computer applications in business, document processing, application development, decision support, and information management. A three-hour laboratory is required.

CO: Mathematics 1000
CR: COMP 1600, COMP 2660, or Business 3700 LH 3
PR: Level III Advanced Mathematics or Mathematics 1000 or Mathematics 1000 (or equivalent)

AR = Attendance requirement; CH = Credit hours are 3 unless otherwise noted, CO = Co-requisite(s); CR = Credit can be retained for only one course from the set(s) consisting of the course being described and the course(s) listed; LC = Lecture hours per week are 3 unless otherwise noted, LH = Laboratory hours per week; OR = Other requirements of the course such as tutorials, practical sessions, or seminars; PR = Prerequisite(s); UL = Usage limitation(s).
10.4.3 Third Year Courses

3550 Introduction to Bioinformatics (same as Biology 3591) deals with the development and application of computational methods to address biological problems. The course will focus on the fundamental concepts, ideas and related biological applications of existing bioinformatics tools. This course will provide hands-on experience in applying bioinformatics software tools and online databases to analyze experimental biological data, and it will also introduce scripting language tools typically used to automate some biological data analysis tasks.

CR: Biology 3591
PR: Biology 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding COMP 1460, COMP 1600 and COMP 2000; or COMP 2500 or COMP 2710 or COMP 2901, and one Biology course at the 1000-level or above excluding Biology 2400 and Biology 2401; or permission of the course instructor

3700 Industrial Experience is a course for students who are admitted to CIIO. Students are required to register for this non-credit course every semester during their internship. This course is open only to students who have been accepted into the Internship Program and provides an opportunity for qualified students to obtain rewarding job experience of 8, 12 or 16 months of continuous duration, during the course of their studies.

PR: admission to the Computer Industry Internship Option (CIIO)

3710 Vocational Languages is a study of several programming languages of vocational significance. The use of appropriate programming paradigms to solve some significant problems will be illustrated.

PR: COMP 2711 or COMP 2002

3714 Programming Languages and their Processors—inactive course.

3715 Network Computing with WEB Applications studies how distributed applications (e.g., client/server Web applications) are constructed using the Internet. Topics covered include: the socket interface for network communication, client/server applications, browser scripting using Javascript, content generation for web applications (e.g., jsp, php), hypertext documents, and the use of cryptography to handle security.

CR: COMP 2004
PR: COMP 2711 or COMP 2002

3716 Software Methodology studies the development of software by gathering the requirements of the software program, analyzing the requirements to create a development model, and creating the software and documents for the software product. This course studies techniques for all three software development activities.

CR: COMP 2003
PR: COMP 2711 or COMP 2002

3717 Symbolic Computation and Recursion—inactive course.

3718 Programming in the Small demonstrates the tools and techniques used in the construction of small software systems. The software tools and techniques to be covered include analysis and design of software components, software construction tools (e.g., linkers, builders, debuggers), software library use and design, and system integration.

3719 Theory of Computation and Algorithms is an introduction to formal algorithmic problem solving. Various algorithm design techniques that sometimes yield efficient solutions are studied. Deterministic and nondeterministic machines (finite state automata, pushdown automata and Turing machines) are discussed and used to efficiently solve problems such as the Sizing Matching Problem, the parsing of Context-free Languages, and to introduce the theory of NP-completeness. In addition, Turing machines are used to prove the unsolvability of certain problems. Tractable, intractable and undecidable problems are contrasted. Basic issues related to parallelization are discussed as well.

CR: the former COMP 3711, and the former COMP 3740, and COMP 3502
PR: COMP 2711 or COMP 2002; and Mathematics 2320 or COMP 1002

3723 Logic Design—inactive course.

3724 Computer Organization can be studied at the digital logic implementation level, the instruction set architecture level, and the translation of programming languages to the underlying machine instruction level. This course studies computer organization at these levels.

CR: COMP 2003
PR: Mathematics 2320

3725 Computer Architecture and Operating Systems covers system design and the architectural implementations of these designs. The objective is to develop the basic concepts of processor design, memory management, operating systems, and I/O devices and their interactions.

CR: COMP 2004
PR: COMP 3724 or COMP 2003

3731 Introduction to Scientific Computing main objectives are the development of algorithms for the numerical solution of mathematical problems and the study of the numerical stability of these algorithms. The efficiency of these algorithms with respect to speed and storage requirements is considered as well. Emphasis is also placed on the study of the sensitivity of selected problems to perturbations in the data. There is also a brief introduction to the development of numerical algorithms that take advantage of advanced computer architectures, such as pipeline processors, array processors and parallel processors.

CR: Mathematics 3132, COMP 3500
PR: Mathematics 2000 and Mathematics 2050, and one of COMP 2660 or COMP 2710 or COMP 1001

3751 Computational Aspects of Operations Research—inactive course.

3753 Computational Aspects of Linear Programming is an introduction to the Linear Programming Problem (LPP). The emphasis is placed upon developing the most recent and numerically reliable algorithms for the solution of the Linear Programming Problem. The numerical stability of these algorithms will be examined as well. Geometric understanding of
the LPP. Simplex method for the LPP. Sparse matrix LPP. Duality and postoptimality analysis. Extensions to the simplex algorithm. Principles of interior algorithms for the LPP.
CR: COMP 4500
PR: Mathematics 2050, and one of COMP 2602 or 2710 or COMP 2001

3754 Introduction to Information and Intelligent Systems introduces students to application areas that are away from usual number-based and text-based processing. Students will learn the basic concepts and become aware of the historical developments and social and ethical issues related to the application areas such as intelligent systems and information management. This exposure will help students to become knowledgeable about managing large volumes of data and dealing with problems that are well defined but whose algorithmic solutions are not feasible or that problems that are fuzzily defined.
CR: COMP 2007
PR: COMP 2711 or COMP 2002, and COMP 2742 or COMP 1002

3799 Directed Readings—inactive course.

AR = Attendance requirement; CH = Credit hours are 3 unless otherwise noted; CO = Co-requisite(s); CR = Credit can be reaped for only one course from the set(s) consisting of the course being described and the course(s) listed; LC = Lecture hours per week are 3 unless otherwise noted; LH = Laboratory hours per week; OR = Other requirements of the course such as tutorials, practical sessions, or seminars; PR = Prerequisite(s), UL = Usage limitation(s).

10.4.4 Fourth Year Courses

4559 Bioinformatics: Biological Data Analysis (same as Biology 4606) provides students with the basis to analyze a variety of biological data within an integrated programming environment for data manipulation, calculation and graphical display. Students will learn to extract meaningful information from data generated by high-throughput experimentation. The course will introduce one such integrated programming environment and will explore the computational and statistical foundations of the most commonly used biological data analysis procedures.
CR: Biology 4606 LH: 3
PR: Biology 3551 or COMP 3550, and Statistics 2550 (or equivalent), or permission of the course instructor

4711 Structure of Programming Languages covers programming language design considerations; syntactic and semantic structure; survey of typical features and operations; analysis of facilities for control and data structuring; language extensibility; execution models; formal specification of programming languages.
PR: COMP 3713 or COMP 3602, and COMP 3724 or COMP 2003

4712 Compiler Construction studies properties of formal grammars and languages; syntax-directed parsing and code generation, top-down and bottom-up parsing methods; LL(k) and LR(k) grammars and parsers; Code optimization; compiler writing tools.
PR: COMP 3719 or COMP 3602, and COMP 3724 or COMP 2003

4715 and 4717 Special Topics in Programming Languages

4718 Survey of Software Engineering surveys the major topics of software engineering. Areas covered include: requirements capture, system design and design approaches, verification and validation (including formal methods and testing), and management of the software development process.
PR: COMP 3716 or COMP 2005

4719 Software Specification—inactive course.

4721 Operating Systems studies the design and implementation of an operating system's kernel. The main components used in operating system implementations include: context switches, process management, memory management, interprocess communication, file systems and system calls. The data structures and algorithms used in implementing the above components are studied. The different architectural styles of kernel implementation are also considered. Real-time operating systems are also discussed.
CR: Engineering 8894
PR: COMP 3725 or COMP 2004

4723 Introduction to Microprocessors examines the architecture and instruction sets for several microprocessors. The use of microprocessors as device controllers; comparisons of hardware and programmed techniques; microprocessor interfacing with external devices; methods of I/O; bus structures; modern microprocessor support devices are discussed.
LH: Minimum of three hours per week. Practical experience with basic principles will be obtained through laboratory experience.
PR: COMP 3721 or COMP 2003

4725-4729 Special Topics in Computer Systems
4734 Matrix Computations and Applications is an introduction to linear algebra: solution to linear systems; scaling, improving and estimating accuracy; the linear least squares problem; the eigenvalue problem; singular value decomposition of a matrix; the generalized eigenvalue problem.
CR: COMP 3501
PR: COMP 3731 or COMP 3500

4736 Advanced Matrix Computations and Applications—inactive course.

4738-4739 Special Topics In Numerical Computations will have topics to be studied announced by the Department.

4740 Design and Analysis of Algorithms will give an overview of techniques for the design of efficient optimal-solution and heuristic algorithms. It will include an introduction to various advanced data structures for set and string processing that are used to further optimize algorithm efficiency.
CR: COMP 3600
PR: COMP 3719 or COMP 3602

4741 Formal Languages and Computability is an in-depth study of various types of formal machines and their associated languages. Effective computability and other formalisms, such as lambda calculus will be studied as well.
CR: the former COMP 3740
PR: COMP 3719 or COMP 3602

4742 Computational Complexity is an in-depth discussion of computational complexity theory. Topics covered in the course include: models of computation (for both serial and parallel computations); complexity measures; reducibility; complexity classes (NP, PSPACE, NC, LOGSPACE and P); and randomized computations.
PR: COMP 3719 or COMP 3602

4743 Graph Algorithms and Combinatorial Optimization discusses classical problems in combinatorial optimization and graph algorithms, including matching, colorability, independent sets, isomorphism, network flows and scheduling. Special families of graphs are discussed and algorithms that would otherwise be NP-hard or complete are shown to be polynomial time when restricted to such families.
PR: COMP 3719 or COMP 3602

4745-4749 (Excluding 4748) Special Topics In Theoretical Aspects

4748 Introduction to the Science of Complexity is an exploration of the use of computers in the simulation of complex systems. Some theories and models, such as cellular automata, artificial life, fractals, genetic algorithms, chaos, and evolution will be discussed and will be used in the modeling of "real-life" systems. The approach in this course is practical. Students have to write a number of programs of different levels of sophistication including a final project.
PR: COMP 3719 or COMP 3602

4750 Introduction to Natural Language Processing covers tasks involving human languages, such as speech recognition, text understanding, and keyword-based information retrieval which underlie many modern computing applications and their interfaces. To be truly useful, such natural language processing must be both efficient and robust. This course will give an introduction to the algorithms and data structures used to solve key NLP tasks, including utterance understanding and generation and language acquisition, in both the major algorithmic paradigms used today (rule-based and statistical). The emphasis will be primarily on text-based processing though speech-based processing will be addressed where possible.
PR: COMP 3719 or COMP 3602, and Statistics 1510

4751 Computer Graphics examines display devices, display processors, display file compilers, display transformations, structured display files, graphical input devices, perspective, hidden line elimination, languages and graphics systems
LH: 3
PR: COMP 3719 or COMP 3602, and Mathematics 2050

4752 Introduction to Computational Intelligence provides an introduction to four of the fundamental computational intelligence methods: artificial neural networks, evolutionary computation, swarm intelligence and fuzzy systems. The integration of these techniques for problem solving will also be introduced.
CR: COMP 3201
PR: COMP 3719 or COMP 3602, and COMP 3754 or COMP 2007

4753 Artificial Intelligence has selected topics from AI programming languages; heuristic searching; problem solving; game-playing; knowledge representations; knowledge-based systems; reasoning in uncertainty situations; planning; natural language understanding; pattern recognition; computer vision; and machine learning.
PR: COMP 3719 or COMP 3602, and COMP 3754 or COMP 2007

4754 Database Systems introduces students to database processing, database management systems and database design considerations. It will cover the theory and methodologies essential for the relational database design, implementation, manipulation, optimization and management.
PR: COMP 3725 or COMP 2004, and COMP 3754 or COMP 2007

4756 Image Processing will centre on the key analytical and algorithmic tools and concepts of digital image processing. Topics will include Transformations, Enhancement, Encoding, Data Bases, Segmentation and Description.
LH: 3
PR: COMP 3719 or COMP 3602

4759 Computer Networks looks at how the operation of computer networks requires the following: a) communication between two computers, b) information transfer between two computers not directly connected, and c) services that need computer communication. This course focuses on the standard solutions and services used to fulfill the previous requirements. These include: physical transmission of signals, reliable communication based on unreliable communication channels, the routing of messages between connected computers to reach computers that are not directly connected, e-mail, file transfer, name servers, remote terminal access and the World Wide Web. Particular attention will be placed on the workings of the Internet.
PR: COMP 3715 or COMP 2006, and COMP 3725 or COMP 2004

4761-Human-Computer Interaction—inactive course.
4762 Introduction to Computational Molecular Biology will give an overview of computational problems and algorithms for these problems associated with a variety of analyses of biological molecular data.
PR: COMP 3716 or COMP 3500

4766 Introduction to Autonomous Robotics examines the fundamental constraints, technologies, and algorithms of autonomous robotics. The focus of this course will be on computational aspects of autonomous wheeled mobile robots. The following topics will be covered: major paradigms in robotics, methods of locomotion, kinematics, simple control systems, sensor technologies, stereo vision, feature extraction, modeling uncertainty of sensors and positional information, localization, SLAM, obstacle avoidance, and 2-D path planning.
LH: 3
PR: COMP 2711 or COMP 2002, Mathematics 2000, Mathematics 2050, and Statistics 1510 or Statistics 2550 or the former Statistics 2510

4767 Information Visualization and Applications focuses on the design and implementation of interactive visualization techniques for the analysis, comprehension, exploration, and explanation of large collections of abstract information. Topics to be covered include principles of visual perception, information data types, visual encodings of data, representation of relationships, interaction methods, understanding user goals and tasks, and evaluation techniques. Case studies of accepted techniques and the current state-of-the-art in information visualization will be presented.
CR: COMP 4304
PR: COMP 2760 or COMP 2008, and COMP 3719 or COMP 3602

4768 Software Development for Mobile Devices focuses on the design and implementation of software in a mobile networking environment. The primary topics to be covered in this course include software engineering, network computing, graphics programming, and human-computer interaction for mobile devices. A modern mobile device with advanced networking and graphic features, including multi-touch interaction and motion sensors will be used as the primary platform for development in this course. 
LH: One and one-half hours per week
PR: COMP 2760 or COMP 2008, COMP 3715 or COMP 2006, and COMP 3716 or COMP 2005

4770 Team Project has as its main objective to develop a working prototype of a software system as a team effort. A group of students will work on a project for a term, experiencing the advantages and difficulties of team projects.
AR: attendance is required
PR: COMP 3715 or COMP 2006, COMP 3716 or COMP 2005, COMP 3724 or COMP 2003, and COMP 3754 or COMP 2007

4780 Honours Project introduces computer science honours students to research activities, familiarizes them with a special problem in computer science, and provides independent study on an advanced topic under the direct supervision of a member of the computer science faculty. The topic is decided in consultation with the supervisor. The student is required to produce a written report on the project, to include the literature search on the topic, and to present this work at a departmental seminar prior to the last week of the semester.
PR: admission to the honours program and permission of the Head of Department

4800-4825 Special Topics will be offered as departmental resources permit.
CO: Special topics courses are not offered on a regular basis, but whenever departmental resources permit. For these reasons, the co-requisites can vary each time the courses are offered.
PR: Special topics courses are not offered on a regular basis, but whenever departmental resources permit. For these reasons, the prerequisites can vary each time the courses are offered.

AR = Attendance requirement; CH = Credit hours are 3 unless otherwise noted; CO = Co-requisite(s); CR = Credit can be retained for only one course from the set(s) consisting of the course being described and the course(s) listed; LC = Lecture hours per week are 3 unless otherwise noted; LH = Laboratory hours per week; OR = Other requirements of the course such as tutorials, practical sessions, or seminars; PR = Prerequisite(s); UL = Usage limitation(s).
TO: Wolfgang Banzhaf, Department Head, Department of Computer Science

FROM: Alison Ambi, Science Research Liaison Librarian, QEII Library

DATE: November 2015

RE: Library evaluation for proposed calendar changes associated with the Computer Science undergraduate curriculum update:

- Introduction of 37 new courses (See Appendix 1) and 6 new major streams
- Removal of former courses
- Associated housekeeping calendar adjustments (prerequisites, graduation requirements, etc.)
Summary

The proposed housekeeping calendar changes and course discontinuations associated with the Computer Science undergraduate curriculum update will have no effect on Library resources.

Of the 37 proposed new courses, 15 have been created by re-packaging topics previously taught in other undergraduate courses (see Appendix 1). These courses should therefore be adequately supported by current library resources and collections guidelines, and an evaluation was not necessary.

An evaluation of library resources was conducted to determine whether current holdings and collections guidelines will adequately support the remaining 22 courses.

The proposed changes to the undergraduate curriculum follow recommendations by the ACM (Association of Computing Machinery) and the IEEE (Institute of Electrical and Electronic Engineers). These recommendations reflect current research trends in the field. Memorial subscribes to the electronic products of these two organizations as well as many other core resources in the field. Memorial researchers consequently have access to a strong collection of primary resources.

Undergraduate students in Computer Science, however, tend to require secondary literature and practical guides to supplement their textbooks. Until they reach the upper years the primary research literature is typically too specific or too technical for most students’ purposes.

This evaluation therefore focused on the extent to which the core primary research is supplemented by book holdings. The library purchases books both individually and in multi-disciplinary eBook packages like SpringerLink, ebrary, IGI Global, etc.

While the current library book holdings can adequately supplement the textbooks for the new courses, a few areas of the collection should be supplemented or refreshed to ensure that they are well supported. Specifically:

- Introductory texts and manuals for programming languages will need to be refreshed. The relative merits of purchasing physical or eBooks in this genre will be considered and in December more beginner guides to Python will be purchased and the collection of manuals for various other languages will be updated.
- The collection guidelines for Computer Science will be changed to ensure that purchasing is more focused on some of the newer topics over the next few years, for example nature-inspired computing, visual, game and mobile web programming, 3D graphics, artificial intelligence in games, autonomous systems and machine learning. As many of these topics will not be taught until 2018/2019 there is time to strengthen the collection in these areas.
- A selection of the recommended texts for the upper level courses will be purchased or updated over the next few years.
Analysis

Library Holdings Evaluation

The proposed Computer Science courses are based on undergraduate curriculum recommendations by the ACM (Association of Computing Machinery) and the IEEE (Institute of Electrical and Electronic Engineers). These recommendations reflect current research trends in the field.

Memorial Libraries subscribes to both the ACM and IEEE digital products:
- ACM Digital Library - Every article ever published by the ACM and citations from other major publishers in computing
- IEEE Xplore - Journals and Books

In addition to the ACM and IEEE products, students and researchers at Memorial are provided with access to many computer science journals from other publishers and a range of other electronic collections and indexes relevant to the field of Computer Science including Web of Science, Scopus, Abstracts in New Technology & Engineering, The Collection of Computer Science Bibliographies, Compendex, and Proquest Dissertations and Theses.

Computer Scientists also benefit from a culture of openly sharing their research, for example in the freely accessible article archives CoRR (Computing Research Repository housed on ArXiv) and CiteSeerX.

Memorial researchers consequently have access to a strong collection of core primary resources reflecting current trends in the field, as well as indexing tools to allow the discovery of relevant literature beyond the current holdings.

Undergraduate students in Computer Science, however, tend to require secondary literature, and practical guides to supplement their textbooks. Until they reach the upper years the primary research literature is typically too specific or too technical for most students’ purposes.

This evaluation therefore focused on the extent to which the core primary research is supplemented by book holdings. The library purchases books both individually and in multi-disciplinary eBook packages like SpringerLink, ebrary, IGI Global, etc.

Searches were conducted in “OneSearch” (limited to “catalogue” and publication start date 2005) to estimate the book holdings relevant to the key topics associated with the new courses. While the figures for paper books in the QEII library are accurate, some of the eBook numbers may be inflated because eBooks are sometimes indexed at the chapter level and the results sometimes include a few other things (for example conference proceedings). When eBook numbers exceed a few hundred, this is probably why, and these large numbers can simply be interpreted as “we have many electronic book-type documents on this topic.” Books and eBooks are also often not tagged with the same subject headings. Any list of “hits” from a search using a subject heading might favour results in one or the other category. Caveats aside, the figures can provide a sense of the strength of the collection on particular topics and where the collection might need to be supplemented or refreshed.

Alison Ambi, Collections Division, QEII Library, St. John’s, Newfoundland. Canada A1B 3Y8
Phone: 709 864-7125 Email: ambi@mun.ca Fax: 709 864 2153
Core Courses

Of the 11 proposed new core courses, 9 have been created by repackaging topics that are currently taught. (See Appendix 1) Evaluations for these will not be necessary. Two have new content:

COMP 1001 Introduction to Programming

COMP 2001 Object-Oriented Programming and Human-Computer Interaction

Manuals and introductory texts for the programming languages used in these courses are the most likely supplemental resources that students might seek. For the Introduction to programming course Python will now be taught while Java will be used for Object-Oriented Programming course. Because programming languages are developed continually, results were limited to those published from 2005 onwards.

<table>
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<th>Subject Heading/Keywords</th>
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<td>#S: Python (Computer program language)</td>
<td>18*</td>
<td>118</td>
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<td>S: Java (Computer Programming Language)</td>
<td>23</td>
<td>399</td>
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<td>S: Human computer interaction</td>
<td>169</td>
<td>1596</td>
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</table>

*Entries preceded by "S:" are controlled vocabulary subject terms, rather than just keywords.

*Only 2 truly introductory titles published after 2005 are currently available at the QEII library.

The paper manuals for these programming languages are a little dated. A few more recent Python introductory texts would be ideal for serving these students. Introductory titles from the O'Reilly series have been made available for a few years through the Safari eBook package, but students have expressed a preference for this type of resource to be available as physical rather than eBooks. For this reason, and due to budget constraints, the Safari package is slated for cancellation. The challenge with physical books is they are available to only one user at a time and recently published books in this genre are high theft items. It might be beneficial to consider a smaller more affordable and highly focused Safari package in conjunction with the purchase of a few physical introductory texts.

Journal articles are not typically useful for studies at this level.

Alison Ambl, Collections Division, QEII Library, St. John's, Newfoundland, Canada A1B 3Y1
Phone: 709 864-7125 Email: ambl@mun.ca Fax: 709 864 2153
Streams:

1. Net Centric Computing

COMP 2100 Social Web Analysis

COMP 3100 Web Programming

COMP 4100 Web Services
Liang-Jie Zhang, Jia Zhang and Hong Cai, Services Computing, Springer 2007. (SpringerLink)

COMP 4101 Search Engines

Because many of these topics/terms like “social networks” are discussed in literature from other fields (Psychology, Sociology, Education, etc.) it was a little more challenging to get purely Computer Science-focused results sets. There might still be “noise” in these numbers.

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<th>Keywords/Subject Headings</th>
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<td>Computer science AND S: Information technology - social aspects</td>
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<td>S: Web search engines</td>
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<td>S: Online Social Networks AND location</td>
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<td>S: Social Networks AND privacy</td>
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<td>Web programming AND (browser* OR server* OR HTTP)</td>
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<td>“Server side” AND script*</td>
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<td>Node.js</td>
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</tr>
</tbody>
</table>
2. Smart Systems

COMP 3200 Algorithmic Techniques for Autonomous Systems
(QEII stacks)

COMP 3201 Introduction to Nature-Inspired Computing

COMP 3202 Introduction to Machine Learning

COMP3301 Visual Computing and Applications (See visual computing stream)
3. Visual Computing and Games

COMP 2300 Introduction to Multimedia Programming

COMP 3300 Interactive Technologies
S. Blackman (2013) Beginning 3D Game Development with Unity (2nd Ed.). Springer. (SpringerLink)

COMP 3301 Visual Computing and Applications

COMP 4300 Introduction to Game Programming
Sanjay Madhav, Game Programming Algorithms and Techniques.

COMP 4301 Computer Vision

COMP 4302 3D Computer Graphics

COMP 4303 Artificial Intelligence in Computer Games

Alison Ambi, CoPetitions Division, QEII Library, St. John’s, Newfoundland, Canada A1B 3Y1
Phone: 709 864 7125 Email: ambi@muni.ca Fax: 709 864 2153
COMP 4304 Data Visualization
Scott Marray, Interactive Data Visualization for the Web, O'Reilly, 2013.

<table>
<thead>
<tr>
<th>Keywords/Subject Headings</th>
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<td>S: Application Software — Development AND Android</td>
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<td>S: Image processing — digital techniques</td>
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<td>S: Computer vision AND algorithm*</td>
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<td>S: Computer Games - programming</td>
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</table>

4. Data Science

COMP 3202 Introduction to Machine Learning (See section 2 — Smart Systems)

COMP 3400 Introduction to Databases

COMP 3401 Introduction to Data Mining
Jiawei Han, Micheline Kamber and Jian Pei, Data Mining, Concepts and Techniques 3rd Edition, Morgan Kaufmann Publishers, 2012. (QEIi stacks)

COMP 4405 Privacy and Security — An Introduction
Alfred J. Menezes, Paul C. van Oorschot and Scott A Vanstone, Handbook of Applied Cryptography, CRC Press, 1996 (QEIi stacks and free online access: http://cacr.uwaterloo.ca/hac)
5. Scientific Computing

COMP 3500  Introduction to Scientific Computing

COMP 3501  Computational Linear Algebra with Applications
Alan Laub, Computational Matrix Analysis, SIAM, 2012.
COMP 4500  Numerical Optimization with Applications  

COMP 4501  Numerical Algorithms for Shared and Distributed Memory Architecture  
Kaminsky, A., Building Parallel Programs: SMPs, Clusters & Java, Course Technology, 2010.  

<table>
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<td>S: computer science AND distributed memory</td>
<td>50</td>
<td>300</td>
</tr>
<tr>
<td>S: Parallel programming (computer science)</td>
<td>17</td>
<td>61</td>
</tr>
<tr>
<td>S: Numerical calculations</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>S: Numerical calculations AND Algorithms</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

6. Theory of Computing

COMP 3600  Algorithm Design and Analysis  

COMP 3601  Mathematical Methods in Theory of Computation  
No texts

Alison Ambi, Collections Division, QEII Library, St. John's, Newfoundland, Canada A1B 3Y1  
Phone: 709 864-7125    Email: ambi@mun.ca    Fax: 709 864 2153
COMP 3602  Introduction to the Theory of Computation  

<table>
<thead>
<tr>
<th>Keywords/Subject Headings</th>
<th>QEII Books</th>
<th>eBooks</th>
</tr>
</thead>
<tbody>
<tr>
<td>S: Computer algorithms</td>
<td>150</td>
<td>229</td>
</tr>
<tr>
<td>S: Algorithms</td>
<td>271</td>
<td>771</td>
</tr>
<tr>
<td>S: Algorithms AND T: design</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>T: “analysis of algorithms”</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>S: Theory of computation</td>
<td>20</td>
<td>274</td>
</tr>
<tr>
<td>S: Computer Science - Mathematics</td>
<td>51</td>
<td>331</td>
</tr>
<tr>
<td>S: Number theory AND “Computer Science”</td>
<td>4</td>
<td>39</td>
</tr>
<tr>
<td>S: Graph Theory AND “Computer Science”</td>
<td>27</td>
<td>43</td>
</tr>
<tr>
<td>S: Algorithms AND S: Algorithm Analysis and Problem Complexity</td>
<td>55</td>
<td>150</td>
</tr>
</tbody>
</table>

Conclusions

All of the topics in the proposed new courses are supported to some extent by current library holdings. Most are supported well or adequately.

Some areas of the collection should ideally be enhanced, either because this topic has not previously been a priority or, because the topic is relatively new less has been published. For example the collections related to nature-inspired computing, visual, game and mobile web programming, 3D graphics, artificial intelligence in games, autonomous systems and machine learning could be strengthened. It is anticipated that many of the courses on these topics will not be offered until 2018 or 2019, which allows plenty of time to enhance the collection. Modifications will be made to the Computer Science collections guidelines to ensure that these topics receive focused collection development over the next few years.

Many of the beginner guides and manuals for the programming languages used in the new curriculum are dated. A few more recent introductory texts will need to be purchased in December, especially for Python. While students prefer physical books in this genre, the single-user limitations and high theft rate make this method of addressing the need less practical. Access to introductory titles from the O’Reilly series could be obtained by negotiating a smaller Safari eBook package (the current package is too costly to retain). Options will be considered and action will be taken to rectify this gap in December.

While the library does not typically purchase text books, texts recommended for the upper level courses are often key texts in the field. We appear to have roughly half of the texts for the upper-level courses (some are older editions). Over time we can work on adding the others to the collection.
Appendix 1 – Courses, Content and Timelines

Note: The information in this appendix was provided by the Computer Science department.

Appendix Table 1: New Courses - Summary of Content and Introduction Schedule

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>New Content?</th>
<th>Previously Covered In</th>
<th>Year to be Introduced? [*]</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 1000</td>
<td>Computer Science – An Introduction</td>
<td>No</td>
<td>1700</td>
<td>2016</td>
</tr>
<tr>
<td>COMP 1001</td>
<td>Introduction to Programming</td>
<td>30% (N)</td>
<td>1710</td>
<td>2016</td>
</tr>
<tr>
<td>COMP 1002</td>
<td>Logic for Computer Science</td>
<td>No</td>
<td>2742</td>
<td>2016</td>
</tr>
<tr>
<td>COMP 2001</td>
<td>Object-Oriented Programming and Human-Computer Interaction</td>
<td>10% (N)</td>
<td>2710</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2002</td>
<td>Data Structures and Algorithms</td>
<td>No</td>
<td>2711</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2003</td>
<td>Computer Architecture</td>
<td>No</td>
<td>3724</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2004</td>
<td>Operating Systems</td>
<td>No</td>
<td>4721</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2005</td>
<td>Software Engineering</td>
<td>No</td>
<td>3736</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2006</td>
<td>Computer Networking</td>
<td>No</td>
<td>3715</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2007</td>
<td>Information Management</td>
<td>No</td>
<td>3754</td>
<td>2017</td>
</tr>
<tr>
<td>COMP 2008</td>
<td>Social Issues and Professional Practice</td>
<td>No</td>
<td>2760</td>
<td>2017</td>
</tr>
</tbody>
</table>

Stream – Net-Centric Computing

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>New Content?</th>
<th>Previously Covered In</th>
<th>Year to be Introduced? [*]</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 2100</td>
<td>Social Web Analysis</td>
<td>100%</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3100</td>
<td>Web Programming</td>
<td>80%</td>
<td>3715</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 4100</td>
<td>Web Services</td>
<td>80%</td>
<td>3715</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4101</td>
<td>Search Engines</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stream – Smart Systems

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>New Content?</th>
<th>Previously Covered In</th>
<th>Year to be Introduced? [*]</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3200</td>
<td>Algorithmic Techniques for Autonomous Systems</td>
<td>100%</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3201</td>
<td>Introduction to Nature-Inspired Computing</td>
<td>70%</td>
<td>4752, partially</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3202</td>
<td>Introduction to Machine Learning</td>
<td>100%</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3301</td>
<td>Visual Computing and Applications</td>
<td>See below</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Stream – Visual Computing and Games

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 2300</td>
<td>Introduction to Multimedia Programming</td>
<td>20%</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3300</td>
<td>Interactive Technologies</td>
<td>80%</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3301</td>
<td>Visual Computing and Applications</td>
<td>90%</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 4300</td>
<td>Introduction to Game Programming</td>
<td>100%</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4301</td>
<td>Computer Vision</td>
<td>50%</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4302</td>
<td>3D Computer Graphics</td>
<td>100%</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4303</td>
<td>Artificial Intelligence in Computer Games</td>
<td>100%</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4304</td>
<td>Data Visualization</td>
<td>50%</td>
<td>2019</td>
</tr>
</tbody>
</table>

### Stream – Data Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3202</td>
<td>Introduction to Machine Learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP 3400</td>
<td>Introduction to Databases</td>
<td>no</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3401</td>
<td>Introduction to Data Mining</td>
<td>100%</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 4405</td>
<td>Security and Privacy – An Introduction</td>
<td>100%</td>
<td>2016</td>
</tr>
</tbody>
</table>

### Stream – Scientific Computing

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3500</td>
<td>Introduction to Scientific Computing</td>
<td>No</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3501</td>
<td>Computational Linear Algebra with Applications</td>
<td>No</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 4500</td>
<td>Numerical Optimization with Applications</td>
<td>No</td>
<td>2019</td>
</tr>
<tr>
<td>COMP 4501</td>
<td>Numerical Algorithms for Shared and Distributed Memory Architecture</td>
<td>100%</td>
<td>2019</td>
</tr>
</tbody>
</table>

### Stream – Theory of Computing

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 3600</td>
<td>Algorithm Design and Analysis</td>
<td>No</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3601</td>
<td>Mathematical Methods in Theory of Computation</td>
<td>100%</td>
<td>2018</td>
</tr>
<tr>
<td>COMP 3602</td>
<td>Introduction to the Theory of Computation</td>
<td>No</td>
<td>2018</td>
</tr>
</tbody>
</table>

(*) Estimate  
(**) Graduate course already exists  
(##) COMP 1001 Programming Language changes from JAVA to PYTHON  
COMP 2001 The HCI component of the course
### Table 2: Courses to be Discontinued over the next Four Years

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Topic subsumed in new course?</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 2602</td>
<td>Computer Programming in Fortran*</td>
<td>1510 **</td>
</tr>
<tr>
<td>COMP 2650</td>
<td>Problem Solving with Personal Computers</td>
<td>1600 **</td>
</tr>
<tr>
<td>COMP 2752</td>
<td>Introduction to Business Data Processing*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 2801</td>
<td>Introduction to Computing for Business</td>
<td>No</td>
</tr>
<tr>
<td>COMP 3714</td>
<td>Programming Languages and their Processors*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 3717</td>
<td>Symbolic Computation and Recursion*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 3723</td>
<td>Logic Design*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 3751</td>
<td>Computational Aspects of Operations Research*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 3790</td>
<td>Directed Readings*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 4719</td>
<td>Software Specification*</td>
<td>4718 **</td>
</tr>
<tr>
<td>COMP 4725</td>
<td>Introduction to LSI Design*</td>
<td>No</td>
</tr>
<tr>
<td>COMP 4735</td>
<td>Advanced Matrix Computations and Applications*</td>
<td>3501, partially</td>
</tr>
<tr>
<td>COMP 4761</td>
<td>Human-Computer Interaction</td>
<td>2001, 3300</td>
</tr>
</tbody>
</table>

**Housekeeping: Inactive Courses and Courses that have already been replaced – to be removed from the Calendar after 2015-2016**

**To be immediately discontinued after this academic year, 2015-2016:**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP-1700</td>
<td>Introduction to Computer Science</td>
</tr>
<tr>
<td>COMP-1710</td>
<td>Object-Oriented Programming</td>
</tr>
<tr>
<td>COMP-4748</td>
<td>Introduction to the Science of Complexity</td>
</tr>
<tr>
<td>COMP-4754</td>
<td>Database Systems</td>
</tr>
<tr>
<td>COMP-4767</td>
<td>Information Visualization and Applications</td>
</tr>
</tbody>
</table>

**To be discontinued after 2016-2017:**

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>COMP-2710</td>
<td>Object-Oriented Programming II</td>
</tr>
<tr>
<td>COMP-2711</td>
<td>Introduction to Algorithms and Data Structures</td>
</tr>
<tr>
<td>COMP-2742</td>
<td>Logic for Computer Science</td>
</tr>
<tr>
<td>COMP-2760</td>
<td>Encountering the Computer: Society and the Individual</td>
</tr>
<tr>
<td>COMP-3754</td>
<td>Introduction to Information and Intelligent Systems</td>
</tr>
<tr>
<td>COMP-4721</td>
<td>Operating Systems</td>
</tr>
</tbody>
</table>
To be discontinued after 2017-2018:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP-1550</td>
<td>Introduction to Multimedia Application Development</td>
</tr>
<tr>
<td>COMP-3715</td>
<td>Network Computing with Web Applications</td>
</tr>
<tr>
<td>COMP-3716</td>
<td>Software Methodology</td>
</tr>
<tr>
<td>COMP-3724</td>
<td>Computer Organization</td>
</tr>
<tr>
<td>COMP-3725</td>
<td>Computer Architecture and Operating Systems</td>
</tr>
<tr>
<td>COMP-3731</td>
<td>Introduction to Scientific Computing</td>
</tr>
<tr>
<td>COMP-3753</td>
<td>Computational Aspects of Linear Programming</td>
</tr>
<tr>
<td>COMP-4734</td>
<td>Advanced Matrix Computations and Applications</td>
</tr>
<tr>
<td>COMP-4740</td>
<td>Design and Analysis of Algorithms</td>
</tr>
<tr>
<td>COMP-4751</td>
<td>Computer Graphics</td>
</tr>
<tr>
<td>COMP-4753</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>COMP-4746</td>
<td>Special Topics in Theoretical Aspects</td>
</tr>
</tbody>
</table>

(*) Inactive course  
(***) Course already exists
Faculty of Arts

11.6 Computer Science

For Departmental Regulations and Course Descriptions, see Faculty of Science section of the Calendar. The following undergraduate programs are available in the Department of Computer Science: Add: www.mun.ca/computerscience

1. Applied Mathematics and Computer Science Joint Major (B.Sc. only)
2. Computer Internship Option (CiIO)
3. Computer Science Honours (B.A., B.Sc.)
4. Computer Science and Economics Joint Major (B.Sc. Θ only)
5. Computer Science and Geography Joint Honours (B.Sc. only)
6. Computer Science and Geography Joint Major (B.Sc. only)
7. Computer Science and Physics Joint Honours
8. Computer Science and Physics Joint Major
9. Computer Science and Pure Mathematics Joint Honours (B.Sc. only)
10. Computer Science and Pure Mathematics Joint Major (B.Sc. only)
11. Computer Science and Statistics Joint Honours
12. Computer Science and Statistics Joint Major (B.Sc. only)
13. Computer Science (Software Engineering) Honours (B.Sc. only)
14. Major in Computer Science (B.A., B.Sc.)
15. Minor in Computer Science (B.A., B.Sc.)

As there is a re-ordering and re-numbering of the above due to the addition of the new streams, the revised list would appear as follows:

1. Applied Mathematics and Computer Science Joint Major (B.Sc. only)
2. Computer Science and Economics Joint Major (B.Sc. Θ only)
3. Computer Science and Geography Joint Honours (B.Sc. only)
4. Computer Science and Geography Joint Major (B.Sc. only)
5. Computer Science and Physics Joint Honours
6. Computer Science and Physics Joint Major
7. Computer Science and Pure Mathematics Joint Honours (B.Sc. only)
8. Computer Science and Pure Mathematics Joint Major (B.Sc. only)
9. Computer Science and Statistics Joint Honours
10. Computer Science and Statistics Joint Major (B.Sc. only)
11. Computer Science Honours (B.A., B.Sc.)
12. Major in Computer Science (B.A., B.Sc.)
13. Computer Science (Network-centric Computing) Major (B.Sc. only)
14. Computer Science (Smart Systems) Major (B.Sc. only)
15. Computer Science (Visual Computing and Games) Major (B.Sc. only)
16. Computer Science (Data Science) Major (B.Sc. only)
17. Computer Science (Scientific Computing) Major (B.Sc. only)
18. Computer Science (Theory of Computation) Major (B.Sc. only)
19. Computer Science (Software Engineering) Honours (B.Sc. only)
20. Minor in Computer Science (B.A., B.Sc.)
21. Computer Internship Option (CiIO)
Proposed Secondary Changes for Review by Departments

Suggestions for updates are noted by Department, with strikeout and underlined texts. These are proposed for consideration by individual departments reflecting the proposed changes to the existing Computer Science program.

Faculty of Arts
Department of Economics

p.114
11.7.3 Major in Economics (B.A. or B.Sc.)
9c. Computer Science 4760 1000, and an additional 3 credit hours of Computer Science. With the approval of the Head of the Department or delegate, students may substitute another 1000-level Computer Science course for Computer Science 4760 1000. Minors in Computer Science should enroll in Computer Science 4740.

p.117
Major in Economics (Co-operative Option) B.Sc. - Academic Course Program Table
Term 1 (Fall)
Computer Science 4760 1000

p.118
Honours in Economics (Co-operative Option) B.Sc. - Academic Course Program Table
Term 1 (Fall)
Computer Science 4760 1000 [see Note 1]
Notes: 1. Another 1000-level Computer Science course may be substituted for Computer Science 4760 1000 with the approval of the Department Head.

Department of Geography

p.103
7.7.4 Course List
Computer Science 4740 Computer Science 1001

p.174
12.12 Geography
4261 Advanced Methods in Geographic Information Systems (GIS) explores the nature and use of advanced GIS algorithms, discrete and continuous data structures, computational methods and analysis of error for the purpose of analysing and modelling spatial patterns and processes. Laboratory exercises permit students to use GIS software to explore as well as develop problem solving and modelling skills for a wide variety of real world applications.
LH: 3
PR: GEOG 3260; Mathematics 2050; Computer Science 4740 1001; (or equivalent, with permission of instructor and the Head of Department).

Proposed Secondary Changes from Computer Science - December 1, 2015
Faculty of Science  
Department of Biology  

p.488  
9.2.3.1 Major in Biology  
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.  

9.2.3.2 Major in Biology (Cell and Molecular)  
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2650 1000 or 1600.  

9.2.3.3 Major in Biology (Ecology and Conservation)  
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2550 1000 or 1600.  

9.2.3.4 Major in Biology (Marine)  
It is recommended, but not required, that a Computer Science course be included and the Department of Biology strongly recommends Computer Science 2550 1000 or 1600.  

p.515  
3951 Introduction to Bioinformatics (same as Computer Science 3550) deals with the development and application of computational methods to address biological problems. The course will focus on the fundamental concepts, ideas and related biological applications of existing bioinformatics tools. This course will provide hands-on experience in applying bioinformatics software tools and online databases to analyze experimental biological data, and it will also introduce scripting language tools typically used to automate some biological data analysis tasks.  
CR: Computer Science 3550  
LH: 3  
PR: BIOL 2060 or Biochemistry 2101, and one Computer Science course at the 1000-level or above excluding Computer Science 1400, or Computer Science 1600 and Computer Science 2000; or Computer Science 2500 or Computer Science 2740 2001, and one Biology course at the 1000-level or above excluding BIOL 2040 and BIOL 2041; or permission of the course instructor.  

Department of Chemistry  

p.491  
9.3.6 General Degree - Major in Computational Chemistry  

9.3.6.2 Suggested Program of Study  
5. Computer Science 1510 and 1710 1001  

9.3.7 Honours Degree in Computational Chemistry  

Proposed Secondary Changes from Computer Science - December 1, 2015  
Page 2

9.3.7.2 Suggested Program of Study
5. Computer Science 1510 and 4740 1001

Department of Mathematics and Statistics

p.528

2130 Technical Writing in Mathematics is a project oriented course combining mathematical investigation and technical writing. By using computer programming, graphical and typesetting tools, students will explore mathematical concepts and will produce technical reports of professional quality. The latter will combine elements of writing and graphics to convey technical ideas in a clear and concise manner.

PR: admission to Applied or Pure Mathematics major and MATH 1001 and (Computer Science 1510 or 4740 or 2719 or 2662 1001 or 2001; or permission of the Head of Department)

UL: qualifies as a Research/Writing course in the Faculty of Arts

3132 Numerical Analysis I includes a discussion of round-off error, the solution of linear systems, iterative methods for nonlinear equations, interpolation and polynomial approximation, least squares approximation, fast Fourier transform, numerical differentiation and integration, and numerical methods for initial value problems.

CR: Computer Science 3500 and Computer Science 3731

LH: 1.5

PR: MATH 2000, MATH 2050, and a computing course (Computer Science 1510 is recommended)

4131 Numerical Linear Algebra - inactive course.
CR: COMP 4500

4132 Introduction to Optimization - inactive course
CR: COMP 4500

4133 Numerical Optimization - inactive course.
CR: COMP 4500

Department of Physics and Physical Oceanography

p.500

9.10.3 Honours in Physics

The Honours Physics program in and beyond the third year requires a familiarity with computer programming and numerical analysis. In choosing electives for this program, the Department recommends that students supplement the prescribed program with the following courses: Computer Science 2662 and 3734, 2500 or 2510, and 3500 or 3731 (or Mathematics 2130 and 3132).

Proposed Secondary Changes from Computer Science - December 1, 2015
Department of Psychology

p.504
9.11.5 Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)
3d. Computer Science: Any 2000, 3000, or 4000 level course except the former 2650 and 2801
sent-mail: Re: Calendar Changes for Computer Science Program

Date: Fri, 16 Oct 2015 16:23:46 -0230
From: cs-chair <cs-chair@mun.ca>
To: cs-chair <cs-chair@mun.ca>
Cc: stacey.m@mun.ca, fba.ad.undergrad@mun.ca, shicks@mun.ca, bfeal@mun.ca, dpeters@mun.ca, eng/consult@mun.ca, associatevpoffice@granfell.mun.ca, mehickey@mun.ca, mgconsultations@mi.mun.ca, cvardy@mun.ca, Sherry.caines@med.mun.ca, mwolk@mun.ca, canh.nurse@mun.ca, pharminfo@mun.ca, deansci@mun.ca, adteamgradswk@mun.ca, uel@mun.ca, biohead@mun.ca, pmarino@mun.ca, chemhead@mun.ca, jhanchar@mun.ca, math-head@mun.ca, fletcher@mun.ca, joliantal@mun.ca, psychology.head@mun.ca, wlocke@mun.ca, ncollo@mun.ca, banzha@mun.ca

Subject: Re: Calendar Changes for Computer Science Program

Part(s): 2 Proposal-for-Revised-CS-Program-with-Streams.pdf application/pdf 963.23 KB
3 Course-Outlines-for-Proposed-Streams.pdf application/pdf 2082.85 KB
4 Proposed-Secondary-Changes.pdf application/pdf 212.88 KB
5 Course-Outlines-for-CS-Core.pdf application/pdf 910.26 KB

Please find 4 of a total eight attachments for the following email. The remaining 4 will follow in the next email.

Quoting cs-chair <cs-chair@mun.ca>:

> Hello,
>
> The Department of Computer Science has undertaken a massive review of its
> current undergraduate program. The proposed changes incorporate
> recommendations of our latest APR report, and follow the newest (2013)
> ACM/IEEE
> guidelines for offering Computer Science curricula.
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> We would appreciate receiving your comments by November 12.
>
> As a result of this process, your school/department/faculty may wish to
> consider
> this as an opportunity to include certain Computer Science course(s) in your

https://webmail.mun.ca/munlogin/imp/message.php?index=505

11/23/2015
> curriculum. Please feel free to contact me to explore this opportunity.
> Best regards,
> Wolfgang Banzhaf
> Department Head
> --
> Department of Computer Science
> Memorial University
> St. John's, NL A1B 3X5
> Phone: (709) 864-8652
> Fax: (709) 864-2009
> cs-chair@mun.ca
> --------
>
sent-mail: Re: Calendar Changes for Computer Science Program (10 of 312)

Date: Fri, 16 Oct 2015 16:27:00 -0230
From: cs-chair <cs-chair@mun.ca>
To: cs-chair <cs-chair@mun.ca>
Cc: stacey.m@mun.ca, fb.ad.undergrad@mun.ca, shicks@mun.ca, bfraize@mun.ca, dpeters@mun.ca, engroconsult@mun.ca, associatepolice@grenfell.mun.ca, mehickey@mun.ca, mugconsultations@mi.mun.ca, cvardy@mun.ca, Sherry.caines@med.mun.ca, mvolk@mun.ca, deanurse@mun.ca, pharmafin@mun.ca, deansci@mun.ca, deanugradswk@mun.ca, univlb@mun.ca, biohead@mun.ca, pmarino@mun.ca, chemhead@mun.ca, jianchar@mun.ca, math-head@mun.ca, fletcher@mun.ca, jolantal@mun.ca, psychology.head@mun.ca, wlocke@mun.ca, ncallio@mun.ca, banzhaf@mun.ca

Subject: Re: Calendar Changes for Computer Science Program

Part(s): 2 Proposed-Calendar-Changes-CS-Regulations.pdf application/pdf 213.78 KB
3 Faculty-of-Arts-Summary.pdf application/pdf 43.52 KB
4 Proposed-Calendar-Changes-Joint-Degrees.pdf application/pdf 115.94 KB
5 Proposed-Calendar-Changes-Existing-CS-Courses.pdf application/pdf 378.84 KB

The remaining 4 attachments are now attached.

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

Please find 4 of a total eight attachments for the following email. The remaining 4 will follow in the next email.

>
>
> Quoting cs-chair <cs-chair@mun.ca>:
> >
> > Hello,
> >
> > The Department of Computer Science has undertaken a massive review of its
> > current undergraduate program. The proposed changes incorporate
> > recommendations of our latest APR report, and follow the newest (2013)
> > ACH/IEEE
> > guidelines for offering Computer Science curricula.
> >
We would appreciate receiving your comments by November 12.

As a result of this process, your school/department/faculty may wish to consider this as an opportunity to include certain Computer Science course(s) in your curriculum. Please feel free to contact me to explore this opportunity.

Best regards,

Wolfgang Banzhaf
Department Head

--
Department of Computer Science
Memorial University
St. John's, NL A1B 3X5
Phone: (709) 864-8652
Fax: (709) 864-2009
cs-chair@mun.ca

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11/23/2015
<table>
<thead>
<tr>
<th>Consultations Sought From</th>
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<td>Department of Earth Sciences</td>
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<td>Department of Economics</td>
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<td>Department of Geography</td>
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<td>Department of Mathematics and Statistics</td>
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<tr>
<td>Department of Ocean Sciences</td>
<td>No</td>
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<tr>
<td>Department of Physics and Oceanography</td>
<td>Yes</td>
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<tr>
<td>Department of Psychology</td>
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<td>Department of Computer Engineering</td>
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<td>School of Social Work</td>
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<td>Grenfell Campus</td>
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<tr>
<td>Marine Institute</td>
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</table>
Inbox: RE: Calendar Changes for Computer Science Program (1 of 395)

Date: Tue, 27 Oct 2015 11:31:54 +0000
From: Biochemistry Head <biohead@mun.ca>
To: cs-chair <cs-chair@mun.ca>
Subject: RE: Calendar Changes for Computer Science Program

Wolfgang

Nothing but support from Biochemistry for what looks like a fairly major overhaul. Best of luck with this.

Mark

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

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

From: cs-chair [cs-chair@mun.ca]
Sent: October 16, 2015 4:25 PM
To: cs-chair
Cc: Mercer, Stacey; fba.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; dpeters@mun.ca; engrconsult@mun.ca; associatevpo@fba@grenfell.mun.ca; Hickey, Marie; miugconsultations@mi.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharminfo@mun.ca; Dean of Science; adeanugradswk; Library Correspondence; Biochemistry Head; Marino, Paul; chemhead@mun.ca; jhanchar@mun.ca; math-head@mun.ca; Fletcher, Garth; Lagowski, Jolanta; psychology.head@mun.ca; wlocke@mun.ca; Catto, Norm; banzhaf@mun.ca
Subject: Re: Calendar Changes for Computer Science Program

Please find 4 of a total eight attachments for the following email. The remaining 4 will follow in the next email.


10/27/2015
Subject: RE: Urgent: Consultation on program changes
From: "Marino, Paul" <pmarino@mun.ca>
Date: 2015-12-01, 11:45 AM
To: Wolfgang Banzhaf <banzhaf@mun.ca>

Hi Wolfgang,
This was one of the program changes that did not get transmitted to our undergraduate officer and hence committee. Apparently, this isn't just Biology though - I think the problem is that sometimes these go to me and to the Admin. Secretary who then sends them to our undergrad officer, sometimes they go to all 3 of us and sometimes they go to just me. These inconsistencies are allowing some of these proposals to slip through the cracks and that is what happened to CS's.
Nonetheless, we did look at it and our undergrad committee discussed it with Lourdes (who is on this committee) and there is nothing in your proposed changes that we have any particular concerns about. Ultimately, as we review our own program (we are having an APR) we may have to make adjustments to our own program, but otherwise we are fine with your proposed changes.
I apologize for this, but it has happened with several program consultations this semester.
Paul

-----Original Message-----
From: Wolfgang Banzhaf [mailto:banzhaf@mun.ca]
Sent: December-01-15 9:55 AM
To: Marino, Paul
Cc: Wolfgang Banzhaf
Subject: Urgent: Consultation on program changes

Dear Paul,

Computer Science has sent out a set of changes for our undergrad program that also impacts Biology. We have changed and modernized our core courses and removed some obsolete courses.

For some reason, your department has not sent an agreement on comments on the proposed secondary changes.

Today is the day we have to submit to the Faculty of Science for council meeting next week. Could you review the changes and give departmental agreement / comments by noon?

I attach the proposed secondary changes for Biology. They refer to a replacement of a recommended course COMP 2650 (which is removed) by COMP 1600 or COMP 1000 (our new introductory course to Computer Science), and to a slight change in the prerequisites of the Bioinformatics course BIOL 3951 where COMP 2710 will be replaced by COMP 2001.

I attach a list. Please let me know whether this is ok with you, otherwise, we can't put those secondary changes through with the package.

Thanks very much,

Wolfgang
Hi Wolfgang and Sharene,

I missed that! We are looking into it now to see what can be done. With COMP 2002, can 1510 not be a prerequisite as well as 1001 (like it is for COMP 3500)? Right now (according to the secondary changes) our students would take 1510, 1000, and 1001. 1510 is intro to scientific computing and 1001 is intro to computing. If 1510 could be used as a prerequisite to 2002 in place of 1001 (like it is for 3500), then we could have our students take 1510 and 1002.

Then our programs would have for example

9.3.6 General Degree - Major in Computational Chemistry

4. Computer Science 1510 and 1002
5. Computer Science 2500 or 2002
6. Computer Science 3500 or Mathematics 3132.

Thanks,
Travis

On 16/11/2015 10:48 AM, CS-Chair wrote:
> Dear Travis,
> > there are two issues you might want to look into
> > In your Comp Chem program, it seems that there now
> > might be a hidden prerequisite to COMP-2002.
> > Also, we are in the process of amending our proposal
> > by removing the prerequisite of COMP-1000 for COMP-1001.
> > Sharene would be happy to discuss this with you or
> another representative in more detail.
> Best
> Wolfgang
> On 2015-11-01 7:38 PM, Travis Fridgen wrote:
>> Dear Wolfgang,
>> We have gone through the extensive review the Computer science
>> program has undergone. Some of the revisions affect the
>> Computational Chemistry program as you have pointed out, but we have
>> absolutely no problems with the changes.
>> Take care,
>> Travis
>> On 16/10/2015 4:27 PM, cs-chair wrote:
>>> The remaining 4 attachments are now attached.
>>> ----------
>>> >>>
>>> >>> Please find 4 of a total eight attachments for the following email.
>>> The
>>> remaining 4 will follow in the next email.
>>> Quoting cs-chair <cs-chair@mun.ca>:
>>> Hello,
>>> The Department of Computer Science has undertaken a massive review
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>>> current undergraduate program. The proposed changes incorporate
>>> recommendations of our latest APR report, and follow the newest
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>>> We would appreciate receiving your comments by November 12.
>>> As a result of this process, your school/department/faculty may
>>> wish to
>>> consider
>>> this as an opportunity to include certain Computer Science
>>> course(s) in
>>> your
>>> curriculum. Please feel free to contact me to explore this
>>> opportunity.
>>> Best regards,
>>> Wolfgang Banzhaf
>>> Department Head
>>> Department of Computer Science
>>> Memorial University
>>> St. John's, NL A1B 3X5
>>> Phone: (709) 864-8652
>>> Fax: (709) 864-2009
>>> cs-chair@mun.ca
>>> --------
We are ok with the suggested changes and the most recent one point out. Alex, I assume you will take care of the changes for the calendar.

wade

-----Original Message-----
From: CS-Chair [mailto:cs-chair@mun.ca]
Sent: December-01-15 10:05 AM
To: Harland, Alex; wlocke@mun.ca
Cc: Computer Science Chair; Mercer, Stacey
Subject: Re: Calendar Changes for Computer Science Program

Dear Alex and Dr. Locke,

thanks very much for your comment and arrangement.
In regard to your comment about the Mathematics offering, I understand where you come from, but we are not authorized to make those changes to the program of the department of Mathematics. I would expect them to come from there.

Further, we have received comments from Geography, but not from Economics as of yet.

I attach the proposed secondary changes to the Economics program. They refer to our core program offerings which will change if approved: COMP 700 will be replaced by COMP 1000. This is going to be the new introductory course to Computer Science. Our first programming course will be COMP 1001, instead of the former COMP 1710 and will use Python, instead of Java as its language.

I attach the proposed secondary changes to this email for your review. Dr. Locke, please let me know whether this is agreeable to your department.
-----Original Message-----
From: Catto, Norm
Sent: October 27, 2015 10:43 AM
To: Mercer, Stacey
Subject: RE: Calendar Changes for Computer Science Program

Dear Stacey:

Drs. Rodolphe Devillers and Alvin Simms are supportive of these changes. Other faculty members may also wish to provide feedback shortly.

Best wishes
Norm

-----Original Message-----
From: Mercer, Stacey
Sent: October-26-15 4:09 PM
To: Catto, Norm
Subject: RE: Calendar Changes for Computer Science Program

Thank you

Stacey Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John’s, NL A1C 5S7
709-864-8255

-----Original Message-----
From: Catto, Norm
Sent: October 26, 2015 9:42 AM

https://webmail.mun.ca/munlogin/imp/message.php?index=19578
To: Mercer, Stacey; 'wade locke'
Subject: RE: Calendar Changes for Computer Science Program

Dear Stacey:

Thank you for writing. I met on Friday with Drs Banzhaf and Bungay concerning this. They will provide me with more information concerning the first-year courses, after which I will get back to you.

Best wishes

Norm

-----Original Message-----
From: Mercer, Stacey
Sent: October-23-15 2:04 PM
To: Catto, Norm; 'wade locke'
Subject: FW: Calendar Changes for Computer Science Program

Good morning,
You are invited to give feedback on the attached proposals.
Thank you.

Stacey Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

-----Original Message-----
From: cs-chair [mailto:cs-chair@mun.ca]
Sent: October 16, 2015 4:25 PM
To: cs-chair
Cc: Mercer, Stacey; fba.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; dpeters@mun.ca; engrcouncil@mun.ca; associatevpoffice@grenfell.mun.ca; Hickey, Marcie; mbugconsultations@mi.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharminfo@mun.ca; Dean of Science; adean@undergrad.mun.ca; Library Correspondence; Biochemistry Head; Marino, Paul; chemhead@mun.ca; jhanchar@mun.ca; math-head@mun.ca; Fletcher, Garth; Lagowski, Jolanta; psychology.head@mun.ca; wlocke@mun.ca; Catto, Norm; banzhaf@mun.ca
Subject: Re: Calendar Changes for Computer Science Program

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Quoting cs-chair <cs-chair@mun.ca>:

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> > recommendations of our latest APR report, and follow the newest (2013)
> > ACM/IEEE guidelines for offering Computer Science curricula.
> > > We would appreciate receiving your comments by November 12.
> > > As a result of this process, your school/department/faculty may wish
> > to consider this as an opportunity to include certain Computer Science

https://webmail.mun.ca/munlogin/imp/message.php?index=19578

11/23/2015
This message was written in a character set other than your own. If it is not displayed correctly, click here to open it in a new window.

-----Original Message-----
From: Elizabeth L Simms [mailto:lambert@mun.ca]
Sent: October-27-15 12:00 PM
To: Catto, Norm
Cc: Alvin Simms; Rodolphe Devillers
Subject: Re: Computer Science - Proposed Changes

Norm,

The change is acceptable to the DGISciences program course requirement to change CS 1710 by CS1001. I would appreciate that the Department of Computer Sciences includes the DGISciences section of the calendar to their package. Otherwise, we will have to wait for next year to make the change.

Thank you,
Elizabeth

Elizabeth L. Simms, PhD
Geographer, Remote Sensing
Department of Geography
Memorial University

Email: lambert@mun.ca

On 2015-10-26 12:37 PM, Alvin Simms wrote:
> Norm
> I would support Rodolphe on this especially since they are now
> including python as the programming language in this course and is
> better suited for our students.
>>
> Alvin
>


11/2/2015
On 2015-10-26 12:36 PM, Rodolphe Devillers wrote:

Hi Norm

Thanks for this. As you know, CS-1710 is a core course for the Diploma program in GISciences (i.e. not only a prerequisite but an actual required course to complete the DGIS). I looked at the proposed change (the table is very useful, thanks!) and think it is a positive change. They change their focus from Java to Python (a more relevant programming language in GIS). Also, the new course better covers some interesting aspects.

I am supportive of this change and would be happy to see this new course replace CS-1710 as a course to complete. Thanks,

Rodolphe

*******************************************************************************
Rodolphe Devillers, PhD
Associate Professor
Department of Geography
Memorial University of Newfoundland
St. John's (NL) A1B 3X9
Canada
Tel: +1 (709) 864-8412
Fax: +1 (709) 864-3119
Email: rdevillers@mun.ca
Web pages: http://www.marinegis.com
http://www.mun.ca/geog/people/faculty/rdevillers.php
Twitter: seamap
*******************************************************************************

On 2015-10-26, 11:49 AM, "James, Valarie" <vjames@mun.ca> wrote:

Hello Everyone,

Please see the e-mail below and attachment forwarded for Norm.

Thanks,
Valerie

------Original Message------
From: Catto, Norm
Sent: October-26-15 11:48 AM
Subject: Computer Science - Proposed Changes
Dear all:

Computer Science is proposing substantial changes in their programmes. The complete files have been placed in the Dropbox.

One of the proposed changes is to replace CS-1710 (currently a prerequisite for the GIS programme) with CS-1001. As well, 1700 is to be replaced by CS-1000. Computer Science’s initial proposal was that all courses that formerly had 1710 as a prerequisite would now have 1000 as a prerequisite.

After discussion with Wolfgang and Sharene on Friday, they have produced a chart showing how the new and old courses compare. This is attached (and is also in the Dropbox).

CS is trying to get this ready for the next calendar (via Science undergraduate) and therefore are asking for comments. If you have any comments on any aspects of this proposal, please let me know, and I will forward them to CS when received.

Best wishes

Norm

-----Original Message-----
From: Wolfgang Banzhaf [mailto:banzhaf@mun.ca]
Sent: October-26-15 11:20 AM
To: Catto, Norm
Cc: Sharene Bunyay; Wolfgang Banzhaf
Subject: COMP-1710 vs 1001 Synopsis

Dear Norm,

please find attached our synopsis of COMP 1710 vs the new course 1001.

I would also want to inform you that we are considering to remove the prerequisite COMP-1000 from 1001. This would allow you to freely choose between COMP-1000 and COMP-1001 as your course. We currently have no such prerequisite for COMP-1710, so carrying this feature over to the new program is a good idea.

Since that has not been decided at the current time (but it will solve a couple of problems we have), maybe you could mention this problem in your comments?

Best

Wolfgang
Inbox: Re: Fwd: RE: Calendar Changes for Computer Science... (14 of 429)

Date: Wed, 04 Nov 2015 16:35:50 -0330
From: Shannon Patrick Sullivan <shannon@mun.ca>
To: CS-Chair <cs-chair@mun.ca>
Cc: Sharene Bungay <sharene@mun.ca>, Math Head <math-head@mun.ca>, Math Undergrad Officer <mathgrad@mun.ca>
Subject: Re: Fwd: RE: Calendar Changes for Computer Science Program

This message was written in a character set other than your own. If it is not displayed correctly, click here to open it in a new window.

Hi Wolfgang,

Thank you for the opportunity to review the package of Calendar changes being proposed by the Department of Computer Science. Thank you, also, for the in-person meeting which cleared up some of this Department's concerns. However, subsequent to that meeting, additional issues were raised by some of our faculty members. These are described in the final two bullets, below.

Our comments are as follows:

* This Department supports the proposed changes to the joint honours and joint majors involving Computer Science and (as applicable) Statistics, Pure Mathematics or Applied Mathematics.

* This Department has no objection to the secondary change to Mathematics 2130 (regarding the deletion of the "UL" notation) requested by the Faculty of Arts. While we feel that such a change should originate in the first instance from the Faculty of Arts itself, we are content to have it reflected in the Computer Science package.

* This Department has reviewed the proposed new course Computer Science 1002 ("Introduction to Logic for Computer Scientists"). While we are conscious of the overlap in topics with Mathematics 2320 ("Discrete Mathematics") we are satisfied that Computer Science 1002 will not explore these topics to the same depth as Mathematics 2320, and that the focus on approaching the topics from the perspective of a computer scientist justifies the existence of Computer Science 1002 as a separate course. Indeed, we feel that Computer Science 1002 could serve as a suitable
preparatory course for students who might otherwise struggle with the content of Mathematics 2320. As such, we advocate a unidirectional credit restriction in this case -- that is, Computer Science 1002 should have a notation "CR: Mathematics 2320", but Mathematics 2320 itself should have no such credit restriction.

* Concern was also expressed that there might be considerable overlap between Computer Science 1002 and content which is currently split between Mathematics 1050 ("Finite Mathematics I") and Mathematics 1051 ("Finite Mathematics II"). In the past, there has been discussion of resequencing the topics in Mathematics 1050/1051, and the resulting organisation might create a course which more strongly resembles the proposed Computer Science 1002. Our support for Computer Science 1002 should not be construed as precluding our right to potentially reorganise Mathematics 1050/1051 in such a manner, and we anticipate that the Department of Computer Science would not hold any objections to our doing so on this basis.

* The courses comprising the Scientific Computing program also created considerable discussion in this Department. We acknowledge that the proposed new course Computer Science 3500 ("Introduction to Scientific Computing") remains sufficiently distinct from Mathematics 3132 ("Introduction to Numerical Analysis") to warrant a credit restriction, but no stronger relationship. However, we are concerned that the new courses Computer Science 3501 ("Computational Linear Algebra with Applications") and Computer Science 4500 ("Numerical Optimization with Applications") overlap considerably with our existing courses Mathematics 4131 ("Numerical Linear Algebra") and Mathematics 4132 ("Introduction to Optimization"). We feel that there is, at minimum, a potential opportunity to cross-list these courses rather than duplicating content across two departments. We believe that a discussion about this possibility is warranted before we can support the proposed Computer Science package as a whole.

Regards,
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

11/6/2015
Hi Wolfgang,

After considerable discussion with our numerical analysts, I'm afraid that our consensus is that, given the substantial overlap between the courses proposed for the Scientific Computing stream and several courses offered by this department, a period of closer consultation is necessary before we can support the proposal in its entirety.

Our numerical analysts feel that a cross-listing arrangement is warranted, and would allow these courses to be taught in an alternating fashion by our two departments. However, achieving such an arrangement might require (possibly modest) changes to the existing Mathematics courses and/or the proposed Computer Science courses. We believe that these changes should be identified and implemented before your proposal (or, at least, the Scientific Computing element of it) goes forward.

Regards,
Shannon

On 09/11/2015 1:00 PM, CS-Chair wrote:
> Hi Shannon,
> 
> thanks very much for your additional comments.
> 
> We are happy with a unidirectional credit restriction
> for COMP-1002 as you proposed.
> 
> We shall not have any objections against your department.
> revising MATH-1050 and -1051.
> In regard to the Scientific Computing stream: We are fine
> with cross-listing COMP-3501 with MATH-4131 and COMP-4500
> with MATH-4132. However, these MATH courses are currently
> listed as "inactive" in the calendar. A cross-listing requires
> deeper discussions between the department than can be
> achieved within the remaining weeks. We therefore propose
> to postpone cross-listing to the next cycle of calendar changes
> and for the moment to only credit-restrict between COMP-3501
> and MATH-4131 and COMP-4500 and MATH-4132. However,
> our goal would remain a cross-listing before these courses
> are offered the first time (presumably in Fall 2018).
>
> I hope these addresses the remaining issues between our
> departments and your department can support the proposed
> changes as a result.
>
> Best regards
>
> Wolfgang

On 2015-11-04 4:35 PM, Shannon Patrick Sullivan wrote:
>> Hi Wolfgang,
>>
>> Thank you for the opportunity to review the package of Calendar
>> changes being proposed by the Department of Computer Science. Thank
>> you, also, for the in-person meeting which cleared up some of this
>> Department's concerns. However, subsequent to that meeting, additional
>> issues were raised by some of our faculty members. These are described
>> in the final two bullets, below.
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>> Our comments are as follows:
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>> * This Department supports the proposed changes to the joint honours
>> and joint majors involving Computer Science and (as applicable)
>> Statistics, Pure Mathematics or Applied Mathematics.
>>
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>> Mathematics 2130 (regarding the deletion of the "UL" notation)
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>> Computer Science 1002 should have a notation "CR: Mathematics 2320",
>> but Mathematics 2320 itself should have no such credit restriction.
Concern was also expressed that there might be considerable overlap between Computer Science 1002 and content which is currently split between Mathematics 1050 ("Finite Mathematics I") and Mathematics 1051 ("Finite Mathematics II"). In the past, there has been discussion of resequencing the topics in Mathematics 1050/1051, and the resulting organization might create a course which more strongly resembles the proposed Computer Science 1002. Our support for Computer Science 1002 should not be construed as precluding our right to potentially reorganise Mathematics 1050/1051 in such a manner, and we anticipate that the Department of Computer Science would not hold any objections to our doing so on this basis.

The courses comprising the Scientific Computing program also created considerable discussion in this Department. We acknowledge that the proposed new course Computer Science 3500 ("Introduction to Scientific Computing") remains sufficiently distinct from Mathematics 3132 ("Introduction to Numerical Analysis") to warrant a credit restriction, but no stronger relationship. However, we are concerned that the new courses Computer Science 3501 ("Computational Linear Algebra with Applications") and Computer Science 4500 ("Numerical Optimization with Applications") overlap considerably with our existing courses Mathematics 4131 ("Numerical Linear Algebra") and Mathematics 4132 ("Introduction to Optimization"). We feel that there is, at minimum, a potential opportunity to cross-list these courses rather than duplicating content across two departments. We believe that a discussion about this possibility is warranted before we can support the proposed Computer Science package as a whole.

Regards,
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
Hi Wolfgang,

> I would like to give you a call tomorrow to see how we
> can best solve this problem.

I believe George Himinis is planning to meet with Ron Haynes and Scott
MacLachlan in the very near future about their concerns.

We can certainly still have a chat regardless, but perhaps it might make
more sense to wait and see how their discussion goes?

Cheers,
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.ucsf.mun.ca/~shannon
Hi Wolfgang,

On the advice of our numerical analysts, I understand that an agreement has been reached that, for the time being, relevant courses in the proposed Scientific Computing stream should be credit-restricted with the corresponding courses offered by this department, with the intention within the next Calendar cycle of developing a more formal cross-listing arrangement involving these courses.

Bearing in mind this and the other amendments to which we’ve already agreed, the Department of Mathematics and Statistics no longer has any objections to the proposed changes to courses and programs offered by the Department of Computer Science. We wish you luck as you embark upon this substantial overhaul.

Regards,
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.u-s.mun.ca/~shannon
Hi Wolfgang and Sharene,

The department of Physics and Physical Oceanography approves the proposed changes to the joint Computer Science/Physics programs as indicated in the document entitled 'Calendar revised Nov10 Excerpt Joint Programs.'

Cheers,

Martin


11/16/2015
5.1.14 Computer Science and Geography Joint Honours (B.Sc. Only)

See Regulations for the Honours Degree of Bachelor of Science

1. Computer Science Requirements
   Forty-eight credit hours in Computer Science courses are required for the Joint Honours
   a. 2440, 2740, 2741, 2742, 2743, 2745, 2746, 2748, 2750, 2752, 2756, 2760, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3750, 3752, 3756, 3760, 3762, 3766, 3768, 4761, 4762, 4763, 4765, 4766, 4767, 4768, 4770, 4771, 4772, 4773, 4774, 1000, 1001, 1002, 1003, 1004, 1005, 2006, 2007, 2008, 3301
   b. Six additional credit hours in courses at the 4000 level or including 4780.
   c. Three additional credit hours in courses at the 3000 level or beyond

2. Geography Requirements
   Forty-eight credit hours in Geography courses are required for the Joint Honours 1050, 2001, 2102, 2195, 2226, 2302, 2425, 3202, 3222, 3226, 3250, 3260, 3303, 4262, 4250, 4261, and the former 4291.

3. Additional Requirements
   b. An Honours Dissertation (either Computer Science 4780 or Geography 4999). The topic for dissertation must be chosen with the prior approval of the Heads of both Departments.

Note: Courses marked with an asterisk (*) are 1-hour courses.

5.1.15 Computer Science and Physics Joint Honours

The following courses are prescribed
1. Chemistry 1050 and 1051 (or Chemistry 1010, 1011, and the former 1031) (or 1200 and 1001).
   b. Nine additional credit hours in Computer Science courses numbered 3000 or higher, including at least 6 three credit hours in courses numbered at the 4000 level or higher.
   c. Physics 1050 (or 1052) and 1051.
   d. Physics 2053, 2055, 2750 or 2806, 2820, 3220, 3400, 3401, 3405, 3500, 3750, 3820, 4260, 4290 and 4320 or 3300
   e. Three additional credit hours in Physics at the 4000 level.
3. Physics 450A/B and 450B or Computer Science 4780 and three additional credit hours in Computer Science at the 4000 level.
   b. Mathematics 2000, 2050, 2260 (or 2360) and 2320 2302.

7. English 1080 and 1110 (or equivalent).
8. Two electives to bring the total credit hours to 120.

Computer Science 2500 and Statistics 2550 & are recommended.

The topic for the Honours project or thesis, Computer Science 1780 or Physics 1600A/B, must be chosen with the prior approval of both Departments.

Note: Courses marked with an asterisk (*) are 1-hour courses.

5.1.16 Computer Science and Pure Mathematics Joint Honours (B.Sc. Only)

See Regulations for the Honours Degree of Bachelor of Science. Students shall complete the following:

At least 51 credit hours in Computer Science courses are required including the following:


2. Excluding 4780, 4824 additional credit hours from courses numbered 3000 or higher, at least 9 credit hours of which must be in courses at the 4000 level.

The following courses in Mathematics and Statistics are required:


Note: There is an Undergraduate Advisor in each Department. These advisors should be consulted on all academic matters.

Note: Courses marked with an asterisk (*) are 1-hour courses.

5.1.17 Computer Science and Statistics Joint Honours (B.Sc. Only)

See Regulations for the Honours Degree of Bachelor of Science. The following courses are required:

1. Mathematics 1000, 1001, 2060, 2050, 2051, 2320, 3340, Statistics 1510 or 2500 or 2550, 2501 or 2560, 3410, 3411, 3520, 3521.
3540, 4530, 4590.

2. Eighteen further credit hours in Statistics courses including at least 12 credit hours in courses numbered 4000 or higher, but not including Statistics 4501 and 459A/B.


4. Six Twenty-one additional credit hours in Computer Science courses at the 4000 3000 level or higher, not including 4780.

5. Either Computer Science 4780 or Statistics 459A/B.

Note: Courses marked with an asterisk (*) are 1-hour courses.
5.2 Joint Majors

5.2.1 Applied Mathematics and Computer Science Joint Major (B.Sc. Only)

The following courses are required:

1. Computer Science 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, plus 6 or 18 further credit hours in Computer Science courses numbered 3000 or higher.

2. Mathematics 1000, 1001, 2000, 2050, 2051, 2130, 2260 (or 3260), 2320, 3000, 3100, 3102, 3103, 3202, 4160, 4190, plus one of Mathematics 3210, 4101, 4102, 4103.

In addition, Statistics 2550 is highly recommended.

Note: Courses marked with an asterisk (*) are 1-hour courses.

5.2.4 Computer Science and Economics Joint Major (B.Sc. Only)

1. Computer Science Requirements

Forty-two credit hours in Computer Science courses are required: 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 2050, 2051, 3731, 3753 plus 6 further credit hours in Computer Science courses numbered 3000 or higher.

2. Economics Requirements

A total of 42 credit hours in Economics courses are required: 2010, 2020, 2550, 3000, 3001, 3010, and 6 credit hours from either 3550 and 3551, or 4550 and 4551 are obligatory.

The remaining 18 credit hours shall be chosen from among the various Economics courses in consultation with the Head of the Department of Economics, and will include at least 9 credit hours in courses at the 4000 level.


Note: Courses marked with an asterisk (*) are 1-hour courses.

5.2.5 Computer Science and Geography Joint Major (B.Sc. Only)

1. Computer Science Requirements


2. Geography Requirements

Thirty-nine credit hours in Geography courses are required: 1050, 2001, 2102, 2195, 2302, 2425, 3202, 3222, 3250, 3260, 4202, 4250, 4261.


Note: Courses marked with an asterisk (*) are 1-hour courses.

5.2.6 Computer Science and Physics Joint Major

1. Chemistry 1050 and 1051 (or Chemistry 1010, 1011, and the former 1031).

2. Thirty-nine credit hours in Computer Science are required for the Joint Major: 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 1000, 1001, 1002, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2550, 3731, plus 9 further credit hours in Computer Science courses numbered 3000 or higher, including at least 33 hours credit hours at the 4000 level.

3. Physics 1050 (or 1026) and 1051 plus at least 30 additional credit hours in Physics including 2053, 2055, 2750 (or 2668), 2820, 3220, 3400, 3500, 3600, 3750, 3900, 3900.

4. a. Mathematics 1000 and 1001
   c. Physics 3610 or Mathematics 3202.

5. Additional electives to bring the credit hours to 150.

   Computer Science 2550 and Statistics 2550 are recommended.

Note: Courses marked with an asterisk (*) are 1-hour courses.
5.2.7 Computer Science and Pure Mathematics Joint Major (B.Sc. Only)

In addition to Mathematics 1000, 1001, and Computer Science 2240, 1000, 1001, the following courses numbered 2000 or higher are required:

2. Six additional credit hours in Computer Science courses numbered 3000 or higher.
4. Nine additional credit hours in courses numbered 3000 or higher offered by the Department of Mathematics and Statistics, excluding Mathematics 3330.

Note: Courses marked with an asterisk (*) are 1-hour courses.

5.2.8 Computer Science and Statistics Joint Major (B.Sc. Only)

The following courses are required:

2. Statistics 1510 or 2500 or 2550, and 2501 or 2560.
4. Nine further credit hours in Statistics courses numbered 3000 or higher including at least a 3 credit hour course numbered 4000 or higher excluding Statistics 4580.

Note: Courses marked with an asterisk (*) are 1-hour courses.
Hi Wolfgang and Sharene,

We have not had time to digest fully the proposed changes but we do have some initial thoughts on the joint CS/Physics programs.

We currently have two (at least) students in the honors version of that program and they have expressed some degree of frustration in the total number of courses required and the fact the program is difficult to complete in four years.

My understanding is that the Faculty of Science has tried to gradually move all our undergrad programs to be 120 credit hours, five courses per semester, doable in four years.

It is not clear that the joint CS/Physics programs, past or proposed, satisfy those goals.

It seems that a useful exercise would be to construct an Recommended Schedule as we have in the Calendar.

https://webmail.mun.ca/munlogin/imp/message.php?index=19529

10/21/2015
for our pure honours physics program:
http://www.mun.ca/regist/calendar/sectionNo-SCI-1481#SCI-1519

Other points to note is that our 490A/B are Each 3 credit hours - and
PHYS3810 is inactive (since a long time).

An unrelated question: How are 1710 and 1001 different?
If you wish, we can meet to discuss the joint programs.

Martin

-----Original Message-----
From: Lagowski, Jolanta [mailto:jolanlal@mun.ca]
Sent: October-15-15 4:34 PM
To: Martin Plummer
Subject: FW: Calendar Changes for Computer Science Program

Here is the rest of it.
J.

On 2015-10-16, 4:30 PM, "cs-chair" <cs-chair@mun.ca
<mailto:cs-chair@mun.ca>> wrote:

The remaining 4 attachments are now attached.

----------

Please find 4 of a total eight attachments for the following email.
The remaining 4 will follow in the next email.

Quoting cs-chair <cs-chair@mun.ca <mailto:cs-chair@mun.ca>>:

Hello,

The Department of Computer Science has undertaken a massive review
of
its
current undergraduate program. The proposed changes incorporate
recommendations of our latest APR report, and follow the newest

We would appreciate receiving your comments by November 12.
As a result of this process, your school/department/faculty may
wish
consider
this as an opportunity to include certain Computer Science
course(s)
in
your
curriculum. Please feel free to contact me to explore this
opportunity.

Best regards,
Wolfgang Banzhaf
Department Head
--
Department of Computer Science
Memorial University
St. John's, NL A1B 3X5
Phone: (709) 864-6652
Fax: (709) 864-2009
cs-chair@mun.ca <mailto:cs-chair@mun.ca>

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No virus found in this message.
Checked by AVG - www.avg.com <http://www.avg.com>
Version: 2015.0.6172 / Virus Database: 4447/10836 - Release Date: 10/17/15
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No virus found in this message.
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Version: 2015.0.6172 / Virus Database: 4447/10836 - Release Date: 10/17/15

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Version: 2015.0.6172 / Virus Database: 4447/10836 - Release Date: 10/17/15

No virus found in this message.
Checked by AVG - www.avg.com <http://www.avg.com>
Version: 2015.0.6172 / Virus Database: 4447/10850 - Release Date: 10/19/15

Hi Wolfgang,

Thank you for the consultation. Psychology requests a very slight modification to one part of the proposal:

The original version in the current Calendar in 9.11.5 is:

3d. Computer Science: Any 2000, 3000, or 4000 level course except 2650 and 2801

Your proposal is to delete â€œexcept 2650 and 2801.â€ Could this be rephrased to the following:

3d. Computer Science: Any 2000, 3000, or 4000 level course except the former 2650 and 2801

The rationale is that for the next few years, at least, it is possible that some Behavioural Neuroscience majors may have taken 2650 and/or 2801 before they were deleted from your program.

https://webmail.mun.ca/munlogin/imp/message.php?index=19571

11/6/2015
If you have any concerns about this change, please let me know.

Other than that, your proposal will have no impact on the programs in the Psychology Department.

Best wishes,

-Ian

---

Office of the Head
Psychology Department
Memorial University of Newfoundland
St. John's, NL
Canada
A1B 3X9

Phone: (709) 864-8495
Fax: (709) 864-2430
Email: Psychology.Head@mun.ca
Web: http://www.mun.ca/psychology
Dear Dr. Banzhaf,

A tiny but perhaps important remark for your secondary changes.

For p.528, the course 2130 Technical Writing in Mathematics includes "UL: qualifies as a Research/Writing course in the Faculty of Arts". This needs to be struck. As you may be aware, all Faculty of Arts Research/Writing courses will cease to exist in the 2016-17 edition of the university calendar. Senate likely already approved the deletion of this remark, but to be on the safe side please strike it out in your proposal too.

Separately, I am arranging for comments from Economics and Geography, given that these programs are mentioned in your proposals.

Thank you for the opportunity to comment.

Alex

Alex Marland
Associate Professor, Political Science
Associate Dean (Undergraduate), Faculty of Arts
Arts & Administration Building, A-5015
Memorial University, St. John's, NL, Canada A1B 3X9
T (709) 864-8254 F (709) 864-2135
www.mun.ca/posc/people/Marland.php

https://webmail.mun.ca/munlogin/imp/message.php?index=19532

10/21/2015
Dear Dr. Banzhaf,

Thank you for the opportunity to comment on the set of Calendar changes for the Computer Science program. The next regular meeting of the Engineering CUGS is tomorrow. I will invite comments from members of CUGS, to pass on to you before your deadline of Nov. 12.

In the meantime, I will comment on minor tweaks needed to the crosslisted course COMP 4301 / ENGI 8814 "Computer Vision". The versions of the Calendar description must match exactly (except for the interchange of Engineering and Computer Science references).

Replace "4301 Computer Vision studies ..." by "4301 Computer Vision (same as Engineering 8814) studies ..."

Replace "This course ..." by "The course ..."

Replace "CR: ENGI-8814" by "CR: Engineering 8814" (abbreviations are used only within each department's section of the Calendar)

Replace "PR: COMP-3301" by "PR: COMP 3301 or Engineering 7054 or permission of the instructor"

For your records the Calendar proposal for ENGI 8814, as approved by the Engineering Faculty Council, is attached.

https://webmail.mun.ca/munlogin/imp/message.php?index=19526

11/6/2015
Yours sincerely,

Dr. Glyn George, Chair
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's NL Canada A1B 3X5
http://www.engr.mun.ca/~ggeorge

Quoting cs-chair <cs-chair@mun.ca>:

> Hello,
> The Department of Computer Science has undertaken a massive review of its
> current undergraduate program. The proposed changes incorporate
> recommendations of our latest APR report, and follow the newest (2013)
> ACH/IEEE
> guidelines for offering Computer Science curricula.
> We would appreciate receiving your comments by November 12.
> As a result of this process, your school/department/faculty may wish to
> consider
> this as an opportunity to include certain Computer Science course(s) in your
> curriculum. Please feel free to contact me to explore this opportunity.
> Best regards,
> Wolfgang Banzhaf
> Department Head
> --
> Department of Computer Science
> Memorial University
> St. John's, NL A1B 3X5
> Phone: (709) 864-8652
> Fax: (709) 864-2009
> cs-chair@mun.ca
> -------
Proposal for a New Course: 
ENGI 8814: Computer Vision

Executive Summary

The purpose of this proposal is to convert the existing special topics course ENGI 8814: Special Topics in Computer Engineering - Computer Vision into a regular course in the computer engineering program, starting in the winter semester of the academic year 2016/2017. The course will be titled “Computer Vision” and it will be cross-listed with a new course in the Department of Computer Science, starting in the academic year 2016/2017. It will be added to the list of elective courses for Term 8 Computer Engineering. The block of special topics numbers will be updated.

Resource Implications: Instructional Costs

ENGI 8814 is already being offered as a special topics course in the computer engineering program. The current instructor for ENGI 8814 will be teaching this proposed course. Also, Dr. Andrew Vardy (cross appointed between Engineering and Computer Science) has agreed to be an alternate instructor for the course. Therefore, there are no additional resources required.

Consultations

Consultation has taken place with the Department of Computer Science (CS) regarding offering a course in computer vision that builds on previous image processing courses currently offered (CS will be offering a year 3 visual computing course while the Faculty of Engineering and Applied Science (FEAS) offers a term 7 industrial machine vision course). The outcome of the discussion was that there is high interest and mutual consent to offer the proposed computer vision course as a regular cross-listed course between FEAS and CS starting the academic year 2016/2017. Evidence of consultation with other units begins on page 5.

Signature of Unit Head: __________________________

Date: __________________________

Signature of Dean: __________________________

Date: __________________________
ENGI 8814

Proposed Course Outline (based on the outline for the existing ENGI 8814)

ENGI 8814: Computer Vision

Instructor          Mohamed Shehata
Alternate instructor Andrew Vardy

Website
The course content such as lecture notes and assignments are posted under MUN D2L. Assignments are also submitted online using Memorial@Home system. Log on to the Memorial@Home system using https://online.mun.ca/. If you are properly registered for the course, you will find the course listed on your page.

Communication
Asking questions is strongly encouraged. Questions in person are welcome during and outside office hours, but I can't promise to be available outside of the office hours unless you schedule an appointment. Email is the best way of communication; although this course is hosted on D2L, I prefer regular MUN e-mail for communication.

CALENDAR ENTRY:
ENGI 8814 Computer Vision (same as Computer Science 4301) studies how to develop methods that enable a machine to "understand" or analyze images. This course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.
CR: Computer Science 4301

PREREQUISITES: ENGI 7854 or COMP 3301 or permission of the instructor

SCHEDULE: TBD

CREDIT VALUE: 3 credits

RESOURCES:

TEXT BOOK
There are no required course text books. All materials are available from the course slides. However, the suggested text books for the course are:
- Selected state-of-the-art Journal publications
ASSESSMENT:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Weight</th>
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<tbody>
<tr>
<td></td>
<td>20%</td>
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<tr>
<td>Midterm</td>
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<tr>
<td>Project</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>30%</td>
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</tbody>
</table>

ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:
Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty and University practices. More information is available at www.engr.mun.ca/undergrad/academicintegrity.


[Instructors are encouraged to include more detailed, course specific comments such as expectations for group/individual work on assignments or labs.]

LAB SAFETY:
Students are expected to demonstrate awareness of, and personal accountability for, safe laboratory conduct. Appropriate personal protective equipment (PPE) must be worn (e.g. steel-toed shoes, safety glasses, etc.) and safe work practices must be followed as indicated for individual laboratories, materials and equipment. Students will immediately report any concerns regarding safety to the teaching assistant, staff technologist, and professor.

INCLUSION AND EQUITY:
Students who require physical or academic accommodations are encouraged to speak privately to the instructor so that appropriate arrangements can be made to ensure your full participation in the course. All conversations will remain confidential.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

STUDENT ASSISTANCE: Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at www.mun.ca/student.
Detailed Topics

Unit 1: Grouping and fitting
  1. K-means
  2. Hough transform
  3. RANSAC

Unit 2: Feature detection and matching
  1. Interest point detection (corners/blobs)
  2. SIFT
  3. HOG

Unit 3: Geometric and multi-view vision
  1. Geometric transformation
  2. Camera model and camera calibration
  3. Image stitching

Unit 4: Feature based alignment
  1. 2D and 3D feature based alignment
  2. Pose estimation

Unit 5: Structure from X
  1. Epipolar geometry
  2. Stereo vision
  3. Essential and fundamental matrix
  4. Structure from motion

Unit 6: Segmentation and tracking
  1. Foreground segmentation in video
  2. Optical flow
  3. Tracking

Unit 7: Recognition
  1. Introduction to recognition
  2. Object detect and recognition (face detection, pedestrian recognition)
  3. General category recognition (bags of features)
Evidence of Consultation

E-mail from the Head of the Department of Computer Science

From: Wolfgang Banzhaf [mailto:banzhaf@mun.ca]
Sent: June-04-15 10:10 AM
To: Shehata, Mohamed
Cc: Minglun Gong; Wolfgang Banzhaf
Subject: Re: The CS version of the proposal for Computer vision course

Dear Mohamed (and Minglun),

thanks very much for this information. We are indeed very interested in cross-listing such a course.

We shall have an electronic vote sometime in the summer for new courses, and I intend to put this on the list of courses to be approved. I shall let you know about the outcome (possibly in August).

Best regards,
Wolfgang

---

E-mail sent 2015 06 05:

Attached is a proposal for a Calendar change to convert the existing special topics course ENGI 8814 "Computer Vision" into a regular course and to cross-list it with a new course in the Department of Computer Science. We invite your comments on this proposal.

We would appreciate a reply by July 15.

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
Replies

From the School of Nursing, 2015 June 07

Hello,

I have reviewed are have no comments.

Best wishes,

Alice Gaudine
Dean, School of Nursing

From the School of Music, 2015 June 07

Music has no problem with this. Cheers, Ellen

Ellen Wateman
Dean, School of Music

A telephone conversation with the Calendar editor, 2015 June 08, resulted in no changes to this Calendar proposal.

From the Faculty of Education, 2015 June 08

Hello Dr. George,

I have reviewed the Calendar change and confirm that there will be no impact on the Faculty of Education.

Best regards,

Beverly Fraize
Student Advisor
Undergraduate Programs
Faculty of Education
From the School of Human Kinetics and Recreation, 2015 June 09

Hi Glyn  
I have reviewed the request for ENGI 8814 and have no concerns.  
Linda

Linda E. Rohr PhD  
Associate Professor  
Associate Dean Undergraduate Studies  
School of Human Kinetics and Recreation

From the Faculty of Business Administration, 2015 June 08

Hello:

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

-larry

From the Department of Physics and Physical Oceanography, 2015 June 12

Dr. George

Thank you for the opportunity to comment on ENGI 8814. This looks like a strong proposal and Physics has no concerns with it.

Best wishes

Michael Morrow

--

******************************************************************************
Department of Physics and Physical Oceanography

- 7 -
From the Marine Institute, 2015 June 23

Glyn,

Thank you for the opportunity to review the proposed new course ENGI 8814 Computer Vision.

This new course will have no impact on the courses at the Marine Institute. We are happy to support this request as presented.

Derek

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

From the School of Pharmacy, 2015 June 26

Hello Dr. George
Please be advised that the School of Pharmacy has no concerns with the proposed calendar changes regarding ENGI 8814. Thank you for the opportunity to comment.

Regards,
Glew Csop

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

From the Department of Biology, 2015 June 30

Dear Dr. George,
The Biology Undergraduate Studies Committee reviewed the proposed calendar change and cross listing of ENGI 8814 with COMP 4XXX. The committee has no issues or concerns with such changes.

Thanks
Karen

*Karen Morris
Undergraduate Officer
Department of Biology
Collections Development Division  
Queen Elizabeth II Library  
St. John's, Newfoundland, Canada  
A1B 3Y1

15 July 2015

TO: Dr. Dr. Glyn George, Chair, Committee on Undergraduate Studies,  
Faculty of Engineering & Applied Science

FROM: Dianne Taylor-Harding, Collection Development Librarian,  
Engineering & Applied Science

SUBJECT: Library Resources Review for Proposed New Course -- ENGI 8814 Computer Vision

Upon review of the course proposal for **ENGI 8814 Computer Vision**, I have determined that the Memorial University Libraries hold sufficient resources to support the objectives of this course.

Course content includes: "how to develop methods that enable a machine to "understand" or analyze images. The course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition."

The Memorial University Libraries collect materials covering Computer Vision at the Research Level. No additional library materials will be required to support this new course.

7/15/2015

D. E. Taylor-Harding

Dianne E. Taylor-Harding  
Collections Librarian, Engineering & Applied Sci...
A. Journals
The Memorial University Libraries subscribe to hundreds of e-journals that cover topics related to Computer Science –

- Computer Science
- Electrical & Computer Engineering (996 journal titles)

B. Reference & Research
The Memorial University Libraries offer access to two large full-text collections which support research in Computer Vision –

**ACM digital library**
Full-text access to all periodical articles and conference papers published by the Association for Computing Machinery, 1947 to present

**IEEE Xplore**
Full-text access to 1 million from 12,000+ publications from the IEEE, IET and related organizations, 1988 to present: journals, transactions, magazines, letters, books, conference proceedings, standards in computer science, electronics, electrical engineering, related & applied fields

The Memorial University Libraries also offer access to other reference databases which may be used for research related to Computer Vision, including –

**CiteSeerX: scientific literature digital library and search engine**
Digital library and search engine providing automated citation indexing and citation linking to over 2 million documents in computer science & engineering.

**Compendex**
Comprehensive engineering database covering 190 engineering disciplines, 1884 to present. Includes 16.3 million records describing papers from thousands of engineering journals and conferences.

**Computing research repository (CoRR)**
Full-text access to preprints of papers in computer science, 1993-present. CoRR constitutes the computer science collection in arXiv.

**Guide to computing literature**
Index comprising over 750,000 records describing journal articles, books, conference papers, dissertations, theses, and technical reports from the ACM and 3,000+ other computing publishers, 1947 to present.
**Synthesis digital library of engineering and computer science**
Full-text collection comprising several hundred short self-contained eBooks authored by prominent researchers in computer science or engineering.

**Scopus**
Large multi-disciplinary database which indexes and abstracts articles from 18,000+ scholarly journals + thousands of conference proceedings and books, 1995 to present.

**Web of Science**
Large multi-disciplinary database which indexes and abstracts articles from 10,000+ scholarly journals and thousands of conference proceedings, 1900 to the present.

---

**C. Monographs, Reports, Conference Publications, etc**

**Textbook and Course Readings**
A short list comprising two text-books was included in the course proposal.

- Both are available through the Memorial University Libraries.

<table>
<thead>
<tr>
<th>Library Holdings</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Available Online – unlimited users</strong></td>
<td>TEXT BOOK</td>
</tr>
<tr>
<td>TEXTBOOK</td>
<td><strong>Computer vision: a modern approach</strong> / David A. Forsyth, Jean Ponce, Pearson, c2012. Online edition can be added on request in Safari Books – contact the QEII Library</td>
</tr>
<tr>
<td>Selected state of the art readings</td>
<td>No titles were supplied</td>
</tr>
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</table>
Monographs, Reports, Conference Publications, etc

Texts, monographs, theses, conference proceedings, reports, etc. on Computer Vision in the Memorial University Libraries by subject -

<table>
<thead>
<tr>
<th>LC Subject Headings related to Computer Vision</th>
<th>Number of Book Titles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous robots</td>
<td>61 titles</td>
</tr>
<tr>
<td>Color vision</td>
<td>86 titles</td>
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<tr>
<td>Computer vision</td>
<td>1699 titles</td>
</tr>
<tr>
<td>Depth perception</td>
<td>12 titles</td>
</tr>
<tr>
<td>Human activity recognition</td>
<td>4 titles</td>
</tr>
<tr>
<td>Human face recognition (Computer science)</td>
<td>27 titles</td>
</tr>
<tr>
<td>Image analysis</td>
<td>120 titles</td>
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<tr>
<td>Image converters</td>
<td>7 titles</td>
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<tr>
<td>Image processing</td>
<td>1279 titles</td>
</tr>
<tr>
<td>Image reconstruction</td>
<td>20 titles</td>
</tr>
<tr>
<td>Image transmission</td>
<td>21 titles</td>
</tr>
<tr>
<td>Images, Photographic</td>
<td>30 titles</td>
</tr>
<tr>
<td>Imaging systems</td>
<td>464 titles</td>
</tr>
<tr>
<td>Laser recording</td>
<td>10 titles</td>
</tr>
<tr>
<td>Machine learning</td>
<td>400 titles</td>
</tr>
<tr>
<td>Motion perception (Vision)</td>
<td>46 titles</td>
</tr>
<tr>
<td>Multimedia systems</td>
<td>1083 titles</td>
</tr>
<tr>
<td>Optical character recognition devices</td>
<td>22 titles</td>
</tr>
<tr>
<td>Optical data processing</td>
<td>96 titles</td>
</tr>
<tr>
<td>Optical images</td>
<td>7 titles</td>
</tr>
<tr>
<td>Optical pattern recognition</td>
<td>1132 titles</td>
</tr>
<tr>
<td>Optical scanners</td>
<td>21 titles</td>
</tr>
<tr>
<td>Optical storage devices</td>
<td>41 titles</td>
</tr>
<tr>
<td>Pattern perception</td>
<td>199 titles</td>
</tr>
<tr>
<td>Pattern recognition systems</td>
<td>281 titles</td>
</tr>
<tr>
<td>Robot vision</td>
<td>32 titles</td>
</tr>
<tr>
<td>Robots - Motion</td>
<td>52 titles</td>
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<tr>
<td>Robotics</td>
<td>1015 titles</td>
</tr>
<tr>
<td>Space perception</td>
<td>234 titles</td>
</tr>
<tr>
<td>Stereoscopic views</td>
<td>8 titles</td>
</tr>
<tr>
<td>Synthetic aperture radar</td>
<td>85 titles</td>
</tr>
<tr>
<td>Three-dimensional display systems</td>
<td>237 titles</td>
</tr>
<tr>
<td>Three-dimensional imaging</td>
<td>141 titles</td>
</tr>
<tr>
<td>Visual discrimination</td>
<td>29 titles</td>
</tr>
<tr>
<td>Visual texture recognition</td>
<td>3 titles</td>
</tr>
</tbody>
</table>
ENGI 8814

SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title ENGI 8814 - Computer Vision

Abbreviated Course Title Computer Vision

Calendar Change Add to Engineering Regulation 11.8 (2015-16 edition of the Calendar, page 278)

ENGI 8814 Computer Vision (same as Computer Science 4301) studies how to develop methods that enable a machine to "understand" or analyze images. The course introduces the fundamental problems in computer vision and the state-of-the-art approaches that address them. Topics include feature detection and matching, geometric and multi-view vision, structure from X, segmentation, object tracking and visual recognition.

CR: Computer Science 4301

PR: ENGI 7854 or Computer Science 3301 or permission of the instructor

Secondary Calendar Changes

On page 260, Engineering Regulation 6.2.1, Table 2 (Computer Engineering Major), last row (Winter Academic Term 8), last column (Elective Courses), add ENGI 8814 to the list of elective courses as indicated:

"... 6 credit hours from: ENGI 7680, 8814, 8821, 8826, 8863, 8868, 8879, 8801-8805, or other courses as specified by the Head of the Department of Electrical and Computer Engineering"

A corresponding change to the Computer Science degree regulations will be proposed in the separate proposal for the cross-listed course COMP 4301.

On page 279, Engineering Regulation 11.9 (Special Topics Courses), amend the ninth entry

"8844 8815-8820 Special Topics in Computer Engineering ..."

Rationale

Computer vision is a multidisciplinary topic by nature and is of mutual interest to both computer engineering and computer science students. Currently, the Faculty of Engineering and Applied Science (FEAS) offers a term 7 course (ENGI 7854 "Industrial Machine Vision") which covers only an introduction to image processing techniques that can be used in the design of industrial machine vision systems. ENGI 7854 assumes no prior knowledge of image/vision from the students and therefore can cover only basic fundamental image processing techniques and a very little exposure to low-level/mid-level vision techniques.
The same case will apply to the new computer science (CS) visual computing course COMP 3301 that will be offered to year 3 students. Several discussions have taken place over the last year between FEAS and CS to propose a course in computer vision that can build on the previous image processing course to provide students with more current state-of-the-art techniques and practices, especially in mid-level and high-level vision theory.

The outcome of the discussions is that there is high interest and mutual consent to offer the proposed computer vision course as a regular cross-listed course between FEAS and CS starting the academic year 2016/2017. A special topics course (ENGI 8814) is already being taught and this proposal aims at converting this special topics course to be a regular offering while also cross-listing it with the Department of Computer Science.

<table>
<thead>
<tr>
<th>Consultations Sought From</th>
<th>Comments Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenfell Campus</td>
<td>No</td>
</tr>
<tr>
<td>Marine Institute</td>
<td>Yes</td>
</tr>
<tr>
<td>Office of the Registrar (Calendar Editor)</td>
<td>Yes</td>
</tr>
<tr>
<td>Faculty of Arts</td>
<td>No</td>
</tr>
<tr>
<td>Faculty of Business Administration</td>
<td>No</td>
</tr>
<tr>
<td>Faculty of Education</td>
<td>Yes</td>
</tr>
<tr>
<td>Faculty of Medicine</td>
<td>No</td>
</tr>
<tr>
<td>Faculty of Science (three departments, including Computer Science)</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Human Kinetics and Recreation</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Music</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Nursing</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Pharmacy</td>
<td>Yes</td>
</tr>
<tr>
<td>School of Social Work</td>
<td>No</td>
</tr>
</tbody>
</table>

Library Report Received

Approved by Dean

Dr. G.F. Naterer

Yes
FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair: ________________________________

Secretary: ____________________________

Date: ________________________________
Thank you Dr. Banzhof for your reply.

If Dr. Norvell, Dr. Peters or Prof. Fisher have any further comment, then I invite another "reply all" to your e-mail.

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 CS-Chair <cs-chair@mun.ca>:

> Dear Dr. George,
> 
> thank you very much for sending comments on our
> proposals. I think they warrant an answer as they touch
> on a number of topics in our program. Please find my
> responses to your comments interspersed below.
> 
> With best regards,
> Wolfgang
> 
> On 2015-11-06 9:16 AM, Engineering Consultations wrote:
> > Dear Dr. Banzhof,
> > 
> > Thank you for the opportunity to comment on the proposed
> > major changes to the undergraduate program of the

https://webmail.mun.ca/munlogin/imp/message.php?index=19715  

11/23/2015
Department of Computer Science. These changes were on
the agenda of the meeting of our Committee on Undergraduate
Studies on October 21 and were circulated to all members of
the Department of Electrical and Computer Engineering.

The only comment that I have received to date from members
of the Committee on Undergraduate Studies is the detailed
e-mail from Dr. Theo Norvell, Vice Chair of the Committee
and a faculty member in Computer Engineering, which follows
verbatim below.

The Head of the Department of Electrical and Computer
Engineering, Dr. Dennis Peters, may be providing a separate
reply at a later date.

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

From Dr. Theodore S. Norvell, 2015 11 04

Hi Glyn: I've quickly gone through the C.S. document proposal.
For lack of time I have focussed on the core of the program.
Below are my thoughts.

(O) Good time to revamp program

It is good that C.S. is revamping their undergraduate program.
The proposal is bold and far reaching. There is much in the
core that is good and interesting ideas in the options.
For example a complete course in Social Issues and
Professional Practice and a mandatory course in Software
Engineering.

(1) Comparison with CS2013

I compared the BSc in C.S. core courses (1000-1002, 2001-2008)
to the ACM/IEEE Computer Science Curricula 2013. I only
looked at what the IEEE and ACM call the "Core Tier 1" topics.
As they put it: "computer-science curricula should cover all
the Core Tier-1 topics".

For the most part the new proposal follows the IEEE/ACM
Curriculum in this regard. I noted the following apparent
exceptions.

* OS/Graphs and Trees 3hrs. Seems to be missing. There
appears to be room in COMP-1002 for this. Yes
implementation of trees and graphs are in COMP-2002, but
here they correspond to AL/Fundamental Data Structures
and Algorithms.

As you observed, these topics are covered in COMP-2002.
But they are also covered in COMP-1002, though this is not
explicit. The Knowledge Area is covered under "other discrete
structures. Examples will be discussed (as they are the simplest)
> in "Proof induction".
>
> > * GV/Fundamental Concepts (of Graphics and Visualization)
> > 2hrs. Seems to be missing.  
> > This is covered in COMP-1000 under "Selected CS subfields".
> >
> > * IAS/Foundational Concepts in Security 1hr, IAS/Principles of secure design 1hr, and IAS/Defensive programming 1 hr
> > all seem to be missing.  
> > This is covered in COMP-2007 under "Security and Privacy" and "Defensive programming" respectively.  
> > * PD/ Parallelism Fundamentals 2hr, PD/Parallel Decomposition 1hr, PD/Communication and Coordination 1hr
> > all seem to be missing.  
> > * PL/Functional programming seems to be missing
> > * SF/Parallelism 3hrs seems to be missing.
> >
> > Tier-1 concepts in parallel and distributed computing are covered in COMP-2003 and COMP-2004.
> >
> > (2) Fundamental concepts missing
> >
> > It's a bit worrying that a graduate of MUN with a B.Sc. in C.S. might graduate without ever having heard of such concepts as race conditions, semaphores (or monitors), context-free grammars, functional programming, finite state automata, Turing Machines (or an equivalent formalism), to pick a few examples. I might be missing something, but I don't see any of these topics in the new core.
> >
> > Race conditions, semaphores (or monitors) are covered in COMP-2004, "Process coordination".
> >
> > Context-free grammars (ACM CS2013 AL-Tier 2) and Turing machine (ACM CS2013 AL-Elective) are covered in COMP-3602.
> >
> > Finite state automata are covered in COMP 2003 "State machines".
> >
> > The concept of functional programming can be conveyed in either 1001 or 2001.
> >
> > (3) Parallel and functional programming.
> >
> > There should be at least one course in the core on parallel, concurrent, and distributed computing. If need be, it could be combined with functional programming as a "paradigms of programming" course.
> >
> > Note this is 2015. The world of computing long ago went parallel. Also functional programming, after years of neglect, is becoming very widely used in industry.
> >
> > These facts are not unrelated.
> >
> > See above, Tier-1 concepts in parallel and distributed computing are covered in COMP-2003 and COMP-2004.
> > (3) Math content
> >
> > In light of the above, it seems to me a mistake that the
core includes 3 courses in differential and integral
calculus but only 1 in discrete math and logic.
MATH-2000 should be replaced by a second discrete math
course in the core. That course could include graph
theory, a deeper study of logic, and theoretical models
such as TMs, FSAs, lambda-calculus, CSP (or CCS).
Of course MATH-2000 would be required for certain
specializations.

This is a topic orthogonal to our current program revisions:
Do we want to have more discrete mathematics in our program,
versus continuous mathematics? At the current time there is
no MATH course which would cover the topics interesting for
Computer Science. Due to the restriction in courses for Computer
Science, it would not fit into CS courses either. For the moment,
therefore, there is no better alternative.

(4) Software Engineering Honours program

In the Honours (Software Engineering) branch there is no
group project (e.g. 4770). I think this is a serious
mistake.

We agree. This is being remedied by keeping 4770 in the
Software Engineering (Honours) program.
I also think that 4718 Survey of Software Engineering
should be required for this option. As it stands a
student could graduate with this degree having seen less
than 4 hours on testing and formal verification. Again
it's a serious mistake.

4718 has not been removed from the program, this is
a misunderstanding.
I haven't had a chance to compare this program to the
IEEE Software Engineering Body of Knowledge (SWEBOK) in
detail, but I suspect it is missing a lot of what should
be in such a program, especially in the absence of 4718
and 4770.

See above.
In any case the whole S.E. option should be reviewed.

This is a different issue, see below.

(5) Software Engineering non-Honours program

Why leave S.E. out of the options for the non-Honours BSc?
Since the courses are needed to be put on for the Honours
program there is little cost to making a non-Honours BSc.
(Or replace the Honours in S.E. with a non-Honours in
S.E.)

We agree that a major in software engineering, ie a stream
in SE would be highly desirable. Our program re-design is,
however, driven by individuals, and without a champion for
a SE specialization there simply is no revised set of courses
we could offer to justify a new stream. It is hoped that such
a stream could be formed in a collaboration between
Computer Engineering and Computer Science, but this will
have to wait until such an initiative can be formed.
I wonder how many graduates of C.S. are working in a job
that relates to their degree, but are not working as
software engineers (by some reasonable definition of that term). I suspect the percentage is very small.

If the thinking is that no S.E. option is required since all graduates of C.S. should be qualified to work as software engineers (by some reasonable definition of that term), then 4718 and 4770 should be core for all C.S. graduates.

This is not the thinking. Instead, the philosophy of the new program is to offer a core of Computer Science courses in the first and second year, after which students specialize in one of the streams, or pick their courses from the new offerings for a general degree.

(6) Credit exclusion needed.

There should be a credit exclusion between COMP-1002 and ENGI-4424.

Agreed.

(7) Workability

The idea of having options is fine. But with 6 options and a low number of students it will be unworkable.

Courses that are core for one or two students will have to be put on in order to be fair to those students who are in the option. This will mean that there will be very few electives available apart from these courses.

It is not clear that C.S. will be able to do this within current staffing levels. Consider that the core courses between the six options are 31 in number. Then a reasonable number of elective courses needs to be put on each year in addition to this core. And there are service courses.

The offering of streams has resource implications. However, we continue to uphold our principle, not to offer courses with less than 5 students registered at the beginning of a term.

Streams are majors which need to be declared in the year prior to expecting the courses being offered. If a sufficient number of students cannot be found, a stream is simply not offered, ie students are not signed in for a given year.

However, the plan is to offer sufficiently attractive courses that we don't have that problem in the longer run.

It's a good plan for a large department that has a large student population. I know that it is a "if we build it they will come" strategy, but I am skeptical that it can (let alone will) be a success.

Thanks for conveying this, but our APR has strongly recommended decisive action. Our proposals are flowing from those recommendations and we are planning to implement them in the most resource-efficient way possible.
Dear Dr. Banzhaf

The Faculty of Medicine understands that the Department of Computer Science has undertaken a massive review of its current undergraduate program. We support your proposed changes.

Sincerely,

Cathy Vardy, MD, FRCP(C)
Vice Dean
Faculty of Medicine
Health Sciences Centre, Room M2M319
Memorial University of Newfoundland
St. John's, NL, Canada, A1B 3V6
Tel: 709-864-6417 or Fax: 709-864-6336

-----Original Message-----
From: cs-chair [mailto:cs-chair@mun.ca]
Sent: October-16-15 4:24 PM
To: cs-chair
Cc: stacey@mun.ca; fba.ad.undergrad@mun.ca; shicks@mun.ca; bbraize@mun.ca;
dpeters@mun.ca; engconsult@mun.ca; associatevpoffice@grenfell.mun.ca;
mechickey@mun.ca; mgugconsultations@m1.mun.ca; Vardy, Cathy; Caines, Sherry;
mvolk@mun.ca; deannurse@mun.ca; pharminfo@mun.ca; deansci@mun.ca;
adeanugradswk@mun.ca; univlib@mun.ca; biohead@mun.ca; pmarino@mun.ca;
chemhead@mun.ca; jhanchar@mun.ca; math-head@mun.ca; fletcher@mun.ca;
jolanta@mun.ca; psychology.head@mun.ca; wlocke@mun.ca; ncatto@mun.ca;
banchaf@mun.ca
Subject: Re: Calendar Changes for Computer Science Program

Please find 4 of a total eight attachments for the following email. The
INBOX: calendar changes for computer science program (89 of 498)

Date: Wed, 4 Nov 2015 18:26:24 +0000
From: "Rohr, Linda" <lerohr@mun.ca>
To: "cs-chair@mun.ca" <cs-chair@mun.ca>
Subject: calendar changes for computer science program

The proposed changes to the Computer Science program have no impact on the programs in the School of Human Kinetics and Recreation. We support the changes as presented.

Linda Rohr PhD
Associate Professor & Associate Dean Undergraduate Studies
Human Kinetics and Recreation, Memorial University
t: 709.864.6202  f: 709.864.7531  e: <lerohr@mun.ca> lerohr@mun.ca
PE 2025
Oops, yes I did. We have no comments or concerns. Thanks!

Maureen

From: CS-Chair [cs-chair@mun.ca]
Sent: October 20, 2015 10:55 AM
To: Volk, Maureen
Cc: Computer Science Chair
Subject: Re: Calendar Changes for Computer Science Program

Dear Dr. Volk,

in order to avoid a misunderstanding: Did you mean "no" comments or concerns?

Thanks,
Wolfgang Banzhaf

On 2015-10-19 8:16 PM, Volk, Maureen wrote:
> The School of Music has comments or concerns.
> > Maureen Volk
> > -----Original Message-----
> > From: cs-chair [mailto:cs-chair@mun.ca]
> > Sent: October-16-15 4:30 PM
> > To: cs-chair
> > Cc: Mercer, Stacey; fba.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly;
> > dpeters@mun.ca; engrcconsult@mun.ca; associatepoffice@grenfell.mun.ca; Hickey,
> > Marie; mugconsultations@mi.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca;
> > Volk, Maureen; DeanNurse; pharminfo@mun.ca; Dean of Science; adecanugradswk;
> > Library Correspondence; Biochemistry Head; Marino, Paul; chemhead@mun.ca,


10/21/2015
Hello Dr. Banzhaf

The School of Pharmacy is supportive of the proposed calendar changes and commend the department on the work done. We have a couple of very minor editorial suggestions so it is in-line with the calendar format. In the calendar descriptions:
- remove the hyphens between the course abbreviation and number (e.g., "PR: COMP 2001" instead of "PR: COMP-2100").
- spell out the names of other departments (e.g., "PR: Statistics 1510" instead of "PR: STAT 1510")

Regards,
Csop Glew

-----Original Message-----

https://webmail.mun.ca/munlogin/imp/message.php?index=19763

11/23/2015
Greetings Wolfgang,

I have just completed my review of the proposed changes to your undergraduate program that you sent out for comments. I am new to the calendar change process, so I want to share my admiration for you and your team because you have completed such a significant project. Congratulations!

I am fine with your changes which, to my knowledge, do not impact the School of Social Work.

I hope this information is helpful to you.

Heather

Heather J. Haire, PhD, RMFT, RSW
Associate Dean Undergraduate Programs
School of Social Work, Memorial University
St. John's, NL, Canada, A1C 5S7
T: 709-864-2552 or 709-864-7349

-----Original Message-----
From: cs-chair [mailto:cs-chair@mun.ca]
Sent: October 16, 2015 4:30 PM
To: cs-chair
Cc: Mercer, Stacey; fba.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; dpeters@mun.ca; engrcconsult@mun.ca; associatevpoffice@grenfell.mun.ca; Hickey, Marie; mgicconsultations@m1.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharmed@mun.ca; Dean of Science; deaneugradswk; Library Correspondence; Biochemistry Head; Marino, Paul; chemhead@mun.ca; jhanchar@mun.ca; math-head@mun.ca; Fletcher, Garth; Lagowski, Jo; anta; psychology.head@mun.ca; wlocke@mun.ca; Catto, Norm; banzahf@mun.ca
Dr. Banzhaf,

Thank you for the opportunity to review the Calendar changes to the Computer Science Program. These are indeed significant in scope and should serve the Computer Science Faculty well.

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

All the best,

Derek Howse

Derek Howse
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0506
FAX: 709-778-0394

https://webmail.mun.ca/munlogin/imp/message.php?index=19569

10/29/2015
December 1, 2015

TO: All Members, Faculty Council of Science

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

SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisites for Statistics 3510
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3600, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burry
Associate Registrar and
Secretary
Proposal:
Elimination of CHEM 3500

Executive Summary

This proposal is to eliminate CHEM 3500 as a mandatory course in the Chemistry Honours, Majors, and Joint Honours programs and from the calendar.

Resource Implications: Instructional Costs

There are no anticipated new costs associated with the changes to the chemistry and associated joint honours programs.

Library Holdings and/or Other Resources Required

There are no library or other resources or changes required.

Signature of Unit Head (if appropriate):

Date:

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Program Title

Calendar Change(s)

9.3.4 General Degree - Major in Chemistry
The courses required for a Major in Chemistry are:
   1. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, 3211, 3303, 3410, and 3411, and 3500.

9.3.5 Honours Degree in Chemistry

Students wishing to take Honours should consult those sections of the Calendar dealing with Regulations for the Honours Degree of Bachelor of Science. The Honours program in Chemistry consists of at least 63 credit hours in Chemistry courses. It is recommended that candidates also take groups of 18 or more credit hours in each of two other science subjects, normally Biochemistry, Biology, Earth Sciences, Physics, or Mathematics.

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

5.1 Joint Honours

5.1.1 Applied Mathematics and Chemistry Joint Honours (B.Sc. Only)
The following courses are required:
   6. Chemistry 1050 and 1051 (or 1010, 1011 and the former 1031) (or 1200 and 1001), 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3210, or 3211, 3303, 3500.
   7. Six additional credit hours chosen from courses numbered 3000 or higher that are offered by the Department of Chemistry.

5.1.4 Biochemistry and Chemistry Joint Honours
The following courses are required:
   3. Chemistry 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3211, 3303, 3410, 3411, 3506, and 6 further credit hours in Chemistry courses at the 4000 level.

5.1.12 Chemistry and Earth Sciences Joint Honours
   3. Chemistry 2100, 2210, 2301 (or 2300), 2302, 2400, 2401, 3500; plus 3211, 3303, 3410, and 3411 with the option of substituting up to 6 credit hours of these 3000-level courses with 4000-level Chemistry courses; and at least 3 additional credit hours in 4000-level Chemistry courses.
5.1.13 Chemistry and Physics Joint Honours

The following courses are prescribed:

2. Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and the former 1031; or Chemistry 1200 and 1001), 2100, 2210, 2301 (or 2300), 2302, 2400, 2401, 3210 or 3211, 3303, 3410, 3500, and 6 additional credit hours in Chemistry courses numbered 3000 or higher.

5. A sufficient number of 2 elective courses to bring the degree total to 120 credit hours.
10.3 Chemistry

3410 Bio-organic Chemistry is a study of the major classes of biomolecules, their structure, function, and in vitro chemistry. An introduction to natural products. Synthetic polymers compared to biopolymers. Heteroaromatic molecules and derived biomolecules.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: the former CHEM 3401
LH: 3
PR: CHEM 2401. It is recommended that CHEM 3500 be taken concurrently.

3500 Spectroscopic Analysis: Spectroscopy and Structure is the application of spectroscopic methods to the determination of molecular structure. Emphasis will be placed on electronic, vibrational and rotational spectroscopy, nuclear magnetic resonance spectroscopy and mass spectrometry.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
LH: 3
PR: CHEM 2210, CHEM 2302 (or 2300) and CHEM 2401

4420 Physical Organic Chemistry is an introduction to the quantitative and qualitative theories of reactions and reactivity and their application to organic reaction mechanisms and to mechanism elucidation.
CR: the former CHEM 4400 and the former CHEM 4401
PR: CHEM 2302 or the former CHEM 3301, and CHEM 3411 or the former CHEM 3401. CHEM 3500 is strongly recommended.

4500 Advanced Nuclear Magnetic Resonance Spectroscopy examines advances in modern and traditional NMR techniques, the principles and applications of solution and solid-state NMR spectroscopy and micro imaging.
AR: Attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
LH: 3
PR: CHEM 2302 and 2401 3500.
Rationale

Content such as that covered in CHEM 3500, spectroscopic characterization, is best taught when integrated with the subjects such as synthetic, materials, analytical, and physical chemistry courses. Chemistry 2401 specifies the introduction of many of the main methods taught in Chemistry 3500. In recent years, as chemistry curricula have evolved, students are in fact being formally exposed to spectroscopic structure elucidation and confirmation techniques in courses such as Chemistry 3210, 3211, and 3411 lectures and labs. The removal of this course is part of the ongoing modernization of the chemistry curriculum. It also allows much needed flexibility for our students and brings our degrees in line with other Chemistry degrees in Canada where 20 Chemistry courses is the norm for a single major Honours. The chemistry department has committed to further integrate spectroscopic characterization methods, including hands-on work, into their courses at all levels.
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<tr>
<td>Library Report Received</td>
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</tbody>
</table>

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

Name

---

FOR OFFICE USE ONLY

APPROVALGRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Responses to Consultations:

Consultations email:

From: Chris Flinn <cflinn@mun.ca>
Sent: October 22, 2015 4:14 PM
To: Associate VP Office - Academic; miugconsultations@mi.mun.ca; mathconsult@mun.ca; Biochemistry Head; Parrish, Chris; psychology.head@mun.ca; pharminfo@mun.ca; Engineering Consultations; Karen Morris; cs-chair@mun.ca; Alison Leitch; jolantal@mun.ca
Subject: New chemistry proposals for review

>> Hello Everyone,
>>
>> The chemistry department invites you to review two new proposals. We
>> welcome your comments and suggestions. I apologise for sending this
>> effectively twice. The first time had the wrong Subject line.
>>
>> sincerely,
>>
>> Chris Flinn
>> Deputy Head, Undergraduate Studies
>> MUN Chemistry Department

Library:

Hi Chris,

I have taken a look at both of these proposals.

Neither the elimination of CHEM 3500 not the reduction of lab time in CHEM 2100 will have any impact on the Library.

Please let me know if something further is required.

Erin

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

Grenfell:

From: Parkinson, Don-Roger
Sent: Friday, October 23, 2015 2:39 PM
To: Gallant, Robert
Ce: Daniels, Karen
Subject: RE: New chemistry proposals for review

Dear Dr. C. Flinn,

I have no objection to such changes in Chem courses 2100 and 3500. However I will ask, since I am ignorant of the fact, is the Chemistry program accredited with the CIC? If so (or not), would these changes put into jeopardy such accreditation continuance or prospects (respectively)?

Also for the Chem 3500 changes, I would suggest to you that the course, chem 2401 (organic II) is already tasked with a great deal of material for the proper coverage of organic chemistry. Would not the addition of more material, of what is essentially an analytical or spectroscopic, to this course impede such organic coverage?

Best regards,

Don-Roger

Chair of ENVS

Engineering and Applied Science:

Travis et al.,

The elimination of CHEM 3500 has an impact on the proposed new minor in Applied Science for Chemistry majors. CHEM 3500 appears in the list of required courses for those students in the proposal for the minors (timetable, page 2). What further changes are required in the minor?

CHEM 2100 is a required course in the proposed minor in Chemistry for Process Engineering majors. Do any of you have concerns about the reduction in laboratory hours from 4 to 3 hours per week?

The changes proposed in the consultation request are attached.

The current version of the proposal for the two minors is also attached.

Glyn.

Dr. Glyn George, Chair
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's, NL Canada A1B 3X5
http://www. engr. mun. ca/~george
Hi Glyn

Chem 2100: I do not have any concern reduction in lab hour, from 4 to 3. It will consistent with our lab offerings. 
I do see elimination of Chem 3500 a concern (unless replaced with similar course).
Faisal

Hello
Travis, will there be an equivalent for 3500?
The 2100 is not a concern in lab hours

Travis et al.,

At its meeting this afternoon, the Engineering Faculty Council approved the two minors. 
We still need to resolve the issue of CHEM 3500, (although it does not seem to affect the Calendar regulations, just the timetable on page 2 of the package).

Travis: what is the status of the Calendar change proposal for the minors in the Faculty of Science?

Glyn.

Dr. Glyn George
Department of Electrical and Computer Engineering
Memorial University of Newfoundland
St. John's NL Canada A1B 3X5
http://www.engr.mun.ca/~ggeorge

Thank you Dr. Flinn for the opportunity to comment on these proposed changes.

The elimination of CHEM 3500 will cause a small change in the supporting documentation for the proposed new Minor in Applied Science for Chemistry majors, but will not affect the proposed Calendar entries.
CHEM 2100 is a required course in the proposed Minor in Chemistry for Process Engineering majors. The Department of Process Engineering reports that it has no concerns about the reduction in laboratory hours for CHEM 2100 from 4 to 3 hours per week. Such a change is consistent with our laboratory offerings.

The Faculty of Engineering and Applied Science supports these changes.

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

Chemistry response to engineering concerns:

Hi Glyn,

Science Undergraduate will meet on Monday and will pass this, then the Faculty meets on Nov 18th.

3500 is not an issue as it affects chemistry majors. Yes, the timetable that we post will need to be edited, but the calendar changes are fine.

T

Biochemistry:

Chris

No concerns from Biochemistry.

We will take care of the 3500 listing in our calendar entries, as part of some other house-keeping items that we need to tidy up.

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 request to remove the course CHEM 3500.

This change will have no impact on the programs at the Marine Institute. We are happy to support these changes as presented.

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

Physics

Hi Chris,

Here are comments from Physics regarding the two chemistry proposals.

1) Reduction from 4 to 3 hours of lab for CHEM2100
   [CHEM2100 required for Chem/Phys joint Hons]

   Fine.

2) Elimination of CHEM3500

   Elimination opens up 3 credit hours for Chem/Phys joint Hons program. So either 1) increase from 6 to 9 the "additional credit hours in Chemistry courses numbered 3000 or higher", or 2) increase the number of elective courses from 2 to 3 in order to get up to the 120 required credit hours.

Cheers,
Martin

Biology

Hi Chris,

The Biology Undergraduate Studies Committee has met and reviewed the proposed calendar change to Chemistry 2100 Analytical Chemistry and the elimination of Chemistry 3500. We have no issues or concerns with such changes.

Thanks
Karen

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

Mathematics and Statistics

Hi Chris,

The Department of Mathematics and Statistics has no objection to the proposed change in laboratory hours for Chemistry 2100, nor the proposed deletion of Chemistry 3500 (and, in particular, its removal from the Joint Honours program in Applied Mathematics and Chemistry).

Regards,
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.ufs.mun.ca/~shannon

Pharmacy

Hello Dr. Flinn
The School of Pharmacy is in support of the proposed calendar changes.  
Regards,

Csop Glew

CSOP GLEW, Hon. B.A., M.U.P.  |  MANAGER OF ACADEMIC PROGRAMS  
School of Pharmacy  
Memorial University of Newfoundland  
St. John's, NL A1B 3V6  
Health Sciences Centre  |  Room H3435  
T 709 777 6963  |  F 709 777 7044
Proposal
Calendar Change(s) to Existing Course(s)

Executive Summary

Reduce the duration of the weekly laboratory component of CHEM 2100 from 4 hours to 3 hours.

Resource Implications: Instructional Costs

There will be no increases in instructional costs.

Library Holdings and/or Other Resources Required

None required.

Signature of Unit Head (if appropriate):

Date:

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

CHEM 2100 Analytical Chemistry I

Analytical Chemistry I

Calendar Changes

2100 Analytical Chemistry I (same as the former CHEM 3100) is an introduction to analytical chemistry and includes preparation of samples and standards, calibration methods, statistical treatment of data, spectrophotometric trace analysis, gravimetric analysis and volumetric analysis including acid-based titrations, precipitation titrations, oxidation-reduction titrations, complexometric titrations and titrations in non-aqueous systems. Also introduced are liquid-liquid and other types of extractions, and chromatography with key methods of detection. Theoretical, practical and problem-solving aspects are covered.

AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: the former CHEM 3100
LH: ≤3
PR: CHEM 1051 (or 1001 or the former 1031) with a grade of at least 60%

Rationale

The weekly laboratory component of CHEM 2100 will be shortened from 4 to 3 hours. This will bring CHEM 2100 in line with all other second year chemistry courses offered at Memorial University and with other introductory analytical chemistry laboratories offered at other institutions in Canada.
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Library Report Received: Yes

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

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
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Sent: October 22, 2015 4:14 PM
To: Associate VP Office - Academic; miugconsultations@mi.mun.ca; mathconsult@mun.ca; Biochemistry Head; Parrish, Chris; psychology.head@mun.ca; pharinfo@mun.ca; Engineering Consultations; Karen Morris; co-chair@mun.ca; Alison Leitch; jolantal@mun.ca
Subject: New chemistry proposals for review

>> Hello Everyone,

>> The chemistry department invites you to review two new proposals. We welcome your comments and suggestions. I apologise for sending this twice. The first time had the wrong Subject line.

>> sincerely,

>> Chris Flinn

>> Deputy Head, Undergraduate Studies

>> MUN Chemistry Department

Library:

Hi Chris,

I have taken a look at both of these proposals.

Neither the elimination of CHEM 3500 nor the reduction of lab time in CHEM 2100 will have any impact on the Library.

Please let me know if something further is required.

Erin

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

Grenfell:

From: Parkinson, Don-Roger
Sent: Friday, October 23, 2015 2:39 PM
To: Gallant, Robert
Cc: Daniels, Karen
Subject: RE: New chemistry proposals for review
Dear Dr. C. Flinn,

I have no objection to such changes in Chem courses 2100 and 3500. However I will ask, since I am ignorant of the fact, is the Chemistry program accredited with the CIC? If so (or not), would these changes put into jeopardy such accreditation continuance or prospects (respectively)?

Also for the Chem 3500 changes, I would suggest to you that the course, chem 2401 (organic II) is already tasked with a great deal of material for the proper coverage of organic chemistry. Would not the addition of more material, of what is essentially an analytical or spectroscopic, to this course impede such organic coverage?

Best regards,

Don-Roger

Chair of ENVS

Engineering and Applied Science:

Travis et al.,

The elimination of CHEM 3500 has an impact on the proposed new minor in Applied Science for Chemistry majors. CHEM 3500 appears in the list of required courses for those students in the proposal for the minors (timetable, page 2). What further changes are required in the minor?

CHEM 2100 is a required course in the proposed minor in Chemistry for Process Engineering majors. Do any of you have concerns about the reduction in laboratory hours from 4 to 3 hours per week?

The changes proposed in the consultation request are attached.

The current version of the proposal for the two minors is also attached.

Glyn.
Dr. Glyn George, Chair
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's NL Canada A1B 3X5
http://www. engr.mun.ca/~ggeorge

Hi Glyn

Chem 2100: I do not have any concern reduction in lab hour, from 4 to 3. It will consistent with our lab offerings.
I do see elimination of Chem 3500 a concern (unless replaced with similar course).
Faisal

Hello
Travis, will there be an equivalent for 3500?
The 2100 is not a concern in lab hours

CHEM 2100 is a required course in the proposed Minor in Chemistry
for Process Engineering majors. The Department of Process Engineering reports that it has no concerns about the reduction in laboratory hours for CHEM 2100 from 4 to 3 hours per week. Such a change is consistent with our laboratory offerings.

The Faculty of Engineering and Applied Science supports these changes.

--
Dr. Glyn George, Chair

Biochemistry:

Chris

No concerns from Biochemistry.

We will take care of the 3500 listing in our calendar entries, as part of some other house-keeping items that we need to tidy up.

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 request to change the lab hours for the course CHEM 2100.

This change will have no impact on the programs at the Marine Institute. We are happy to support these changes as presented.

All the best,
Derek

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

Hi Chris,

Here are comments from Physics regarding the two chemistry proposals.

1) Reduction from 4 to 3 hours of lab for CHEM2100
   [CHEM2100 required for Chem/Phys joint Hons]

   Fine.

2) Elimination of CHEM3500

   Elimination opens up 3 credit hours for Chem/Phys joint Hons program. So
   either 1) increase from 6 to 9 the "additional credit hours in Chemistry
   courses numbered 3000 or higher", or 2) increase the number of elective
   courses from 2 to 3 in order to get up to the 120 required credit hours.

Cheers,
Martin

Biology

Hi Chris,

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Chemistry 2100 Analytical Chemistry and the elimination of Chemistry 3500. We have no issues or concerns
with such changes.

Thanks
Karen

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

Mathematics and Statistics

Hi Chris,

The Department of Mathematics and Statistics has no objection to the proposed change in laboratory hours for
Chemistry 2100, nor the proposed deletion of Chemistry 3500 (and, in particular, its removal from the Joint Honours
program in Applied Mathematics and Chemistry).

Regards,
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

Pharmacy

Hello Dr. Flinn  
The School of Pharmacy is in support of the proposed calendar changes.  
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
Office of the Registrar

St. John's, NL Canada A1C 5S7
Tel 709 864 8260 Fax 709 864 2337
www.mun.ca

December 1, 2015

TO: All Members, Faculty Council of Science
FROM: Joan Burry, Secretary
Committee on Undergraduate Studies, Faculty of Science

SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisite for Statistics 3510
   (c) Rewording of Mathematics and Statistics program regulations

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burry
Associate Registrar and
Secretary
Proposal
Calendar Change to the Major in Applied Mathematics

Executive Summary

We propose to allow students to take a course from any Mathematics subdiscipline in place of a current requirement for an Applied Mathematics course.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from the Library, the Marine Institute, the Faculty of Arts and the Department of Physics & Physical Oceanography.

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.

Signature of Unit Head (if appropriate): ____________________________

Date: ____________________________

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

Date: ____________________________
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: Major in Applied Mathematics

Calendar Change

Under the Faculty of Science, page 498, 2015-2016 Calendar, 9.8.4 Major in Applied Mathematics (B.Sc. Only), amend regulation 2 as follows:

"2. Three credit hours in Applied Mathematics courses numbered 3000 or higher that are offered by the Department of Mathematics and Statistics, excluding Mathematics 3330."

Rationale

In 2008, an analogous change was made to the Honours in Applied Mathematics, to provide additional flexibility for Applied Mathematics students and to recognise the relevance of traditional Pure Mathematics and Statistics disciplines to applied mathematicians. This change will bring the Major program in line with the Honours program.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Department of Biochemistry
5. Department of Biology
6. Department of Chemistry
7. Department of Computer Science
8. Department of Earth Sciences
9. Department of Ocean Sciences
10. Department of Physics and Physical Oceanography
11. Department of Psychology

Comments Received

No
Yes
No
No
No
No
Yes
No

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:
Subject: Request for Consultation: Three Calendar changes from Mathematics and Statistics
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 04/11/2015 9:16 PM
To: associatevpoffice@grenfell.mun.ca, miugconsultations@mi.mun.ca, stacey.m@mun.ca, chemhead@mun.ca, cs-chair@mun.ca, jolantals@mun.ca, biocheads@mun.ca, pmarinos@mun.ca, jhancars@mun.ca, fletcher@mun.ca, psychology.head@mun.ca, aambi@mun.ca

Greetings,

Attached are three proposed Calendar changes from the Department of Mathematics and Statistics:

1. To amend a regulation pertaining to the equivalence of courses offered by this department.

2. To amend the Major in Applied Mathematics

3. To amend the prerequisite for Statistics 3410 ("Probability and Statistics")

If you have any comments on this proposal, we would appreciate receiving your responses no later than Tuesday, December 1st.

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:

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6 November 2015

TO: Dr. Shannon Patrick Sullivan

FROM: Alison Ambi, Liaison Librarian, Mathematics & Statistics

SUBJECT: Calendar changes for the 2016-2017 academic year

Upon review of the proposals to:
- Amend the prerequisite for Statistics 3410 from Mathematics 1001 to Mathematics 200.
- Allow students to take a course from any Mathematics subdiscipline in place of a current requirement for an Applied Mathematics course
- Clarify a calendar regulation concerning the equivalence of courses offered by the Department of Mathematics and Statistics

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: RE: Request for Consultation: Three Calendar changes from Mathematics and Statistics - AMAT Regulation Change
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Date: 12/11/2015 9:22 AM
To: Shannon Patrick Sullivan <shannon@mun.ca>

Shannon,

Thank you for the opportunity to review and comment on the AMAT Regulation Change. This change will have no impact on the programs at the Marine Institute. We are happy to support this proposal as presented.

Sincerely,
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

-----Original Message-----
From: Shannon Patrick Sullivan [mailto:shannon@mun.ca]
Sent: Wednesday, November 04, 2015 9:17 PM
To: associatevpoffice@grenfell.mun.ca; MIUG Consultations <MIUGconsultations@mi.mun.ca>; staceym@mun.ca; chemhead@mun.ca; cs-chair@mun.ca; jolantj@mun.ca; engconsult@mun.ca; biohead@mun.ca; pmarino@mun.ca; jhanchar@mun.ca; fletcher@mun.ca; psychology.head@mun.ca; aambi@mun.ca
Subject: Request for Consultation: Three Calendar changes from Mathematics and Statistics

Greetings,

Attached are three proposed Calendar changes from the Department of Mathematics and Statistics:

1. To amend a regulation pertaining to the equivalence of courses offered by this department.

2. To amend the Major in Applied Mathematics

3. To amend the prerequisite for Statistics 3410 ("Probability and Statistics")

If you have any comments on this proposal, we would appreciate receiving your responses no later than Tuesday, December 1st.

Thanks,
Shannon

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Dr. Shannon Patrick Sullivan
Dept. of Mathematics & Statistics
Senior Faculty Advisor, Faculty of Science
Memorial University of Newfoundland St.
RE: Request for Consultation: Three Calendar changes from Mathema...

Subject: RE: Request for Consultation: Three Calendar changes from Mathematics and Statistics
From: "Mercer, Stacey" <staceym@mun.ca>
Date: 06/11/2015 4:19 PM
To: "Sullivan, Shannon" <shannon@mun.ca>

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 Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

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- Martin Plumer

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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

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No virus found in this message.
Checked by AVG - www.avg.com
Version: 2015.0.6173 / Virus Database: 4455/10932 - Release Date: 11/01/15
Internal Virus Database is out of date.
Proposal
Calendar Change to Existing Course: Statistics 3410

Executive Summary

We propose to amend the prerequisite for Statistics 3410 from Mathematics 1001 to Mathematics 2000.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from the Library, the Marine Institute, the Faculty of Arts and the Department of Physics & Physical Oceanography.

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.

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: Statistics 3410 Probability and Statistics

Abbreviated Course Title

Probability and Statistics

Calendar Change

Under the Faculty of Science, page 530, 2015-2016 Calendar, 10.8.4 Statistics Courses, amend the prerequisite for Statistics 3410 as follows:

“3410 Probability and Statistics covers basic probability concepts, combinatorial analysis, conditional probability, independence, random variables, distribution function, mathematical expectation, Chebyshev’s inequality, distribution of two random variables, binomial and related distributions, Poisson, gamma, beta, normal, multivariate normal, student t and F distributions, transformations of random variables, convergence in probability, convergence in distribution, delta-method, moment-generating function technique, central limit theorem.

OR: one and a half hour tutorial period weekly
PR: Mathematics 4994 2000”

Rationale

As part of the overhaul of Statistics programs and courses in 2013, the prerequisite for Statistics 3410 was changed from Math 2000 to Math 1001. Subsequent instructors have determined that students are now underprepared for Statistics 3410, and wish to restore the original prerequisite.

Note that there is no need for a reciprocal Calendar change to the Grenfell Campus section of the Calendar. While Statistics 3410 is also offered at Grenfell, an oversight resulted in the prerequisite not being amended in that section of the Calendar in 2013, and so it is already in line with this proposal.

Consultations Sought From

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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:
Subject: Request for Consultation: Three Calendar changes from Mathematics and Statistics
From: Shannon Patrick Sullivan <shannon@mun.ca>
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To: associatepoffice@grenfell.mun.ca, miugconsultations@mi.mun.ca, staceyjm@mun.ca, chemhead@mun.ca, cs-chair@mun.ca, jolantal@mun.ca, biochead@mun.ca, pmarino@mun.ca, jhanchar@mun.ca, fletcher@mun.ca, psychology.head@mun.ca, aambi@mun.ca

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Thanks,
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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.ucon.mun.ca/~shannon

Attachments:

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Collections Development Division  
Queen Elizabeth II Library  
St. John’s, Newfoundland, Canada  
A1B 3Y1

6 November 2015

TO:  Dr. Shannon Patrick Sullivan

FROM:  Alison Ambi, Liaison Librarian, Mathematics & Statistics

SUBJECT:  Calendar changes for the 2016-2017 academic year

Upon review of the proposals to:
   - Amend the prerequisite for Statistics 3410 from Mathematics 1001 to Mathematics 200.
   - Allow students to take a course from any Mathematics subdiscipline in place of a current requirement for an Applied Mathematics course
   - Clarify a calendar regulation concerning the equivalence of courses offered by the Department of Mathematics and Statistics

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

St. John’s, Newfoundland, Canada A1B 3Y1 
Tel: (709) 864-7125  Fax: (709) 864-2153
Subject: RE: Request for Consultation: Three Calendar changes from Mathematics and Statistics - STAT 3410
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Date: 12/11/2015 9:23 AM
To: Shannon Patrick Sullivan <shannon@mun.ca>

Shannon,

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Sincerely,

Derek Housel

Derek Howse
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0586
FAX: 709-778-0394
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www.lcs.mun.ca/~shannon

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Version: 2015.0.6173 / Virus Database: 4455/10932 - Release Date: 11/01/15
Internal Virus Database is out of date.
Proposal
Calendar Change to
Mathematics and Statistics Program Regulations

Executive Summary

We propose to clarify a Calendar regulation concerning the equivalence of courses offered by the Department of Mathematics and Statistics.

Resource Implications: Instructional Costs

None

Consultations

Comments were received from the Library, the Marine Institute, the Faculty of Arts and the Department of Physics & Physical Oceanography.

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.

Signature of Unit Head (if appropriate):

Date:

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: None

Calendar Change(s)

Under the Faculty of Science, page 497, 2015-2016 Calendar, 9.8 Mathematics and Statistics, delete the first paragraph:

"From the point of view of degree regulations, Applied Mathematics, Pure Mathematics, and Statistics are considered to be one subject area."

On the same page, amend 9.8.3 Course Numbering System as follows:

"The subject area of all courses offered by the Department of Mathematics and Statistics is identified by the second digit of the course number:

Second Digit
0 – Common Core Mathematics courses
1 – Applied Mathematics courses
2 – Applied Mathematics and Pure Mathematics courses
3 – Pure Mathematics courses
4 – Pure Mathematics and Statistics courses
5 – Statistics courses

Unless otherwise specified, where a regulation makes reference to Mathematics courses, this shall include courses in any of the categories listed above.

Where a regulation makes reference to Applied Mathematics courses, this shall include all courses with second digit 1 or 2. Where a regulation makes reference to Pure Mathematics courses, this shall include all courses with second digit 2, 3 or 4. Where a regulation makes reference to Statistics courses, this shall include all courses with second digit 4 or 5."

Rationale

The existing statement is ambiguous and misleading. For instance, there are many degrees (such as the Major in Pure Mathematics) for the purpose of which Applied Mathematics, Pure Mathematics and Statistics are explicitly considered to be different subject areas. Consultation with the Office of the Registrar suggests that the application of the current statement is confined to interpreting which courses (such as Statistics courses) can be used to fulfill a program requirement for “Mathematics” courses. However, not only does the current statement make no reference to “courses”, it also makes no reference to (adjectiveless) “Mathematics”. The revised statement clarifies the situation, and is relocated to a more appropriate place in the Calendar, forming part of the description of the Department’s course numbering system.

The opportunity is also taken to correct a small typographical inconsistency in Section 9.8.3.
## Consultations Sought From

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## Library Report Received

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

Name

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**FOR OFFICE USE ONLY**

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Secretary:

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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

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Checked by AVG - www.avg.com
Version: 2015.0.6173 / Virus Database: 4455/10932 - Release Date: 11/01/15
Internal Virus Database is out of date.
TO: All Members, Faculty Council of Science
FROM: Joan Burry, Secretary
       Committee on Undergraduate Studies, Faculty of Science
SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors’ programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisite for Statistics 3510
   (c) Reworking of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.
Proposal from the Department of Physics and Physical Oceanography to Several Amend Course Calendar Entries

The Department of Physics and Physical Oceanography has initiated a review of all of its undergraduate course calendar entries.

These will be submitted for consultation and approval in blocks of 2-5 courses, by subject area, over the coming months.

Attached are amendment proposals for three courses: PHYS 3800, PHYS 3820 and PHYS 4820. Feedback is requested by Nov. 23, 2015.

Thank you.

Martin Plumer, Chair, Undergraduate Studies Committee (plumer@mun.ca)
Jolanta Lagowski, Head (jolantai@mun.ca).
October 30, 2015.
Proposal
Amend Calendar Entry PHYS 3800

Executive Summary
Proposal contains minor revisions to course syllabus and elimination of several CO.

Resource Implications: Instructional Costs
- None.

Consultations
- Faculty of Science.
- Grenfell Campus
- Marine Institute

Library Holdings and/or Other Resources Required
- No new Library resources required.

Signature of Unit Head (if appropriate): ________________________________
Date: ________________________________

Signature of Dean/Associate Vice-President (Academic)/Vice-President:
________________________________________
Date: ___________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Physics 3800 Computational Physics

Abbreviated Course Title

Computational Physics

Calendar Change(s)

3800 Computational Physics is a project-based course intended to train students to become functional in computational methods, by writing and compiling computer code (C/Fortran) in a Unix environment to solve problems drawn from different areas of physics. Students will complete several one or more projects selected from different areas of physics. Projects which will introduce the students to a particular class of numerical methods. Lectures and tutorials will cover the theory that underlies the computational methods and background for code development and the application of the required numerical methods.

CO: Any two 2000-level Physics course plus at least one other 3000-level Physics course
LC: 5
LH: 5
PR: Computer Science 1510 (or equivalent), PHYS 2820, Mathematics 2260 (or 3260), Mathematics 3202

Rationale

It is desirable to introduce more flexibility regarding the number of projects (there could be only one). Elimination of the Physics course COs better reflects the fact that Computational Physics does not assume prior knowledge of physics beyond that taught in first year (captured by the PR of PHYS 2820). Also, the course description had been a bit too long.
Consultations Sought From

- Faculty of Science.
- Grenfell Campus
- Marine Institute

Library Report Received

Comments Received

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:
Proposal
Amend Calendar Entry PHYS 3820

Executive Summary
Proposal contains minor revisions to course title, syllabus, and elimination of a reference to an inactive course.

Resource Implications: Instructional Costs
- None.

Consultations
- Faculty of Science.
- Grenfell Campus
- Marine Institute

Library Holdings and/or Other Resources Required
- No new Library resources required.

Signature of Unit Head (if appropriate): ________________________________

Date: ________________________________

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

Date: ________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Physics 3820 Mathematical Physics II.

Abbreviated Course Title

Mathematical Physics I

Calendar Change(s)


PR: Mathematics 2260 (or 3260) and PHYS 3840 (or Mathematics 3202).

Rationale

Evolution of the syllabus in our first and second-year courses over the past decade have not been fully rationalized with our higher level courses. There are three items in the proposed changes to address these changes for Mathematical Physics I: Courses title, course syllabus, and elimination of reference to an inactive course:

a) The proposed course title change is from Mathematical Physics II to Mathematical Physics I. This is desirable since PHYS 2820 used to be named Mathematical Physics I and was re-named Computational Mechanics about ten years ago. Physics 3820 is now our introductory course to the topic of mathematical physics.

b) The new syllabus is a more accurate reflection of what has been taught in the course over the past decade.

c) PHYS 3810 has been inactive for over a decade.
Consultations Sought From

- Faculty of Science.
- Grenfell Campus
- Marine Institute

Library Report Received

Comment Received

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

Name

FOREOFFICEUSEONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Proposal
Amend Calendar Entry PHYS 4820

Executive Summary
Proposal contains minor revisions to course title, syllabus, and alternative PR.

Resource Implications: Instructional Costs
- None.

Consultations
- Faculty of Science.
- Grenfell Campus
- Marine Institute

Library Holdings and/or Other Resources Required
- No new Library resources required.

Signature of Unit Head (if appropriate): ________________________________

Date: ________________________________

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

Date: ________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Physics 4820 Mathematical Physics III.

Abbreviated Course Title

Mathematical Physics II

Calendar Change(s)

4820 Mathematical Physics III II covers further topics on the common partial differential equations of Mathematical Physics and boundary value problems; Sturm-Liouville theory, Fourier series, generalized Fourier series, introduction to the theory of distributions, Dirac delta function, Laplace and Fourier transforms, Green's functions, Bessel functions, Legendre functions, spherical harmonics, and other topics such as group theory.

PR: Physics 3820 or all of Mathematics 2051, 2260, 3202, 3210

Rationale

Evolution of the syllabus in our first and second-year courses over the past decade have not been fully rationalized with our higher level courses. There are three items in the proposed changes to address these changes for Mathematical Physics II: Courses title, course syllabus, and an alternative PR.

a) The proposed course title change is from Mathematical Physics III to Mathematical Physics II. This is desirable since PHYS 2820 used to be named Mathematical Physics I and was re-named Computational Mechanics about ten years ago. Physics 3820 is now our introductory course to be named Mathematical Physics I.

b) The new syllabus is a more accurate reflection of what has been taught in the course over the past decade.

c) The new PR allows students who have taken all of the four mathematics courses 2051, 2260, 3202, 3210 to enroll into Phys 4820. These four courses cover nearly all of the same topics, in more depth, that are covered in Physics 3820 (the previous exclusive PR for Phys 4820). Note that these four mathematics courses are required for the Applied Mathematics/Physics joint honours program. Also note that the foundation courses, Mathematics 2260 and 3202, are required of all physics major and honours programs.

Mathematics 2051: Linear Algebra II
Mathematics 2260: Ordinary Differential Equations I
Mathematics 3202: Vector Calculus
Mathematics 3210: Introduction to Complex Analysis
Consultations Sought From

- Faculty of Science.
- Grenfell Campus
- Marine Institute

Comments Received

Library Report Received

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:
CONSULTATIONS – See attached.

1. Grenfell Campus     Yes/No
2. Marine Institute    Yes
3. Department of Biochemistry  Yes/No
4. Department of Biology   Yes/No
5. Department of Chemistry   Yes
6. Department of Computer Science   Yes/No
7. Department of Earth Sciences   Yes/No
8. Department of Mathematics and Statistics   Yes
9. Department of Ocean Sciences   Yes/No
10. Department of Psychology   Yes/No
11. Library                Yes
12. Engineering            Yes
Martin Plumer

Subject: FW: FW: Consultation: Minor amendments to 3 PHYS courses

-----Original Message-----
From: Engineering Consultations [mailto:engrconsult@mun.ca]
Sent: November-20-15 3:52 PM
To: Martin Plumer
Subject: Re: FW: Consultation: Minor amendments to 3 PHYS courses

Dear Dr. Plumer,

Thank you for the opportunity to comment on the Calendar changes for PHYS 3800, PHYS 3820 and PHYS 4820.

At the meeting of the Committee on Undergraduate Studies of the Faculty of Engineering and Applied Science on November 18, no concerns were raised about this Calendar change, which has no impact on our programs.

Yours sincerely,

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

Quoting Martin Plumer <plumer@mun.ca>:

> Dear Glyn,
> 
> I think I mistakenly omitted Engineering from this consultation.
> Cheers,
> 
> Martin
> From: Martin Plumer [mailto:plumer@mun.ca]
> Sent: October-30-15 8:02 AM
> To: 'BioChem'; 'Biology'; 'Chemistry'; 'Computer Science'; 'Earth Science'; 'Grenfell'; 'Marine Inst'; 'Math'; 'Ocean Sciences'; 'Physics'; 'Psychology'
> Cc: 'Ania Harlick'; 'Entcho Demirov'; 'Ivan Saika-Voivod'; 'James Munroe'; 'Qiyng Chen'; 'Rick Goulding'; 'Stefan Wallin'
> Subject: Consultation: Minor amendments to 3 PHYS courses
> TO: Faculty of Science, Marine Institute, and Grenfell:
> Attached are minor amendment proposals for three physics courses: PHYS 3800, PHYS 3820 and PHYS 4820.
> 
> Feedback is requested by Nov. 23, 2015.
> 
> Thank you.
> Martin Plumer, Chair, Undergraduate Studies Committee (plumer@mun.ca)
> Jolanta Lagowski, Head (jolantal@mun.ca).
> October 30, 2015.
Collections Development Division  
Queen Elizabeth II Library  
St. John's, Newfoundland, Canada  
A1B 3Y1

16 November 2015

TO:  Jolanta Lagowski, Head, Physics & Physical Oceanography  
Martin Plumer, Chair, Undergraduate Studies Committee

FROM: Alison Ambi, Liaison Librarian, Physics & Physical Oceanography

SUBJECT: Library approval of proposed calendar changes

Upon review of the October 30th proposal to make the following calendar changes:

1. Amended calendar entry for PHYS 3800  
2. Amended calendar entry for PHYS 3820  
3. Amended calendar entry for PHYS 4820  

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  
aambi@mun.ca
Martin Plumer

Subject: FW: Consultation: Minor amendments to 3 PHYS courses

From: Martin Plumer [mailto:plumer@mun.ca]  
Sent: October 30-15 11:15 AM  
To: 'MIUG Consultations'  
Subject: RE: Consultation: Minor amendments to 3 PHYS courses

Hi Derek,

Thanks for the observation.

I am told either the new or old name can be used for this purpose.

Cheers,
Martin

From: Dawn King [mailto:Dawn.King@mi.mun.ca] On Behalf Of MIUG Consultations  
Sent: October 30-15 9:54 AM  
To: Martin Plumer  
Subject: RE: Consultation: Minor amendments to 3 PHYS courses

Dr. Plumer,

Thank you for the opportunity to review the proposed changes to PHYS 3800, 3820 and 4820. These changes will have no impact on the programs at the Marine Institute.

We are happy to support these changes as presented.

Please note that there is a minor typo on page 6 of the submission. The Course Number and Title is listed as Physics 3820 Mathematical Physics II whereas I believe it should now be Physics 3820 Mathematical Physics I.

A similar typo exists on page 9 of the submission with the Course Number and Title showing Physics 4820 Mathematical Physics III whereas this should now be Physics 4820 Mathematical Physics II.

All the best,

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: Martin Plumer [mailto:plumer@mun.ca]  
Sent: Friday, October 30, 2015 8:02 AM  
To: 'BioChem' <biocheadd@mun.ca>; 'Biology' <dinner@mun.ca>; 'Chemistry' <chemhead@mun.ca>; 'Computer Science' <cs-chair@mun.ca>; 'Earth Science' <jhanchar@mun.ca>; 'Grenfell' <associatevpoffice@grenfell.mun.ca>;
Attached are minor amendment proposals for three physics courses: PHYS 3800, PHYS 3820 and PHYS 4820. Feedback is requested by Nov. 23, 2015.

Thank you.

Martin Plumer, Chair, Undergraduate Studies Committee (plumer@mun.ca)
Jolanta Lagowski, Head (jolantal@mun.ca).
October 30, 2015.
Hi Martin,

These changes have no impact on chemistry and having reviewed them, we have no concerns with or comments on these changes.

Take care,

Travis

On 30/10/2015 8:01 AM, Martin Plumer wrote:

TO: Faculty of Science, Marine Institute, and Grenfell:

Attached are minor amendment proposals for three physics courses: PHYS 3800, PHYS 3820 and PHYS 4820.

Feedback is requested by Nov. 23, 2015.

Thank you.

Martin Plumer, Chair, Undergraduate Studies Committee (plumer@mun.ca)
Jolanta Lagowski, Head (jolanta@mun.ca).
October 30, 2015.

--

Travis D. Fridgen BSc, BEd, PhD
Professor and Head
Department of Chemistry
Memorial University
St. John's, NL, A1B 3X7
chemhead@mun.ca
709-864-3470
http://www.chem.mun.ca/zfac/rdf.php

No virus found in this message.
Checked by AVG - www.avg.com
Version: 2015.0.6176 / Virus Database: 4460/10980 - Release Date: 11/11/15

No virus found in this message.
Checked by AVG - www.avg.com
Version: 2015.0.6176 / Virus Database: 4460/10985 - Release Date: 11/12/15
Hi Martin,

The Department of Mathematics and Statistics has no objection to the proposed changes to Physics 3800, 3820 and 4820.

Regards,
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.ucsf.mun.ca/~shannon

-----
No virus found in this message.
Checked by AVG - www.avg.com
Version: 2015.0.6176 / Virus Database: 4460/11039 - Release Date: 11/21/15

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No virus found in this message.
Checked by AVG - www.avg.com
Version: 2015.0.6176 / Virus Database: 4460/11016 - Release Date: 11/17/15
TO: Joan Burry, Secretary, Faculty of Science Undergraduate Studies Committee

FROM: Karen Morris, Undergraduate Officer, Biology

DATE: November 16, 2015

SUBJECT: Calendar Changes Proposal: Biology 4405 - Landscape Ecology

Please find attached a proposal for calendar changes to an existing course Biology 4405 - Landscape Ecology which was approved at a departmental meeting of October 14, 2015. The consultation request and responses received to date are attached.

The calendar change proposal is now being submitted to the Committee on Undergraduate Studies, Faculty of Science for consideration.

cc. P. Marino, Head, Biology
TO: All Members, Faculty Council of Science

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

SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors’ programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisite for Statistics 3510
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burry
Associate Registrar and
Secretary
Proposal
Calendar Change to Existing Course

Executive Summary

Biology 4405, Landscape Ecology, is currently offered on campus every other year during the Winter Semester. We would like to have the option of offering this course as a two-week Spring semester field course at the Bonne Bay Marine Station. This would increase the diversity of courses currently offered at the Station.

Resource Implications: Instructional Costs

This course will be offered by existing faculty, and teaching this course will be considered as part of normal workload. The faculty member currently teaching BIOL 4405 (Dr. Wiersma) is able to teach this as a field course.

Consultations
Faculties of Arts, Business, Education, Engineering, Human Kinetics and Recreation, Medicine, Music, Nursing, Pharmacy, Science and Social Work; Grenfell Campus; Marine Institute and MUN Library.

Library Holdings and/or Other Resources Required

No new library resources or costs are required or anticipated.

Signature of Unit Head (if appropriate):

Date: 16 Nov 2015

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Biology 4405 - Landscape Ecology

Landscape Ecology

Calendar Change(s)

4805 Landscape Ecology is an introduction to the theory and principles of landscape pattern and processes, including issues related to scale, networks, landform and vegetation patterns, species distributions, and natural and human-caused aspects of landscape change.

CO: Statistics 2550 or equivalent
LH: 3
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 2600 and 18 credit hours in Biology, Statistics 2550 or equivalent, or permission from the course instructor

Secondary Calendar Changes

Rationale

BIOL 4405 is a relatively new course at Memorial. It was developed by Dr. Wiersma when she was hired in 2006 and was first offered in Winter 2009. The course has been successful, and could also be readily be offered as a two-week intensive course at the Bonne Bay Marine Station where students could more readily see the connections between the ecological world and the way landscape ecologists analyse it using GIS software. Having the course in Bonne Bay may also make it easier for students at Grenfell to take a course in Landscape Ecology; a topic that is not offered on the Grenfell campus.

Consultations Sought From

<table>
<thead>
<tr>
<th>Arts</th>
<th>Comments Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography</td>
<td>Yes</td>
</tr>
<tr>
<td>Business</td>
<td>Yes</td>
</tr>
<tr>
<td>Education</td>
<td>Yes</td>
</tr>
<tr>
<td>Engineering</td>
<td>Yes</td>
</tr>
<tr>
<td>Grenfell Campus</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Biology 4405: Landscape Ecology

Human Kinetics and Recreation  Yes
Marine Institute  Yes
Medicine  Yes
Music  Yes
Pharmacy  Yes
Science  Yes
Social Work  Yes

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: Biology 4405 Landscape Ecology proposed course change
From: Karen Morris <morrisk@mun.ca>
Date: 16/10/2015 10:46 AM
To: stacey.m@mun.ca, fla.ad.undergrad@mun.ca, shicks@mun.ca, "Fraize, Beverly"
<bfraize@mun.ca>, engrconsult@mun.ca, associatevpoffice@grenfell.mun.ca,
mehickey@mun.ca, miugconsultation@mi.mun.ca, cvardy@mun.ca,
Sherry.calnes@med.mun.ca, Maureen Volk <mvolk@mun.ca>, deanNurse@mun.ca,
pharinfo@mun.ca, deansci@mun.ca, adeanugradsw@mun.ca, univlib@mun.ca
CC: "Marino, Paul" <pmarino@mun.ca>

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape
Ecology. Could you please review the proposal and forward any concerns and/or comments
to me as soon as possible.

Many Thanks
Karen

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

Attachments:

2015 Biology 4405 Landscape Ecology Course Change Proposal.doc 32.5 KB
Biology 4405: Landscape Ecology

Proposal
Calendar Change to Existing Course

Executive Summary

Biology 4405, Landscape Ecology, is currently offered on campus every other year during the Winter Semester. We would like to have the option of offering this course as a two-week Spring semester field course at the Bonne Bay Marine Station. This would increase the diversity of courses currently offered at the Station.

Resource Implications: Instructional Costs

This course will be offered by existing faculty, and teaching this course will be considered as part of normal workload. The faculty member currently teaching BIOL 4405 (Dr. Wiersma) is able to teach this as a field course.

Consultations
Faculties of Arts, Business, Education, Engineering, Human Kinetics and Recreation, Medicine, Music, Nursing, Pharmacy, Science and Social Work; Grenfell Campus; Marine Institute and MUN Library.

Library Holdings and/or Other Resources Required

No new library resources or costs are required or anticipated.

Signature of Unit Head (if appropriate):
________________________________

Date:
________________________________

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

Date:
________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Biology 4405 - Landscape Ecology

Landscape Ecology

Calendar Change(s)

4805 Landscape Ecology is an introduction to the theory and principles of landscape pattern and processes, including issues related to scale, networks, landform and vegetation patterns, species distributions, and natural and human-caused aspects of landscape change.

CO: Statistics 2550 or equivalent

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 2600 and 18 credit hours in Biology, Statistics 2550 or equivalent, or permission from the course instructor

Secondary Calendar Changes

Rationale

BiOL 4405 is a relatively new course at Memorial. It was developed by Dr. Wiersma when she was hired in 2006 and was first offered in Winter 2009. The course has been successful, and could also be readily be offered as a two-week intensive course at the Bonne Bay Marine Station where students could more readily see the connections between the ecological world and the way landscape ecologists analyse it using GIS software. Having the course in Bonne Bay may also make it easier for students at Grenfell to take a course in Landscape Ecology; a topic that is not offered on the Grenfell campus.

Consultations Sought From

Arts
Business
Education
Engineering
Grenfell Campus
Human Kinetics and Recreation

Comments Received
Biology 4405: Landscape Ecology

Marine Institute
Medicine
Music
Pharmacy
Science
Social Work

Library Report Received

Yes / No

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: FW: Biology 4405 Landscape Ecology proposed course change
From: "Mercer, Stacey" <staceym@mun.ca>
Date: 23/10/2015 2:05 PM
To: "morrisk@mun.ca" <morrisk@mun.ca>

Hi Karen:
Here is a comment.
Thanks.

Stacey Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

From: Catto, Norm
Sent: October 22, 2015 8:40 AM
To: Mercer, Stacey
Subject: RE: Biology 4405 Landscape Ecology proposed course change

Geography supports this proposal. Landscape ecology could be part of a suite of classes taught at Bonne Bay. that could be of interest to our students.

From: Mercer, Stacey
Sent: October-20-15 3:58 PM
To: Catto, Norm
Subject: FW: Biology 4405 Landscape Ecology proposed course change

Good afternoon,
You are invited to give feedback on the attached proposal.
Thank you.

Stacey Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October 16, 2015 10:50 AM
To: Mercer, Stacey; fa.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; engrconsult@mun.ca; associateyoffice@grnfell.mun.ca; Hickey, Marie; mluconsultation@ml.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Voil, Maureen; DeanNurse; pharinfo@mun.ca; Dean of Science; adeanuoradsw@mun.ca; Library Correspondence
Cc: Marino, Paul
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Subject: Biology 4405 Landscape Ecology proposed course change
From: Associate Dean of Under Graduate Faculty of Business Administration
<adundgradfba@mun.ca>
Date: 31/10/2015 2:43 PM
To: Karen Morris <morrisk@mun.ca>

Hello:

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

--larry

On Oct 16, 2015, at 10:27 AM, Karen Morris <morrisk@mun.ca> wrote:

-------- Forwarded Message --------
Subject:Biology 4405 Landscape Ecology proposed course change
Date: Fri, 16 Oct 2015 10:46:24 -0230
From: Karen Morris <morrisk@mun.ca>
To: staceym@mun.ca, fla.ad.undergrad@mun.ca, shicks@mun.ca, Fraize, Beverly
<bfraize@mun.ca>, engrconsult@mun.ca, associatevpoffice@grenfell.mun.ca,
mehickey@mun.ca, mgconsultation@mi.mun.ca, cvardy@mun.ca,
Sherry.caines@med.mun.ca, Maureen Volk <mvolk@mun.ca>, deanNurse@mun.ca,
pharminfo@mun.ca, deansci@mun.ca, adeanugradsw@mun.ca, univlib@mun.ca
CC: Marino, Paul <pmarino@mun.ca>

Hi,

Please find attached a proposed calendar change for Biology 4405, Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen

Karen Morris
Undergraduate Office
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709-864-2921

<2015 Biology 4405 Landscape Ecology Course Change Proposal.doc>
Subject: RE: Biology 4405 Landscape Ecology proposed course change
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Date: 16/10/2015 3:03 PM
To: Karen Morris <morrisk@mun.ca>
CC: Derek Howse <Derek.Howse@mi.mun.ca>

Karen,

Thank you for the opportunity to review the proposed changes to the course Biology 4405 Landscape Ecology. These changes will have no impact on the programs here at the Marine Institute.

We are happy to support this change 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: Karen Morris [mailto:morrisk@mun.ca]
Sent: Friday, October 16, 2015 11:57 AM
To: MIUG Consultations <MIUGconsultations@mi.mun.ca>; adeanugradswk@mun.ca;
fbad.ad.undergrad@mun.ca
Subject: Fwd: Biology 4405 Landscape Ecology proposed course change

-------- Forwarded Message --------
Subject:Biology 4405 Landscape Ecology proposed course change
Date:Fri, 16 Oct 2015 10:46:24 -0230
From:Karen Morris <morrisk@mun.ca>
To:staceym@mun.ca, fbad.ad.undergrad@mun.ca, shicks@mun.ca, Fraize, Beverly <bfraize@mun.ca>, engconsult@mun.ca, associateyoffice@grenfell.mun.ca, mehickey@mun.ca, miugconsultation@mi.mun.ca, cvardy@mun.ca, Sherry.caines@med.mun.ca, Maureen Volk <mvolk@mun.ca>, deanNurse@mun.ca, pharminfo@mun.ca, deansci@mun.ca, adeanugradsw@mun.ca, univlib@mun.ca
CC:Marino, Paul <pmarino@mun.ca>

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.
Challenge: RE: Biology 4405 Landscape Ecology proposed course change

From: "Frale, Beverly" <bfralie@mun.ca>
Date: 21/10/2015 12:25 PM
To: "Karen Morris" <morrisk@mun.ca>

Hello Karen,

I have reviewed the attached Calendar Changes and confirm that there are no implications on the Faculty of Education.

Best regards,

Beverly Fraize
Student Advisor
Undergraduate Programs
Faculty of Education, Room ED 2020
Education Building
Memorial University of Newfoundland
St. John's, NL A1B 3X8
Phone: 709-864-3485
Fax: 709-864-2001
Admission Enquiries: edadmiss@mun.ca
General Enquiries: muneduc@mun.ca

From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October-16-15 10:50 AM
To: Mercer, Stacey; fla.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; engrconsult@mun.ca; associatevpoffice@grenfell.mun.ca; Hickey, Marie; miugconsultation@mi.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharminfo@mun.ca; Dean of Science; adeanugradsw@mun.ca; Library Correspondence
Cc: Marino, Paul
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen

Karen Morris
Undergraduate Officer
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709-864-8021
Subject: Re: Biology 4405 Landscape Ecology proposed course change
From: Engineering Consultations <engrconsult@mun.ca>
Date: 22/10/2015 9:25 AM
To: Karen Morris <morrisk@mun.ca>

Dear Ms. Morris,

Thank you for the opportunity to comment on the proposed change to the Calendar entry for BIOL 4405.

At its regular meeting of October 21, the Committee on Undergraduate Studies of the Faculty of Engineering and Applied Science found that these changes will have no impact on the programs of the Faculty.

We wish you well in the development of this proposal.

Yours sincerely,

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

Quoting Karen Morris <morrisk@mun.ca>:

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen

*Karen Morris
Undergraduate Officer
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709-864-8021*
Re: Biology 4405 Landscape Ecology Consultation

Subject: Re: Biology 4405 Landscape Ecology Consultation
From: "Gallant, Robert" <rgallant@grenfell.mun.ca>
Date: 19/10/2015 9:38 AM
To: Yolanda Wiersma <ywiersma@mun.ca>
CC: "Karen Morris" <morrisk@mun.ca>

Dr. Wiersma and Dr. Morris,

Thank you for the additional information, which I have passed on to interested faculty. Since then I have received a number of comments from Division of Science Faculty indicating support for your proposal.

Thanks

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

From: Yolanda Wiersma <ywiersma@mun.ca>
Sent: Friday, October 16, 2015 1:13 PM
To: Gallant, Robert
Cc: 'Karen Morris'
Subject: FW: Biology 4405 Landscape Ecology Consultation

Hello Dr. Gallant,

Karen Morris asked me to respond to your questions below, as I am the faculty member who teaches the current on-campus version of Landscape Ecology (BIOL 4405). I envision the course being approximately 50% field based and 50% classroom/computer lab, perhaps as high as 60% field: 40% lab. I have never taught a landscape ecology course this way, but have always felt it would be a good way to teach the course. Nor have I taught a field course at Bonne Bay, so it will be a bit of trial and error process in the first offerings. The field component would be a combination of observational work in different landscape types (to relate ecological landscapes as they are perceived on the ground to the way they are analysed with digital/map data) along with more intensive sampling work (e.g., vegetation plots, point counts for species, spatial surveys) to collect spatially explicit data that students would take back to the lab and analyze.

I hope this answers your question.

Dr. Yolanda Wiersma

From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October-16-15 12:01 PM
To: Yolanda Wiersma
Subject: Fwd: Biology 4405 Landscape Ecology Consultation

Hi Yolanda,

Can you provide more information to answer the query below. If you can answer and cc me that would be great as it will have to go in the package that goes to Faculty of Science Undergraduate as well as the other committees up the line.

Thanks
Re: Biology 4405 Landscape Ecology Consultation

Karen

-------- Forwarded Message --------
Subject: Biology 4405 Landscape Ecology Consultation
Date: Fri, 16 Oct 2015 14:15:14 -0000
From: Gallant, Robert <rpuallant@grenfell.mun.ca>
To: Karen Morris <morrisk@mun.ca>

Hello Dr. Morris,

I have received a number of comments from Environmental Science faculty expressing interest in the course because it could serve as a field course option for Grenfell Environmental Science students. As such the faculty would be interested in a bit more detail on more information about the field aspects of the course; for example what proportion of time is expected to be spent in the field and what kind of exercises will occur there.

Thanks

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

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This electronic communication is governed by the terms and conditions at http://www.mun.ca/cc/policies/electronic_communications_disclaimer_2011.php.
Subject: Biology 4405 Landscape Ecology proposed course change
From: "Rohr, Linda" <lerohr@mun.ca>
Date: 20/10/2015 10:13 AM
To: "morrisk@mun.ca" <morrisk@mun.ca>

Hi Karen
I have reviewed the proposed changes to Biology 4405 and have no concerns.
Linda

Linda E. Rohr PhD
Associate Professor & Associate Dean Undergraduate Studies
Human Kinetics and Recreation, Memorial University
t: 709.864.6202  f: 709.864.7531  e: lerohr@mun.ca
PE 2025
RE: Biology 4405 Landscape Ecology proposed course change

Subject: RE: Biology 4405 Landscape Ecology proposed course change
From: cvardy@mun.ca
Date: 16/10/2015 4:54 PM
To: <morrisk@mun.ca>

Hi

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

Cathy

Cathy Vardy, MD, FRCP(C)
Vice Dean
Faculty of Medicine
Health Sciences Centre, Room M2M319
Memorial University of Newfoundland
St. John's, NL, Canada, A1B 3V6
Tel: 709-864-6417 or Fax: 709-864-6336

From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October-16-15 10:46 AM
To: staceym@mun.ca; fla.ad.undergrad@mun.ca; shicks@mun.ca; Fraize, Beverly; engrconsult@mun.ca; associatevpoffice@grenfell.mun.ca; mehickey@mun.ca; miugconsultation@mi.mun.ca; Vardy, Cathy; Caines, Sherry; Maureen Volk; deanNurse@mun.ca; pharminfo@mun.ca; deansci@mun.ca; adeanugradsw@mun.ca; univlib@mun.ca
Cc: Marino, Paul
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen

Karen Morris
Undergraduate Officer
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709-864-8021
Subject: RE: Biology 4405 Landscape Ecology proposed course change
From: "Volk, Maureen" <mvolk@mun.ca>
Date: 16/10/2015 6:19 PM
To: Karen Morris <morrisk@mun.ca>

The School of Music has no concerns or comments.
Maureen Volk

From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October-16-15 10:50 AM
To: Mercer, Stacey; fla.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; engrconsult@mun.ca; associatevpoffice@grenfell.mun.ca; Hickey, Marie; mlugconsultation@ml.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharinfo@mun.ca; Dean of Science; adeanugradsw@mun.ca; Library Correspondence
Cc: Marino, Paul
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen

Karen Morris
Undergraduate Officer
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709-864-8021
RE: Biology 4405 Landscape Ecology proposed course change

Subject: RE: Biology 4405 Landscape Ecology proposed course change
From: adeanugradswk <adeanugradswk@mun.ca>
Date: 03/11/2015 2:04 PM
To: Karen Morris <morrisk@mun.ca>

Hi Karen,

I am new to the calendar change process and what language is acceptable or not. So, my apologies if I am off-track. I wonder about including in the calendar the option of a full term versus a two week intensive. How do students know what they are selecting?

Aside from my query above, these course changes do not impact the School of Social Work.

Best to you,

I look forward to hearing from you,

Heather

Heather J. Hair, PhD, RMFT, RSW
Associate Dean Undergraduate Programs
School of Social Work, Memorial University
St. John's, NL, Canada, A1C 5S7
T: 709-864-2562 or 709-864-7349

From: Karen Morris [mailto:morrisk@MUN.CA]
Sent: October 16, 2015 12:00 PM
To: mlugconsultations@mi.mun.ca; adeanugradswk; jba.ad.undergrad@MUN.CA
Subject: Fwd: Biology 4405 Landscape Ecology proposed course change

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

Subject: Biology 4405 Landscape Ecology proposed course change
Date: Fri, 16 Oct 2015 10:46:24 -0230
From: Karen Morris <morrisk@mun.ca>

To: steve@mun.ca, jba.ad.undergrad@mun.ca, shicks@mun.ca, Fraize, Beverly <bfraize@mun.ca>, enrconsult@mun.ca, associatevpooffice@urenfell.mun.ca, mehickey@mun.ca, mlugconsultation@mi.mun.ca, cvardy@mun.ca, Sherry.caines@med.mun.ca, Maureen Volk <mvolk@mun.ca>, deanNurse@mun.ca, pharminfo@mun.ca, deansci@mun.ca, adeanugradswk@mun.ca, univlib@mun.ca
CC: Marino, Paul <pmarino@mun.ca>

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
FW: Biology 4405 Landscape Ecology proposed course change

Subject: FW: Biology 4405 Landscape Ecology proposed course change  
From: "Alcock, Erin" <ekalcock@mun.ca>  
Date: 22/10/2015 6:15 PM  
To: "morrisK@mun.ca" <morrisK@mun.ca>

Hi Karen,

Thank you for getting in touch with us regarding the proposed calendar change for Biology 4405.

As this course is already supported by Memorial University Libraries, there would be little to no impact if the course were offered from Bonne Bay. I would hope that any of the needs of the students would be met via our online subscriptions or nearby access to the Grenfell Campus.

Please get back to me if you have additional questions.

Erin Alcock

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

From: Library Correspondence  
Sent: Friday, October 16, 2015 3:42 PM  
To: Alcock, Erin  
Cc: Dennis, Chris  
Subject: FW: Biology 4405 Landscape Ecology proposed course change

From: Karen Morris [mailto:morrisK@mun.ca]  
Sent: Friday, October 16, 2015 10:50 AM  
To: Mercer, Stacey; fla.ad.undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; engrconsult@mun.ca; associatevoffice@grenfell.mun.ca; Hickey, Marie; mlugconsultation@ml.mun.ca; cvardy@mun.ca; Sherry.cahnes@med.mun.ca; Volk, Maureen; DeanNurse; pharminfo@mun.ca; Dean of Science; adeanugradsw@mun.ca; Library Correspondence  
Cc: Marino, Paul  
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and /or comments to me as soon as possible.

Many Thanks  
Karen

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

Attachments:  
2015 Biology 4405 Landscape Ecology Course Change Proposal.doc  
32.5 KB
-------- Forwarded Message --------
Subject: RE: Biology 4405 Landscape Ecology proposed course change
Date: Tue, 17 Nov 2015 18:23:37 +0000
From: Glew, Csop <cglew@mun.ca>
To: 'Karen Morris' <morrisk@mun.ca>
CC: Dillon, Carla <crmdillon@mun.ca>

Hello Karen
The School of Pharmacy has no concerns with the proposed calendar change. We did note a typing error under "Calendar Change(s)" the course is referred to as "4805" but should be "4405".
Regards,
Csop Glew

CSOP GLEW, Hon. B.A., M.U.P. 1 MANAGER OF ACADEMIC PROGRAMS
School of Pharmacy
Memorial University of Newfoundland
St. John's, NL 1 A1B 3V6
Health Sciences Centre 1 Room H3435
T 709 777 6963  F 709 777 7044
www.mun.ca/pharmacy
Please note that the deadline to apply for admission for September 2016 is February 1, 2016.

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From: Karen Morris [mailto:morrisk@mun.ca]
Sent: October 16-15 10:50 AM
To: Mercer, Stacey; flad_undergrad@mun.ca; Hicks, Sue; Fraize, Beverly; engrconsult@mun.ca; associatevpoffice@grenfell.mun.ca; Hickey, Marie; mlugconsultation@mi.mun.ca; cvardy@mun.ca; Sherry.caines@med.mun.ca; Volk, Maureen; DeanNurse; pharinfo@mun.ca; Dean of Science; adeangradsw@mun.ca; Library Correspondence
Cc: Marino, Paul
Subject: Biology 4405 Landscape Ecology proposed course change

Hi,

Please find attached a proposed calendar change for Biology 4405 Landscape Ecology. Could you please review the proposal and forward any concerns and/or comments to me as soon as possible.

Many Thanks
Karen
TO: All Members, Faculty Council of Science

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

SUBJECT: New Program Proposals, New Course Proposals and Calendar Changes

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisite for Statistics 3510
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology major programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burny
Associate Registrar and Secretary
Calendar Changes in Existing Biochemistry Programs

Executive Summary
(i) Biochemistry 2000 has been inactive for a number of years, the department does not anticipate offering this course in the future, and now wishes to delete it and update our regulations accordingly. (ii) The Faculty of Medicine will cease offering Medicine 4300 Introduction to General and Autonomic Pharmacology (cross-listed as Biochemistry 4220) with the introduction of the PharmD program in 2017. The department proposes to delete the course from our listings now. It will be replaced in the Biochemistry(Hons) and Nutrition(Hons) programs with a new Chemistry course on a related topic: Chemistry 4701 Principles of Pharmaceutical Chemistry. (iii) The Department of Chemistry will no longer offer Chemistry 3500, an optional Chemistry course in the Biochemistry Honours program, and the department proposes to delete it from our program listings. In addition, following consultation with Dr. Robert Gallant, Head of Division of Science, Grenfell Campus, we propose to delete Environmental Science 3211 from the Biochemistry Honours program regulations.

Resource Implications: Instructional Costs
These changes will use no teaching resources in the Department of Biochemistry.

Consultations
The University Library, Grenfell Campus, the Marine Institute, the Faculty of Medicine, the School of Pharmacy, and Departments in the Faculty of Science on the St. John’s Campus,

Library Holdings and/or Other Resources Required
Any requirement for Library resources for Chemistry 4701 will have been addressed with the Proposal for a New Course submitted by the Department of Chemistry.

The costs, if any, associated with this change/these changes can be met from within the existing budget allocation for the Department of Biochemistry.

Signature of Unit Head (if appropriate): ________________________________

Date: ________________________________

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

Date: ________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Existing Program Titles where updates are being done
(5.1.4) Biochemistry and Chemistry Joint Honours
(5.1.6) Biochemistry and Psychology (Behavioural Neuroscience) Joint Honours
(5.1.7) Biochemistry (Nutrition) and Psychology (Behavioural Neuroscience) Joint Honours
(9.1.2.1) Honours Degree in Biochemistry
(9.1.3.1) Major in Nutrition
(9.1.3.2) Honours Degree in Nutrition

Calendar Changes
See appended pages

Secondary Calendar Changes
In clause 9.11.5.3 (a) of the Faculty of Science section of the Calendar, add “the former” in front of 2000 so that the regulation reads:

- Biochemistry: Any 2000-, 3000-, or 4000-level course except the former 2000, 2005, the former 2010, the former 2011, 3202, 3402, or 4502

In clause 11.2 of the Faculty of Medicine section of the Calendar, add “the former” in front of the credit restriction for Biochemistry 4200 so that it reads:

CR: the former Biochemistry 4200

Rationale
The discontinuation of three courses necessitates updates to our program regulations. One course was taught by Biochemistry, the two others were offered by other units but were included in our programs. In the case of one of the latter two discontinued courses, a new course is being added to the Biochemistry and Nutrition Honours degree programs in its place.

Consultations Sought From

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Delete 3 courses, add one, and update affected programs

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Library Report Received: Yes / No

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

Name: Date:

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:
Secretary:
Date:
MARKED UP CHANGES

5.1.4 Biochemistry and Chemistry Joint Honours

The following courses are required:

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

5.1.6 Biochemistry and Psychology (Behavioural Neuroscience) Joint Honours

*Note: Students completing this program cannot receive credit for Psychology 2920.*

The following courses (or equivalent) are required to complete the 120 credit hours in courses required for the degree:

1. Chemistry 1050 and 1051 (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000 and 1001, Physics 1050, (or 1020), 1051 (or 1021), English 1080 and 1110.
2. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, Medicine 310A/B, either 4210 or 4211, 9 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4220, 4230-4249, **Chemistry 4701.**

5.1.7 Biochemistry (Nutrition) and Psychology (Behavioural Neuroscience) Joint Honours

*Note: Students completing this program cannot receive credit for Psychology 2920.*

The following courses (or equivalent) are required:

1. Chemistry 1010 and 1011 (or 1050, 1051) (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000, Physics 1020 or 1050, and 1021 (or 1051), English 1080 and 1110.
2. Biochemistry 2100, 2101, 2600, 3106, 3203, 4002, 4300, 4301, 4502, Medicine 310A/B; one course chosen from: Biochemistry 3105, 3107, 3108, 3202, 3402, 3600, 4101, 4103, 4104, 4105, 4200, 4201, 4210, 4211, **4220, 4230-4249,** Biology 3050, **Chemistry 4701.**

9.1.2.1 Honours Degree in Biochemistry

3. Required courses:

   a. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, 4102, 499A, 499B, Medicine 310A/B.
   b. Biochemistry 4210 or 4211.
   c. Twelve credit hours in courses from Biochemistry 4002, 4101, 4103, 4104, 4105, 4200, 4201, 4230-4239.
d. At least 6 credit hours in courses from Biochemistry 2600, 3203, 4229, 4240-4249, Biology 2060, 3050, 3530, 4200, 4245, 4404, Chemistry 4201, 4701.
e. Biology 1001 and 1002; Mathematics 1001; and Physics 1050 (or 1020), 1051 (or 1021), for those students who did not complete them in first year. (See Notes 1. and 2. below).
f. Chemistry 1051 is a required course for the major in Biochemistry and must normally be completed prior to entrance into 2nd year Chemistry and Biochemistry courses. Students who do not meet the requirements for entry into Chemistry 1050 from high school can take Chemistry 1010 followed by Chemistry 1050 and 1051. It is strongly recommended that these students complete Chemistry 1051 prior to second year.
g. Chemistry 2301 or Physics 2053, Chemistry 2400, 2401, one of Chemistry 3410 or 3411.
h. One of Chemistry 2100, Chemistry 3500, Environmental Sciences 3210, Environmental Sciences 3241.
i. Statistics 2550 or equivalent

9.1.3 Nutrition Program
9.1.3.1 Major in Nutrition

1. Required courses to complete the major:
   a. Biochemistry 2000 or 2005, 2100, 2101, 2600, 3106, 3203, 3402, 4300, 4301, Medicine 310A/B

9.1.3.2 Honours Degree in Nutrition

1. Required courses:
   b. Twelve additional credit hours chosen from Biochemistry 3052, 3105, 3108, 3202, 4101, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4229, 4230-4249, Biology 3050, Chemistry 4701.

SECONDARY CHANGES:

9.11.5 Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)
The program for a Major in Behavioural Neuroscience shall include:

3. Eighteen credit hours from the following courses chosen from at least two different sciences:
   c. Biochemistry: Any 2000-, 3000-, or 4000-level course except the former 2000, 2005, the former 2010, the former 2011, 3202, 3402, or 4502
In section 11.2 of the Faculty of Medicine entry in the Calendar:

4300 Introduction to General and Autonomic Pharmacology deals with the general principles of pharmacology (dose-response relationship, drug-receptor interaction, absorption, distribution, metabolism, excretion of drugs), and drugs that affect neuromuscular and autonomic neurotransmission; the cardiovascular, gastrointestinal, and central nervous systems, and autacoids/prostanoids.

CO: Biochemistry 3106 or Pharmacy 3111
CR: the former Biochemistry 4220
LH: to be specified
PR: Medicine 310A/B or Biochemistry 311A/B, or Pharmacy 2002/2003 or the former Pharmacy 3201/3202.

10.1 Biochemistry
Biochemistry courses are designated by BIOC.

2000 Principles of Food Science—inactive course.

3402 Food Chemistry examines the following topics: water structure and the role of water in chemical reactions and mechanical properties of foods; chemistry and physical properties of carbohydrates, proteins and lipids; food dispersions; pigments and natural colorants; food flavour; enzyme properties and applications; vitamins and minerals; chemistry of enzymic and non-enzymic browning; characteristics of: muscle tissue, milk, eggs, bread and edible plant tissue; food additives; and, chemical changes in foods during processing.

LH: one period per week
PR: BIOC 2000 or 2005; BIOC 2101; Chemistry 2440 or Chemistry 2401

4220 Introduction to General and Autonomic Pharmacology (same as Medicine 4300) deals with the general principles of pharmacology (dose-response relationship, drug-receptor interaction, absorption, distribution, metabolism, excretion of drugs), and drugs that affect neuromuscular and autonomic neurotransmission, the cardiovascular, gastrointestinal, and central nervous systems, and autacoids/prostanoids.

CO: BIOC 3106 or Pharmacy 3111
CR: Medicine 4300
LH: 3
PR: BIOC 311A/B or Medicine 310A/B or Pharmacy 2002/2003 (or the former Pharmacy 3201/3202)
CLEAN COPY

5.1.4 Biochemistry and Chemistry Joint Honours

The following courses are required:
1. Chemistry 1050 and 1051 (or Chemistry 1010, 1011 and the former 1031) (or 1200 and 1001), Mathematics 1000 and 1001, Physics 1050 and 1051, 6 credit hours in first year English courses. Biology 1001 and 1002 are highly recommended.
3. Chemistry 2100, 2210, 2301, 2302, 2400, 2401, 3110, 3211, 3303, 3410, 3411, and 6 further credit hours in Chemistry courses at the 4000 level.
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5.1.6 Biochemistry and Psychology (Behavioural Neuroscience) Joint Honours

Note: Students completing this program cannot receive credit for Psychology 2920.

The following courses (or equivalent) are required to complete the 120 credit hours in courses required for the degree:
3. Chemistry 1050 and 1051 (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000 and 1001, Physics 1050, (or 1020), 1051 (or 1021), English 1080 and 1110.
4. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, Medicine 310A/B, either 4210 or 4211, 9 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4230-4249, Chemistry 4701.

5.1.7 Biochemistry (Nutrition) and Psychology (Behavioural Neuroscience) Joint Honours

Note: Students completing this program cannot receive credit for Psychology 2920.

The following courses (or equivalent) are required:
3. Chemistry 1010 and 1011 (or 1050, 1051) (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000, Physics 1020 or 1050, and 1021 (or 1051), English 1080 and 1110.
4. Biochemistry 2100, 2101, 2600, 3106, 3203, 4002, 4300, 4301, 4502, Medicine 310A/B; one course chosen from: Biochemistry 3105, 3107, 3108, 3202, 3402, 3600, 4101, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4230-4249, Biology 3050, Chemistry 4701.

9.1.2.1 Honours Degree in Biochemistry

3. Required courses:
   a. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, 4102, 499A, 499B, Medicine 310A/B.
   b. Biochemistry 4210 or 4211.
   c. Twelve credit hours in courses from Biochemistry 4002, 4101, 4103, 4104, 4105, 4200, 4201, 4230-4239.
Delete 3 courses, add one, and update affected programs

Page 8 of 14

d. At least 6 credit hours in courses from Biochemistry 2600, 3203, 4240-4249, Biology 2060, 3050, 3530, 4200, 4245, 4404, Chemistry 4201, 4701.

e. Biology 1001 and 1002; Mathematics 1001; and Physics 1050 (or 1020), 1051 (or 1021), for those students who did not complete them in first year. (See Notes 1. and 2. below).

f. Chemistry 1051 is a required course for the major in Biochemistry and must normally be completed prior to entrance into 2nd year Chemistry and Biochemistry courses. Students who do not meet the requirements for entry into Chemistry 1050 from high school can take Chemistry 1010 followed by Chemistry 1050 and 1051. It is strongly recommended that these students complete Chemistry 1051 prior to second year.

g. Chemistry 2301 or Physics 2053, Chemistry 2400, 2401, one of Chemistry 3410 or 3411.
h. One of Chemistry 2100, Environmental Sciences 3210.
i. Statistics 2550 or equivalent

9.1.3 Nutrition Program
9.1.3.1 Major in Nutrition

2. Required courses to complete the major:
   a. Biochemistry 2005, 2100, 2101, 2600, 3106, 3203, 3402, 4300, 4301, Medicine 310A/B

9.1.3.2 Honours Degree in Nutrition

2. Required courses:
   b. Twelve additional credit hours chosen from Biochemistry 3052, 3105, 3108, 3202, 4101, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4230-4249, Biology 3050, Chemistry 4701.

10.1 Biochemistry

Biochemistry courses are designated by BIOC.

3402 Food Chemistry examines the following topics: water structure and the role of water in chemical reactions and mechanical properties of foods; chemistry and physical properties of carbohydrates, proteins and lipids; food dispersions; pigments and natural colorants; food flavour; enzyme properties and applications; vitamins and minerals; chemistry of enzymic and non-enzymic browning; characteristics of muscle tissue, milk, eggs, bread and edible plant tissue; food additives; and, chemical changes in foods during processing.

LH: one period per week

PR: BIOC 2005; BIOC 2101; Chemistry 2440 or Chemistry 2401
SECONDARY CHANGES:

9.11.5 Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)
The program for a Major in Behavioural Neuroscience shall include:

3. Eighteen credit hours from the following courses chosen from at least two different sciences:
   c. Biochemistry: Any 2000-, 3000-, or 4000-level course except the former 2000, 2005, the former 2010, the former 2011, 3202, 3402, or 4502

In section 11.2 of the Faculty of Medicine entry in the Calendar:

4300 Introduction to General and Autonomic Pharmacology deals with the general principles of pharmacology (dose-response relationship, drug-receptor interaction, absorption, distribution, metabolism, excretion of drugs), and drugs that affect neuromuscular and autonomic neurotransmission, the cardiovascular, gastrointestinal, and central nervous systems, and autacoids/prostanoids.
   CO: Biochemistry 3106 or Pharmacy 3111
   CR: the former Biochemistry 4220
   LH: to be specified
   PR: Medicine 310A/B or Biochemistry 311A/B, or Pharmacy 2002/2003 or the former Pharmacy 3201/3202.
CONSULTATIONS

Dear Colleague,

The Department of Biochemistry has passed some minor changes to its program regulations mostly necessitated by changes in course offerings by other units. These are described in the attached document.

I would appreciate any comments or feedback you may have on these proposals.

Thanks

martin
(Chair, Undergraduate Studies Committee)

=================================================================
Dr. Martin E. Mulligan              mulligan@mun.ca
Department of Biochemistry          P: (709) 864-7978
Memorial University of Newfoundland  F: (709) 864-2422
St. John's, Newfoundland, CANADA A1B 3X9

REPLIES:

November 12, 2015

Dear Dr. Mulligan

The Faculty of Medicine supports the minor changes to your programs regulations as described in your attachment.

Regards,

Cathy Vardy, MD, FRCP(C)
Vice Dean
Faculty of Medicine
November 17, 2015

Martin,

Thank you for the opportunity to review and comment on the proposed changes to the Biochemistry section of the Calendar.

These changes will have no impact on the programs at the Marine Institute. We are happy to support this change as presented.

Derek

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

+++++

Hello Dr. Mulligan
The School of Pharmacy has no comments on the proposed calendar change.
CsoP Glew

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

November 18, 2015

Hi Martin,

Physics is agreeable with this proposal.

Martin Plumer

From: Lagowski, Jolanta [mailto:jolantal@mun.ca]  Sent: November-12-15 11:02 AM  To: plumer@mun.ca  Subject: FW: Biochemistry Calendar Changes

Martin,
I am OK with these changes.
Jolanta

+++++

Hi Martin,
Thank you for the opportunity to consult on the proposed calendar changes for Biochemistry. The psychology department has no problem with any of these changes. Although please note that you appear to have a typo in Sections 5.1.6 and in 5.1.7 where you refer to Chemistry 4701 as Chemistry 4710.

The psychology department approves the secondary calendar changes that you have made to add “the former” 2000 in Clause 9.11.5.3a (Requirements for a Major in Behavioural Neuroscience).

Thank you
Christina

Christina Thorpe
Deputy Head, Undergraduate Studies
Psychology Department
CONSULTATION ON DELETION OF ENVS3211

Hello Dr. Mulligan.

Thank you for thinking of us.
I have talked to representatives from the Environmental Science unit and they agree that under the circumstances there is no need to retain ENVS 3211 in your regulation.

Cheers,

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

From: Martin Mulligan <mulligan@mun.ca>
Sent: Thursday, November 12, 2015 11:08 AM
To: Gallant, Robert
Cc: Valerie Booth
Subject: biochemistry regulations and grenfell campus ENVS courses query

Dear Dr. Gallant,

The Dept of Chemistry on the St. John’s campus are discontinuing Chemistry 3500. That change necessitates some minor adjustments to the Biochemistry program regulations and, in turn, it raises a question for us about one particular regulation that relates to offerings at Grenfell Campus.

Our current clause 9.1.2.1.3 (h) in the Hons program in Biochemistry states:

h. One of Chemistry 2100, Chemistry 3500, Environmental Sciences 3210, Environmental Sciences 3211.

The clause was designed to help students who were interested in Hons. Biochemistry to complete 2 years at Grenfell Campus before coming to St. John’s to complete the rest of the program.

There is a certain symmetry in the current regulation: Chemistry 2100 and Environmental Sciences 3210 are "wet" analytical chemistry courses; Chemistry 3500 and Environmental Sciences 3211 are spectroscopy courses.

With the discontinuation of Chemistry 3500, we are wondering whether there is any need to retain Environmental Sciences 3211 in our regulation? Is it possible for students at Grenfell Campus to take Environmental Sciences 3211 without first taking Environmental Sciences 3210? Would it hurt Grenfell Campus students - or make little to no difference - if we were to delete Environmental Sciences 3211 from the clause?
Delete 3 courses, add one, and update affected programs

Page 14 of 14

This is not a particularly urgent matter but we felt that it was better to ask the question now while we think of it.

I sent our proposed changes for this year to your associate VPs office a short while ago. I expect that they will wend their way to you soon.

Thanks for your help,

martin

===========================================================================================================
Dr. Martin E. Mulligan   mulligan@mun.ca
Department of Biochemistry   P: (709) 864-7978
Memorial University of Newfoundland   F: (709) 864-2422
St. John's, Newfoundland, CANADA A1B 3X9
===========================================================================================================

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

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science
   (a) Proposals for six new major programs
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics
   (a) Change to Applied Mathematics major program
   (b) Change to pre-requisite for Statistics 2510
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography
   (a) Amendments to Calendar entries for PHYS 3800, 3820 and 4821

5. Department of Biology
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry
   (a) Changes to existing Biochemistry programs

7. Department of Psychology
   (a) Change to course description of Psychology/Biology 4770
   (b) "Housekeeping" changes to several courses
   (c) Modifications to Psychology majors programs
   (d) Modification to Psychology joint majors programs

8. Faculty of Science
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burry  
Associate Registrar and  
Secretary
Proposal
Calendar Change(s) to Existing Course(s)

Executive Summary

PSYC/BIOL 4770 (Research Experience in Animal Behaviour) is intended to give students experience with observing animal behaviour in the natural environment, but it is currently offered as a 13-week on-campus course only. Therefore, the proposed revision to the calendar description for this course would also allow the course to be taught as a two-week field course at a field station, such the Bonne Bay Marine Station, where students would experience animal behaviour first hand.

Resource Implications: Instructional Costs

The Biology Department will cover the costs associated with holding the field course at Bonne Bay Marine Station.

Consultations

Comments were received from Faculty of Science (Biology and Physics), Faculty of Arts, and Faculty of Engineering and Applied Science.

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: _____________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Psychology 4770: Research Experience in Animal Behaviour

Abbreviated Course Title

n/a

Calendar Change(s)

4770 Research Experience in Animal Behaviour (same as Biology 4770) allows students to gain research experience in selected areas of animal behaviour. This course may be offered in a usual 13-week semester or as a two-week field course.

CR: Biology 4770
LC: either three hours of lecture per week or a two-week field course that embodies equivalent instructional time
PR: PSYC 2520, 2930 or the former 2570, 2911, and PSYC 3750 or BIOL 3750, and admission to a major in Psychology or Behavioural Neuroscience

Secondary Calendar Changes

Biology 4770 Research Experience in Animal Behaviour (same as Psychology 4770) allows students to gain research experience in selected areas of animal behaviour. This course may be offered in a usual 13-week semester or as a two-week field course.

CR: Psychology 4770
LC: either three hours of lecture per week or a two-week field course that embodies equivalent instructional time
PR: BIOL 3750 or Psychology 3750

Rationale

PSYC/BIOL 4770 is intended to give students experience with observing animal behaviour in the natural environment, but it is currently offered as a 13-week on-campus course only. The proposed calendar change would also allow this course to be taught at a field station, such the Bonne Bay Marine Station, where students would experience animal behaviour first hand. PSYC 2930 replaced PSYC 2570 as a required course for all psychology students in the 2015-2016 academic year. Therefore the pre-requisites need to be updated.

Consultations Sought From

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

Comments Received

No

Yes

Yes
<table>
<thead>
<tr>
<th>Department</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Biochemistry</td>
<td>No</td>
</tr>
<tr>
<td>Department of Biology</td>
<td>Yes (see attached)</td>
</tr>
<tr>
<td>Department of Chemistry</td>
<td>No</td>
</tr>
<tr>
<td>Department of Computer Science</td>
<td>No</td>
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<tr>
<td>Department of Earth Sciences</td>
<td>No</td>
</tr>
<tr>
<td>Department of Mathematics and Statistics</td>
<td>No</td>
</tr>
<tr>
<td>Department of Ocean Sciences</td>
<td>No</td>
</tr>
<tr>
<td>Department of Physics and Physical Oceanography</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Library Report Received: Yes

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

Name

FOR OFFICE USE ONLY

APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
Responses from Consultations

Consultation e-mail:

Hello,

Please find attached an additional proposal for a course description change from the Psychology department.

This proposal is to allow an option for students to take Psychology/Biology 4770 (Research Experience in Animal Behaviour) as a two-week field course. This option will allow students to gain more experience observing animal behaviour in the natural environment.

Thank you in advance for your comments.
Christina

Responses:

Dear Christina,

Physics is agreeable to these proposed changes.

Cheers,
Martin Plumer
Undergraduate Studies Committee

Dear Dr. Thorpe,

Thank you for the opportunity to comment on the Calendar changes to the programs of the Department of Psychology (including Psychology/Biology 4770).

Having consulted with the members of the Committee on Undergraduate Studies, I can report that the Faculty of Engineering and Applied Science has no concerns with these proposed changes.

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

Dr. Thorpe,
Thank you for the opportunity to review and comment on the change to the course description for PSYCH 4770.

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

One comment regarding the submission: There is no reference made in the changes to the addition of “2930 or” to the list of prerequisites. I assume this is an editorial change fixing an omission from previous versions? A quick comment to provide rationale and to ensure this doesn’t get overlooked would be useful.

Respectfully,
Derek

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

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 Griffiths
Office of the Dean of Arts Memorial University of Newfoundland
St. John’s, NL A1C 5S7
709-864-8255

19 November 2015

TO: Dr. Christina Thorpe, Deputy Head & Undergraduate Officer, Department of Psychology
FROM: Dr. Dianne Keeping, Collection Development Librarian
SUBJECT: Proposal, Calendar Changes to Existing Courses - PSYC/BIOL 4770

I have reviewed the proposal to offer the option for students to enroll in PSYC/BIOL 4770 as either a two week field course at a field station or as a 13 week on-campus course and can confirm that the proposed changes do not have any significant resource implications for the University Library. Most of the library resources for Psychology/Biology are available in electronic format and are accessible off-campus to any student who has Internet access.
Hi Dave,

The Biology Department approved the proposed change to Psychology / Biology 4770 Research Experience in Animal Behaviour whereby the course will be offered as either a 13 week course or a 2 week field course.

Thanks
Karen

Karen Morris
Undergraduate Officer
Department of Biology
Memorial University of Newfoundland
St. John's, NL A1B 3X9
709 864-6021
Proposal
Calendar Change(s) to Existing Course(s)

Executive Summary

In the 2015-2016 academic year the Psychology department introduced a new course (PSYC 2930) that is required for all second year students majoring in either Psychology or Behavioural Neuroscience. This course replaces a former course, PSYC 2570, as a pre-requisite for a number of our third and fourth year courses. The descriptions of most third and fourth year courses need to be updated to reflect this change.

At the same time we are also doing house-cleaning and deleting credit restrictions and pre-requisites for courses that have not been offered since the 2005-2006 academic year. These former courses include: PSYC 2250, 2360, 2620, 2850, 2900, 2901, and 3052.

Finally, we are also simplifying some of the pre-requisite descriptions. For example, the pre-requisite for PSYC 4070 currently lists “2520, the former 2570, 2911, and 3050 and admission to a Major in Psychology or Behavioural Neuroscience”. Given that the pre-requisites for PSYC 3050 are PSYC 2520, the former 2570, and 2911 and admission to a Major in Psychology or Behavioural Neuroscience this pre-requisite can be simplified as PSYC 3050.

Because these changes are repetitive and affect a large number of courses, they are being included in one proposal.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from Faculty of Arts, The Marine Institute, Faculty of Engineering and Applied Science, Faculty of Science (Physics, Biochemistry, and Biology)

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:


Responses from Consultations

Consultation e-mail:

In the 2014-2015 academic year, the Psychology department introduced a number of changes to their programs, most notably a new required second-year course for all Psychology and Behavioural Neuroscience students. This year we are making changes to calendar descriptions for upper level courses to reflect these changes (e.g., changes in pre-requisites for upper level courses). We are also making a number of changes to the calendar descriptions to update and simplify credit restrictions and pre-requisites, as well as some other house-cleaning. These and other changes are outlined in the three attached proposals from the psychology department.

If you have any comments on these proposals, we would appreciate receiving your responses no later than November 26.

Responses:

Dear Dr. Thorpe,

In my estimation there are no matters here that ought to be a source of concern in the Faculty of Arts. Congratulations for your efforts towards strengthening the Psychology program's calendar entry.

Alex

Alex Marland
Associate Professor, Political Science
Associate Dean (Undergraduate), Faculty of Arts
Arts & Administration Building, A-5015
Memorial University, St. John's, NL, Canada A1B 3X9
T (709) 864-8254  F (709) 864-2135
www.mun.ca/posec/people/Marland.php

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 Griffiths
Office of the Dean of Arts Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

Dear Christina,

Physics is agreeable to these proposed changes.

Cheers,

Martin Plumer
Undergraduate Studies Committee

Christine

No concerns from the Biochemistry undergraduate committee. With respect to the joint honours aspects we will take the changes to our meeting next week for official Departmental approval.

All the best

Mark

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

__________________________

Dr. Thorpe,

Thank you for the opportunity to review the request to change the course descriptions for this suite of psychology courses.

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

All the best,

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

__________________________

Hi Christina,
The Biology Undergraduate Studies Committee has reviewed the proposed calendar changes to existing courses, the proposal to modify requirements for a major in Psychology and in Behavioural Neuroscience as well as the proposal to modify the joint programs in Psychology (Behavioural Neuroscience). We have no concerns regarding any of the proposed changes.

Thanks

Karen

Karen Morris
Undergraduate Officer
Dear Dr. Thorpe,

Thank you for the opportunity to comment on the Calendar changes to the programs of the Department of Psychology (including Psychology/Biology 4770).

Having consulted with the members of the Committee on Undergraduate Studies, I can report that the Faculty of Engineering and Applied Science has no concerns with these proposed changes.

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

TO: Dr. Christina Thorpe, Deputy Head & Undergraduate Officer, Department of Psychology
FROM: Dr. Dianne Keeping, Collection Development Librarian
SUBJECT: Proposal, Calendar Change(s) to Existing Course(s)

I have reviewed the Department of Psychology’s proposal to introduce calendar changes and to replace the old course PSYC 2570 with the new course PSYC 2930. I can confirm that the proposed calendar changes do not have any significant resource implications for the University Library. A library report dated 25 November 2014 was submitted in support of the new course proposal for PSYC 29XX (later numbered 2930).
SUMMARY PAGE FOR SENATE

Approval Form

Course Number and Title

Psychology 3050: Developmental Psychology
Psychology 3100: Social Psychology
Psychology 3250: Neurobiology of Learning and Memory
Psychology 3450: Human Cognition
Psychology 3510: Directed Study
Psychology 3511: Directed Study
Psychology 3650: Abnormal Psychology
Psychology 3750: Animal Behaviour I
Psychology 3800: Cellular Neuroscience
Psychology 3820: Research Techniques in Behavioural Neuroscience
Psychology 3830: Behavioural Endocrinology
Psychology 4770: Research Experience in Animal Behaviour

Abbreviated Course Title

n/a

Calendar Change(s)

3050 Developmental Psychology is an examination of the methods of study and an evaluation of current findings and theoretical issues of importance to an understanding of development. Topics will be drawn from perception, learning, cognition, social learning, memory, and language development. CR: PSYC 2010, PSYC 2025
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3100 Social Psychology is an examination of the concepts and principles involved in social behaviour. Topics covered will include attitudes, social cognition, interpersonal relations, and group processes.
CR: PSYC 2100, PSYC 2125
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3250 Neurobiology of Learning and Memory examines how organisms adjust their behaviour to regularities in the environment as a result of experience. Experience changes behavior by modifying the nervous system. We will take a multidisciplinary approach, combining information from psychology and neuroscience, to study learning and memory. Students will gain an understanding of sensitization, habituation, and classical and operant conditioning using animal models, with a particular emphasis on the synaptic and molecular changes that occur with learning and memory.
PR: PSYC 2520, 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience
3450 Human Cognition is an introduction to the experimental study of the mental representations and processes involved in human cognition. Topics such as attention, perception and pattern recognition, concepts and the organization of knowledge, language processes, mental imagery, reasoning, problem solving, decision making, and skilled performance will be covered with an emphasis on experimental analysis and techniques.
CR: PSYC 2440, PSYC 2425
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3510 Directed Study provides an opportunity to work with an individual faculty member on a research project. The student will submit a formal written report of the research conducted. Permission of the instructor is required.
PR: PSYC 2949, 2911 and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3511 Directed Study provides an opportunity to work with an individual faculty member on a research project. The student will submit a formal written report of the research conducted. Permission of the instructor is required.
PR: PSYC 2949, 2911 and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3650 Abnormal Psychology is an examination of the nature, explanation, and treatment of psychological disorders with an emphasis on research methods and current findings.
CR: PSYC 3640, PSYC 3626
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3750 Animal Behaviour I (same as Biology 3750) is an introduction to the mechanisms, development, function, and evolution of behaviour in animals. Topics include the history of ethology, and comparative psychology, and behavioural ecology; methods of animal behaviour study, behaviour of animals in relation to physiology, learning, communication, mating systems, and other areas in Biology and Psychology.
CR: Biology 3750
PR: Biology 1001, 1002 and PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

3800 Cellular Neuroscience addresses the structure and function of neurons and neural circuits and examines principles of electrochemical neural communication at the macroscopic, microscopic, and molecular level. The relevance of this knowledge to understanding brain mechanisms of normal and diseased brain functions will be touched upon. The molecular basis of the formation of some types of memories will be explored.
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, Biology 1001 and 1002, and admission to a Major in Psychology or Behavioural Neuroscience

3820 Research Techniques in Behavioural Neuroscience allows students to increase their understanding of how knowledge is generated in the study of neuroscience and behavior. Students will visit various on-campus laboratories on-campus that are engaged in research relevant to these fields. In addition to observations and hands-on tutorials, readings, discussions, and writing assignments will strengthen students' understanding of the techniques used to answer specific
research questions in neuroscience and behaviour.
PR: PSYC 2520, 2911, and 2930 or the former 2570, Biology 1001 and 1002, and admission to a Major in Psychology or Behavioural Neuroscience

3830 Behavioural Endocrinology explores the behavioural effects of hormones and the question of how hormones act on the brain to influence behaviour. Topics include: basic concepts in neuroendocrinology, reproductive behaviour (sexual and parental), sexual differentiation of the brain and behaviour, aggressive behaviour, and the neuroendocrinology of stress, including the effects of stress on the brain and behaviour.
PR: PSYC 2520, 2911, and 2930 or the former 2570, Biology 1001 and 1002, and admission to a Major in Psychology or Behavioural Neuroscience

4661 Family Psychology is a study of the reciprocal relationship between family processes and abnormal behaviour. The course will focus on the role of family dynamics in the etiology of abnormal behaviour, the impact of psychological disorders on family functioning and the application of family therapy to create therapeutic change.
PR: PSYC 3650, or all of 2520, 2930 (or the former 2570), 2911, and 3640, and admission to a Major in Psychology or Behavioural Neuroscience

4770 Research Experience in Animal Behaviour (same as Biology 4770) allows students to gain research experience in selected areas of animal behaviour.
CR: Biology 4770
PR: PSYC 2520, 2930 or the former 2570, 2911, and PSYC 3750 or BIOL 3750, and admission to a major in Psychology or Behavioural Neuroscience

Secondary Calendar Changes

None.

Rationale

In the 2014-2015 Academic Year, the Psychology department changed the Program Requirements so that all students are required to take PSYC 2930 and that this course would be a pre-requisite for third year Psychology courses. In addition, PSYC 2570, which was formerly a required course, is no longer required and is no longer offered. However, the current calendar descriptions of the third year courses do not reflect this change. The calendar changes listed in this section are all to allow either PSYC 2570 or 2930 as a pre-requisite.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences

Comments Received

No
Yes
Yes
Yes
Yes
No
No
No
10. Department of Mathematics and Statistics
   No
11. Department of Ocean Sciences
   No
12. Department of Physics and Physical Oceanography
   Yes

Library Report Received
   Yes

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

Psychology 2030: Adult Development
Psychology 2910: Research Methods in Psychology I
Psychology 2911: Research Methods in Psychology II
Psychology 3350: Perception
Psychology 4250: Selected Topics in Learning and Motivation I
Psychology 4251: Selected Topics in Learning and Motivation II
Psychology 4351: Selected Topics in Perception II
Psychology 4620: Selected Topics in Personality II

Abbreviated Course Title

n/a

Calendar Change(s)

2030 Adult Development (same as the former PSYC 2012) examines physical and psychological changes from early adulthood until the end of the lifespan. Topics include career choices, love partnerships, parenting and grandparenting, cognitive changes, interpersonal changes, and healthy aging.
CR: the former PSYC 2012, the former PSYC 3052
PR: PSYC 1000 and 1001
UL: cannot be used towards the Psychology major

2910 Research Methods in Psychology I is an introduction to the design and application of psychological research with particular concentration on understanding and applying scientific method, creating and testing hypotheses, constructing reliable and valid experiments, managing and analysing data sets, using statistical software, and scientific writing. Specific topics include descriptive statistics including measures of central tendency, variability and relative standing, inferential statistics such as t tests for one and two sample designs, correlation and regression, and non-parametric statistics.
CR: Statistics 2500, 2550, the former 2510, the former PSYC 2900, PSYC 2925
LH: one laboratory period weekly
PR: PSYC 1000 and 1001; Mathematics 1000 or two of 1090, 1050 and 1051 (or equivalent) and admission to a Major in Psychology or Behavioural Neuroscience

2911 Research Methods in Psychology II covers research methods in psychology with a focus on more complex research designs and statistical approaches, within the realm of experimentation and beyond the laboratory. Specific topics include controlling participant variables, using between and repeated measures designs within the context of Analysis of Variance (ANOVA). Particular ANOVA approaches include one-way and factorial designs, within subject design, and two-way mixed designs.
CR: Statistics 2501, 2560, the former PSYC 2904, PSYC 2950
LH: one laboratory period weekly
PR: PSYC 2910 and admission to a Major in Psychology or Behavioural Neuroscience
3350 Perception (formerly-PSYC-2360) is a broad survey of theory and research in sensation and perception.
CR: the former-PSYC-2360
PR: PSYC 2520, the former 2570, and 2911, and 2930 or the former 2570, and admission to a Major in Psychology or Behavioural Neuroscience

4250 Selected Topics in Learning and Motivation I is an intensive examination of a specific topic in learning and motivation.
PR: PSYC 3250 or the former-PSYC-2250 and admission to a Major in Psychology or Behavioural Neuroscience

4251 Selected Topics in Learning and Motivation II is an intensive examination of a specific topic in learning and motivation.
PR: PSYC 3250 or the former-PSYC-2250 and admission to a Major in Psychology or Behavioural Neuroscience

4351 Selected Topics in Perception II is an intensive examination of a specific topic in perception.
PR: PSYC 3350 or the former-PSYC-2360 and admission to a Major in Psychology or Behavioural Neuroscience

4620 Selected Topics in Personality II is an intensive examination of a specific topic in personality.
PR: PSYC 3620 or the former-PSYC-2620 and admission to a Major in Psychology or Behavioural Neuroscience

Secondary Calendar Changes
None.

Rationale
The courses that are being deleted from the course descriptions have not been offered since the 2005-2006 Academic Year.

1. Grenfell Campus No
2. Marine Institute Yes
3. Faculty of Arts Yes
4. Faculty of Engineering and Applied Science Yes
5. Department of Biochemistry Yes
6. Department of Biology Yes
7. Department of Chemistry No
8. Department of Computer Science No
9. Department of Earth Sciences No
10. Department of Mathematics and Statistics No
11. Department of Ocean Sciences No
12. Department of Physics and Physical Oceanography Yes

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

Name

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Course Number and Title

Psychology 4070: Research Experience in Development Psychology
Psychology 4170: Research Experience in Social Psychology
Psychology 4270: Research Experience in Learning
Psychology 4370: Research Experience in Perception
Psychology 4470: Research Experience in Cognition
Psychology 4670: Research Experience in Abnormal Psychology

Abbreviated Course Title

n/a

Calendar Change(s)

4070 Research Experience in Development Psychology allows students to gain research experience in selected areas of developmental psychology.
PR: PSYC 2520, the former 2570, 2914, and 3050 and admission to a Major in Psychology or Behavioural Neuroscience

4170 Research Experience in Social Psychology will provide research experience in a selection of areas typically studied by social psychologists such as attitudes, prejudice, groups and social cognition. Students will acquire experience with research methods that are used to advance the body of knowledge in social psychology.
PR: PSYC 2520, the former 2570, 2914, and 3100 and admission to a Major in Psychology or Behavioural Neuroscience

4270 Research Experience in Learning allows students to gain research experience in selected areas of learning.
PR: PSYC 2520, the former 2570, 2914, and 3250 and admission to a Major in Psychology or Behavioural Neuroscience

4370 Research Experience in Perception allows students to gain research experience in selected areas of perception.
PR: PSYC 2520, the former 2570, 2914 and 3350 and admission to a Major in Psychology or Behavioural Neuroscience

4470 Research Experience in Cognition allows students to gain research experience in selected areas of cognition.
PR: PSYC 2520, the former 2570, 2914, and 3450 and admission to a Major in Psychology or Behavioural Neuroscience

4670 Research Experience in Abnormal Psychology allows students to gain research experience in selected areas of clinical psychology.
PR: PSYC 2520, the former 2570, 2914 and 3650 and admission to a Major in Psychology or
Behavioural Neuroscience

Secondary Calendar Changes

None.

Rationale

These changes are to simplify some of the pre-requisite descriptions. For example, the pre-requisite for PSYC 4070 currently lists "2520, the former 2570, 2911, and 3050". Given that the pre-requisites for PSYC 3050 are PSYC 2520, the former 2570, and 2911 this pre-requisite can be simplified as PSYC 3050.

1. Grenfell Campus No
2. Marine Institute Yes
3. Faculty of Arts Yes
4. Faculty of Engineering and Applied Science Yes
5. Department of Biochemistry Yes
6. Department of Biology Yes
7. Department of Chemistry No
8. Department of Computer Science No
9. Department of Earth Sciences No
10. Department of Mathematics and Statistics No
11. Department of Ocean Sciences No
12. Department of Physics and Physical Oceanography Yes

Library Report Received Yes

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

Name

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Course Number and Title

Psychology 2810: Brain and Behaviour
Psychology 2520: Introduction to Behavioural Neuroscience

Abbreviated Course Title

n/a

Calendar Change(s)

2810 Brain and Behaviour is a broad survey of physiological psychology at an elementary level. Topics will include the following: structure of the nervous system, nerve conduction, sensory and motor systems, behavioural biology of reproduction, aggression, feeding and drinking, sleep and arousal, pleasure and pain, learning and memory.
CR: PSYC 2520, PSYC 2825, the former PSYC 2850; the former PSYC 3801
PR: PSYC 1000 and 1001
UL: cannot be used towards the Psychology major

2520 Introduction to Behavioural Neuroscience is based on the idea that psychological and neuroscience research efforts are synergistic. Neuroscience research can reveal mechanisms that help explain the mind and behaviour, while concepts developed by psychological research often define the topics that neuroscience investigates. The course will survey a broad range of topics that include the fundamentals of neuroanatomy, neurophysiology, and neurodevelopment, as well as higher level functions such as motivation, emotion, sleep, memory, language, and mental illness.
CR: PSYC 2810, 2825, the former PSYC 3801
PR: PSYC 1000 and 1001 and admission to a Major in Psychology or Behavioural Neuroscience; minors may be permitted to take this course if space permits

Secondary Calendar Changes

None.

Rationale

As part of the restructuring of the Psychology Program in the 2014-2015 Academic Year, we redesigned Psychology 2520. Because of this redesign there is now considerable content overlap between Psychology 2810 and Psychology 2520. Therefore, we feel that these two courses should be credit restricted.

1. Grenfell Campus
   No
2. Marine Institute
   Yes
3. Faculty of Arts
   Yes
4. Faculty of Engineering and Applied Science
   Yes
5. Department of Biochemistry
   Yes
6. Department of Biology  Yes
7. Department of Chemistry  No
8. Department of Computer Science  No
9. Department of Earth Sciences  No
10. Department of Mathematics and Statistics  No
11. Department of Ocean Sciences  No
12. Department of Physics and Physical Oceanography  Yes

Library Report Received  Yes

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

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Date:
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Approval Form

Course Number and Title
Psychology 2930: Research and Writing in Psychology

Abbreviated Course Title
n/a

Calendar Change(s)

2930 Research and Writing in Psychology is an introduction to the fundamentals of preparing psychology reports, emphasizing organization, correct use of terminology, adherence to appropriate discipline style, concise and accurate description, preparation of abstracts, and integration of numerical data. Topics for reports will be selected each semester by the instructor.
PR: PSYC 1000 and 1001 and admission to a Major in Psychology or Behavioural Neuroscience
UL: may not be used towards the Faculty of Arts CRW requirement or the former R/W requirement

Secondary Calendar Changes
None.

Rationale

This is a new course that was created in the 2014-2015 Academic Year. It was an oversight that Psychology 1000 and 1001 were not listed as pre-requisites.

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics
11. Department of Ocean Sciences
12. Department of Physics and Physical Oceanography

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Course Number and Title

Psychology 4850: Selected Topics in Behavioural Neuroscience I
Psychology 4870: Research Experience in Neuroscience

Abbreviated Course Title

n/a

Calendar Change(s)

4850 Selected Topics in Behavioural Neuroscience I is an intensive examination of a specific topic in behavioural neuroscience.
PR: One of PSYC 3800, the former 3801, 3820, or 3250, PSYC 2810, or 3800 or 3801 and admission to a Major in Psychology or Behavioural Neuroscience

4870 Research Experience in Behavioural Neuroscience allows students to gain research experience in selected areas of neuroscience.
PR: PSYC 3820 or the former 3801, PSYC 2520, the former 2570, 2911, and either 3800 or 3801 and admission to a Major in Psychology or Behavioural Neuroscience

Secondary Calendar Changes

None.

Rationale

There were a number of changes to the Behavioural Neurosciences courses adopted in the 2014-2015 Academic Year. For Psychology 4850, we feel that it is appropriate for students to have a 3000-level neuroscience course as a pre-requisite, so we are proposing to eliminate Psychology 2810 as one of the possible pre-requisites. For Psychology 4870, we think that it is appropriate for students to have exposure to various Behavioural Neuroscience Techniques before they do a Research Experience course in Behavioural Neuroscience. Therefore, we are adding 3820 to the list of pre-requisites.

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics

No
Yes
Yes
Yes
Yes
Yes
No
No
No
No
11. Department of Ocean Sciences  No
12. Department of Physics and Physical Oceanography  Yes

Library Report Received  Yes

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

Name

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Date:
SUMMARY PAGE FOR SENATE

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Course Number and Title

Psychology 3801: Behavioural Neuroscience

Abbreviated Course Title

n/a

Calendar Change(s)

3801 Behavioural Neuroscience is a survey of knowledge about brain mechanisms of behaviour. Topics will include the following: basic neuroanatomy and neurophysiology, somatosensory systems and pain, reward, mental illness, sleep and arousal, developmental neurobiology, sexual development and behaviour, regulation of eating and body weight, learning and memory, and cortical function, including cortical mediation of language.
CR: PSYC 2810, PSYC 2825, the former PSYC 2850
PR: PSYC 2520, the former 2570 and 2011 and admission to a Major in Psychology or Behavioural Neuroscience

Secondary Calendar Changes

None.

Rationale

There were a number of changes to the Behavioural Neurosciences program adopted in the 2014-2015 Academic Year. Part of these changes included eliminating Psychology 3801.

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics
11. Department of Ocean Sciences
12. Department of Physics and Physical Oceanography

Library Report Received

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

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Chair:
Secretary:
Date:
Proposal to Modify
a) Requirements for a Major in Psychology [Section 9.11.3] and
b) Requirements for a Major in Behavioural Neuroscience
   [Section 9.11.5]

Executive Summary

In the 2014-2015 Academic Year the Psychology department added a new course, Psychology 3830: Behavioural Endocrinology. However, this course was omitted from the list of courses that could be used towards their Psychology requirements [See Clause 1b of Section 9.11.3 of Requirements for a Major in Psychology]. We would like to add Psychology 3830 to the list of courses in Clause 1b.

Currently students pursuing a major in Behavioural Neuroscience are given options of various Biology courses that may be used towards their degree [See Clause 3b of Section 9.11.5 of Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)]. We would like to add Biology 2122: Biology of Invertebrates to this list.

We are also proposing to revise all six of the Tables of Suggested Course Sequences for our Co-operative programs to make them easier to understand.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from Faculty of Arts, The Marine Institute, Faculty of Engineering and Applied Science, Faculty of Science (Physics, Biochemistry, and Biology)

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:
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: 9.11.3 Requirements for a Major in Psychology

Calendar Change(s)

9.11.3 Requirements for a Major in Psychology
Students completing this program cannot receive credit for Psychology 2920. Students who intend to pursue graduate studies should take courses leading to the Honours degree.
1. Students may Major in Psychology as part of either a B.A. or a B.Sc. program. All Majors are required to complete a minimum of 42 credit hours of Psychology as listed below:
   a. Psychology 1000, 1001, 2520, 2910, 2911, 2930.
   b. Twelve credit hours in Psychology chosen from the following: 3050, 3100, 3250, 3350, 3450, 3620, 3650, 3750, or one of 3800 or 3830.
   c. Twelve credit hours of 4000-level courses in Psychology, of which at least one must be a research experience course and one must be a selected topics course.
2. Psychology Majors following the B.Sc. program are also required to complete the following:
   a. Mathematics 1000 (or equivalent).
   b. Biology 1001 and 1002
   c. Either Chemistry 1010 and 1011 (or 1050 and 1051); OR Physics 1020 (or 1050) and 1021 (or 1051)
      Note: First year students should think carefully about whether Chemistry or Physics best suits their future program needs. Students should examine the prerequisites for upper-level science courses and attempt to take them in their first year.
   d. Six credit hours of laboratory courses at the 2000 level or above in one of Biology, Chemistry, or Physics.
      Note: Biology/Psychology 4701 and Biology 3053 cannot be used to satisfy the requirement of 6 laboratory credit hours at the 2000 level or above in either Biology, Chemistry, or Physics.
3. Psychology Majors following the B.A. program are also required to complete Mathematics 1000 or two of 1090, 1050, 1051 (or equivalent), and are encouraged to complete at least 6 credit hours in Biology.

Secondary Calendar Changes

None.

Rationale

Psychology 3830 (Behavioural Endocrinology) was added in the 2014-2015 Academic Year. It was an oversight that it was not added to the list of possible required courses at that time. We have chosen to allow students to use only one of 3800 or 3830 towards this requirement because both courses are Neuroscience courses and the intention of this clause is to have students take courses in a variety of psychology disciplines.

Consultations Sought From

Comments Received
1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics
11. Department of Ocean Sciences
12. Department of Physics and Physical Oceanography

Library Report Received

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

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Date:
Responses from Consultations

Consultation e-mail:

In the 2014-2015 academic year, the Psychology department introduced a number of changes to their programs, most notably a new required second-year course for all Psychology and Behavioural Neuroscience students. This year we are making changes to calendar descriptions for upper level courses to reflect these changes (e.g., changes in pre-requisites for upper level courses). We are also making a number of changes to the calendar descriptions to update and simplify credit restrictions and pre-requisites, as well as some other house-cleaning. These and other changes are outlined in the three attached proposals from the psychology department.

If you have any comments on these proposals, we would appreciate receiving your responses no later than November 26.

Responses:

Dear Dr. Thorpe,

In my estimation there are no matters here that ought to be a source of concern in the Faculty of Arts. Congratulations for your efforts towards strengthening the Psychology program's calendar entry.

Alex

Alex Marland
Associate Professor, Political Science
Associate Dean (Undergraduate), Faculty of Arts
Arts & Administration Building, A-5015
Memorial University, St. John's, NL, Canada A1B 3X9
T (709) 864-8254  F (709) 864-2135
www.mun.ca/pose/people/Marland.php

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 Griffiths
Office of the Dean of Arts Memorial University of Newfoundland
St. John's, NL  A1C 5S7
709-864-8255

Dear Christina,

Physics is agreeable to these proposed changes.

Cheers,
Martin Plumer
Undergraduate Studies Committee

Christine

No concerns from the Biochemistry undergraduate committee. With respect to the joint honours aspects we will take the changes to our meeting next week for official Departmental approval.

All the best

Mark

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

Dr. Thorpe,

Thank you for the opportunity to review the request to modify a) Requirements for a Major in Psychology [Section 9.11.3] and b) Requirements for a Major in Behavioural Neuroscience [Section 9.11.5].

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

All the best.
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

Hi Christina,
The Biology Undergraduate Studies Committee has reviewed the proposed calendar changes to existing courses, the proposal to modify requirements for a major in Psychology and in Behavioural Neuroscience as well as the proposal to modify the joint programs in Psychology (Behavioural Neuroscience). We have no concerns regarding any of the proposed changes.
Thanks
Karen

Karen Morris
Dear Dr. Thorpe,

Thank you for the opportunity to comment on the Calendar changes to the programs of the Department of Psychology (including Psychology/Biology 4770).

Having consulted with the members of the Committee on Undergraduate Studies, I can report that the Faculty of Engineering and Applied Science has no concerns with these proposed changes.

--

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

TO: Dr. Christina Thorpe, Deputy Head & Undergraduate Officer, Department of Psychology
FROM: Dr. Dianne Keeping, Collection Development Librarian
SUBJECT: Proposal, Calendar Change(s) to Existing Course(s)

I have reviewed the Department of Psychology’s proposal to introduce calendar changes and to replace the old course PSYC 2570 with the new course PSYC 2930. I can confirm that the proposed calendar changes do not have any significant resource implications for the University Library. A library report dated 25 November 2014 was submitted in support of the new course proposal for PSYC 29XX (later numbered 2930).
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: 9.11.5 Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)

Calendar Change(s)

The program for a Major in Behavioural Neuroscience shall include:
1. a. Psychology 1000, 1001, 2520, 2910, 2911, 2930, 3250, 3800, 3820.
b. Three credit hours in Psychology chosen from the following: 3050, 3100, 3350, 3450, 3620, 3650, 3750.
c. Any research experience course and one of Psychology 4250, 4251, 4850 or 4851; or, any selected topics course and one of Psychology 4270 or 4870.
2. a. Mathematics 1000 (or equivalent) and 1001
b. Chemistry 1010 and 1011 (or 1050 and 1051), and 2440 (or 2400/2401)
c. Physics 1020 (or 1050) and 1021 (or 1051).
d. Biology 1001 and 1002
e. English 1080 and one of 1101, 1102, 1103, or 1110, or equivalent
3. Eighteen credit hours from the following courses chosen from at least two different sciences:
   a. Biochemistry: Any 2000-, 3000-, or 4000-level course except 2000, 2005, the former 2010, the former 2011, 3202, 3402, or 4502
   b. Biology: 2060, 2122, 2210, 2250, 2900, 3050, 3160, 3202, 3295, 3401, 3500, 3530, 3540, 3750, 4200, 4241, 4245, 4250, 4402, the former 4450, 4601, 4605, 4701, the former 4900 (see note below)
   c. Chemistry: 2100, 2210, 2301 (or 2300) or any 3000 or 4000 level course
   d. Computer Science: Any 2000, 3000, or 4000 level course except 2650 and 2801
   e. Mathematics: 2000, 2050, 2051, 3000, 3001 or any 3000 or 4000 level pure or applied mathematics course
   f. Physics: Any 2000, 3000, or 4000 level course except 2151, 3150, 3151

Secondary Calendar Changes

None.

Rationale

There are many invertebrate models of learning and memory, so a course in Invertebrates would be appropriate for our students.

Consultations Sought From

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

Comments Received

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

Library Report Received  Yes

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

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### SUMMARY PAGE FOR SENATE

**Approval Form**

**Program Title:** 9.11.9 Suggested Course Sequences

**Calendar Change(s)**

**Table 1: Suggested Course Sequence for B.A. in Psychology (Co-operative)**

<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
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<tbody>
<tr>
<td><strong>Fall Semester 1</strong></td>
<td>Elective or Arts requirement</td>
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<tr>
<td></td>
<td>Elective or Arts requirement</td>
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<td>English 1080</td>
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<td>Mathematics 1000 or one of Mathematics 1090, 1050, 1051</td>
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<td>Psychology 1000</td>
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<td><strong>Winter Semester 2</strong></td>
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<td>Elective or Arts requirement</td>
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<td></td>
<td>Elective or Arts requirement</td>
</tr>
</tbody>
</table>
### Table 2 Suggested Course Sequence for B.Sc. in Psychology (Co-operative)

<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
</tr>
</thead>
</table>
| **Fall Semester 1** | Biology 1001  
Chemistry 1010 (1050)* or Physics 1020 (1050)**  
Chemistry 1010 (1050) or Physics 1020 (1050)*  
English 1080  
Mathematics 1090***  
Mathematics 1090 or 1000  
Psychology 1000 |
| Winter          | Biology 1002  
Mathematics 1090**  
Psychology 1000 |

*or Elective or Arts requirement if Mathematics 1000 was taken in Semester 1
| Semester 2 | Chemistry 1011 (1051) or Physics 1021 (1051)  
English 1101, 1102, 1103, or 1110  
Mathematics 1000***  
Mathematics 1000 or Elective or Science requirement  
Psychology 1001 |
|-----------|-------------------------------------------------|
| Fall Semester 3 | Biology, Chemistry, or Physics Lab Course  
Elective or Science requirement  
Elective or Science requirement  
Psychology 2520 or 2930  
Psychology 2910 |
| Winter Semester 4 | Biology, Chemistry, or Physics Lab Course  
Elective or Science requirement  
Elective or Science requirement  
Psychology 2911  
Psychology 2930 or 2520 |
| Spring Work Term 1 | Psychology 199W |
| Fall Semester 5 | Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement  
Psychology 3000-Level Core  
Psychology 3000-Level Core  
3000-Level-Core  
3000-Level-Core  
Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement |
| Winter Semester 6 | Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement  
Psychology 3000-Level Core  
Psychology 3000-Level Core  
3000-Level-Core  
3000-Level-Core  
Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement |
| Spring Work Term 2 | Psychology 299W |
| Fall Semester 7 | Elective or Science requirement  
Elective or Science requirement  
Elective or Science requirement  
Psychology 4000-Level  
Psychology Selected Topics  
4000-Level-Psychology |
<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
</tr>
</thead>
</table>
| **Fall Semester 1** | Elective or Arts requirement  
|                  | Elective or Arts requirement  
|                  | English 1080  
|                  | Mathematics 1000 or one of Mathematics 1090, 1050, 1051  
|                  | Psychology 1000  
| **Winter Semester 2** | Elective or Arts requirement  
|                    | Elective or Arts requirement  
|                    | English 1101, 1102, 1103, or 1110  
|                    | One other of Mathematics 1090, 1050 or 1051*  
|                    | Psychology 1001  
| **Fall Semester 3** | Elective or Arts requirement  
|                    | Elective or Arts requirement  
|                    | Elective or Arts requirement  
|                    | Psychology 2520 or 2930  
|                    | Psychology 2910  
| **Winter Semester 4** | Elective or Arts requirement  
|                       | Elective or Arts requirement  
|                       | Elective or Arts requirement  
|                       | Psychology 2911  

*Students registered in Chemistry 1050 must also be registered in Mathematics 1000 (not 1090).
**Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).
***Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).
****or Mathematics 1000 (Semester 1) and an elective (Semester 2).
<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
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<tbody>
<tr>
<td>Spring Term 1</td>
<td>Psychology 2930 or 2520</td>
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<tr>
<td></td>
<td>Psychology 199W</td>
</tr>
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<td>Fall Semester 5</td>
<td>Elective or Arts requirement</td>
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<tr>
<td></td>
<td>Psychology 3000-Level Core</td>
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<td>Psychology 3000-Level Core</td>
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<td></td>
<td>Psychology 3000-Level Core</td>
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<tr>
<td></td>
<td>Psychology 3900</td>
</tr>
<tr>
<td></td>
<td>3000-Level-Core</td>
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<td></td>
<td>3000-Level-Core</td>
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<td>3000-Level-Core</td>
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<td></td>
<td>Elective or Arts requirement</td>
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<td>Psychology 3900</td>
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<td>Winter Semester 6</td>
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<td></td>
<td>Elective or Arts requirement</td>
</tr>
<tr>
<td></td>
<td>Psychology 3000-Level Core</td>
</tr>
<tr>
<td></td>
<td>Psychology Research Experience course</td>
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<tr>
<td></td>
<td>Psychology 4910</td>
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<tr>
<td></td>
<td>3000-Level-Core</td>
</tr>
<tr>
<td></td>
<td>Elective or Arts requirement</td>
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<tr>
<td></td>
<td>Elective or Arts requirement</td>
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<tr>
<td></td>
<td>Psychology 4910</td>
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<td>Research Experience</td>
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<td>Spring Term 2</td>
<td>Psychology 299W</td>
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<td>Fall Semester 7</td>
<td>Elective or Arts requirement</td>
</tr>
<tr>
<td></td>
<td>Psychology 3000-Level Core</td>
</tr>
<tr>
<td></td>
<td>Psychology 4000-Level</td>
</tr>
<tr>
<td></td>
<td>Psychology Selected Topics course</td>
</tr>
<tr>
<td></td>
<td>Psychology 499A</td>
</tr>
<tr>
<td></td>
<td>3000-Level-Core</td>
</tr>
<tr>
<td></td>
<td>4000-Level-Psychology</td>
</tr>
<tr>
<td></td>
<td>Elective or Arts requirement</td>
</tr>
<tr>
<td></td>
<td>Psychology 499A</td>
</tr>
<tr>
<td></td>
<td>Selected-Topics</td>
</tr>
<tr>
<td>Winter Term 3</td>
<td>Psychology 399W</td>
</tr>
<tr>
<td>Spring (Optional)</td>
<td>Psychology 499A</td>
</tr>
<tr>
<td>Fall Semester 8</td>
<td>Elective or Arts requirement</td>
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<td>Elective or Arts requirement</td>
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<tr>
<td></td>
<td>Psychology 3000-Level Core</td>
</tr>
<tr>
<td></td>
<td>Psychology 4000-Level</td>
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<tr>
<td></td>
<td>Psychology 499B</td>
</tr>
<tr>
<td></td>
<td>3000-Level-Core</td>
</tr>
</tbody>
</table>
Table 4 Suggested Course Sequence for B.Sc. (Honours) in Psychology (Co-operative)

<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester 1</strong></td>
<td>Biology 1001&lt;br&gt;Chemistry 1010 (1050)* or Physics 1020 (1050)<strong>&lt;br&gt;Chemistry 1010 (1050) or Physics 1020 (1050)<em>&lt;br&gt;English 1080&lt;br&gt;Mathematics 1090</em></strong>&lt;br&gt;Mathematics 1090 or Math 1000&lt;br&gt;Psychology 1000</td>
</tr>
<tr>
<td><strong>Winter Semester 2</strong></td>
<td>Biology 1002&lt;br&gt;Chemistry 1011 (1051) or Physics 1021 (1051)&lt;br&gt;English 1101, 1102, 1103, or 1110&lt;br&gt;Mathematics 1090***&lt;br&gt;Mathematics 1000 or Elective or Science requirement&lt;br&gt;Psychology 1001</td>
</tr>
<tr>
<td><strong>Fall Semester 3</strong></td>
<td>Biology, Chemistry, or Physics Lab Course&lt;br&gt;Elective or Science requirement&lt;br&gt;Elective or Science requirement&lt;br&gt;Psychology 2520 or 2930&lt;br&gt;Psychology 2910</td>
</tr>
<tr>
<td><strong>Winter Semester 4</strong></td>
<td>Biology, Chemistry, or Physics Lab Course&lt;br&gt;Elective or Science requirement&lt;br&gt;Elective or Science requirement&lt;br&gt;Psychology 2911&lt;br&gt;Psychology 2930 or 2520</td>
</tr>
<tr>
<td><strong>Spring Work Term 1</strong></td>
<td>Psychology 199W</td>
</tr>
<tr>
<td><strong>Fall Semester 5</strong></td>
<td>Elective or Science requirement&lt;br&gt;Elective or Science requirement&lt;br&gt;Psychology 3000-Level Core&lt;br&gt;Psychology 3000-Level Core&lt;br&gt;Psychology 3900</td>
</tr>
<tr>
<td><strong>Winter Semester 6</strong></td>
<td>Elective or Science requirement&lt;br&gt;Psychology 3000-Level Core&lt;br&gt;Psychology 3000-Level Core&lt;br&gt;Psychology Research Experience</td>
</tr>
</tbody>
</table>

*or Elective or Arts requirement if Mathematics 1000 was taken in Semester 1
<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester 1</td>
<td>Biology 1001 or Physics 1020 (1050)*</td>
</tr>
<tr>
<td>Fall Semester 2</td>
<td>Biology 1001 or Physics 1020 (1050)*</td>
</tr>
<tr>
<td>Spring Term 2</td>
<td>Psychology 299W</td>
</tr>
<tr>
<td>Fall Semester 3</td>
<td>Psychology 3000-Level Core</td>
</tr>
<tr>
<td></td>
<td>Psychology 4000-04 Level</td>
</tr>
<tr>
<td></td>
<td>Psychology Selected Topics</td>
</tr>
<tr>
<td></td>
<td>Psychology 499A</td>
</tr>
<tr>
<td>Winter Term 3</td>
<td>Psychology 399W</td>
</tr>
<tr>
<td>Spring (Optional)</td>
<td>Psychology 499A</td>
</tr>
<tr>
<td>Fall Semester 4</td>
<td>Biology 1001 or Physics 1020 (1050)*</td>
</tr>
<tr>
<td></td>
<td>Biology 1001 or Physics 1020 (1050)*</td>
</tr>
<tr>
<td></td>
<td>Chemistry 1010 (1050)</td>
</tr>
</tbody>
</table>

*Students registered in Chemistry 1050 must also be registered in Mathematics 1000 (not 1090).
**Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).
*Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).
**Students registered in Mathematics 1000 (Semester 1) and an elective (Semester 2).
<table>
<thead>
<tr>
<th>Semester</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Semester 2</td>
<td>Biology 1002 or Physics 1021 (1051)</td>
</tr>
<tr>
<td></td>
<td>Chemistry 1011 (1051)</td>
</tr>
<tr>
<td></td>
<td>English 1101, 1102, 1103, or 1110</td>
</tr>
<tr>
<td></td>
<td>Mathematics 1000 or 1001</td>
</tr>
<tr>
<td></td>
<td>Psychology 1001</td>
</tr>
<tr>
<td></td>
<td>Chemistry 1011 (1051)</td>
</tr>
<tr>
<td></td>
<td>English 1101, 1102, 1103, or 1110</td>
</tr>
<tr>
<td></td>
<td>Mathematics 1000 or 1001</td>
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<td></td>
<td>Physics 1020 (1050)****</td>
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<td>Psychology 1001</td>
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<tr>
<td>Fall Semester 3</td>
<td>BHNR Requirement 1**</td>
</tr>
<tr>
<td></td>
<td>Physics 1020 (1050)* or Biology 1001</td>
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<td></td>
<td>Chemistry 2440***</td>
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<td></td>
<td>BHNR Requirement 1****</td>
</tr>
<tr>
<td></td>
<td>Biology 1002 or Physics 1021 (1051)****</td>
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<td>Chemistry 2440***</td>
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<tr>
<td></td>
<td>Physics 1020 (1050)****</td>
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<td></td>
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<td></td>
<td>Psychology 2910</td>
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<td>Winter Semester 4</td>
<td>BHNR Requirement 2</td>
</tr>
<tr>
<td></td>
<td>Physics 1021 (1051) or Biology 1002</td>
</tr>
<tr>
<td></td>
<td>Mathematics 1001 or Elective or Science requirement</td>
</tr>
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<td>Psychology 2911</td>
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<td></td>
<td>Psychology 2930 or 2520</td>
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<tr>
<td></td>
<td>BHNR Requirement 2</td>
</tr>
<tr>
<td></td>
<td>Biology 1002 or Physics 1021 (1051)****</td>
</tr>
<tr>
<td></td>
<td>Mathematics 1001 or Science requirement</td>
</tr>
<tr>
<td></td>
<td>Psychology 2914</td>
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<tr>
<td></td>
<td>Psychology 2930 or 2520</td>
</tr>
<tr>
<td>Spring Work Term 1</td>
<td>Psychology 199W</td>
</tr>
<tr>
<td>Fall Semester 5</td>
<td>BHNR Requirement 3</td>
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<tr>
<td></td>
<td>Elective or Science requirement</td>
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<tr>
<td></td>
<td>Elective or Science requirement</td>
</tr>
</tbody>
</table>
| Winter Semester 6 | Psychology 3750-3250  
|                 | Psychology 3800  
|                 | BHN R Requirement 4  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | Psychology 3000-level core  
|                 | Psychology 3820  
|                 | 3000-level Core  
|                 | BHN R Requirement 4  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | Psychology 3820  
| Spring Work Term 2 | Psychology 299W  
| Fall Semester 7 | BHN R Requirement 5  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | a Psychology Research Experience course  
| Winter Work Term 3 | Psychology 399W  
| Fall Semester 8 | BHN R Requirement 6  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | Elective or Science requirement  
|                 | a Psychology Selected Topics course  

*Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).  
**BHN R Requirement 1-6 specified in clause 3. Requirements for a Major in Behavioural Neuroscience (B.Sc. Only).  
***Students may choose to instead take Chemistry 2400 and 2401. These students should consult with the Psychology Undergraduate Advisor.  

*Students registered in Chemistry 1050 must also be registered in Mathematics 1000 (not 1090).  
**or Mathematics 1000 (Semester 1) and Mathematics 1001 (Semester 2).  
***or Chemistry 2400/2401  
****Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).  
*****BHN R Requirement 1-6 refers to the requirement specified in clause 3. Requirements for a Major in Behavioural Neuroscience (B.Sc. Only).
Table 6 Suggested Course Sequence for B.Sc. (Honours) in Behavioural Neuroscience (Co-operative)

<table>
<thead>
<tr>
<th>Term</th>
<th>Suggested Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester 1</td>
<td>Biology 1001 or Physics 1020 (1050)*&lt;br&gt;Chemistry 1010 (1050)&lt;br&gt;English 1080&lt;br&gt;Mathematics 1090 or 1000&lt;br&gt;Psychology 1000 &lt;br&gt;Biological 1004&lt;br&gt;Chemistry 1010 (1050)<strong>&lt;br&gt;English 1080&lt;br&gt;Mathematics 1090</strong>&lt;br&gt;Psychology 1000</td>
</tr>
<tr>
<td>Winter Semester 2</td>
<td>Biology 1002 or Physics 1021 (1051)&lt;br&gt;Chemistry 1011 (1051)&lt;br&gt;English 1101, 1102, 1103, or 1110&lt;br&gt;Mathematics 1000 or 1001&lt;br&gt;Psychology 1001 &lt;br&gt;Chemistry 1011 (1051)&lt;br&gt;English 1101, 1102, 1103, or 1110&lt;br&gt;Mathematics 1000**&lt;br&gt;Physics 1020 (1050)****&lt;br&gt;Psychology 1004</td>
</tr>
<tr>
<td>Fall Semester 3</td>
<td>BHNR Requirement 1**&lt;br&gt;Physics 1020 (1050)* or Biology 1001&lt;br&gt;Chemistry 2440***&lt;br&gt;Psychology 2520 or 2930&lt;br&gt;Psychology 2910 &lt;br&gt;BHNR Requirement 1****&lt;br&gt;Biological 1002 or Physics 1021 (1051)**<strong>&lt;br&gt;Chemistry 2440</strong>*&lt;br&gt;Psychology 2520 or 2930&lt;br&gt;Psychology 2910</td>
</tr>
<tr>
<td>Winter Semester 4</td>
<td>BHNR Requirement 2&lt;br&gt;Physics 1021 (1051) or Biology 1002&lt;br&gt;Mathematics 1001 or Elective or Science requirement&lt;br&gt;Psychology 2911&lt;br&gt;Psychology 2930 or 2520 &lt;br&gt;BHNR Requirement 2&lt;br&gt;Biological 1002 or Physics 1021 (1051)****&lt;br&gt;Mathematics 1001 or Science requirement&lt;br&gt;Psychology 2911&lt;br&gt;Psychology 2930 or 2520</td>
</tr>
<tr>
<td>Spring</td>
<td>Psychology 199W</td>
</tr>
<tr>
<td>Work Term 1</td>
<td></td>
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<td>---------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td><strong>Fall Semester 5</strong></td>
<td><strong>BHNR Requirement 3</strong></td>
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<tr>
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<td>Elective or Science requirement</td>
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<td></td>
<td>Psychology 3250</td>
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<td>Psychology 3800</td>
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<td>Psychology 3900</td>
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<td><strong>Winter Semester 6</strong></td>
<td><strong>BHNR Requirement 4</strong></td>
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<td>Elective or Science requirement</td>
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<td>Psychology 3750</td>
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<td>3000-level core</td>
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<td>Psychology 3820</td>
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<tr>
<td><strong>Spring Work Term 2</strong></td>
<td><strong>Psychology 299W</strong></td>
</tr>
<tr>
<td><strong>Fall Semester 7</strong></td>
<td><strong>BHNR Requirement 5</strong></td>
</tr>
<tr>
<td></td>
<td>Elective or Science requirement</td>
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<tr>
<td></td>
<td>Elective or Science requirement</td>
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<tr>
<td></td>
<td>Psychology Research Experience course</td>
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<tr>
<td></td>
<td>Psychology 499A</td>
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<td></td>
<td>3000-level-core</td>
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<td>BHNR Requirement 5</td>
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<tr>
<td></td>
<td>Elective or Science requirement</td>
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<tr>
<td></td>
<td>Psychology 499A</td>
</tr>
<tr>
<td></td>
<td>a Research Experience course</td>
</tr>
<tr>
<td><strong>Winter Work Term 3</strong></td>
<td><strong>Psychology 399W</strong></td>
</tr>
<tr>
<td><strong>Spring (Optional)</strong></td>
<td><strong>Psychology 499A</strong></td>
</tr>
<tr>
<td><strong>Fall Semester 8</strong></td>
<td><strong>BHNR Requirement 6</strong></td>
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<td>Elective or Science requirement</td>
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<td>Elective or Science requirement</td>
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<td></td>
<td>Psychology 499B</td>
</tr>
<tr>
<td></td>
<td>a Psychology Selected Topics course</td>
</tr>
<tr>
<td></td>
<td>Psychology 499B</td>
</tr>
</tbody>
</table>

*Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).

**BHNR Requirement 1-6 specified in clause 3, Requirements for a Major in Behavioural Neuroscience (B.Sc. Only)

*** Students may choose to instead take Chemistry 2400 and 2401. These students should consult with the Psychology Undergraduate Advisor.

# Students registered in Chemistry 1050 must also be registered in Mathematics 1000 (not 1090).

** or Mathematics 1000-(Semester 1) and Mathematics 1001-(Semester 2);

*** or Chemistry 2400/2401

**** Students registered in Physics 1050 must also be registered in Mathematics 1000 (not 1090).
Secondary Calendar Changes

None.

Rationale

We have tried to improve on three aspects of the tables. First, we wanted to make it clear that 3000-level core, Research Experience, and Selected Topics referred to Psychology courses (Changes in all Tables). Second, we wanted to reduce the number of notes in Tables 2, 4, 5, and 6 by including Mathematics 1090 or 1000 in the Tables for Fall Semester 1. And third, Tables 5 and 6 suggested to students that they should take Biology 1001 and Chemistry 1010(1050) in Fall Semester 1, Chemistry 1011(1051) and Physics 1020(1050) in Winter Semester 2, and Biology 1002 or Physics 1021 (1051) and Physics 1020(1050) in Fall Semester 3. Some students want to take Physics in Fall Semester 1. And some students did not like having an option to complete Biology 1002 in the semester immediately following the semester in which they took Biology 1001.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics
11. Department of Ocean Sciences
12. Department of Physics and Physical Oceanography

Comments Received

No
Yes
Yes
Yes
Yes
No
No
No
No
Yes

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:
Proposal to Modify
Joint Programs with Psychology (Behavioural Neuroscience)

Executive Summary

In the 2014-2015 Academic Year the Psychology department made changes to the B.Sc. and B.Sc. (Hons.) degree so that Psychology 3250 was a required course. We would like to modify the Joint Programs with Behavioural Neuroscience [Biochemistry, Biochemistry (Nutrition), and Biology] so that they are consistent with this requirement that Psychology 3250 is required.

Resource Implications: Instructional Costs

None.

Consultations

Comments were received from Faculty of Arts, Marine Institute, Faculty of Engineering and Applied Science, Faculty of Science (Physics, Biochemistry, and Biology)

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:
Responses from Consultations

Consultation e-mail:

In the 2014-2015 academic year, the Psychology department introduced a number of changes to their programs, most notably a new required second-year course for all Psychology and Behavioural Neuroscience students. This year we are making changes to calendar descriptions for upper level courses to reflect these changes (e.g., changes in pre-requisites for upper level courses). We are also making a number of changes to the calendar descriptions to update and simplify credit restrictions and pre-requisites, as well as some other house-cleaning. These and other changes are outlined in the three attached proposals from the psychology department.

If you have any comments on these proposals, we would appreciate receiving your responses no later than November 26.

Responses:

Dear Dr. Thorpe,

In my estimation there are no matters here that ought to be a source of concern in the Faculty of Arts. Congratulations for your efforts towards strengthening the Psychology program’s calendar entry.

Alex

Alex Marland
Associate Professor, Political Science
Associate Dean (Undergraduate), Faculty of Arts
Arts & Administration Building, A-5015
Memorial University, St. John’s, NL, Canada A1B 3X9
T (709) 864-8254  F (709) 864-2135
www.mun.ca/pose/people/Marland.php

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 Griffiths
Office of the Dean of Arts Memorial University of Newfoundland
St. John’s, NL A1C 5S7
709-864-8255

Dear Christina,

Physics is agreeable to these proposed changes.

Cheers,
Martin Plumer
Undergraduate Studies Committee

Christine

No concerns from the Biochemistry undergraduate committee. With respect to the joint honours aspects we will take the changes to our meeting next week for official Departmental approval.

All the best

Mark

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

Dr. Thorpe,

Thank you for the opportunity to review the request to Modify Joint Programs with Psychology (Behavioural Neuroscience).

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

All the best,

Derek

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

Hi Christina,
The Biology Undergraduate Studies Committee has reviewed the proposed calendar changes to existing courses, the proposal to modify requirements for a major in Psychology and in Behavioural Neuroscience as well as the proposal to modify the joint programs in Psychology (Behavioural Neuroscience). We have no concerns regarding any of the proposed changes.

Thanks
Karen

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

Dear Dr. Thorpe,

Thank you for the opportunity to comment on the Calendar changes to the programs of the Department of Psychology (including Psychology/Biology 4770).

Having consulted with the members of the Committee on Undergraduate Studies, I can report that the Faculty of Engineering and Applied Science has no concerns with these proposed changes.

--

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

TO: Dr. Christina Thorpe, Deputy Head & Undergraduate Officer, Department of Psychology  
FROM: Dr. Dianne Keeping, Collection Development Librarian  
SUBJECT: Proposal to Modify Joint Programs with Psychology (Behavioural Neuroscience)

I have reviewed the proposal to modify the Joint Programs with Behavioural Neuroscience to make them consistent in requiring completion of Psychology 3250 and can confirm that the proposed changes do not have any significant resource implications for the University Library.
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: 5.1.6 Biochemistry and Psychology (Behavioural Neuroscience) Joint Honours

Calendar Change(s)

5.1.6 Biochemistry and Psychology (Behavioural Neuroscience) Joint Honours

Note: Students completing this program cannot receive credit for Psychology 2920.

The following courses (or equivalent) are required to complete the 120 credit hours in courses required for the degree:

1. Chemistry 1050 and 1051 (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000 and 1001, Physics 1050, (or 1020), 1051 (or 1021), English 1080 and 1110.
2. Biochemistry 2100, 2101, 3105, 3106, 3107, 3108, Medicine 310A/B, either 4210 or 4211, 9 credit hours chosen from Biochemistry 4002, 4101, 4102, 4103, 4104, 4105, 4200, 4201, 4220, 4230-4249.
3. Psychology 1000, 1001, 2520, 2910, 2911, 2930, 3250, 3600, 3820, 3900, two one further courses in Psychology chosen from the following: 3050, 3100, 3250-3350, 3450, 3620, 3650, 3750; any research experience course and one of Psychology 4250, 4251, 4850 or 4851; or, any selected topics course and one of Psychology 4270 or 4870.
4. Either Biochemistry 499A/B or Psychology 499A/B.
5. Chemistry 2301, 2400, 2401.

Notes:

1. In accordance with Clause 6.a. of the Regulations for the Honours Degree of Bachelor of Science, Honours candidates must obtain a grade of "B" or better, or an average of 75% or higher in all the required courses listed in Clauses 2., 3. and 4. above, except those at the 1000 level.
2. Students in first year intending to follow this program should note the regulations for admission to Major programs in Psychology and that the deadline for submission of a completed application form to the Department of Psychology is June 1 for the Fall semester.

Secondary Calendar Changes

None.

Rationale

Psychology 3250 is a required course for the B.Sc. (Hons.) in Behavioural Neuroscience. This change brings this joint program in line with the single degree requirement.

Consultations Sought From

1. Grenfell Campus

Comments Received

No
2. Marine Institute: Yes
3. Faculty of Arts: Yes
4. Faculty of Engineering and Applied Science: Yes
5. Department of Biochemistry: Yes
6. Department of Biology: Yes
7. Department of Chemistry: No
8. Department of Computer Science: No
9. Department of Earth Sciences: No
10. Department of Mathematics and Statistics: No
11. Department of Ocean Sciences: No
12. Department of Physics and Physical Oceanography: Yes

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

Program Title: 5.1.7 Biochemistry (Nutrition) and Psychology (Behavioural Neuroscience) Joint Honours

Calendar Change(s)

5.1.7 Biochemistry (Nutrition) and Psychology (Behavioural Neuroscience) Joint Honours

Note: Students completing this program cannot receive credit for Psychology 2920.

The following courses (or equivalent) are required:

1. Chemistry 1010 and 1011 (or 1050, 1051) (or 1200 and 1001), Biology 1001 and 1002, Mathematics 1000, Physics 1020 or 1050, and 1021 (or 1051), English 1080 and 1110.
2. Biochemistry 2100, 2101, 2600, 3106, 3203, 4002, 4300, 4301, 4502, Medicine 310A/B; one course chosen from: Biochemistry 3105, 3107, 3108, 3202, 3402, 3600, 4101, 4103, 4104, 4105, 4200, 4201, 4210, 4211, 4220, 4230-4249, Biology 3050.
3. Psychology 1000, 1001, 2520, 2910, 2911, 2930, 3250, 3800, 3820, 3900, two one further courses in Psychology chosen from the following: 3050, 3100, 3250; 3350, 3450, 3620, 3650, 3750; any research experience course and one of Psychology 4250, 4251, 4850 or 4851; or, any selected topics course and one of Psychology 4270 or 4870.
4. Either Biochemistry 499A/B or Psychology 499A/B.
5. Chemistry 2400, 2401 or Chemistry 2440.
6. Other courses to complete at least the prescribed minimum of 120 credit hours in courses for the Joint Honours Degree.

Notes:

1. In accordance with Clause 6.a. of the Regulations for the Honours Degree of Bachelor of Science, Honours candidates must obtain a grade of "B" or better, or an average of 75% or higher in all the required courses listed in Clauses 2., 3., and 4. above, except those at the 1000 level.
2. Students in first year intending to follow this program should note the regulations as outlined for admission to Major programs in Psychology and that the deadline for submission of a completed application form to the Department of Psychology is June 1 for the Fall semester.

Secondary Calendar Changes

None.

Rationale

Psychology 3250 is a required course for the B.Sc. (Hons.) in Behavioural Neuroscience. This change brings this joint program in line with the single degree requirement.

Consultations Sought From

Comments Received
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<thead>
<tr>
<th>Department</th>
<th>Library Report Received</th>
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<tbody>
<tr>
<td>1. Grenfell Campus</td>
<td>No</td>
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<tr>
<td>2. Marine Institute</td>
<td>Yes</td>
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<tr>
<td>3. Faculty of Arts</td>
<td>Yes</td>
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<td>4. Faculty of Engineering and Applied Science</td>
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<td>5. Department of Biochemistry</td>
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<td>6. Department of Biology</td>
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<td>7. Department of Chemistry</td>
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<td>8. Department of Computer Science</td>
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<td>9. Department of Earth Sciences</td>
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<td>10. Department of Mathematics and Statistics</td>
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<td>11. Department of Ocean Sciences</td>
<td>No</td>
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<tr>
<td>12. Department of Physics and Physical Oceanography</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Program Title: 5.1.10 Biology and Psychology (Behavioural Neuroscience) Joint Honours

Calendar Change(s)

5.1.10 Biology and Psychology (Behavioural Neuroscience) Joint Honours

Note: Students completing this program cannot receive credit for Psychology 2920.

The following forty courses (or equivalent) are required:
1. Biology 1001, 1002, 2060, 2250, 2600, 2900; one of 3401, 3402, 4245, 4404; five Biology electives at the 2000, 3000 or 4000 level not including Biology 499A or 499B.
2. Psychology 1000, 1001, 2520, 2910, 2911, 2930, 3250, 3800, 3820, 3900; two-one further courses in Psychology chosen from the following: 3050, 3100, 3250, 3350, 3450, 3620, 3650, 3750; any research experience course and one of Psychology 4250, 4251, 4850 or 4851; or, any selected topics course and one of Psychology 4270 or 4870.
3. Biology or Psychology 499A/B.
5. English 1080 and 1110; Mathematics 1000 and 1001; Physics 1020 (or 1050) and 1021 (or 1051); Chemistry 1010 and 1011 (or 1050 and 1051), and 2440 (or 2400 and 2401);
6. Other courses, if necessary, to complete at least 120 credit hours of courses.

Note: In accordance with Clause 6.a. of the Regulations for the Honours Degree of Bachelor of Science, Honours candidates must obtain a grade of "B" or better, OR average of 75% or higher in all the required courses listed in Clauses 1, 2, 3, and 4 above, except those at the 1000 level.

Secondary Calendar Changes

None.

Rationale

Psychology 3250 is a required course for the B.Sc. (Hons.) in Behavioural Neuroscience. This change brings this joint program in line with the single degree requirement.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Faculty of Engineering and Applied Science
5. Department of Biochemistry
6. Department of Biology
7. Department of Chemistry
8. Department of Computer Science
9. Department of Earth Sciences
10. Department of Mathematics and Statistics

Comments Received

No
Yes
Yes
Yes
No
No
No
No
11. Department of Ocean Sciences  
No
12. Department of Physics and Physical Oceanography  
Yes

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

At a meeting held on November 30, 2015, the Undergraduate Studies Committee of the Faculty of Science agreed that the following items be forwarded to Faculty Council for approval:

1. Department of Computer Science  
   (a) Proposals for six new major programs  
   (b) Proposals for thirty-six new courses and deletion of thirteen existing courses  
   (c) Calendar changes to existing major and joint major programs

2. Department of Chemistry  
   (a) Deletion of Chemistry 3500 and resulting changes to majors' programs  
   (b) Amendment to course description of Chemistry 2100

3. Department of Mathematics and Statistics  
   (a) Change to Applied Mathematics major program  
   (b) Change to pre-requisite for Statistics 3510  
   (c) Rewording of Mathematics and Statistics program regulation

4. Department of Physics and Physical Oceanography  
   (a) Amendments to Calendar entries for PHYS 3800, 3920 and 4821

5. Department of Biology  
   (a) Amendment to Calendar entry for Biology 4405

6. Department of Biochemistry  
   (a) Changes to existing Biochemistry programs

7. Department of Psychology  
   (a) Change to course description of Psychology/Biology 4770  
   (b) "Housekeeping" changes to several courses  
   (c) Modifications to Psychology majors programs  
   (d) Modification to Psychology joint majors programs

8. Faculty of Science  
   (a) Proposal to add Science 1807 as a prerequisite to laboratory courses.

Joan Burry
Associate Registrar and  
Secretary
Proposal
Calendar Change(s) to Existing Course(s)

Executive Summary

Recently the Faculty of Science created a 0-credit, no fee, course Science 1807 (Safety in the Science Laboratory) to allow a laboratory safety course to be recorded on a student's academic transcript. The Biochemistry Department added the course as a prerequisite to their (8) laboratory courses last year. The other Faculty of Science departments with relevant courses would now like to add it as a prerequisite. Thus this is an omnibus proposal to add this prerequisite to all the Science lab courses where hazards are present.

Resource Implications: Instructional Costs

None. The safety course is already being offered.

Consultations

Arts
Business
Education
Engineering
Grenfell Campus
Human Kinetics and Recreation
Marine Institute
Medicine
Music
Nursing
Pharmacy
Social Work
Library

Faculty of Science, Department of:
Biochemistry
Biology
Chemistry
Computer Science
Earth Sciences
Mathematics and Statistics
Ocean Sciences
Physics and Physical Oceanography

Library Holdings and/or Other Resources Required

None.

The costs, if any, associated with this change/these changes can be met from within the existing
budget allocation or authorized new funding for 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 Numbers and Titles

Please see below for course titles. The course numbers affected by this proposal include:

Biology 1001, 1002, 2010, 2060, 2120, 2122, 2210, 2250, 2600, 2900, 3014, 3050, 3052, 3053, 3202, 3295, 3300, 3401, 3402, 3500, 3530, 3610, 3620, 3709, 3710, 3711, 3712, 3714, 3715, 3950, 4010, 4012, 4040, 4050, 4122, 4141, 4180, 4182, 4200, 4241, 4245, 4250, 4251, 4255, 4360, 4404, 4405, 4550, 4620, 4630, 4710, 4810, 4820.

Chemistry 1010, 1011, 1050, 1051, 2100, 2210, 2301, 2302, 2400, 2401, 2440, 3110, 3210, 3211, 3303, 3410, 3411, 4151.

Ocean Sciences 3620, 4122.

Physics 1021, 1051, 2053, 2055, 3900, 4900.

Psychology 3820, 4270, 4770, 4870.

Science 1150, 1151.

Calendar Changes

Add “PR: Science 1807” as follows:

BIOLOGY

1001 Principles of Biology is an introduction to the science of Biology, including a discussion of the unity, diversity and evolution of living organisms.

LH: 3
PR: Science 1807
UL: credit may be obtained for only 6 1000-level credit hours in Biology

1002 Principles of Biology is an introduction to the science of Biology, including a discussion of the unity, diversity and evolution of living organisms.

LH: 3
PR: Science 1807; BIOL 1001
UL: credit may be obtained for only 6 1000-level credit hours in Bio

2010 Biology of Plants is a study of the structure, function and reproductive biology of plants, with emphasis on the vascular plants, and on their relationship to environment and human activities.

LH: 3
PR: Science 1807; BIOL 1001 and 1002; Chemistry 1010 or 1050 (or the former Chemistry 1000)

2060 Principles of Cell Biology is a modern view of the biology of eukaryotic cells, organelles and molecules and their interactions in the functioning of living organisms.

CO: Physics 1021 or 1051; Biochemistry 2101
CR: the former BIOL 3060
LH: 3
PR: Physics 1021 or 1051; Biochemistry 2101
PR: Science 1807; BIOL 1001, 1002 and 2250; Chemistry 2440 or 2400

2120 Biology for Students of Earth Sciences is an introduction of the principles of Biology for students in Earth Sciences. Topics will include principles of classification, levels of biological organization, fundamental characteristics of living organisms and basic concepts in ecology.
CR: BIOL 1001 or 1002
LH: 3
PR: Science 1807; Earth Science major; Earth Sciences 1001 or 1002 or permission of the Head of Department.
UL: may not be used for credit by Biology Majors or Minors

2122 Biology of Invertebrates is a study of the invertebrates with emphasis on structure and function, adaptations and life histories. The laboratories will present a broad survey of the major invertebrate groups.
CR: the former BIOL 3122
LH: 3
PR: Science 1807; BIOL 1001 and 1002

2210 Biology of Vertebrates is a study of the vertebrates, with emphasis on structure and function, adaptations and life histories.
CR: the former BIOL 3210
LH: 3
PR: Science 1807; BIOL 1001 and 1002

2250 Principles of Genetics is an introduction to Mendelian and molecular genetics. Phenotype and genotype, behaviour of alleles in genetic crosses, chromosome theory of inheritance, genetic linkage, molecular biology of DNA, RNA and protein, molecular basis of mutation, recombinant DNA, applications of genetic biotechnology.
CO: Chemistry 2440 or 2400
CR: Biochemistry 2100 the former BIOL 3250
LH: 3
PR: Science 1807; BIOL 1001 and 1002; Chemistry 1010 and 1011 (or 1050/1051)
PR: Chemistry 2440 or 2400

2600 Principles of Ecology is a conceptual course introducing the principles of ecology, including theoretical, functional and empirical approaches.
CR: the former BIOL 3600
LH: 3
PR: Science 1807; BIOL 1001 and 1002

2900 Principles of Evolution and Systematics is an introduction to the processes and patterns of evolution, and the principles of classification. Natural selection and other microevolutionary processes, variation and adaptation, species and speciation, phylogenetic systematics, reconstruction of phylogeny, macro-evolutionary patterns in the fossil record and their interpretation.
CO: Statistics 2550 (or equivalent)
CR: the former BIOL 3900
LH: 3
PR: Science 1807; BIOL 1001, 1002 and 2250
PR: Statistics 2550 (or equivalent)
3014 Biology and Ecology of Boreal and Arctic Seaweeds is a field course examination of seaweed biology and ecology with special study of living specimens in estuarine, fjordic and exposed coastal sites, demonstrating their physiological and ecological adaptations to cold-water habitats.
CR: the former BIOL 4014
OR: this course is offered at the Bonne Bay Marine Station during the Summer semester with two weeks of instruction followed by a week to complete course requirements
PR: Science 1807; BIOL 2600 or equivalent

3050 Introduction to Microbiology is a course in which the basic principles underlying microbial life are studied. Aspects include structure, function, bioenergetics and growth with an emphasis on prokaryotes. Also studied are viruses, microbial diseases, introductory principles of immunology and the control of microorganisms. The laboratory sessions provide training in culture and determinative techniques using microorganisms.
LH: 3
PR: Science 1807; BIOL 1001 and 1002; Biochemistry 2101

3052 Food Microbiology (same as Biochemistry 3052) is the study of the microbiology of water and food with regard to the beneficial and detrimental roles of microorganisms on interaction with these systems. Emphasis will be on the microbiology of food, fermentations, food spoilage and food borne vectors of human disease.
CR: Biochemistry 3052 and the former Biochemistry 3054, Biochemistry 3401
LC: three hours per week
LH: three hours per week
PR: Science 1807; BIOL 3050

3053 Microbiology for Nurses examines the fundamentals of microbiology with an emphasis on medical microbiology. The course will include topics such as: host responses to infections, human diseases caused by microorganisms, and the control and exploitation of microorganisms.
LH: 2
PR: Science 1807; students admitted to the Bachelor of Nursing (Collaborative) program
UL: not acceptable as one of the required courses for the Minor, Major or Honours programs in Biology, nor is it acceptable for any of the joint programs between Biology and other disciplines

3202 Comparative Vertebrate Anatomy examines the phylogenetic development and comparative anatomy of the vertebrates.
CR: the former BIOL 3200 or the former BIOL 3201
LH: 3
PR: Science 1807; BIOL 1001 and 1002

3295 Population and Evolutionary Ecology is an introduction to the theory and principles of evolutionary ecology and population dynamics.
CR: the former BIOL 4290
LH: 3
PR: Science 1807; BIOL 2600; at least one of BIOL 2010, 2122 or 2210

3300 Introductory Entomology is a study of the classification and ecology of insects within an evolutionary framework. Topics will include molecular biological and classical morphological issues surrounding insect taxonomy, evolutionary based higher systematics, and the ecological roles of insects in a variety of ecosystems.
CR: BIOL 4150 and the former BIOL 4140
LH: 3
PR: Science 1807; BIOL 2600. It is recommended that students have completed BIOL 2900.
3401 Comparative Animal Physiology is a comparative study of the basic physiological processes, with special attention paid to those strategies invoked by animals which enable them to adapt to environmental changes.
CO: Biochemistry 3106
CR: the former BIOL 4401
LH: 3
PR: Science 1807; BIOL 2060 and 2210
PR: Biochemistry 3106

3402 Principles of Plant Physiology is a consideration of the principles of plant physiology, including water relations, nutrition, metabolism, growth and development.
CO: Biochemistry 3106
CR: the former BIOL 4403
LH: 3
PR: Science 1807; BIOL 2010 and 2060
PR: Biochemistry 3106

3500 Histology is a study of microstructure and ultrastructure of tissues and organ systems in vertebrates, particularly mammals, with emphasis on correlating structure and function.
LH: 3
PR: Science 1807; BIOL 2060 and 2210

3530 Molecular and Developmental Biology is a study of developmental model systems with a focus on the underlying principles and molecular mechanisms involved in embryogenesis, organogenesis, morphogenesis, cellular differentiation, growth and regeneration in animals (vertebrates and invertebrates) and plants. Current cellular and molecular biology techniques and the implications of developmental biology in modern biological and health research will be emphasized.
LH: 3
PR: Science 1807; BIOL 2060 and BIOL 2250 or Biochemistry 2100

3610 Boreal Ecology is a study of the principal features of terrestrial ecosystems, with emphasis on the boreal region. This course may be offered in a usual 13 week semester or as a two-week field course.
CR: Environmental Science 3131
LC: either three hours of lecture and three hours of laboratory per week or a two week field course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two week field course that embodies equivalent instructional time
PR: Science 1807; BIOL 2010, 2250, 2600 and 2900; Statistics 2550 or equivalent

3620 Aquatic Microbial Ecology (same as Ocean Sciences 3620) is a study of the nature, distribution and activities of microorganisms in the freshwater and marine environments. Field and laboratory work illustrate some of the investigative techniques used in this area of study.
CR: Ocean Sciences 3620 and the former BIOL 3603
LH: 3
PR: Science 1807; BIOL 2600 and 3050; Statistics 2550 or equivalent

3709 Field Course in Marine Principles and Techniques begins with a two-week field school immediately prior to the beginning of the Fall Semester. In the Fall Semester there are follow-up lectures, readings and submission of reports. The course is designed to introduce the principal marine environments, organisms and techniques. It is strongly recommended that this course be taken before either BIOL 3710, 3711 or 4810.
PR: Science 1807; BIOL 2600; Statistics 2550 or equivalent and permission of the Head of
Department

3710 Biological Oceanography is an introductory course in biotic and abiotic factors controlling marine biomass and primary production, emphasizing plankton and fishes. It introduces students to major groups of marine phytoplankton, zooplankton, and fishes, emphasizing how the physical, chemical, and geological environments interact with biology to define processes and pattern in marine organisms.
LC: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
PR: Science 1807; BIOL 2122 and 2600

3711 Principles of Marine Biology is an introductory course in biology of the oceans. Introduces students to marine habitats and the organisms that inhabit them, emphasizing functional morphology, physiology, biodiversity, phylogeny, and ecology. Also includes introduction to marine biogeography, conservation, fisheries and pollution.
LC: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
PR: Science 1807; BIOL 2122, BIOL 2600

3712 Benthic Biology examines the biology of the aquatic benthos (bottom-dwelling organisms); their origins, adaptations, life histories and ecological roles. This course may be offered in a usual 13 week semester or as a two-week field course.
CR: the former Biology 3630
LC: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
PR: Science 1807; Biology 2122, 2600 and 3710

3714 Estuarine Fish Ecology Field Course examines community structure, function and distribution of northern coastal fishes in fjords and estuarine environments. Emphasis on sampling, field techniques, taxonomy, quantitative characterization, adaptations and habitat relationships. A comparative approach will contrast fish communities from other areas. To be held as a two week field course.
PR: Science 1807; BIOL 2600

3715 Ecology and Evolution of Fishes (same as the former BIOL 4600) examines the evolutionary history and ecology of the world’s fishes, with particular emphasis on those of ecological, economical and cultural importance to Eastern Canada. Topics will include taxonomy, life histories, behaviour, zoogeography, evolutionary ecology, population biology, contemporary evolution, and conservation biology.
CR: the former BIOL 4600
LH: 3
PR: Science 1807; BIOL 2600 and 2900

3950 Research Methods in Genetic Biotechnology (same as the former BIOL 4900) will include DNA extraction, DNA amplification by the Polymerase Chain Reaction (PCR), DNA cloning, DNA sequence analysis and Bioinformatics. Additional modules in gene expression and re-sequencing chip technologies may be included. Theory and methods will be introduced in a research framework.
CR: the former BIOL 4900
LH: Three hours of lecture and three hours of laboratory per week or a three week on-campus course that embodies equivalent instructor time
PR: Science 1807; BIOL 2060 and 2250

4010 Virology will examine topics about viruses infecting all forms of life including humans and other animals, plants and bacteria. The scope within the course ranges from the molecular biology of virus replication to virus evolution and ecology. Current issues concerning viruses and society are incorporated into the course including the practical applications of viruses, vaccines, and emerging viruses.
LH: Three hours of laboratory/seminar/discussion per week
PR: Science 1807; BIOL 2900 and 3050

4012 Phycology studies the biology of the algae. A study of the structure, reproduction and evolution of the major divisions of the algae. Aspects of algal physiology and ecology relating to how algae are adapted to life in freshwater, marine and symbiotic environments, together with economic aspects of phycology, will also be covered. The laboratories will emphasize the recognition and identification of representative species of the major algal divisions with a bias towards local species. There will be field trips to collect material in local marine and freshwater environments. This course may be offered in a usual 13 week semester or as a two-week field course.
LC: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
LH: either three hours of lecture and three hours of laboratory per week or a two-week field course that embodies equivalent instructional time
PR: Science 1807; BIOL 2060 and 2600

4040 Mycology is a study of the physiology, morphogenesis, nature of plant and animal parasitism, ecology and taxonomy of terrestrial and freshwater fungi.
CR: the former BIOL 3020
LH: 3
PR: Science 1807; BIOL 2050 and 3050

4050 Advanced Topics in Microbiology examines the beneficial and harmful properties of microbes including topics on industrial microbiology and the discovery of new antimicrobial agents. The scope within the course ranges from the genetic manipulation of microbes for useful purposes to the isolation of bacteria for applications in various fields. Current issues concerning microbiology and society will also be discussed including the practical applications of microbes and bacterial diseases affecting society.
LH: 3
PR: Science 1807; BIOL 3050

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 to 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: Science 1807; BIOL 2122, 2600 and 2900

4141 Nematology is a study of plant parasitic, insect parasitic and free-living marine, freshwater and terrestrial nematodes, with emphasis on taxonomy, biology, economic importance, control methodologies and environmental applications.
LH: 3
PR: Science 1807; BIOL 2010, 2122 and 2600

4180 General Parasitology is an examination of parasitism as a way of life, with emphasis on classification, structural adaptation, life cycles and ecology.
LH: 3
PR: Science 1807; BIOL 2122, 2210 and 2600

4182 Fisheries and Wildlife Parasitology is a study of the important parasites of fish and other wildlife and their impact on both individuals and populations.
LH: 3
PR: Science 1807; BIOL 4180

4200 Immunology is an introduction to the cells and organs of the innate and adaptive immune systems. The molecular and cellular basis of allergy, autoimmunity, vaccination and cancer immunology will also be discussed.
CR: Biochemistry 4105, Pharmacy 3006, and the former Pharmacy 4105
LH: 3
PR: Science 1807; BIOL 2060 and BIOL 3050

4241 Advanced Genetics has advanced topics in modern genetic analysis, including regulation of gene expression, developmental genetics, molecular basis of inherited disease, genomics, immunogenetics, behavioural genetics, and molecular evolution.
LH: 3
PR: Science 1807; BIOL 2250 and Biochemistry 2101

4245 Biophysics is an examination of the physical properties involved in defining diffusion, membrane properties, electrochemical potentials and the processes of bioenergetics within cells and organelles. Selected topics in biomechanics and the functioning of whole organisms with respect to size, shape, support, orientation, transport and motility.
LH: 3
PR: Science 1807; BIOL 2060 and Biochemistry 2101

4250 Evolutionary Genetics has advanced topics in the study of micro and macro-evolutionary phenomena. Genetic variation in natural populations; theory of genetic drift, mutation, migration, inbreeding, and natural selection; neutral theory of molecular evolution, patterns of nucleotide substitution, heritability and quantitative genetics.
LH: 3
PR: Science 1807; BIOL 2250 and 2900

4251 Genomics will have lecture, seminar, and laboratory components. Topics covered will include Technical Foundations of Genomics, Global Gene Expression Profiling, Bioinformatics, Comparative Genomics, Microbial Genomics, Genomics and Medicine, Genomics and Agriculture, Environmental Genomics, and Ethical Issues of Genomics. Each topic will involve a lecture component, in which theory and methods will be taught using the textbook and journal articles. Some lecture and lab times will be devoted to seminars on methods and papers related to lecture or laboratory components of the course. In the lab component, students will have the opportunity to use state-of-the-art genomic techniques to address a research question.
LH: 3
**4255 Proteomics** is the study of the proteome, the complete set of proteins produced by a species, using the technologies of large-scale protein separation and identification. Proteomics describes how proteins are modified, when and where they are expressed, how they are involved in metabolic pathways and how they interact with one another. Topics covered will include Technical Foundations of Proteomics, Global Functional Protein Expression Profiling, Experimental Bioinformatics, Comparative Proteomics, Posttranslational Modification-Specific Proteomics, Proteomics in Medicine, Agriculture, Environmental Proteomics and Proteomics for Quality and Safety of Food.

LH: 3  
PR: **Science 1807; BIOL 2060, 2250**; Biochemistry 3106

**4360 Community and Ecosystem Ecology** is a study of the basic principles, patterns and processes of ecological communities and ecosystems.

OR: a seminar/discussion group each week  
PR: Science 1807; BIOL 2250, 2600 and 2900 and one of BIOL 2010, 2122 or 2210; Statistics 2550 or equivalent

**4404 Microbial Physiology** is a study of the structure and growth of microorganisms. Themes covered in this course include the structure, function and regulation of the microbial cellular machinery, the hierarchical regulation of cellular activities, and communication between cells. Quantitative experimental methodology relating to microbial physiology is studied in the laboratory.

LH: 3  
PR: **Science 1807; BIOL 2250 and BIOL 3050**

**4405 Landscape Ecology** is an introduction to the theory and principles of landscape pattern and processes, including issues related to scale, networks, landform and vegetation patterns, species distributions, and natural and human-caused aspects of landscape change.

CO: Statistics 2550 or equivalent

LH: 3  
PR: **Science 1807; BIOL 2600 and 18 credit hours in Biology, Statistics 2550 or equivalent, or permission from the course instructor**

**4550 Principles of Endocrinology** comprises an introduction to basic concepts concerned with how chemical messages are transmitted and received between cells to coordinate body functions. Hormonal control of adaptation, reproduction, metabolism, growth, digestion, and electrolyte homeostasis will be discussed. Although the endocrinology of invertebrates and lower vertebrates will be mentioned as appropriate, the main emphasis will be on mammalian and human endocrinology at the level of the whole organism.

LH: 3  
PR: **Science 1807; BIOL 3401; Biochemistry 3106**

**4620 Ornithology** examines structure, classification, evolution, ecology and behaviour of birds, with particular reference to those of economic importance. Identification of the birds of Eastern Canada.

LH: 3  
PR: **Science 1807; BIOL 2210 and 2600**

**4630 Mammalogy** examines evolution, systematics, life histories and distribution of mammals, with particular emphasis on eastern North American forms.

LH: 3
**PR: Science 1807; BIOL 2210 and 2600**

**4710 Experimental Marine Ecology of Newfoundland Waters** is a two-week field course examines the ecology of cold ocean environments, focussing on energy flux through marine pelagic and benthic flora and fauna of Newfoundland waters, and how the dynamics of this environment influence linkages among organisms in different habitats. The course will be field intensive with some lecture component and a strong hands-on field component. Students will identify local organisms and study how and why they vary in time and space. This course will be offered during two weeks of the Spring semester.

**PR: Science 1807; BIOL 2600**

**4810 Research Field Course in Marine Biology** will consist of an intensive two-week field school designed to acquaint students with marine field research, experimental design, methodology and data analysis. Emphasis will be placed on individual projects. Projects must be designed and approved prior to the commencement of the course and will involve a written report. At the discretion of the Head of Department, another recognized field course may be substituted for BIOL 4810.

**PR: Science 1807; BIOL 3710 and any two of BIOL 2010, 2122 or 2210 and permission of the Head of the Department. It is strongly recommended that students take BIOL 3709 before 4810.**

**4820 Field Course in Terrestrial Biology** will begin with a three-week field school immediately prior to the beginning of the Fall Semester. It is designed to acquaint students with terrestrial organisms and environments, and emphasis will be placed on survey and sampling techniques. In the Fall Semester the material and data collected in the field will be used in lecture and laboratory periods dealing with identification, analytical methods, and report compilation.

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

**CHEMISTRY**

**1010 Introductory Chemistry I** examines descriptive chemistry; measurements; atoms; molecules; the mole; mole calculations and reaction stoichiometry; the balancing of redox reactions; gases; thermochemistry; introduction to chemical kinetics and equilibrium; acids and bases.

**AR:** attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.

**CR:** CHEM 1200

**LC:** 4

**LH:** 3 hours biweekly alternating with tutorials

**OR:** 1.5 hour tutorial alternating with labs

**PR:** Science 1807. It is recommended that students have successfully completed high school Academic Mathematics 3201, or a pass in any university level mathematics course

**UL:** only 6 science credit hours will be awarded for a major or honours in Chemistry from the following course groups: CHEM 1010/1011/the former 1031, or CHEM 1010/1050/1051, or CHEM 1810/1200/1001 (Grenfell Campus)

**1011 Introductory Chemistry II** examines atomic structure; periodic properties; chemical bonding including VSEPR shapes and polarity; introduction to valence bond theory and hybridization; liquids, solids and intermolecular forces; solubility equilibrium; electrochemistry.

**AR:** attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.

**CR:** CHEM 1001 and CHEM 1051

**LH:** 3 hours biweekly alternating with tutorials

**OR:** 1.5 hour tutorial alternating with labs

**PR:** Science 1807; CHEM 1010
UL: only 6 science credit hours will be awarded for a major or honours in Chemistry from the following course groups: CHEM 1010/1011/the former 1031, or CHEM 1010/1050/1051, or CHEM 1810/1200/1001 (Grenfell Campus)

1050 General Chemistry I builds on basic chemistry concepts from high school. Topics include gases; thermochemistry; atomic structure; periodic properties; chemical bonding including valence bond theory; hybridization and introduction to molecular orbital theory; properties of liquids and solids.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: CHEM 1200
LC: 4
LH: 3
PR: Science 1807; CHEM 1010 with a grade of at least 60% or high school CHEM 3202 with a grade of at least 65%. It is also recommended that students have successfully completed high school Mathematics 3200 or 3201.

UL: only 6 science credit hours will be awarded for a major or honours in Chemistry from the following course groups: CHEM 1010/1011/the former 1031, or CHEM 1010/1050/1051, or CHEM 1810/1200/1001 (Grenfell Campus)

1051 General Chemistry II builds on CHEM 1050 topics and on basic chemistry concepts from high school. Topics include solutions, kinetics, chemical equilibrium, equilibria involving acids and bases including polyprotic acids, buffers, acid-base indicators, titration curves, solubility and complex ion equilibrium, thermodynamics, and electrochemistry.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: CHEM 1001 and CHEM 1011
LC: 4
LH: 3
PR: Science 1807; CHEM 1050

UL: only 6 science credit hours will be awarded for a major or honours in Chemistry from the following course groups: CHEM 1010/1011/the former 1031, or CHEM 1010/1050/1051, or CHEM 1810/1200/1001 (Grenfell Campus)

2100 Analytical Chemistry I (same as the former CHEM 3100) is an introduction to analytical chemistry and includes preparation of samples and standards, calibration methods, statistical treatment of data, spectrophotometric trace analysis, gravimetric analysis and volumetric analysis including acid-based titrations, precipitation titrations, oxidation-reduction titrations, complexometric titrations and titrations in non-aqueous systems. Also introduced are liquid-liquid and other types of extraction, and chromatography with key methods of detection. Theoretical, practical and problem-solving aspects are covered.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: the former CHEM 3100
LH: 4
PR: Science 1807; CHEM 1051 (or 1001 or the former 1031) with a grade of at least 60%

2210 Introductory Inorganic Chemistry studies the chemistry of selected s, p, and d block elements. Introduction to crystal and molecular structures and to molecular orbital and crystal field theories.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
LH: 3
PR: Science 1807; CHEM 1051 (or 1001 or the former 1031), Mathematics 1000
2301 Thermodynamics and Kinetics builds upon knowledge of physical chemistry from first year. It covers the three laws of thermodynamics for ideal and real systems as well as chemical kinetics. Topics in thermodynamics include the thermodynamics of ideal and real gases, phases, and solutions, the Maxwell relations, equilibria between phases, and in electrolyte solutions. The integrated rate laws for simple and complex mechanisms, and the temperature dependence of reaction rates in terms of kinetic molecular theory are some of the topics discussed in the kinetics section of the course.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CO: Mathematics 2000 is recommended
CR: CHEM 2300
LH: 3
PR: Science 1807; minimum 60% in CHEM 1051 (or CHEM 1001 or the former CHEM 1031), Mathematics 1001 and Physics 1051 or Physics 1021

2302 Quantum Chemistry and Spectroscopy examines the quantum mechanics of simple systems such as the particle in a box, the harmonic oscillator, linear rotor, and hydrogen-like atoms. Topics also include orbital quantum numbers, spin, many electron atoms, an introduction to quantum mechanical methods, the electronic structures of molecules, bonding, and symmetry. Furthermore, electronic, rotational, and vibrational spectroscopy will be discussed as well as modern applications of spectroscopy and lasers.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CO: Mathematics 2000 is recommended
CR: the former CHEM 3301
LH: 3
PR: Science 1807; minimum 60% in CHEM 1051 (or CHEM 1001 or the former CHEM 1031), Mathematics 1001 and Physics 1051 or Physics 1021

2400 Introductory Organic Chemistry I is a course on bonding involving carbon; conformations and stereochemistry; introduction to functional groups and nomenclature; properties, syntheses and reactions of hydrocarbons, alkyl halides and alcohols.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CO: CHEM 1051
CR: CHEM 2440
LH: 3
PR: Science 1807; CHEM 1050 and 1051, or the former 1031; or CHEM 1010 and 1011 with a grade of at least 80% in each; or CHEM 1011 with a grade of at least 85%; or CHEM 1001 with a grade of at least 65%

2401 Introductory Organic Chemistry II is an introduction to the interpretation of infrared, H and C-13 NMR spectra; properties, syntheses and reactions of ethers, simple aromatic compounds, ketones, aldehydes, amines, carboxylic acids and their derivatives; aldol and related reactions.
AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.
CR: the former CHEM 2420, 2440, and the former 240A/B
LH: 3
PR: Science 1807; CHEM 2400

3110 Analytical Chemistry II (same as the former CHEM 4110) builds upon the student's knowledge from CHEM 2100 (Analytical Chemistry I) and applies it to a more advanced level of
instrumental quantitative analysis. The course examines error treatment, atomic emission an
absorption spectroscopy, gas and liquid chromatography, capillary electrophoresis and
supercritical fluid chromatography and extraction techniques, electroanalytical chemistry,
molecular and atomic mass spectrometry, x-ray spectroscopy, ion and electron spectroscopy,
surface analysis techniques and thermogravimetric analysis.
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
CR: the former CHEM 4100, the former CHEM 4101, or the former CHEM 4110
LH: 3
PR: Science 1807; CHEM 2100 or the former CHEM 3100

3210 Main Group and Materials Chemistry is a detailed examination of the chemistry of the s
and p block elements and modern applications of inorganic chemistry in materials and
nanotechnology.
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
LH: 3
PR: Science 1807; CHEM 2210, CHEM 2301 (or 2300), and CHEM 2302

3211 Inorganic Chemistry is a detailed examination of the structure, bonding, and chemistry
of the d block elements.
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
LH: 3
PR: Science 1807; CHEM 2210, CHEM 2301 (or 2300), and CHEM 2302

3303 Statistical Thermodynamics and Rate Theories examines physical chemistry from the
microscopic viewpoint. Topics include probability distributions, quantum statistical mechanics,
statistical thermodynamics, ensembles, kinetics and introduction to statistical rate theories as
well as an introduction to computational chemistry (lab).
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
CR: the former CHEM 3300
LH: 3
PR: Science 1807; CHEM 2301 (or 2300) and CHEM 2302 (or the former CHEM 3301)
Mathematics 2000 and Mathematics 2050.

3410 Bio-organic Chemistry is a study of the major classes of biomolecules, their structure,
function, and in vitro chemistry. An introduction to natural products. Synthetic polymers
compared to biopolymers. Heteroaromatic molecules and derived biomolecules.
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
CR: the former CHEM 3401
LH: 3
PR: Science 1807; CHEM 2401. It is recommended that CHEM 3500 be taken concurrently.

3411 Synthetic Organic Chemistry I is a survey of some important reactions used in organic
synthesis, including pericyclic reactions and those based on carbocation, carbene, nitrile and
carbonion intermediates. Emphasis is placed on multifunctional compounds.
AR: attendance is required in the laboratory component of this course. Failure to attend may
result in a failing grade or deregistration from the course.
CR: the former CHEM 3400
LH: 3
PR: Science 1807; CHEM 3410, or all of CHEM 2401, Biochemistry 2100 and Biochemistry 2101
4151 **Analytical Separations and Organic Mass Spectrometry** examines advances in the traditional chromatographic techniques, the development of new analytical tools in separation science, the interfacing of mass spectrometers to chromatographic instruments, and other mass spectrometric techniques.

AR: attendance is required in the laboratory component of this course. Failure to attend may result in a failing grade or deregistration from the course.

LH: 3

PR: Science 1807; CHEM 3110 (or the former CHEM 4100 or the former CHEM 4101 or the former CHEM 4110)

**OCEAN SCIENCES**

3620 **Aquatic Microbial Ecology** (same as Biology 3620) is a study of the nature, distribution and activities of microorganisms in the freshwater and marine environments. Field and laboratory work illustrate some of the investigative techniques used in this field of study.

CR: Biology 3620 and the former Biology 3603

LH: 3

PR: Science 1807; Biology 2600 and 3050, Statistics 2550 or equivalent

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: Science 1807; Biology 2122, Biology 2600, and Biology 2900

**PHYSICS**

1021 **Introductory Physics II** is a non-calculus based introduction to fluids, wave motion, light, optics, electricity and magnetism.

CO: Mathematics 1000

LH: 3; normally there will be six laboratory sessions per semester

OR: tutorial sessions may be held on weeks when no laboratory is scheduled

PR: Science 1807; PHYS 1020 or 1050 and Mathematics 1090 or 1000

1051 **General Physics II: Oscillations, Waves, Electromagnetism** is a calculus based introduction to oscillations, wave motion, physical optics and electromagnetism.

CO: Mathematics 1001

LH: 3; normally there will be six laboratory sessions per semester

OR: tutorial sessions may be held on weeks when no laboratory is scheduled

PR: Science 1807; PHYS 1050, or 1021, or 1020 (with a minimum grade of 65%) and Mathematics 1001

2053 **Fluids and Thermal Physics** examines elasticity, fluid mechanics, thermodynamics, kinetic theory and statistical mechanics.

CO: Mathematics 1001 and PHYS 1051

LH: 3

PR: Science 1807; Mathematics 1001 and PHYS 1051
2055 Electricity and Magnetism examines Gauss' Law, the electrostatic potential, capacitance, magnetic forces and the magnetic field, electromagnetic induction, magnetic materials, ac circuits, superconductivity, the displacement current and Maxwell's equations.
CO: Mathematics 2000
LH: 3
PR: Science 1807; Mathematics 2000 and PHYS 1051

3900 Physics Laboratory I is a selection of experiments based primarily on material covered in the third year courses.
LH: 6
PR: Science 1807; at least two of PHYS 2053, 2820, 2055, and PHYS 2750 (or 2056)

4900 Physics Laboratory II is a selection of experiments at the senior level.
LH: 6
PR: Science 1807; PHYS 3900

PSYCHOLOGY
3820 Research Techniques in Behavioural Neuroscience allows students to increase their understanding of how knowledge is generated in the study of neuroscience and behavior. Students will visit various laboratories on campus that are engaged in research relevant to these fields. In addition to observations and hands-on tutorials, readings, discussions, and writing assignments will strengthen students' understanding of the techniques used to answer specific research questions in neuroscience and behaviour.
PR: Science 1807; PSYC 2520, 2911 and 2930, Biology 1001 and 1002, and admission to a Major in Psychology or Behavioural Neuroscience

4270 Research Experience in Learning allows students to gain research experience in selected areas of learning.
PR: Science 1807; PSYC 2520, the former 2570, 2911, and 3250 and admission to a Major in Psychology or Behavioural Neuroscience

4770 Research Experience in Animal Behaviour (same as Biology 4770) allows students to gain research experience in selected areas of animal behaviour.
CR: Biology 4770
PR: Science 1807; PSYC 2520, the former 2570, 2911 and PSYC 3750 or BIOL 3750, and admission to a major in Psychology or Behavioural Neuroscience

4870 Research Experience in Neuroscience allows students to gain research experience in selected areas of neuroscience.
PR: Science 1807; PSYC 2520, the former 2570, 2911, and either 3800 or 3801 and admission to a Major in Psychology or Behavioural Neuroscience

SCIENCE
1150 Introduction to Physical and Life Sciences (formerly Science 115A) is an introduction to some concepts in the Physical and Life Sciences. This course is primarily intended for the non-science major (Bachelor of Arts; Bachelor of Education (Primary/Elementary)).
CR: the former Science 115A
LH: 3
PR: Science 1807
UL: not acceptable as a prerequisite for 2000 level courses in Physics, Chemistry, Biology, Geography or Earth Sciences

1151 Introduction to Physical and Life Sciences (formerly Science 115B) is an introduction
to some concepts in the Physical and Life Sciences. This course is primarily intended for the non-science major (Bachelor of Arts; Bachelor of Education (Primary/Elementary)).
CR: the former Science 115B
LH: 3
PR: Science 1807
UL: not acceptable as a prerequisite for 2000 level courses in Physics, Chemistry, Biology, Geography or Earth Sciences

**Rationale**

Recently the Faculty of Science created a 0-credit, no fee, course Science 1807 (Safety in the Science Laboratory) to allow a laboratory safety course to be recorded on a student's academic transcript. The Biochemistry Department added this course as a prerequisite to their (8) laboratory courses last year. The other Faculty of Science departments with relevant courses would now like to add it as a prerequisite. Thus this is an omnibus proposal to add this prerequisite to all the Science lab courses where hazards are present.

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**Library Report Received**

No

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

**Name**
Appendix: Consultations

Consultation request:

From: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>
Subject: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 18, 2015 at 5:27:31 PM GMT-3:30

Good afternoon,

Attached is a proposed Calendar change from the Faculty of Science to add the course Science 1807 (Safety in the Science Laboratory) as a prerequisite to all the Science lab courses where laboratory hazards are present.

I look forward to your comments. Please reply to adsu@mun.ca by December 16th, 2015.

Thank you,
Andy

DR. ANDY FOSTER | ASSOCIATE DEAN OF SCIENCE
(Administration & Undergraduate)
Memorial University
St. John’s, NL, Canada A1B 3X7
T 709-864-8155
Responses

Arts

From: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 23, 2015 at 2:46:48 PM GMT-3:30
To: "Mercer, Stacey" <staceym@mun.ca>, "Catto, Norm" <ncatto@mun.ca>

Hi Stacey and Norm,

Thank you for the feedback.

Yes, the qualifier “where hazards are present” does exclude Geography lab courses from this requirement. The proposal includes a large list of individual courses in order to carefully separate the lab courses where hazards are present from the lab courses where the safety training is not required. Many of our courses have associated lab components which do not require Science 1807. Extreme examples of this are courses in Computer Science and in Mathematics and Statistics with scheduled computer labs.

All the best,

Andy

DR. ANDY FOSTER | ASSOCIATE DEAN OF SCIENCE
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T 709-864-8155
adsu@mun.ca

On Nov 20, 2015, at 4:12 PM, Mercer, Stacey <staceym@mun.ca> wrote:
Hi Dr. Foster:
Here is a comment.

--

Dear Stacey:

As indicated during earlier discussion, the qualifier “where hazards are present” excludes Geography lab courses from this requirement. With that understanding, it can proceed.
Best wishes
Norm

Stacey Griffiths
Office of the Dean of Arts
Memorial University of Newfoundland
St. John's, NL A1C 5S7
709-864-8255

Engineering

From: Engineering Consultations <engrconsult@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 20, 2015 at 3:55:59 PM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Dear Dr. Foster,

Thank you for the opportunity to comment on the Calendar changes to extend Science 1807 as a prerequisite to more Science courses.

The Faculty of Engineering and Applied Science expressed strong support for the introduction of Science 1807 as a course that will appear on student transcripts. We therefore extend our full support for this further Calendar change for Science 1807.

Yours sincerely,

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

Medicine

From: <cvardy@mun.ca>
Subject: RE: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 19, 2015 at 1:47:25 PM GMT-3:30
To: <adsu@mun.ca>

Dear Dr. Foster

The Faculty of Medicine supports the proposed calendar change from the Faculty of Science, in particular to add the course Science 1807 as a prerequisite to all the Science lab courses where laboratory hazards are present.

Sincerely,

Cathy Vardy

---

*Cathy Vardy, MD, FRCP(C)*
*Vice Dean*
*Faculty of Medicine*
*Health Sciences Centre, Room M2M319*
*Memorial University of Newfoundland*
*St. John's, NL, Canada, A1B 3V6*
*Tel: 709-864-6417 or Fax: 709-864-6336*

**Music**

From: "Volk, Maureen" <mvolk@mun.ca>
Subject: RE: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 18, 2015 at 5:47:25 PM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Music has no concerns or comments regarding this proposal.
Maureen Volk

**Nursing**

From: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 23, 2015 at 2:25:00 PM GMT-3:30
To: "Gaudine, Alice" <agaudine@mun.ca>

Hello Alice,
Thank you very much for the response. There is one course directly involving Nursing students that is on the list of courses to require the Science 1807 prerequisite: Biology 3053 (Microbiology for Nurses). I just want you to be assured that, since Nursing students now are required to take Safety 1000 in their first year and students who complete Safety 1000 do not need to complete the equivalent Science 1807, we will make sure to put permissions in place to accept either Safety 1000 or Science 1807 for this course.

All the best,
Andy

DR. ANDY FOSTER | ASSOCIATE DEAN OF SCIENCE
(Administration & Undergraduate)
Memorial University
St. John's, NL, Canada A1B 3X7
T 709-864-8155
adsu@mun.ca

On Nov 21, 2015, at 9:25 PM, Gaudine, Alice <agenda@mun.ca> wrote:
Hello,
Sounds like a good idea,
Alice Gaudine
Dean, School of Nursing

Begin forwarded message:

From: DeanNurse <DeanNurse@mun.ca>
Subject: FW: Consultation request for Science 1807 as prerequisite to lab courses
Date: 19 November, 2015 9:47:29 AM NST
To: "Gaudine, Alice" <agenda@mun.ca>

Biochemistry

From: Biochemistry Head <biohead@mun.ca>
Subject: RE: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 19, 2015 at 9:06:13 AM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Hi Andy
Needless to say Biochemistry enthusiastically supports this.

Mark

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

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

**Biology**

From: Karen Morris <morrisk@mun.ca>
Subject: Re: FW: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 25, 2015 at 2:13:25 PM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Hi Andy
The Biology Undergraduate Studies Committee has reviewed the proposed calendar change to add Science 1807 as a prerequisite to lab course. We fully support the proposal.
Thanks
Karen

**Chemistry**

From: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 23, 2015 at 11:42:26 AM GMT-3:30
To: Peter Pickup <chemhead@mun.ca>

Hi Travis,

Thanks very much for your quick reply.

Some items have gone through the system in the recent past with the Calendar changes boldfaced, but I’ll take your advice and change the proposed Calendar additions from boldface to underlining. It would not be good to have the proposal sent back because of a technicality!
All the best,
Andy

DR. ANDY FOSTER | ASSOCIATE DEAN OF SCIENCE
(Administration & Undergraduate)
Memorial University
St. John's, NL, Canada A1B 3X7
T 709-864-8155
adsu@mun.ca

On Nov 19, 2015, at 5:46 AM, Travis Fridgen <chemhead@mun.ca> wrote:
Hi Andy,

Looks fine to me. The only problem is that the additions need to be underlined, not bolded, and deletions (if any) need to be crossed out.

Take care,
Travis

---
Travis D. Fridgen BSc, BEd, PhD
Professor and Head
Department of Chemistry
Memorial University
St. John's, NL, A1B 3X7
chemhead@mun.ca
709-864-3470
http://www.chem.mun.ca/zfac/tdf.php?

From: Chris Flinn <cgflinn@mun.ca>
Subject: Science 1807
Date: December 1, 2015 at 10:58:36 AM GMT-3:30
To: "Foster, Andy" <afcster@mun.ca>

Hi Andy,

The Chemistry Undergraduate Studies committee unanimously endorsed the Science 1807 proposal.
Sincerely,

Chris Flinn
Deputy Head, Undergraduate studies
MUN Chemistry Department

Mathematics and Statistics

From: Math Consult <mathconsult@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 19, 2015 at 10:51:08 AM GMT-3:30
To: <adsu@mun.ca>

Hi Andy,

The Department of Mathematics and Statistics has no objection to proposed prerequisite changes.

Regards,
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

Ocean Sciences

From: Annie Mercier <amerclier@mun.ca>
Subject: Re: Fwd: Consultation request for Science 1807 as prerequisite to lab courses
Date: December 1, 2015 at 10:44:04 AM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Hi Andy:
Our department agrees with this proposed change.

All the best,
Annie

Annie Mercier, PhD
Associate Professor
Department of Ocean Sciences
Memorial University (Ocean Sciences Centre)
St. John's, NL, Canada, A1C 5S7
Tel: (709) 864-2011
Email: amerrier@mun.ca
www.mun.ca/osc/amerrier/bio.php

Psychology

From: Psychology Head <psychhead@mun.ca>
Subject: Re: Consultation request for Science 1807 as prerequisite to lab courses
Date: November 18, 2015 at 6:00:09 PM GMT-3:30
To: "Associate Dean of Science (Undergraduate)" <adsu@mun.ca>

Hi Andy,

The Department of Psychology supports this change.

-lan

--
Office of the Head
Psychology Department
Memorial University of Newfoundland
St. John's, NL
Canada
A1B 3X9
Phone: (709) 864-8495
Fax: (709) 864-2430
Email: Psychology.Head@mun.ca
Web: http://www.mun.ca/psychology
To: Dr. Faye Murrin, Dean pro tempore of Graduate Studies
From: Dr. Chris Radford, Head of Department
Subject: Statistics 6530 - Name Change
Date: November 9, 2015

At the last departmental meeting of the department of Mathematics and Statistics, held on Wednesday, November 4, 2015, a motion was passed approving the name change for Statistics 6530 from "Generalized Linear Longitudinal Mixed Models" to "Longitudinal Data Analysis".

The department also approved a re-design and some minimal changes to the context. The new syllabus is attached.

Regards,

Dr. Chris Radford
Head of Department

c.c. Dr. J.C. Loredo-Osti, Graduate Officer
STAT 6530: Longitudinal Data Analysis
--Syllabus

Course Description:

STAT6530 presents modern statistical approaches to the analysis of longitudinal data, i.e., data collected repeatedly on experimental units over time (or other conditions). Topics include linear mixed effects models, generalized linear models for correlated data (including generalized estimating equations), computational issues and methods for fitting models.

Main topics:

1. Introduction to Longitudinal Data Analysis
2. General Linear Models for Longitudinal Data
   • Introduction: Classical methods and their limitations
   • General linear models for longitudinal data
   • Modeling the mean
   • Models for correlation
   • ML and REML estimation
   • EM algorithm
   • General linear mixed-effects model
   • Inference for the random effects: BLUPs
   • Model building and diagnostics
   • Hierarchical (random coefficient) models
3. Generalized Linear Models for Longitudinal Data
   • Marginal models for binary and count data
   • Fixed effect models for binary and count data
   • Random effects models for binary and count data
   • Mixed effects models for binary and count data
   • Transition models
   • Likelihood -based models for categorical data
   • GQL, GEE and GMM estimation
   • Time-dependent covariates

Text books:


Library holdings (QEII):

QE II library holds all these text books, together with an extensive collection on the subject.
7.4 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.

Applied Statistics
6500 Probability (credit restricted with former 6586)
6503 Stochastic Processes
6505 Survival Analysis
6510 Mathematical Statistics
6520 Linear Models
6530 Generalized Linear-Longitudinal-Mixed-Models
6530 Longitudinal Data Analysis
6540 Time Series Analysis
6545 Statistical Computing
6550 Nonparametric Statistics

Changes to the University Calendar (2015-16) regarding the degree of Master of Science

25.18.3 Courses

Statistics
6500 Probability (credit restricted with former 6586)
6503 Stochastic Processes
6505 Survival Analysis
6510 Mathematical Statistics
6520 Linear Models
6530 Generalized Linear-Longitudinal-Mixed-Models
6530 Longitudinal Data Analysis
6540 Time Series Analysis
6545 Statistical Computing
6550 Nonparametric Statistics

Changes to the University Calendar (2015-16) regarding the degree of Doctor of Philosophy, p.694-695

32.25.4 Courses

Statistics
6500 Probability (credit restricted with former 6586)
6503 Stochastic Processes
6505 Survival Analysis
6510 Mathematical Statistics
6520 Linear Models
6530 Generalized Linear-Longitudinal-Mixed-Models
6530 Longitudinal Data Analysis
6540 Time Series Analysis
6545 Statistical Computing
6550 Nonparametric Statistics

Changes to the University Calendar (2015-16) regarding the degree of Doctor of Philosophy, p.694-695
Hello Gail,

the request for name change and review of content for Stat-6530 has been approved by this committee with 12 votes in favour (R Haynes, C Couturier, C Bottaro, SH Curnoe, R Chuenpagdee, SK Cheema, C Walsh, I Booth, K Tahlan, M Rise, JS Wrobleski and myself) none against. Please, turn his request to the consideration of the Council of Faculty of Science.

Thank you in advance,

-j

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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 García Márquez (Love in the time of cholera).