MEETING OF THE FACULTY COUNCIL OF THE FACULTY OF SCIENCE

A regular meeting of the Faculty Council of the Faculty of Science will be held on Wednesday, October 16, 2013, at 1 p.m. in C-2045.

AGENDA

1. Regrets

2. Adoption of the Minutes of September 18, 2013

3. Business Arising from the Minutes

4. Correspondence:
   A. Secretary, Senate Committee on Undergraduate Studies has provided notification of the date for submission of calendar changes for the 2014-2015 academic year, paper 4.A (1 page).
   B. Notifications received of representatives to Faculty of Science Faculty Council, paper 4.B (4 pages):
      Dorothy Vaandering, Faculty of Education
      Anna Hicks, DELTS
      Donna Stapleton, Faculty of Business
      Barun Maity, GSU
      Joe Mersereau, GSU
      Jin-jun Tong, GSU
      Marc McKinnon, GSU
      Balogun Adeniyi, GSU

5. Reports of Standing Committees:
   A. Undergraduate Studies Committees:
      b. Department of Ocean Sciences, proposal for new course, OCSC 4000, Scientific Diving Methods, paper 5.A.b (16 pages).
      c. Department of Mathematics and Statistics, calendar changes, MATH 2330, 4230, and 4300, paper 5.A.c (21 pages).
      d. Response to Senate Committee on Undergraduate Studies, Penalties for Academic Misconduct, paper 5.A.d (3 pages).
   B. Graduate Studies Committee:
      a. Department of Chemistry, calendar change, comprehensive examination, paper 5.B.a (2 pages).
b. Department of Computer Science, calendar changes plus new courses, omnibus package, paper 5.B.b (58 pages).

C. **Nominating Committee:**
a. Approval of committee matrix, paper 5.C.a (2 pages).

D. **Library Committee:** None

6. **Reports of Delegates from Other Councils**

7. **Report of the Dean**

8. **Question Period**

9. **Adjournment**

[Signature]

Mark Abrahams
Dean of Science
FACULTY OF SCIENCE
FACULTY COUNCIL OF SCIENCE
MINUTES OF MEETING OF SEPTEMBER 18, 2013

A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, September 18, 2013, at 1:00 p.m. in room C-2045.

FSC 2193 Present

Biochemistry
Mulligan, M.

Biology
Leroux, S.

Chemistry
Pickup, P.

Computer Science
Banzhaf, W.          Wareham, H.

Earth Sciences
Hanchar, j.

Mathematics & Statistics
Loredo-Osti, J.      Pike, D.      Radford, C.      Sullivan, S.

Ocean Sciences Centre
Fletcher, G.

Physics & Physical Oceanography
Lewis, J.            Morrow, M.

Psychology
Malsbury, C.

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

Geography
Simms, E.
DELF
Hicks, A.

Library
Alcock, E.

Registrar's Office
Burry, J.

Faculty of Business
Stapleton, D.

Undergraduate Students
Grant, D. Kennedy, S. O'Dea, A.

FSC 2194
Regrets
Norm Catto

FSC 2195
Adoption of Minutes
Moved: Minutes of the April 17, 2013, meeting be adopted as circulated (Sullivan/Pike). Carried.

FSC 2196
Business Arising: None

FSC 2197
Correspondence: None

FSC 2198
Reports of Standing Committees:
A. Undergraduate Studies Committee:
   Report presented by Shannon Sullivan, Chair, Undergraduate Studies Committee.
   b. Moved: Response to Senate Committee on Undergraduate Studies, Award of Transfer Credit During a Period of Academic Withdrawal (Sullivan/Morrow). Carried.

B. Graduate Studies Committee:
   Report presented by J.C. Loredo-Osti, Chair, Graduate Studies Committee.
   a. Department of Biochemistry, special topics course, BIOC 6001, Bioinformatics Analysis Techniques, approved by the committee and included for information only.
   b. Department of Earth Sciences, special topics course, EASC 6902, Modern Depositional Environments as the key to
effective facies modelling, approved by the committee and included for information only.

c. Department of Computer Science, special topics course, COMP 6746, Parameterized Complexity Analysis: Foundations and Applications, approved by the committee and included for information only.

d. **Moved:** Department of Chemistry, proposal for new course, CHEM 6156, Analytical method development and sampling (Loredo-Osti/Pickup). **One abstention. Carried.**

e. **Moved:** Department of Computer Science, proposal for new course, COMP 6716, Security and Privacy (Loredo-Osti/Banzhaf). **Carried.**

C. **Nominating Committee:**
Report presented by Andy Foster, Associate Dean (Undergraduate and Administration).

a. **Moved:** Approval of committee matrix (Foster/Sullivan). **Carried.**

D. **Library Committee:**
Report presented by John Lewis, Faculty of Science Representative to Librarians Academic Council.

A brief review was provided of funding challenges for library holdings. Dr. Lewis informed Faculty Council that he is stepping down as the Representative to Librarians' Academic Council.

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**FSC 2199** **Reports of Delegates from Other Councils:** None

**FSC 2200** **Report of the Dean:**
Presented by Dr. Mark Abrahams, Dean.

**Welcome**
The Dean would like to welcome all of you back from what hopefully has been a productive, stimulating, and rejuvenating summer. He would especially like to welcome our new students and new faculty who are joining us for the first time and also thanks all those who volunteered to help with Science orientation.

**Committee Representatives**
With renewal comes change. In the material for this meeting, you should note that we are seeking representation on a variety of committees. The Dean urges you to provide that assistance and in particular he wants to acknowledge the long contributions of Dr. John Lewis to the library committee, who is stepping down this year. This is a particularly critical year for the Library and it is very important
that the Faculty of Science have strong representation on this committee.

New Science Building
For those of you who recall our last meeting, the Dean announced that the university had submitted the functional space planning analysis to the provincial government for the Core Sciences building. The preparation of this document is a critical first step in the planning of the new building, and the next step is the engineering and architectural design phase. Over the summer, preliminary geotechnical work was conducted at the building site, and we anticipate further announcements on this project from the government this fall.

Dean’s Awards Ceremony
The annual Dean’s awards ceremony will be held on Tuesday evening, September 24, in the Bruneau Innovation Centre from 5 to 7 pm. This ceremony celebrates the accomplishments of our staff, faculty and students and all are welcome to attend.

Dean of Science Renewal
Dr. Abrahams’ term as Dean of Science was renewed for a further five-year period. He thanks those that participated in this process and looks forward to continuing to work with you.

FSC 2201  Question Period

FSC 2202  Adjournment:
The meeting adjourned at 1:35 p.m.
16 September 2013

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

FROM: Secretary, Senate Committee on Undergraduate Studies

SUBJECT: Date for Submission of Calendar Changes – 2014-2015

We are writing now to remind you about deadlines for submission of changes for the 2014-2015 University Calendar. In order to meet deadlines for publication, all calendar changes, including changes to existing courses and programs and proposals for new courses and programs must be presented to Senate for approval not later than the February meeting which is scheduled for 11 February 2014. As you know, items must go through a number of levels of approval from faculty/school/campus/institute undergraduate studies committees and academic councils, to Senate Committee on Undergraduate Studies, before being submitted to the Executive Committee of Senate for Senate. This means that submissions intended for next year’s Calendar should be forwarded to your undergraduate studies committees as soon as possible. Meeting times for Senate, the Executive Committee of Senate and the Senate Committee on Undergraduate Studies are as follows and I have indicated the dates by which submissions must be received by the Senate Committee on Undergraduate Studies in order to be included on the Senate Agenda for the February meeting.

Senate: 
Executive Committee of Senate: 
Senate Committee on Undergraduate Studies: 
Meet 11 February 2014
Meet 30 January 2014
Meet 9 January 2014; items to be considered at that meeting must be received by the Secretary of the Committee no later than Tuesday, 17 December 2013, and must be approved without revisions at this meeting. Any calendar changes requiring revisions or further consultation cannot meet publication deadlines.

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

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

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

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

Thank you,

Jennifer Porter
Deputy Registrar (Acting) and Secretary to the Committee

JP/mrn

cc: Chairpersons and Secretaries, Undergraduate Studies Committees

PS: Please forward this memorandum to all staff in your academic unit who are involved in the preparation of calendar changes.
2013-09-13

TO: Secretary, Faculty Council
    Faculty of Science

FROM: Secretary, Faculty Council
      Faculty of Education

SUBJECT: Faculty of Education Representatives

This is to advise that Dr. Dorothy Vaandering will continue to represent the Faculty of Education on the Faculty Council, Faculty of Science, for the 2013-2014 Academic Year.

[Signature]

Bernadette Power
Secretary, Faculty Council
Faculty of Education

cc: Dr. Dorothy Vaandering
FYI

From: Mahon, Paula  
Sent: September-17-13 11:47 AM  
To: Wall, Mary  
Cc: 'anna.hicks@mun.ca'  
Subject: Faculty of Science Faculty Council

Hi Mary,

This is to advise that Dr. Anna Hicks will be DELTS representative on the Faculty of Science Faculty Council for the 2013-2014 academic year.

Anna can be contacted at the email address noted above or by calling extension 4503.

Paula

Paula Mahon  
Assistant to the Director  
Distance Education, Learning and Teaching Support (DELS)  
G.A. Hickman Bldg, Room ED-3000  
Memorial University  
St. John's, NL Canada A1B 3X8  
ISO 9001:2008 Registered

Tel: 709 864-7921  
Fax: 709 864-7941  
pmahon@mun.ca  
www.delts.mun.ca
TO: Secretary, Faculty Council  
Faculty of Science

FROM: Secretary, Faculty Council  
Faculty of Business Administration

DATE: September 18, 2013

SUBJECT: Faculty of Business Administration Representative

This is to advise that Professor Donna Stapleton will represent the Faculty of Business Administration on Faculty Council, Faculty of Science for the 2013 – 2014 Academic year.

Katherine Gallagher
Secretary, Faculty Council  
Faculty of Business Administration
Good morning Dr. Davis,

The following graduate students have volunteered to sit on the Faculty of Science committees. My apologies for the delay.

Barun Maity  
Joe Mersereau  
Jin-jun Tong  
Marc McKinnon  
Balogun Adeniyi  

Geology  
Biology  
Mathematics  
Chemistry  
Biochemistry

barun.maity@mun.ca  
finance@gsunmun.ca  
jtong@mun.ca  
m.mackinnon@mun.ca  
kab034@mun.ca

Kind regards,  
Joey Donnelly  
GSU President  
(709) 770-9371

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October 7, 2013

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes and New Course Proposals

At a meeting held on September 30, 2013, the Undergraduate Studies Committee of the Faculty of Science agreed that the following new course proposals and Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry-proposal for new course, Chemistry 4156: Analytical Method Development and Sampling

2. Department of Ocean Sciences- proposal for new course, OCSC 4000: Scientific Diving Methods

3. Department of Mathematics and Statistics- changes to Calendar description of Mathematics 2330, 4230 and 4300.

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

Approval Form for New Courses or Course Changes

Course Title and Number

CHEM 4156 – Analytical method development and sampling

Abbreviated Course Title

Analytical method development

Calendar Description

CHEM 4156 comprises the development and critical evaluation of analytical methods and sampling protocols for analyses in complex matrices, including those relevant to environmental, medical, food, and forensic sciences.

Rationale

The Department of Chemistry does not currently have a course that formally prepares students for analytical challenges of developing methods for analysis in complex matrices. This course will build upon the instrumental analysis skills developed in CHEM 3110 (Analytical Chemistry II) and provide a comprehensive skill set allowing students to plan methods from sample collection through to instrumental analysis.

Consultations Sought From

1. Marine Institute
2. Grenfell Campus
3. Department of Biochemistry
4. Department of Biology
5. Department of Earth Science
6. Department of Physics and Physical Oceanography
7. Department of Ocean Sciences
8. Department of Psychology
9. Department of Computer Science
9. QEII library

Comments Received

No
Yes
Yes
Yes
No
Yes
No
Yes
Yes

Library Report Received

Yes

Message sent for Consultations:

1
-----Original Message-----
From: Chris Flinn [mailto:cgflinn@mun.ca]
Sent: July-19-13 2:16 PM
To: bdyoung@mun.ca; Carey.Bonnell@mi.mun.ca; math-head@mun.ca;
Campbell, Christine; ineath@mun.ca; jhanchar@mun.ca; Marino, Paul;
pdavis@mun.ca; banzhaf@mun.ca; Alcock, Erin
Subject: new course chem 4156

Hello Colleagues,

Please see the attachment for the proposed new course chem 4156. I would appreciate feedback as soon as possible.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
Department of Chemistry
Memorial University of Newfoundland

Response from Psychology

Hi Chris - Psychology has no objection to creation of this course.
gerard martin
On 2013-07-19, at 2:19 PM, Ian Neath wrote:

<course_proposal_chem4156.docx>

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

Response from Biochemistry:

Chris,
Look like a great course. OK with us.

Phil
Quoting Chris Flinn <cgflinn@mun.ca>:

Hello Colleagues,

Please see the attachment for the proposed new course chem 4156. I would appreciate feedback as soon as possible.

sincerely,

Chris Flinn
Deputy Head, Undergraduate Studies
Department of Chemistry
Memorial University of Newfoundland

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

Response form Grenfell (Dr. Young's reply included):

Hi Chris,

Here are the comments from Grenfell Environmental Science-Chemistry re Chem 4156:

Whether this course is done at the 4th or MSc level, it is good course and many institutions have such a course. There was some concern as to the lack of a laboratory component, however it was pointed out (by Dr. Parkinson) that the norm is not to have a lab component with this type of course at the 4th year or MSc level ...the thinking being that students already do the honours experimental thesis or MSc experimental thesis work and hence have enough lab.

Some of the topics covered in this course are handled in Grenfell courses ENVS 3210 and 3211 for environmental samples and in further depth for aquatic samples in ENVS 4230 (Aquatic Chem 1). Aspects of sample preparation for environmental organic chemical (pesticides, dyes etc.) samples are also touched upon in ENVS 4249 (Environmental Organic).

However, there is not enough overlap between these courses and Chem 4156 to warrant any cross-listing at this time.
Dr. Young's reply:

I am in agreement with respect to the lab portion of the course. Furthermore, many of the advanced techniques I plan to discuss in the course would not be available for a teaching laboratory setting.

Other points:
-i) will the course include in the 'et al.' the usage of derivatization, as well as the use of automation in sampling, preparation and extraction methodologies? The sample handling-sample preparation and -sample extraction sequence is really becoming the weakest link in trace analysis.

A good (though perhaps a little outdated) article is that of: Koester, C. J.; Clement, R. E. Crit. Rev. Anal. Chem. 1993, 24, 263-316. which gives a nice breakdown and comparison of the different stratagies. Of course, this would not include newer techniques like needle trap device (NTD), Dispersive liquid-liquid microextraction (DLLME), and Single drop microextraction (SDME) which now needs to be mentioned.

Dr. Young's reply:

These are some excellent method suggestions. I definitely plan to examine the role of derivitization and cover as many extraction and sample preparation for techniques for all sample phases as time allows. Automation will be touched upon only briefly, as many state-of-the-science techniques that are used for trace analyses are not yet automated.

-ii) could include some specifics concerning sampling and sample preparation to minimise matrix effects (pre-concentration, the use of solid phase microextraction or microwave assisted solvent extraction, Soxhlet extraction etc.).

Dr. Young's reply:

This will certainly be included in the course material in the discussion of matrix effects in condensed phase samples.

Cheers

Dr. Christine Campbell
Head, Division of Science
Grenfell Campus - Memorial Univ. of Newfoundland
Corner Brook, NL Canada A2H 6P9
phone (709) 637-6200, ext 6478 fax (709) 639-8125
ccampbell@grenfell.mun.ca

Response from Physics and Physical Oceanography:
Chris

We have reviewed this new course Chemistry 4156 and think it is interesting and appropriate and support its development. If you need anything more from us, please let me know.

Brad deY

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<course_proposal_chem4156.docx>

Brad deYoung
Professor and Head
Physics and Physical Oceanography
Memorial University
709-864-8738
bdeyoung@mun.ca

Response from Biology:

Hi Chris,
Biology does not have any issues or concerns with the proposed new course Chem 4156.
The only suggestion would be re. the calendar description - Changing it from

Calendar Description

CHEM 4156 comprises the development and critical evaluation of analytical methods and sampling protocols for analyses in complex matrices, including those relevant to environmental, medical, food, and forensic sciences to

Calendar Description

Analytical method development and sampling comprises the development and critical evaluation of analytical methods and sampling protocols for analyses in complex matrices, including those relevant to environmental, medical, food, and forensic sciences

Many thanks
Karen

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

5
Dr Young's Response to Comments from Biology:

I agree that does sound better! However, it is the impression of the Department of Chemistry that calendar descriptions must begin with the course number.

Library Consultation
Collection Development Division
Queen Elizabeth II Library

31 July 2013

To: Chris Flinn, Department of Chemistry
From: Erin Alcock, Science Research Liaison Librarian
Subject: New Course Proposal, Chemistry 4156

Upon review of the new course proposal for Chemistry 4156 – Analytical method development and sampling, I have determined that Memorial University Library system does have sufficient resources to support the objectives of this course.

The MUN Library system holds hundreds of items on the topic of analytical chemistry. The majority of the holding will be found in the QEII library, and a number more closely related to Clinical and Forensic Chemistry at the Health Sciences Library. The journal literature in this area is also well covered by our current subscriptions. Additional materials could easily be accommodated within existing budget allocations for this subject area.

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

Yes/No

Name
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<td>Approval Granted by Senate Committee on Undergraduate Studies</td>
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Proposal for New Course in Advanced Analytical Chemistry

RESOURCE IMPLICATIONS

No additional resources will be needed.

Instructional Costs

No additional costs are anticipated.

Library Holdings and/or Other Resources Required

No additional information resources will be needed.

________________________________________

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

________________________________________

Date:
Proposal for New Course in Advanced Analytical Chemistry

NEW COURSES

CHEM 4156 – Analytical method development and sampling

Resource Implications

None

Executive Summary

We propose to introduce a new 4000 level course in chemistry, Analytical method development and sampling. This course will cover advanced topics in analytical chemistry to prepare students for real-world analytical problems. Topics will include: sampling protocols, trace analysis, instrumentation, quality control, etc. The course will be offered as an option to students in their fourth year of study.

Rationale

The Department of Chemistry does not currently have a course that prepares students for analytical challenges of developing methods for analysis in complex matrices. This course will build upon the instrumental analysis skills developed in CHEM 3110 (Analytical Chemistry II) and provide a comprehensive skill set allowing students to plan methods from sample collection through to instrumental analysis.

Consultations

We sought consultations from the Departments of Biochemistry, Biology, Earth Science, Physics and Physical Oceanography, and Ocean Sciences, as well as the Marine Institute, Grenfell Campus, and the QElI Library.

Course Number and Title

CHEM 4156 – Analytical method development and sampling
Proposal for New Course in Advanced Analytical Chemistry

Abbreviated Course Title

Analytical method development and sampling

Calendar Description

CHEM 4156 comprises the development and critical evaluation of analytical methods and sampling protocols for analyses in complex matrices, including those relevant to environmental, medical, food, and forensic sciences.

PR: CHEM 3110

Course Outline and Method of Evaluation

Instructor: Cora Young
Lectures: 3 hours per week
Required text: None
Course website: http://www.chem.mun.ca/zcourses/4156.php

Course content:

1. Designing an analytical method:
   i. Analyte properties and its relationship to method selection
   ii. Instrumental methods
   iii. Extraction methods
   iv. Sampling methods
      - Sample collection
      - In situ sampling
   v. Quality assurance/quality control:
      - Calibration
      - Blanks
      - Matrix effects
      - Controls and standards
   vi. Standard operating procedures

2. Analysis in complex matrices, including chemistry and techniques relevant to each matrix:
   i. Aqueous
   ii. Soil/sediment/rock
   iii. Biota (including animal, plant, food, and medical examples)
   iv. Atmosphere

3. Case studies and critiques of state-of-the-science analytical methods in:
   i. Forensic science
   ii. Medical science
   iii. Environmental chemistry
Course evaluation:

The final grade will be determined from 4 components:
- Assignments: 25%
- Midterm: 15%
- Term paper: 30%
- Final exam: 30%

Midterms:
There will be one midterm held during class at the regular time.

Assignments:
There will be 2 assignments. Both will involve critiquing analytical methods from the peer-reviewed literature.

Term paper:
There will be a term paper that will require students to design their own method for a given set of analytes in a complex matrix. The students will examine the literature and determine the appropriate sampling method, extraction, analysis, and quality control for their respective analytes and matrix.

Additional Material
None

Texts

There is no required text. Students may wish to consult the following supplementary texts:


Library Holdings and/or Other Resources

The above-mentioned texts are already held either as electronic resources or in hard copy at the Queen Elizabeth II library.

Instructor(s)

Professor Cora Young will be the primary instructor. In our department, Professors Bottaro and Helleur also have the expertise to teach this course.
October 7, 2013

TO: All Members, Faculty Council of Science

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

SUBJECT: Calendar Changes and New Course Proposals

At a meeting held on September 30, 2013, the Undergraduate Studies Committee of the Faculty of Science agreed that the following new course proposals and Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry-proposal for new course, Chemistry 4156: Analytical Method Development and Sampling

2. Department of Ocean Sciences- proposal for new course, OCSC 4000: Scientific Diving Methods

3. Department of Mathematics and Statistics- changes to Calendar description of Mathematics 2330, 4230 and 4300.

Joan Burry
Assistant Registrar and
Secretary: Committee
on Undergraduate Studies,
Faculty of Science
OCSC 4000 - Scientific Diving Methods

Proposal
New Course - OCSC 4000
Scientific Diving Methods

RESOURCE IMPLICATIONS:

This course will use teaching resources currently available in the Department of Ocean Sciences (DOS).

Instructional Costs

Subject to budgetary approval.

Library Holdings and/or Other Resources Required

The costs associated with this new course, including chartering of local bus company for transportation of students and equipment between the Bonne Bay Marine Station (BBMS, course venue) and dive sites, as well as use of boats at the BBMS and miscellaneous equipment for field work, can be met from within the existing budget allocation or authorized new funding for the DOS. Miscellaneous equipment for lab work will be provided by the BBMS. Each student will be expected to have available for the entire course, at his/her own expense, all the necessary diving equipment. Each student will cover his/her own transportation costs between place of residency and the BBMS, as well as room and board at the BBMS for the entire duration of the course.

Signature of Unit Head (if appropriate):

Date:

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

Date:
OCSC 4000 - Scientific Diving Methods

Course Number and Title
OCSC 4000 - Scientific Diving Methods

Abbreviated Course Title
Scientific Diving Methods

Calendar Description

OCSC 4000 Scientific Diving Methods is an in-depth study and application of methods routinely employed for data collection in underwater scientific research. Aspects covered include habitat mapping; installation and use of instrumentation; still and video camera techniques; planning and execution of surveys and experiments in major subtidal habitats; as well as data analysis and interpretation. Participants are trained in accordance with Memorial University of Newfoundland's Guide for Diving Safety and the Canadian Association for Underwater Science (CAUS) standards to meet the criteria for Scientific Diver I rating. This course is normally offered at the Bonne Bay Marine Station in a special 2-week session at the beginning or end of the spring semester depending on station’s availability.

OR: Nationally recognized scuba diver certification with diver rescue and accident management techniques; diver medical examination; current First Aid, CPR, and Rescue Oxygen administration cards; diver's log book with at least 12 dives in the last 12 months including one dive in the last six months and four dives in cold (<10°C) water. This documentation must be provided to the course instructor at least four months before the first day of the course.

PR: BIOL 2122 or BIOL 3709, BIOL 2600, STAT 2550

Secondary Changes (if applicable)
Not applicable

Rationale

Modern scuba diving is routinely employed in academia, government, and industry to conduct a wide range of research and operating activities. These techniques will continue to play a key role in the study of shallow marine ecosystems worldwide, including coral reefs, sea grass beds, and kelp forests, as well as in the development of the ever growing aquaculture industry. The use of scuba diving in support of marine research activities requires a well-trained contingent of scientists and workers capable of integrating and applying concepts from marine sciences at large, including biology, ecology, and oceanography.

The proposed course will appeal to students interested in acquiring and safely applying knowledge about the equipment and methods routinely employed for data collection in underwater scientific research, while developing the skills to properly plan and execute surveys of, and experiments with, marine organisms (seaweeds, invertebrates, and fish). The course will also emphasize the development of skills pertaining to the analysis, interpretation, and
presentation of data in a scientific format. In addition to work towards obtaining credits for their academic programs, students will be trained in accordance with MUN’s Guide for Diving Safety and Canadian Association for Underwater Science (CAUS) standards to meet the criteria for Scientific Diver I rating. These qualifications (course + MUN and CAUS ratings) will make trainees highly attractive to potential employers conducting scientific research. The course will be offered as an elective in the minor in Ocean Sciences and in the minor in Aquaculture and Fisheries at the Department of Ocean Sciences, while being accessible to students in other departments with active programs in marine research and/or aquaculture such as Biology, Physics and Physical Oceanography, Earth Sciences, Geography, and the Marine Institute. The course will be taught as a 2-week summer field course, normally at the Bonne Bay Marine Station therefore enabling students to learn to do research by investigating some of Newfoundland and Labrador’s dominant subtidal habitats, while promoting the use of the station.

In Canada, there are currently only three universities (Dalhousie, UBC and SFU) offering scientific diving training, either as part of their undergraduate curriculum (Dalhousie [BIOL 3680.03: Scientific Diving Methods for Marine Ecology]), graduate curriculum (SFU [BISC 812-3 Marine Research Techniques: Scientific Diving]), or as an extracurricular program to get approval to use scuba diving as a research tool under university auspices (UBC and SFU). There is currently no such course at MUN. The unique nature of the proposed course will help MUN increase its national and international competitiveness and reputation in the training of highly qualified marine scientists. With one faculty with >15 years of experience in the practice of marine ecological research using scuba diving (and an active research program in this area at MUN), the Department of Ocean Sciences is now in a position to offer an integrated course in scientific diving to both undergraduate and graduate students.

**Pre-training requirements:**

The proposed course will not teach students how to dive. The course will teach them how to use diving to do research underwater. Accordingly, all participants will be required to provide the following documentation for examination by the Department of Health and Safety at MUN no later than four months before the first day of the course:

1. Diver certification cards (scuba diver certification with diver rescue and accident management techniques)
2. Diver medical examination (by a licensed physician knowledgeable in diving medicine)
3. Current First Aid, CPR, and Rescue Oxygen Administration cards
4. Diver’s log book with at least 12 dives in the last 12 months (including 1 dive in the last 6 months and 4 dives in cold [<10°C] water)

Note: approvals and certificates provided under points 2 and 3 must be in effect until at least the last day of the course.

Once the documentation from all participants has been received and approved by the Department of Health and Safety, all participants will go through a diving fitness and skills evaluation in a pool environment. This evaluation will follow the rigorous standards established by the Professional Association of Dive Instructors (PADI) or the equivalent. Prospective
students who fail the fitness evaluation will not be allowed to take the course. Those succeeding will further be required to:

1. Read and demonstrate understanding of the MUN Diving Safety Manual.
2. Write an exam about the physics and physiology of diving and use of dive tables (DCIEM).
3. Complete release and waiver forms developed by the Department of Health and Safety.

Equipment:

- Each student will be expected to have available, at his/her own expense, for the entire course, all of the following equipment:

1. Full wet suit (5 mm or greater: pants, jacket, hood, booties and gloves) or dry suit (5 mm or greater: jacket, hood, gloves).
2. Fins, mask and snorkel.
3. Regulator, with submersible pressure gauge and an independent second stage (either a safe second or an integrated system like the AIR 2). The regulator must have been serviced within the last 12 months and must have the overhaul/service receipt submitted. The safe second must also be serviced.
4. Buoyancy compensator device with a power inflator. The BCD must also have been serviced within the last 12 months and must have the overhaul/service receipt submitted.
5. Gauges: compass, depth & air gauge.
6. Computer or timing device (watch).
7. Dive table.
8. Dive knife.
9. SCUBA safety sausage (signalling tube) or other surface signal device.

- Students will be encouraged to use diving cylinders at the BBMS. Those who wish to bring and use their own cylinder(s) may do so, provided it has proper hydrostatic/VIP service tags on it. Air fills will be provided at the BBMS or by local air supplier(s). A limited supply of regulators with the required gauges and buoyancy compensators will be available to use during the course as backup systems.

- Two of the BBMS' boats with outboard motors for transportation of students and equipment between the BBMS and nearest study sites.

- Miscellaneous equipment for field work, including air dredges, lines, buoys, drill, quadrats, transects, and underwater camera systems.

- Miscellaneous equipment for lab work, including identification guides, scopes, and glassware.

Consultations

1. St. John's Campus: All Faculty of Science Departments, Department of Health and Safety, and Director of the Bonne Bay Marine Station
2. Grenfell Campus
3. Marine Institute
OCSC 4000 - Scientific Diving Methods

4. Library

Sample Course Outline and Method of Evaluation

Course outline:

The course will be taught in a two-week field course format, normally at the Bonne Bay Marine Station (BBMS) in early June or late August (depending on station availability) according to the following daily schedule:

08:30-09:30       Lecture
09:30-10:00       Review of exercises and transportation to, and loading of, gear in vehicles
10:00-11:00       Travel to site, unload vehicles
11:00-12:30       Dive 1
12:30-14:00       Surface interval (lunch, data collation, discussion, lecture)
14:00-15:30       Dive 2
15:30-16:00       Post-dive (clean-up, data collation, load vehicles)
16:00-16:30       Travel to BBMS
16:30-18:30       Break (supper)
18:30-19:00       Get gear ready for next day
19:00-21:00       Lab work (analysis of samples, tutorials, readings, report writing, etc)

<table>
<thead>
<tr>
<th>Day (Mon)</th>
<th>Lecture (Days 1 to 8) and Research Project (Days 9 to 13)</th>
<th>Exercise (Field [F], Lab [L])</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. Program Planning: review of dive safety rules + roles of each participant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Specimen collection (seaweeds, invertebrates)</td>
<td>1. Introductory dive (F)</td>
</tr>
<tr>
<td>2</td>
<td>3. Habitat Mapping (barrens, kelp, rhodolith, seagrass)</td>
<td>2. Site survey, collection (F)</td>
</tr>
<tr>
<td>3</td>
<td>5. Measuring Abundance: above water techniques (optical and acoustic remote sensing and acquisition of ground truth data)</td>
<td>4. Sampling benthos: barrens and kelp habitats (F)</td>
</tr>
<tr>
<td></td>
<td>6. Sampling Fish</td>
<td>5. Sorting and identification of specimens - Pt 2 (L)</td>
</tr>
<tr>
<td></td>
<td>8. Animal Movement (including principles of capture-mark-recapture)</td>
<td>7. Sorting and identification of specimens - Pt 3 (L)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Environmental measures - Pt 1 (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Animal movement - Pt 1 (F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Tutorial (HOBOware) + video documentary on special applications (L)</td>
</tr>
</tbody>
</table>
OCSC 4000 - Scientific Diving Methods

5 (Fri)
9. Experimental Designs (overview)
10. Statistical Tests (including but not limited to t-tests, ANOVA, regression)
11. Environmental measures - Pt 2 (F)
12. Animal movement - Pt 2 (F)
13. Tutorials (Excel + Pop tools + Photoshop + Studio) and analysis of environmental data (L)

6 (Sat)
11. Underwater Photography and Videoing
14. Photographic sampling (F)
15. Tutorials (Photoshop + StudioPro) and preparation and analysis of seabed imagery (L)

7 (Sun)
DAY OFF (optional hike at the Gros Morne National Park)

8 (Mon)
12. Skills training
16. Performance tasks (F)
17. Perfection dive on individually selected theme (F)
18. Discussion and assignment of Research Projects (RP) (L)

9 (Tue)
13. RPs: Design and Planning
19. RPs: Planning Report (L)
20. RPs: Dive 1 (F)

10 (Wed)
14. RPs: Execution
21. RPs: Dive 2 (F)
22. RPs: Dive 3 (F)
23. RPs: Execution Report 1 (L)

11 (Thu)
15. RPs: Execution
24. RPs: Dive 4 (F)
25. RPs: Dive 5 (F)
26. RPs: Execution Report 2 (L)

12 (Fri)
16. RPs: Data Compilation and Analysis
27. Preparation of oral presentations of RPs (L)

13 (Sat)
17. Oral presentations of RPs
18. Class Review
19. Final Course Examination
28. CAUS examination
29. Optional night dive

14 (Sun)
Return to MUN St. John’s campus

Evaluation:

Field Exercises 45%
Research Project - Planning and execution 15%
Research Project - Oral presentation 10%
Research Project - Written report 10%
Final course Examination 20%
OCSC 4000 - Scientific Diving Methods

Field Exercises:
Students submit extended dive logs listing accomplished tasks, working conditions, problems encountered and transcribed data sheets (where applicable) after each exercise. Students participate in post-dive discussion and analysis of methods and tasks.

Research Project:
Students design and execute a dive program to address a scientific question drawn from a list generated during post-dive discussions, specified by the instructor, or determined by the student. The written report of the research project component will be prepared and submitted to the course instructor within two weeks after returning from the BBMS.

Final Course Examination:
Students write a comprehensive examination covering all the material seen during the course (lectures, discussions, activities, and project presentations).

CAUS Examination:
The Canadian Association for Underwater Science has established a uniform Standard of Practice for scientific diving operations conducted by member organizations of the CAUS, which includes MUN. This Standard sets down diving practices, which are universally accepted and proven in their use by the scientific community. Each student will be provided with a copy of the CAUS Standard of Practice at the beginning of the course. Students will be responsible for reading and understanding it (with feedback from the course instructor where appropriate) as the course progresses for individual examination (using CAUS formal examination package) on the last day of activities at the BBMS. Failing the CAUS examination will have no impact on a student’s grade for the course.

Texts

Mandatory:


Recommended:


• Additional readings: lecture notes, journal articles, manuals, technical reports and websites

Instructor(s)

Dr. Patrick Gagnon, Department of Ocean Sciences, MUN
OCSC 4000 - Scientific Diving Methods

SUMMARY PAGE FOR SENATE

Approval Form

Course Title and Number: Scientific Diving Methods - OCSC 4000

Abbreviated Course Title: Scientific Diving Methods

Calendar Description: OCSC 4000 Scientific Diving Methods is an in-depth study and application of methods routinely employed for data collection in underwater scientific research. Aspects covered include habitat mapping; installation and use of instrumentation; still and video camera techniques; planning and execution of surveys and experiments in major subtidal habitats; as well as data analysis and interpretation. Participants are trained in accordance with Memorial University of Newfoundland's Guide for Diving Safety and the Canadian Association for Underwater Science (CAUS) standards to meet the criteria for Scientific Diver I rating. This course is normally offered at the Bonne Bay Marine Station in a special 2-week session at the beginning or end of the spring semester depending on station's availability.

OR: Nationally recognized scuba diver certification with diver rescue and accident management techniques; diver medical examination; current First Aid, CPR, and Rescue Oxygen administration cards; diver's log book with at least 12 dives in the last 12 months including one dive in the last six months and four dives in cold (<10°C) water. This documentation must be provided to the course instructor at least four months before the first day of the course.

PR: BIOL 2122 or BIOL 3709, BIOL 2600, STAT 2550

Rationale: Modern scuba diving is routinely employed in academia, government, and industry to conduct a wide range of research and operating activities. These techniques will continue to play a key role in the study of shallow marine ecosystems worldwide, including coral reefs, seaweed beds, and kelp forests, as well as in the development of the ever-growing aquaculture industry. The use of scuba diving in support of marine research activities requires a well-trained contingent of scientists and workers capable of integrating and applying concepts from marine sciences at large, including biology, ecology, and oceanography.

The proposed course will appeal to students interested in acquiring and safely applying knowledge about the equipment and methods routinely employed for data collection in underwater scientific research, while developing the skills to properly plan and execute surveys of, and experiments with, marine organisms (seaweeds, invertebrates, and fish). The course will also emphasize the development of skills pertaining to the analysis, interpretation, and presentation of data in a scientific format. In addition to work towards obtaining credits for their academic programs, students will be trained in accordance with MUN's Guide for Diving Safety and Canadian Association for Underwater Science (CAUS) standards to meet the criteria for Scientific Diver I rating. These qualifications (course + MUN and CAUS ratings) will make trainees highly attractive to potential employers conducting scientific research. The course will be offered as an elective in the minor in Ocean Sciences and in the minor in Aquaculture and Fisheries at the Department of Ocean Sciences, while being accessible to students in other departments with active programs in marine research and/or aquaculture such as Biology,
Physics and Physical Oceanography, Earth Sciences, Geography, and the Marine Institute. The course will be taught as a 2-week summer field course, normally at the Bonne Bay Marine Station therefore enabling students to learn to do research by investigating some of Newfoundland and Labrador's dominant subtidal habitats, while promoting the use of the station.

In Canada, there are currently only three universities (Dalhousie, UBC and SFU) offering scientific diving training, either as part of their undergraduate curriculum (Dalhousie [BIOL 3680.03: Scientific Diving Methods for Marine Ecology]), graduate curriculum (SFU [BISC 812-3 Marine Research Techniques: Scientific Diving]), or as an extracurricular program to get approval to use scuba diving as a research tool under university auspices (UBC and SFU). There is currently no such course at MUN. The unique nature of the proposed course will help MUN increase its national and international competitiveness and reputation in the training of highly qualified marine scientists. With one faculty with >15 years of experience in the practice of marine ecological research using scuba diving (and an active research program in this area at MUN), the Department of Ocean Sciences is now in a position to offer an integrated course in scientific diving to both undergraduate and graduate students.

Consultations Sought From

Comments Received

Provide a consultation list and indicate whether or not comments were received

St. John's Campus:

All Faculty of Science Departments:

Biochemistry
Biology
Chemistry
Computer Science
Earth Sciences
Mathematics and Statistics
Ocean Sciences
Physics and Physical Oceanography
Psychology

Marine Institute:
Department of Health and Safety:

Director of the Bonne Bay Marine Station:
Grenfell Campus:

Library Report Received

Yes

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

Yes/No
OCSC 4000 - Scientific Diving Methods

Name

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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair:

Secretary:

Date:
4 March 2013

To: Garth Fletcher, Department of Ocean Sciences

From: Erin Alcock, Science Research Liaison Librarian

Subject: New Course Proposal, OCSC 4000

Upon review of the new course proposal for OCSC 4000 – Scientific Diving Methods I have determined that Memorial University Library system has sufficient resources to support the objectives of this course.

While the majority of the course work will be completed at the Bonne Bay Marine Station, there will be sufficient material for students to use upon completing their course projects back in St. John’s, at both the Queen Elizabeth II Library and the C.R. Barrett Library and potentially at our Health Sciences Library. Electronic access to course works might be worthy of exploration and could be accommodated under existing budget allocations.
Hi Joan: Just in, the MUN diving safety officer’s response to Patrick’s scientific diving course.

Best regards

Garth

---

Hi Garth, I thought I would forward Tom’s response in the event this can help.

Regards

Pat

---

Hi Tom,

The various departments to which we submitted the course proposal had until 15 February (last Friday) to provide written feedback. It is my understanding that we have not received written feedback from H&S. I will report to my director to the effect that you and I discussed the logistical and safety aspects listed in the course proposal in a meeting we had in January. During that meeting you suggested a few minor changes, which were easily integrated into the version of the proposal that we are about to submit to the Faculty of Science Committee on Undergraduate Studies for consideration. I suppose H&S can comment later in the process.

Regards

Pat
Hi Garth,

Please find attached to this email a copy of the course proposal OCSC-4000 Scientific Diving Methods. This version includes changes I brought to address comments received from those departments that provided feedback during the formal consultation process.

I would like to bring to your attention that during the consultation process I met personally with current Director and Manager of the Bonne Bay Marine Station, Dr. Robert Hooper and Ms. Allison Eaton, to discuss the feasibility and costs of teaching the proposed course at the station. They both agreed that the station and its various resources could accommodate the course according to a schedule that does not interfere with existing courses. They were also able to suggest service providers in the BBMS area that could fill scuba tanks and transport students to those sites requiring ground transportation, which are the only services that the BBMS does not currently offer. I also met with MUN’s Department of Health and Safety’s Diving and Boating Officer, Mr. Thomas MacLaggan, to discuss the safety aspects of the course. The latter suggested a few minor changes to the proposal, which I easily fixed, while indicating that he could not see why H&S would not be able to take responsibility for ensuring that students wishing to attend the course have all the required credentials listed in the proposal.

All the best

Pat

---

Patrick Gagnon, PhD
Assistant Professor
Department of Ocean Sciences
Ocean Sciences Centre
Memorial University of Newfoundland
0, Marine Lab Road
St. John's, NL Canada A1C 5S7

Phone: (709) 864-7663
Fax: (709) 864-3220
Email: pgagnon@mun.ca

Lab website: http://www.ucs.mun.ca/~pgagnon/

Department of Ocean Sciences website: http://www.mun.ca/osc/Home/
To: Brad de Young; Carey.Bonnell@mi.mun.ca; Chris Radford, Math & Stats; Campbell, Christine; Ian Neath; John Hanchar, Earth Sciences; pmarino@mun.ca; Peter Pickup, Chemistry; Phil Davis, Biochemistry; Wolfgang Banzhaf, Computer Science
Subject: New course OCSC 4000

Colleagues: I have attached a proposal for a new undergraduate course on Scientific Diving Methods to be offered by the Department of Ocean Sciences. Could you please review this proposal and return any comments to me by February 15 2013.

Thank you.

Garth

Garth L. Fletcher PhD
Head, Department of Ocean Sciences
Director Ocean Sciences Centre
Memorial University
St John’s NL Canada
A1C 5S7
Tel: 709-864-3276
Fax: 709-864-2159
fletcher@mun.ca

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From: Karen Morris [mailto:morrisk@mun.ca]
Sent: January 31, 2013 10:56 AM
To: Fletcher, Garth
Subject: New course OCSC 4000

Hi Garth,
The Biology Undergraduate Studies Committee reviewed the New Course Proposal for OCSC 4000 Scientific Diving Methods and have no concerns with the proposal as attached. The proposal was discussed initially at our January 22 meeting and Pat revised it based on some feedback from the committee. We reviewed the revised proposal at our meeting on the 29th and feel that this course would be of interest and value to our Marine Biology students as well as some of our Grad students.

Thanks
Karen

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

This should have no impact on course offerings at Grenfell. The occasional student with the pre-reqs and diving certification could possibly take the course as a field course option perhaps.

Dr. Christine Campbell
Head, Division of Science
Grenfell Campus - Memorial Univ. of Newfoundland
Corner Brook, NL Canada A2H 6P9
phone (709) 637-6200, ext 6478 fax (709) 639-8125
ccampbell@grenfell.mun.ca

OCSC 4000 proposal. Responses fro Department Heads

-----Original Message-----
From: pdavis@mun.ca  [mailto:pdavis@mun.ca]
Sent: January 16, 2013 12:59 PM
To: Fletcher, Garth
Subject: Re: New course OCSC 4000

Biochemistry OK with this.

Phil

Quoting "Fletcher, Garth" <fletcher@mun.ca>:

> Colleagues: I have attached a proposal for a new undergraduate course on
> Scientific Diving Methods to be offered by the Department of Ocean
> Sciences. Could you please review this proposal and return any comments
> to me by February 15 2013. >
> Thank you.
>>
> Garth
>>
> Garth L. Fletcher PhD>
> Head, Department of Ocean Sciences>
> Director Ocean Sciences Centre>
> Memorial University>
> St John's NL Canada>
> A1C 5S7>
> Tel: 709-864-3276>
> Fax: 709-864-2159>
> fletcher@mun.ca
>
October 7, 2013

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

At a meeting held on September 30, 2013, the Undergraduate Studies Committee of the Faculty of Science agreed that the following new course proposals and Calendar changes be forwarded to Faculty Council for approval:

1. Department of Chemistry-proposal for new course, Chemistry 4156: Analytical Method Development and Sampling

2. Department of Ocean Sciences- proposal for new course, OCSC 4000: Scientific Diving Methods

3. Department of Mathematics and Statistics- changes to Calendar description of Mathematics 2330, 4230 and 4300.

Joan Burry
Assistant Registrar and Secretary: Committee on Undergraduate Studies, Faculty of Science
Proposal
Calendar Change(s) to Existing Course(s)

Course Number and Title
MATH 2330 Euclidean Geometry

Proposed Change(s) to Calendar Description

2330 Euclidean Geometry is classical Euclidean geometry of the triangle and circle. The inversion- transformation, including the theorem of Feuerbach. Elliptic and hyperbolic geometries. an introduction to Euclidean geometry of the plane. It covers the geometry of triangles and circles, including results such as the Euler line, the nine-point circle and Ceva’s theorem. It also includes straight-edge and compass constructions, isometries of the plane, the three reflections theorem, and inversions on circles.

CR: MATH 3330
PR: MATH 2051 or 2320

Rationale for Change(s)

At its February 2013 meeting, Senate approved the renumbering of Mathematics 3330 as Mathematics 2330 at the St. John’s campus. While there was no change in course content intended to accompany the renumbering, it was subsequently recognised that the course had, in fact, already long since evolved away from its Calendar description. The revised description better reflects the way Mathematics 3330 has been taught for many years, and how Mathematics 2330 will be taught in the future.

Consultations

Grenfell Campus, the Marine Institute, the Faculty of Arts and the Faculty of Education were invited to comment on this proposal.

Responses were received from the Marine Institute and the Faculty of Education indicating their support.

Library Holdings and/or Other Resources Required

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

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

Signature of Unit Head (if appropriate): __________________________________________

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

________________________________________

Date:

________________________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Title and Number
MATH 2330 Euclidean Geometry

Abbreviated Course Title
Euclidean Geometry

Calendar Description Change(s)

2330 Euclidean Geometry is classical Euclidean geometry of the triangle and circle. The inversion-transformation, including the theorem of Feuerbach. Elliptic and hyperbolic geometries, an introduction to Euclidean geometry of the plane. It covers the geometry of triangles and circles, including results such as the Euler line, the nine-point circle and Ceva's theorem. It also includes straight-edge and compass constructions, isometries of the plane, the three reflections theorem, and inversions on circles.

CR: MATH 3330
PR: MATH 2051 or 2320

Rationale

At its February 2013 meeting, Senate approved the renumbering of Mathematics 3330 as Mathematics 2330 at the St. John's campus. While there was no change in course content intended to accompany the renumbering, it was subsequently recognised that the course had, in fact, already long since evolved away from its Calendar description. The revised description better reflects the way Mathematics 3330 has been taught for many years, and how Mathematics 2330 will be taught in the future.

Consultations Sought From

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

Comments Received

No
Yes
No
Yes

Library Report Received

Yes

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

Yes/No

Name
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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair: ________________________________

Secretary: ____________________________

Date: ________________________________
Proposal

Calendar Change(s) to Existing Course(s)

Course Number and Title

MATH 4230 Differential Geometry

Proposed Change(s) to Calendar Description

4230 Differential Geometry covers theory of curves, Frenet relations, curvature and torsion, singular points of curves, first and second quadratic forms, classification of points on a surface, Gaussian curvature, Gauss-Weingarten theorem, Christoffel's symbols, theorema Egregium, Gauss-Cadazzi-Mainardi theorem, internal geometry of surfaces, isometric and conformal mappings, geodesic curvature and torsion, parallel displacement, Gauss-Bonnet theorem. both classical and modern differential geometry. It begins with the classical theory of curves and surfaces, including the Frenet-Serret relations, the fundamental theorem of space curves, curves on surfaces, the metric, the extrinsic curvature operator and Gaussian curvature. The modern section studies differentiable manifolds, tangent vectors as directional derivatives, one-forms and other tensors, the metric tensor, geodesics, connections and parallel transport, Riemann curvature and the Gauss-Codazzi equations.

PR: MATH 3202

Rationale for Change(s)

The revised description better reflects current course content.

Consultations

Forthcoming.

Library Holdings and/or Other Resources Required

Forthcoming.

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

Signature of Unit Head (if appropriate):

Date:

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

Date:
SUMMARY PAGE FOR SENATE

Approval Form

Course Title and Number

MATH 4230 Differential Geometry

Abbreviated Course Title

Differential Geometry

Calendar Description Change(s)

4230 Differential Geometry covers theory of curves, Frenet relations, curvature and torsion, singular points of curves, first and second quadratic forms, classification of points on a surface, Gaussian curvature, Gauss-Weingarten theorem, Christoffel's symbols, theorema Egregium, Gauss-Cadazzi-Mainardi theorem, internal geometry of surfaces, isometric and conformal mappings, geodesic curvature and torsion, parallel displacement, Gauss-Bonnet theorem, both classical and modern differential geometry. It begins with the classical theory of curves and surfaces, including the Frenet-Serret relations, the fundamental theorem of space curves, curves on surfaces, the metric, the extrinsic curvature operator and Gaussian curvature. The modern section studies differentiable manifolds, tangent vectors as directional derivatives, one-forms and other tensors, the metric tensor, geodesics, connections and parallel transport, Riemann curvature and the Gauss-Codazzi equations.

PR: MATH 3202

Rationale

The revised description better reflects current course content.

Consultations Sought From

1. Grenfell Campus
2. Marine Institute
3. Faculty of Arts
4. Department of Physics and Physical Oceanography

Comments Received

1. No
2. Yes
3. No
4. Yes

Library Report Received

Yes

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

Yes/No

Name
Proposal
Calendar Change(s) to Existing Course(s)

Course Number and Title

MATH 4300 General Topology

Proposed Change(s) to Calendar Description

4300 General Topology examines topological structure on a set, neighbourhood, open and closed sets, continuity, subspaces and quotient spaces, connectedness, relation between topologies, base and subbase, product spaces, applications to Euclidean spaces. Hausdorff, regular, normal and compact spaces, metric spaces, compacta and continua, metrizability. is an introduction to point-set topology, centering around the notions of the topological space and the continuous function. Topological properties such as Hausdorff, compactness, connectedness, normality, regularity and path-connectedness are examined, as are Urysohn's metrization theorem and the Tychonoff theorem.

PR: MATH 3300 or both MATH 3000 and 3303

Rationale for Change(s)

The revised description better reflects current course content.

Consultations

Forthcoming.

Library Holdings and/or Other Resources Required

Forthcoming.

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

Signature of Unit Head (if appropriate): ____________________________

Date: ____________________________

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

Date: ____________________________
SUMMARY PAGE FOR SENATE

Approval Form

Course Title and Number

MATH 4300 General Topology

Abbreviated Course Title

General Topology

Calendar Description Change(s)

4300 General Topology examines topological structure on a set, neighbourhood, open and closed sets, continuity, subspaces and quotient spaces, connectedness, relation between topologies, base and sub-base, product spaces, applications to Euclidean spaces. Hausdorff, regular, normal and compact spaces, metric spaces, compacta and continua, metrizability. Is an introduction to point-set topology, centering around the notions of the topological space and the continuous function. Topological properties such as Hausdorff, compactness, connectedness, normality, regularity and path-connectedness are examined, as are Urysohn's metrization theorem and the Tychonoff theorem.

PR: MATH 3300 or both MATH 3000 and 3303

Rationale

The revised description better reflects current course content.

Consultations Sought From

Consultations Sought From | Comments Received
--- | ---
1. Grenfell Campus | No
2. Marine Institute | Yes
3. Faculty of Arts | No

Library Report Received

Yes

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

Yes/No

Name
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APPROVAL GRANTED BY SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Chair: ____________________________________________

Secretary: _________________________________________

Date: ______________________________________________
Hi Dianne,

Attached are proposals to amend the Calendar descriptions of Mathematics 2330, 4230 and 4300.

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

Thanks,
Shannon

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

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Attachments:

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<td>Math 4300.pdf</td>
<td>18.6</td>
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</tbody>
</table>
26 April 2013

TO: Dr. Shannon Sullivan, Senior Faculty Advisor, Dept. of Mathematics & Statistics
FROM: Dianne Taylor-Harding, Collections Development Librarian, Mathematics & Statistics

SUBJECT: Library Resources Review –
Proposed Calendar Changes for Mathematics courses offered by the Department of Mathematics and Statistics

The Department of Mathematics and Statistics has proposed several calendar changes.

A. MATH2330 Euclidean Geometry – Mathematics 2330 is a renumbered version of Mathematics 3330. The course provides "an introduction to Euclidean geometry of the plane. It covers the geometry of triangles and circles, including results such as the Euler line, the nine-point circle and Ceva’s theorem. It also includes straight-edge and compass constructions, isometries of the plane, the three reflections theorem, and inversions on circles." This "revised description better reflects the way Mathematics 3330 has been taught for many years, and how Mathematics 2330 will be taught in the future."

B. MATH4230 Differential Geometry will cover "both classical and modern differential geometry. It begins with the classical theory of curves and surfaces, including the Frenet-Serret relations, the fundamental theorem of space curves, curves on surfaces, the metric, the extrinsic curvature operator and Gaussian curvature. The modern section studies differentiable manifolds, tangent vectors as directional derivatives, one-forms and other tensors, the metric tensor, geodesics, connections and parallel transport, Riemann curvature and the Gauss-Codazzi equations." The revised description better reflects current course content.

C. MATH4300 4300 General Topology will introduce "point-set topology, centering around the notions of the topological space and the continuous function. Topological properties such as Hausdorff, compactness, connectedness, normality, regularity and path-connectedness are
examined, as are Urysohn’s metrization theorem and the Tychonoff theorem.” The revised description better reflects current course content.

The calendar changes in these proposals will have no impact on collections activities in the Queen Elizabeth II Library.

The Memorial University Libraries will continue to collect materials covering Mathematics and Statistics to support undergraduate, graduate and faculty research and study at the University.

D. E. Taylor-Harding
Dianne E. Taylor-Harding
Collections Librarian, Mathematics & Statistics
Subject: Request for Consultation: Mathematics 2330, 4230, 4300  
From: Shannon Patrick Sullivan <shannon@mun.ca>  
Date: 15/04/2013 1:02 PM  
To: vpoffice@grenfell.mun.ca, miugconsultations@mi.mun.ca

Greetings,

Attached are proposals to amend the Calendar descriptions of Mathematics 2330, 4230 and 4300.

If you have any comments on these proposals, we would appreciate receiving your responses no later than Monday, May 13th.

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

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<td>Math 4300.pdf</td>
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</table>
Subject: Request for Consultation: Mathematics 2330, 4230, 4300
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 15/04/2013 1:05 PM
To: amarland@mun.ca, efoley@mun.ca

Greetings,

Attached are proposals to amend the Calendar descriptions of Mathematics 2330, 4230 and 4300.

Please circulate these proposals amongst the Faculty of Arts. We have requested that other relevant academic units respond to us with their comments no later than Monday, May 13th. I will forward these comments to you after May 13th so that the proposals can be considered by the Arts Undergraduate Studies Committee.

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.ufs.mun.ca/~shannon

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</table>
Subject: Request for Consultation: Mathematics 2330
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 15/04/2013 1:10 PM
To: kirk.anderson@mun.ca
CC: ggalway@mun.ca, jmellor@mun.ca

Greetings,

Attached is a proposal to amend the Calendar description of Mathematics 2330.

If you have any comments on this proposal, we would appreciate receiving your response no later than Monday, May 13th.

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

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Attachments:

Math 2330.pdf

19.4 kB
Subject: RE: Request for Consultation: Mathematics 2330, 4230, 4300
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Date: 06/05/2013 12:57 PM
To: Shannon Patrick Sullivan <shannon@mun.ca>
CC: Charlene Walsh <Charlene.Walsh@mi.mun.ca>

Thank you for the opportunity to review the request for consultation: Mathematics 2330, 4230, 4300. These changes have no impact on our programs.

We are happy to support the proposed changes.

Sincerely,
Charlene

Charlene Walsh
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0784
FAX: 709-778-0394
Charlene.Walsh@mi.mun.ca

-----Original Message-----
From: Shannon Patrick Sullivan [mailto:shannon@mun.ca]
Sent: April 15, 2013 1:02 PM
To: vpoffice@grenfell.mun.ca; MIUG Consultations
Subject: Request for Consultation: Mathematics 2330, 4230, 4300

Greetings,

Attached are proposals to amend the Calendar descriptions of Mathematics 2330, 4230 and 4300.

If you have any comments on these proposals, we would appreciate receiving your responses no later than Monday, May 13th.

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.ucl.mun.ca/~shannon

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This email is governed by the Terms and Conditions found in our Disclaimer<http://www.mi.mun.ca/ict/disclaimer>.
Subject: Request for Consultation: Mathematics 4230
From: Shannon Patrick Sullivan <shannon@mun.ca>
Date: 15/04/2013 1:11 PM
To: bdeyoung@mun.ca

Greetings,

Attached is a proposal to amend the Calendar description of Mathematics 4230.

If you have any comments on this proposal, we would appreciate receiving your response no later than Monday, May 13th.

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.uics.mun.ca/~shannon

Attachments:

Math 4230.pdf 19.4 kB
Subject: RE: Request for Consultation: Mathematics 2330, 4230, 4300
From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Date: 06/05/2013 12:57 PM
To: Shannon Patrick Sullivan <shannon@mun.ca>
CC: Charlene Walsh <Charlene.Walsh@mi.mun.ca>

Thank you for the opportunity to review the request for consultation: Mathematics 2330, 4230, 4300. These changes have no impact on our programs.

We are happy to support the proposed changes.

Sincerely,
Charlene

Charlene Walsh
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0784
FAX: 709-778-0394
Charlene.Walsh@mi.mun.ca

-----Original Message-----
From: Shannon Patrick Sullivan [mailto:shannon@mun.ca]
Sent: April 15, 2013 1:02 PM
To: vpoffice@grenfell.mun.ca; MIUG Consultations
Subject: Request for Consultation: Mathematics 2330, 4230, 4300

Greetings,

Attached are proposals to amend the Calendar descriptions of Mathematics 2330, 4230 and 4300.

If you have any comments on these proposals, we would appreciate receiving your responses no later than Monday, May 13th.

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

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This email is governed by the Terms and Conditions found in our Disclaimer<http://www.mi.mun.ca/ict/disclaimer>.
Subject: Re: Request for Consultation: Mathematics 4230
From: Brad deYoung <bdeyoung@mun.ca>
Date: 15/04/2013 2:58 PM
To: Shannon Patrick Sullivan <shannon@mun.ca>

Shannon

Thank for the opportunity to comment on the proposed changes to M4230.

I have looked at the proposed revised description of M3230 and think that it seems quite reasonable. It remains an interesting and useful course, one that our students often take. The revised description remains supportive of the course title.

Brad

On 2013-04-15, at 1:11 PM, Shannon Patrick Sullivan wrote:

<Math 4230.pdf>

Brad deYoung
Professor and Head
Physics and Physical Oceanography
Memorial University
709-864-8738
bdeyoung@mun.ca

This electronic communication is governed by the terms and conditions at http://www.mun.ca/cc/policies/electronic_communications_disclaimer_2012.php
October 4, 2013

TO:                   All Members, Faculty Council of Science
FROM:                 Joan Burry, Secretary
                      Committee on Undergraduate Studies, Faculty of Science
SUBJECT:              Response to Senate Committee on Undergraduate Studies re Penalties for Academic Misconduct

At a meeting held on September 30, 2013, the Undergraduate Studies Committee of the Faculty of Science (the Committee) discussed the recommendations put forth by the Senate Sub-Committee on Penalties for Academic Misconduct. Following each suggestion is the recommended response from the Faculty of Science.

1. **Develop a non-credit instructional module that would be mandatory remedial work for all students found guilty of academic misconduct.**
   
   There was not much support for this recommendation; it was felt that a pro-active approach would be more beneficial. The Committee recommends that an online module course, similar to Safety 1000, be developed and required of all registered students in their first semester. This course would clearly outline what constitutes plagiarism, other examples of academic misconduct and resulting penalties.

2. **It is recommended that there be no limit on the length of the probation period stated in Academic Regulation 5.11.6.4 for those found guilty of academic misconduct.**
   
   There was no agreement on this proposal. Some units felt that it would be unduly severe to punish a student for the duration of his/her career for an offence committed in the first semester.

3. **Modify the existing penalties so that every student found guilty of academic misconduct by the Senate Committee on Undergraduate Studies receives a minimum period of probation.**
   
   There was no agreement on this proposal; some units felt that not all offences warrant probation and that the Senate Committee on Undergraduate Studies should retain discretion in assigning penalties.

4. **Through a communications plan, encourage all academic units to report situations of academic misconduct to the Office of the Registrar as per General Regulation 5.11.5.2 #7.**
   
   The Committee supports this proposal.

5. **Add the following to the list of academic offences in General Academic Regulation 5.11.4:**
   
   a. Attempt of bribery, and/or threat of blackmail to influence the award of any credit, grade, honour or academic decision

   b. Prevention or obstruction of access to works or materials needed by others for academic purposes

   The Committee supports these amendments to the regulation.

Joan Burry
Assistant Registrar and
Secretary, Committee
on Undergraduate Studies,
TO: Secretaries, Academic Councils, Faculties and Schools
FROM: Jennifer Porter, Secretary, Senate Committee on Undergraduate Studies
SUBJECT: Senate Committee on Undergraduate Studies Sub-Committee to Conduct a Review of Penalties for Academic Misconduct

10 June 2013

In early 2012 the Senate Committee on Undergraduate Studies established a sub-committee to review the calendar sections specific to penalties on academic misconduct.

The incident which led to the establishment of the sub-committee was a student who received a grade of zero in a course, without probation or suspension, due to academic misconduct. As a result of this zero grade, the student’s average (both current and cumulative) did not meet the University’s continued regulations and the student was required to withdraw. This was a consequence which was not necessarily intended by the original punishment. The mandate of the sub-committee was to evaluate the penalties for academic misconduct and determine if revision was required.

The sub-committee undertook a review of 5.11.6.4 Penalties in the Case of Resolution by the Senate Committee on Undergraduate Studies and compiled information on the academic penalties applied by other Canadian and American academic institutions. Overall, the sub-committee was interested in looking at ways that other universities deterred students from committing academic misconduct and penalized those students who were found guilty of academic misconduct. Several themes emerged from the sub-committee’s discussions and review of the compiled information:

- There is a need for better communication with faculty regarding the procedures for an allegation of academic misconduct made against a student and the importance of adhering to these procedures.
- There is a need to deter students from becoming repeat offenders possibly through the introduction of remedial work.
- There is a potential to use a transcript notation as an effective measure to prevent academic misconduct.

These themes guided the sub-committee’s recommendations. A final report was reviewed by Senate Committee on Undergraduate Studies at its April 11 meeting. The report, along with its recommendations, was supported in principle by the Committee and it requested that consultation be undertaken with Academic Councils. In this regard, I am now writing to seek the advice and feedback of Academic Councils of Faculties and Schools with respect to the attached recommendations. The Committee has asked that Councils respond by the end of October 2013.

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

Yours truly,

Jennifer Porter
Deputy Registrar (Acting) and
Secretary to the Committee

JMP/mmn
Attachment

cc Committees on Undergraduate Studies
Please indicate whether or not your Academic Council supports each of the following recommendations and outline any questions or concerns your Council may have.

Recommendations of the Sub-Committee on Penalties for Academic Misconduct

1. Develop a non-credit instructional module that would be mandatory remedial work for all students found guilty of academic misconduct.

2. Presently the period of probation determined by Senate Committee on Undergraduate Studies shall not exceed six semesters; the period of probation is noted on the student transcript and removed entirely upon the expiration of the penalty. It is recommended that there be no limit on the length of the probation period stated in Academic Regulation 5.11.6.4 for those found guilty of academic misconduct.

3. Modify the existing penalties so that every student found guilty of academic misconduct by the Senate Committee on Undergraduate Studies receives a minimum period of probation.

4. Through a communications plan, encourage all academic units to report situations of academic misconduct to the Office of the Registrar as per General Academic Regulation 5.11.5.2 #7.

5. Add the following actions to the list of academic offences in General Academic Regulation 5.11.4:
   a. Attempt of bribery, and/or threat of blackmail to influence the award of any credit, grade, honour or academic decision.
   b. Prevention or obstruction of access to works or materials needed by others for academic purposes.
Gail,
this changes have been approved 9 votes in favour, none against.

-j

On 09/30/2013 11:47 AM, Kenny, Gail wrote:
> Hi JC,
> 
> > For discussion/approval by the Graduate Studies committee.
> > >
> > Gail
> > >
> > From: Graham Bodwell [mailto:gbowdwell@mun.ca]
> > Sent: September-26-13 3:48 PM
> > To: Kenny, Gail
> > Subject: Proposed Calendar Change
> > >
> > Hi Gail,
> > >
> > > Attached is a proposed calendar change for the comprehensive
> > examination in chemistry. Please send this to the Faculty of Science
> > > .
> > >
> > Thanks,
> > >
> > Graham
> > >
Proposed New Calendar Entry for Comprehensive Exams in Analytical, Inorganic and Physical Chemistry

30.5.1 Program of Study

6. Candidates must pass a comprehensive examination, as described in the General Regulations, according to one of the following descriptions:

a. A 3 hour written part covering topics in Organic Chemistry, and, subsequent to the written examination at the discretion of the comprehensive examination committee, an oral exam designed to explore areas of perceived deficiency.

b. A 1.5 hour written part covering topics in Inorganic Chemistry, and, subsequent to the written exam, an oral examination designed to further explore areas of Inorganic Chemistry.

c. A paper on a research topic selected by the student in consultation with his/her supervisor and the examination committee, and subsequently, an oral examination designed to explore general areas of Analytical, Inorganic and/or Physical Chemistry and areas of chemistry related to the research topic.

Justification

Several years ago, there was a single format for the comprehensive examination in chemistry. Following much discussion within the Department of Chemistry, it was decided that each of areas of chemistry (analytical, inorganic, organic and physical) should be able to determine a format for the comprehensive exam that was most appropriate to that sub-discipline. Accordingly, calendar changes were proposed and then approved. During the past few years in which the new regulations have been in place, the inorganic chemistry faculty members have come to the conclusion that they would prefer to administer their comprehensive examinations according to the format currently in place for those in the areas of analytical and physical chemistry. The proposed calendar change reflects these wishes and unites three of the four areas of chemistry.
Hello Gail,

So far, for the omnibus package of changes (calendar changes plus courses) from CS, 6 votes in favour none against.

-j

On 10/08/2013 09:41 AM, Kenny, Gail wrote:
> Hi JC,
> 
> Here are the calendar changes noted in the calendar pages as you requested.
> 
> Gail
>
> -----Original Message-----
> From: R. Edwards [mailto:redwards@mun.ca]
> Sent: October-07-13 10:30 AM
> To: Kenny, Gail
> Subject: Re: FW: Calendar Changes - Computer Science
> 
> Gail,
>
> Attached are the calendar changes (by section) and an updated page for COMP-6913. Just let me know if anything else is needed.
> 
> Thanks,
> Regina
>
> -----
> Contact Person: Regina Edwards | Secretary to Department Head
> Email: redwards@mun.ca | Department of Computer Science
> Phone: (709) 864-8652 | Memorial University of Newfoundland
> Fax: (709) 864-2009 | St. John's, NL Canada A1B 3X5
> -----
> Confidentiality Notice: This communication is intended for use of the recipient to whom it is addressed, and may contain confidential, personal, and/or privileged information. Please contact us immediately if you are not the intended recipient of this communication, and do not
October 2, 2013

TO: Graduate Studies Committee,
    Faculty of Science

FROM: Wolfgang Banzhaf, Department Head
      Department of Computer Science

SUBJECT: Calendar Changes to Graduate Programs in Computer Science

Enclosed please find calendar changes for our graduate course offerings. These revisions are proposed in response to the growth of our graduate programs in recent years.

The enclosed proposals have been recommended by our departmental Graduate Studies Committee. The courses are new or revised from offerings in the past.

The proposals were approved at our departmental meetings between April 25 and September 25, 2013.

Proposed courses include:

COMP-6901: Applied Algorithms
COMP-6902: Computational Complexity
COMP-6903: Concurrent Computing
COMP-6904: Advanced Computer Architecture
COMP-6907: Introduction to Data Mining
COMP-6908: Database Technology and Application
COMP-6910: Services Computing, Semantic Web and Cloud Computing
COMP-6911: Bio-inspired Computing
COMP-6912: Autonomous Robotics
COMP-6913: Bioinformatics
COMP-6915: Machine Learning
COMP-6922: Compiling Methods
COMP-6923: Semantics of Programming Languages
COMP-6925: Advanced Operating Systems
COMP-6926: Performance Evaluation of Computer Systems
Courses to be removed:

COMP-6711 Syntax and Semantics of Programming Languages
COMP-6712 Compiling Techniques
COMP-6714 Functional Programming
COMP-6715 Logic Programming
COMP-6716 Concurrent Programming
COMP-6718-6719 Special Topics in Programming Languages
COMP-6720 Distributed and Parallel Computing
COMP-6721 Operating Systems Design
COMP-6722 Advanced Computer Architectures
COMP-6723 Microprocessor Systems
COMP-6724 VLSI Design
COMP-6725 Computational Aspects of VLSI
COMP-6726 Modelling and Analysis of Computing Systems
COMP-6727 Introduction to High Performance Computer Systems
COMP-6728-6729 Special Topics in Computer Systems - Computer Networks
COMP-6741 Advanced Automata Theory
COMP-6743 Complexity of Computational Problems
COMP-6748-6749 Special Topics in Theoretical Computer Science
COMP-6751 Database Technology and Information Retrieval
COMP-6753 Artificial Intelligence
COMP-6754 Post-Genomic Computational Biology
COMP-6783 Applied Algorithms

Courses remaining include:

601W Work Term
6713 Software Engineering
6731 Topics in Numerical Methods
6732 Matrix Computations
6738-6739 Special Topics in Numerical Methods
6742 Theory of Databases
6745 Special Topics - Advance Computational Geometry
6746: Parameterized Complexity Analysis: Foundations and Applications
6752 Applications of Computer Graphics
6755 Knowledge-based Systems
6756 Digital Image Processing
6758-6769 Special Topics in Computer Applications
6770-6790 Special Topics in Computer Science
6999 Master's Project
Graduate Studies Committee, Faculty of Science
Page 3
October 2, 2013

Should you have any questions, please do not hesitate to contact me.

Wolfgang Banzhaf

/re
Enclosures
Request for Approval of a Graduate Course

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

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

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

Course No.: COMP 6901  (credit restricted with old COMP 6783)

Course Title: Applied Algorithms

I. To be completed for all requests:

A. Course Type:
   ☑ Lecture course
   ☐ Laboratory course
   ☐ Directed readings
   ☐ Lecture course with laboratory
   ☐ Undergraduate course
   ☐ Other (please specify) Project

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

C. Will this course require new funding (including Payment of instructor, labs, equipment, etc.)?
   If yes, please specify:
   ☑ Yes   ☐ No

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   See last page

G. Method of evaluation:

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<tr>
<td>Project</td>
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<tr>
<td>Final examination</td>
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Total 100

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

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

Instructor's initials

1. duplication of thesis work

2. double credit

3. work that is a faculty research product

4. overlap with existing courses

Recommended for offering in the □ Fall □ Winter □ Spring 20□

Length of session if less than a semester:

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

[Signature]
Course instructor

[Signature]
Approval of the head of the academic unit

Nov 26, 2012
Date

Nov 26, 2012
Date

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

[Signature]
Secretary, Faculty/School/Council

Date

Updated October 2011
Course Objectives:
Design and analysis of algorithms is a foundation of Computer Science, and algorithms play an essential role in many related fields. This course aims to consolidate and advance student knowledge of algorithms, by presenting both traditional and contemporary algorithm design paradigms (backtracking, greedy, dynamic programming, divide-and-conquer, randomized, parallel/multithreaded and approximation algorithms). A significant part of the course will be devoted to in-depth exploration of some algorithms in real-world application areas; in particular, text searching/pattern matching, and graph algorithms will be covered.

Prerequisites:
Knowledge in Algorithms and Complexity. (credit restricted with old COMP 6783)

Evaluation:
Assignments                                30%
Examination                                30%
Project                                    40% (with 10% presentation)

Course Outline:
1. Introduction and Stable matching problem. (1 week)
2. Greedy algorithms (with applications to scheduling, graph algorithms and others). (1 week)
3. String matching algorithms (with applications to text processing and bioinformatics) (1 week)
4. Dynamic programming (with applications to bioinformatics and path planning) (2 weeks)
5. Network flow algorithms (applications to optimization problems from various domains) (1 week)
6. Fast Fourier Transform (with applications to Engineering). (1 week)
7. Probability and Random Algorithms (with applications to Computational Geometry, etc). (1 week)
8. Selection of algorithms and applications at the discretion of the instructor (such as Cryptography, Data Compression, approximation and heuristic algorithms) (3 weeks)
9. Algorithms from term projects. (1 week)

Reference Books:
1. Algorithm design.
   Jon Kleinberg and Eva Tardos. Addison-Wesley, 2005.
2. Introduction to Algorithms.
3. Research papers.
Request for Approval of a Graduate Course

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

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

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

Course No.: COMP 6902
Course Title: Computational complexity

I. To be completed for all requests:

A. Course Type:
   ✔ Lecture course
   ✔ Laboratory course
   ✔ Directed readings
   □ Lecture course with laboratory
   □ Undergraduate course¹
   □ Other (please specify) project

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

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

If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 48

F. Course description (reading list required):
   See last page

G. Method of evaluation:

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

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

Instructor's initials

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

Recommended for offering in the □Fall □Winter □Spring

Length of session if less than a semester:

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

Course instructor

Approval of the head of the academic unit

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6902

Computational complexity

Course objectives / description

The goal of this course is to help students develop an intuitive feel for hardness of computational problems, and an ability to prove that intuition. What does it mean that a given problem is "hard"? In which sense is it "hard": is it memory-intensive, computation-intensive; how are these notions related? What problems are unsolvable, and in which models of computation? How expressive are various languages used in databases and AI, and what does it mean computationally? These are some of the questions we will explore in this course.

In particular, we will cover computability and undecidability, classical P vs. NP problem (is checking a solution easier than finding a solution? Nobody knows!), as well as a selection of topics on higher complexity classes, space classes, counting classes, randomized and circuit complexity, descriptive and proof complexity. Time permitting, we will cover a range of advanced topics such as PCP theorem, natural proofs (why it is hard to resolve the P vs. NP question), hardness of approximation, etc.

Course outline (topics will be chosen from the following list)

- Turing machines and computability, undecidability, recursion theorem
- NP-completeness and P vs. NP problem; polynomial time hierarchy, #P.
- Space complexity classes (Savitch theorem, NL=coNL)
- Boolean circuit complexity and non-uniform complexity classes; lower bounds for Parity
- Randomized complexity classes; quantum computation
- Pseudorandomness and cryptography (one-way functions, zero-knowledge, etc)
- Descriptive and proof complexity
- Hardness of approximation and PCP theorem; Interactive proofs.
- Parameterized complexity
- Barrier results (relativization, natural proofs)
- Other relevant subjects in the area of expertise of the instructor.

Prerequisites / background required

Knowledge of basic models of computation and basic computability and complexity (equivalent to COMP 3719), as well as algorithms (COMP 2711). Good background in discrete mathematics.

Evaluation

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References / reading list

- A selection of papers and additional sources at instructor's discretion.
Request for Approval of a Graduate Course

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

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

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

Course No.: COMP 6903
Course Title: Concurrent computing

I. To be completed for all requests:

A. Course Type: ☑ Lecture course ☐ Lecture course with laboratory
☐ Laboratory course ☐ Undergraduate course
☐ Directed readings ☐ Other (please specify)

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

C. Will this course require new funding (including
Payment of instructor, labs, equipment, etc.)? ☐ Yes ☑ No
If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
see the attachment

G. Method of evaluation:

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

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

Instructor's initials

1. duplication of thesis work
   ______________________

2. double credit
   ______________________

3. work that is a faculty research product
   ______________________

4. overlap with existing courses
   ______________________

Recommended for offering in the
   □ Fall  □ Winter  □ Spring  20

Length of session if less than a semester:

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

W.M. Zulawski  April 20, 2013.

Course instructor

Mr. Paisley  Oct 2, 2013

Approval of the head of the academic unit

Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6903: Concurrent computing

Objectives: This course explores challenges in designing concurrent programs, i.e., ensuring correct sequencing of interactions or communications among different components of a computing system as well as coordinating accesses to resources that are shared by these components. Concurrent programs can be implemented as collections of (communicating) processes or as sets of threads within a single process.

Required background: Practical knowledge of programming in a high-level language as well as basic understanding of computer architecture and operating systems are required.

Evaluation:
- Assignments 25 %
- Project 25 %
- Final examination 50 %

Outline:
- concurrent interaction and communications
  - shared-memory interactions
  - message-passing communications
- mutual exclusion mechanisms
  - spin-lock mechanisms
  - Dekker’s algorithm, Peterson algorithm, Lamport’s algorithm
  - Dijkstra’s semaphores
  - Brinch-Hansen’s monitors
  - barrier synchronization
- models of concurrency
  - process algebras (calculus of communicating systems, CCS; communicating sequential processes, CSP; pi calculus)
  - place/transition Petri nets, high-level Petri nets
  - actor systems
- concurrent programming and concurrency-oriented languages

References:
Request for Approval of a Graduate Course

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

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

Course No.: COMP 6904
Course Title: Advanced computer architecture

I. To be completed for all requests:

A. Course Type: ☑ Lecture course  ☐ Lecture course with laboratory
   ☐ Laboratory course  ☐ Undergraduate course
   ☐ Directed readings  ☐ Other (please specify)

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

C. Will this course require new funding (including Payment of instructor, labs, equipment, etc.)?  ☐ Yes  ☑ No
   If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   see the attachment

G. Method of evaluation:

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

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

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

Instructor's initials

Recommended for offering in the

☐ Fall  ☐ Winter  ☐ Spring  20

Length of session if less than a semester:

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

A. M. Zelkovich

Course Instructor

Approval of the head of the academic unit

April 20, 2013

Date

October 2, 2017

Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6904: Advanced computer architecture

Objectives: This course analyzes the architecture of a variety of computer systems, from advanced single processor systems to systems composed of many tightly-coupled processors (e.g., multi-core systems or computer clusters) and loosely-coupled systems (e.g., distributed systems). Elements of performance analysis are used for quantitative characterizations of different architectures.

Required background: General knowledge of basic computer organization and machine-level programming is expected.

Evaluation:

Assignments 25 %
Project 25 %
Final examination 50 %

Outline:

• Introduction and overview of traditional (von Neumann) computer architecture: information representation, computer arithmetic, instructions and instruction sets, memory hierarchy, performance characteristics

• Advanced single processor architectures: pipelining, data and control hazards, hazard reduction methods, branch predictors, out-of-order instruction execution, multithreading, performance characteristics,

• Memory hierarchy, cache organization, multi-level cache memories, virtual memory, performance characteristics

• Multiprocessors – speedup and workload balancing, shared-memory and message-passing systems, distributed memory systems, cache coherence and coherence protocols, tightly coupled and loosely coupled systems, interconnection networks, communication and synchronization issues, elements of performance analysis.

References:


Request for Approval of a Graduate Course

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

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

Course No.: COMP 6907 (credit restricted with old COMP 6762)

Course Title: Introduction to Data Mining

I. To be completed for all requests:

A. Course Type:
   [ ] Lecture course
   [ ] Laboratory course
   [ ] Directed readings
   [ ] Lecture course with laboratory
   [ ] Undergraduate course
   [ ] Other (please specify)

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

C. Will this course require new funding (including Payment of instructor, labs, equipment, etc.)? [ ] Yes [ ] No
   If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   This course introduces the basic theories and methodologies behind the common data mining tasks, with the main emphasis being on two types of tasks, model description and pattern discovery. It introduces the concepts and approaches for efficient mining of association rule patterns. It covers two basic learning classes - supervised and unsupervised learning. Other related topics covered include: Feature selection, maximum likelihood method and outlier detection.

G. Method of evaluation:

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Total 100%

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

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

Instructor’s initials

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

Recommended for offering in the ☐ Fall ☐ Winter ☐ Spring 20___

Length of session if less than a semester:

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

Course instructor

Nov 27, 2012
Date

Approval of the head of the academic unit

Nov 28, 2012
Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6907

Introduction to Data Mining

Course objectives/description

Introduce the basic theories and methodologies underlying common data mining tasks. Two types of tasks are discussed, model-description and pattern-discovery. For model-description, the topics covered include concepts and techniques for regression and classification learning, clustering analysis, and maximum likelihood estimation. For pattern-discovery, the topics include online analytic data processing and association rule mining. The course emphasizes algorithmic approaches; however, their theoretical foundations are also studied.

Course outline

- Introduction to data mining tasks and types of data sets
- Data warehousing and decision support
- OLAP and multidimensional data model
- Statistical inferences for parameter estimations
- Maximum likelihood estimation
- Apriori algorithm for association rule mining
- Linear and non-linear regression
- Predictive models for classification
- Methodologies for feature selection
- Clustering
- Outlier detection

Prerequisite: CS 3711, CS4754, ST2510, knowledge on matrix computation

Evaluation

- Assignments: 40%
- Mid-term: 40%
- Project: 20%

Textbook:

Data Mining: Concepts and Techniques”, 2nd or 3rd Ed., by Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers

References:

"Elements of Statistic Learning", by T. Hastie, R. Tibshirani, J. H. Friedman, Springer Verlag, 1999
Request for Approval of a Graduate Course

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

To: Dean, School of Graduate Studies
From: Faculty/School/Department/Program
Subject: Regular Course
Course No.: COMP 6908 (credit restricted with old COMP 6751)
Course Title: Database Technology and Applications

I. To be completed for all requests:

A. Course Type:
   - [ ] Lecture course
   - [ ] Laboratory course
   - [ ] Directed readings
   - [ ] Lecture course with laboratory
   - [ ] Undergraduate course¹
   - [ ] Other (please specify) Project

B. Can this course be offered by existing faculty?
   - [ ] Yes
   - [ ] No

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

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   The course will cover several current topics related to database and information retrieval applications. Topics include: Review of database design and relational databases; Transaction concepts, concurrency control and recovery methods; Homogeneous and heterogeneous distributed database systems; Workflow management systems; Mobile database systems; Web services; and Data management in a Cloud.

G. Method of evaluation:

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

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

Instructor's initials

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

Recommended for offering in the □ Fall □ Winter □ Spring 20____

Length of session if less than a semester:

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

K. Vidyanarayana

Date

Course instructor

Nov 26, 2012 Nov 27, 2012

Approval of the head of the academic unit

Nov 27, 2012

Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP-6908
Database Technology and Applications

OBJECTIVES

Over the years, the notion of transactions has become synonymous with providing fault-tolerance, reliability and robustness to database systems. The idea then is to extend the same transactional guarantees to new and evolving paradigms, such as Web services and cloud computing. The course will cover basic concurrency control and recovery techniques for database systems, and extending them for non-database applications.

OUTLINE

Topics include:
- Review of database design and relational databases;
- Transaction concepts, concurrency control and recovery;
- Distributed transactions;
- Workflow management systems;
- Mobile Database Systems;
- Web services;
- Service oriented computing; and
- Cloud computing.

PREREQUISITE

An Undergraduate Course on Database Systems (COMP 4754 or equivalent).

GRADING SCHEME

Assignments (4 - 6) - 40%
Mid-term Exam - 20%
Project - 40%
REFERENCES


5. Several research papers.
Request for Approval of a Graduate Course

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

Course No.: COMP 6910

Course Title: Services Computing, Semantic Web and Cloud Computing

I. To be completed for all requests:

A. Course Type: ✅ Lecture course Laboratory course Directed readings Lecture course with laboratory Undergraduate course

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

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

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
See last page.

G. Method of evaluation:

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Total 100

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

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

Instructor's initials

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

Recommended for offering in the Fall Winter Spring 20

Length of session if less than a semester:

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

K. Vidyabalan
Course instructor

Nov. 26, 2012
Date

Approval of the head of the academic unit

Nov. 26, 2012
Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6910

Services Computing, Semantic Web and Cloud Computing

Course objectives / description

This course will cover the fundamental concepts and technologies behind services computing, semantic Web and cloud computing. Services Computing deals with all aspects relating to services, including creation, registration, discovery, composition and delivery. The core concept behind Semantic Web is the representation of data in a machine-interpretable way. Ontologies facilitate the means to realize such representation. Cloud Computing advocates the concept that any computation can be done anywhere and at anytime. Scalability, elasticity, security and confidentiality are important requirements.

Course outline (Topics include the following):

- The Principles of Services and Services Computing;
- Service-Oriented Architecture (SOA);
- Web Ontology Language;
- Web Services Publishing and Discovery;
- Semantic Service Selection;
- Co-ordination Frameworks for Web Services;
- Transaction Concepts;
- Service Management;
- Overview of Cloud Computing;
- Security, Privacy and Trust Management Issues for Cloud Computing;

Prerequisites / background required

Introductory courses in Databases, Computer Architecture and Operating Systems (equivalent to COMP 3754 and COMP 3725) are required.

Evaluation

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Textbook

References / reading list

Request for Approval of a Graduate Course

To: Dean, School of Graduate Studies
From: Faculty/School/Department/Program
Subject: [✓] Regular Course [ ] Special/Selected Topics Course

Course No.: COMP 6911
Course Title: Bio-Inspired Computing

I. To be completed for all requests:

A. Course Type:
   [✓] Lecture course
   [ ] Laboratory course
   [ ] Directed readings
   [ ] Lecture course with laboratory
   [ ] Undergraduate course 1
   [ ] Other (please specify) Project Course

B. Can this course be offered by existing faculty?
   [✓] Yes  [ ] No

C. Will this course require new funding (including payment of instructor, labs, equipment, etc)?
   [ ] Yes  [✓] No

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 39

F. Course description (reading list required):
   Bio-inspired computing aims at taking inspiration from living systems for the design, development and realization of computational (and robotic) systems. Its main premise is that life, essentially, is information processing and that man-made systems used for information processing can benefit from concepts and recipes nature developed over eons. This course introduces methods of bio-inspired computing by discussing a selection of models.

G. Method of evaluation:

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II. To be completed for special/selected topics course requests only

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

Instructor's Initials

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

Recommended for offering in the Fall Winter Spring 20

Length of session if less than a semester:

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

[Signature]
Course instructor

[Signature]
Approval of the head of the academic unit

Date
Nov 26, 2012

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

[Signature]
Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6911
Bio--Inspired Computing

Course objectives / description

Bio-inspired computing aims at taking inspiration from living systems for the design, development and realization of computational (and robotic) systems. Its main premise is that life, essentially, is information processing and that man-made systems used for information processing can benefit from concepts and recipes nature developed over eons.

This course introduces methods of bio-inspired computing by discussing a selection of models used to tackle different computational problems, like optimization, structural design, defense and control. Typical methods employing bio-inspiration are: Artificial Neural Networks, Evolutionary Computation, Computational Intelligence, Self-similar systems, Dynamical systems, Complex networks, Swarms, Biomimetic robotics, Artificial Immune Systems, Artificial Life.

The course will consist of high-level lectures, discussion of selected papers and student projects.

Course outline (topics will be chosen from the following list)

- Evolution and optimization
- Cellular systems and structure
- Learning and adaptation
- Developmental systems and growth
- Immune systems and defense
- Complex networks and emergence
- Behavioral systems and control
- Collective systems intelligence
- Dynamical systems and Artificial Life

Prerequisites / background required

Knowledge in Mathematics and Computer Science from an undergraduate degree is required.

Evaluation

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<tr>
<td>Project</td>
<td>45 %</td>
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<tr>
<td>Project presentation</td>
<td>10 %</td>
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<tr>
<td>Project proposal</td>
<td>10 %</td>
</tr>
<tr>
<td>In-class participation</td>
<td>15 %</td>
</tr>
</tbody>
</table>
References / reading list

- *Neural Networks for Pattern Recognition*, C Bishop, Oxford University Press, 1995
- *Networks*, M.E.J. Newman, Oxford University Press, 2010
- *Swarm Intelligence – From Natural to Artificial Systems*, E. Bonabeau, M. Dorigo, G. Theraulaz, Oxford University Press, 1999

Plus selected articles from primary literature.
Request for Approval of a Graduate Course

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

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

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

Course No.: COMP 6912 (credit restricted with old COMP 6778)

Course Title: Autonomous Robotics

I. To be completed for all requests:

A. Course Type:
   □ Lecture course
   □ Laboratory course
   □ Direct readings
   ✓ Lecture course with laboratory
   □ Undergraduate course
   □ Other (please specify)  Project + Presentation

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

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

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   This course examines the technologies, constraints, and algorithms of autonomous robotics and introduces students to this topic as an active research area. The following topics will be covered: major paradigms in robotics, kinematics, feedback control, sensor technologies, feature extraction, uncertainty modeling, localization, mapping, local navigation, path planning, multi-robot systems, and biologically-inspired robotics.

G. Method of evaluation:

| Class tests | 20% | Written | 55% | Oral |
| Assignments | 30% |

Other (specify):
   Project + Presentation  15%
   Final examination: 30%

Total 100%

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

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

1. duplication of thesis work
   Instructor's initials
   __________________________

2. double credit
   __________________________

3. work that is a faculty research product
   __________________________

4. overlap with existing courses
   __________________________

Recommended for offering in the

☐ Fall  ☐ Winter  ☐ Spring  20____

Length of session if less than a semester:

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

[Signature]
Course instructor

26 Nov. 2012
Date

[Signature]
Approval of the head of the academic unit

Nov. 26, 2012
Date

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

[Signature]
Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6912

Autonomous Robotics

Course objectives / description

This course examines the technologies, constraints, and algorithms of autonomous robotics and introduces students to this topic as an active research area. The following topics will be covered: major paradigms in robotics, kinematics, feedback control, sensor technologies, feature extraction, uncertainty modeling, localization, mapping, local navigation, path planning, multi-robot systems, and biologically-inspired robotics. The main themes are mobility, perception, and navigation.

Course outline

- Historical background and major paradigms (2 hours)
- Mobility (7 hours)
  - Methods of locomotion; kinematics; coordinate transforms; movement control systems; obstacle avoidance
- Perception (8 hours)
  - Sensor technologies; feature extraction; stereo vision
- Localization (8 hours)
  - Noise and aliasing; environmental representations; Markov localization; Kalman and particle filtering;
- Navigation (6 hours)
  - Simultaneous Localization and Mapping (SLAM); topological navigation; biologically-inspired navigation; path planning
- Multi-robot systems (2 hours)

Prerequisites / background required

Students should have a solid background in computer programming, algorithms, calculus, linear algebra, and statistics. Such a background may have been obtained through completion of the following courses at Memorial (or equivalent):

COMP 2711, MATH 2000, MATH 2050, and STAT 2510.
Evaluation

Assignments  30 %
Midterm  20 %
Project  15 %
Presentation  5 %
Participation  0 %
Final exam  30 %

References / reading list


Request for Approval of a Graduate Course

To: Dean, School of Graduate Studies
From: Faculty/School/Department/Program
Subject: [x] Regular Course [ ] Special/Selected Topics Course

Course No.: COMP-6913
Course Title: Bioinformatics

I. To be completed for all requests:

A. Course Type:
   [x] Lecture course
   [ ] Laboratory course
   [ ] Directed readings
   [ ] Lecture course with laboratory
   [ ] Undergraduate course
   [ ] Other (please specify): Project

B. Can this course be offered by existing faculty?
   [x] Yes [ ] No

C. Will this course require new funding (including Payment of Instructor, labs, equipment, etc.)?
   [x] Yes [ ] No

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 3 hrs / week

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

G. Method of evaluation:

<table>
<thead>
<tr>
<th>Method of evaluation</th>
<th>Written</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
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<td>Other (specify):</td>
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<td>Project</td>
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<td>Final examination:</td>
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1 Must specify the additional work at the graduate level
II. To be completed for special/selected topics course requests only

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

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<tr>
<th>Instructor's Initials</th>
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1. duplication of thesis work  
2. double credit  
3. work that is a faculty research product  
4. overlap with existing courses

Recommended for offering in the  
☐ Fall  ☐ Winter  ☐ Spring  20___

Length of session if less than a semester:

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

Course Instructor

Approval of the head of the academic unit

April 22, 2013

Date

Oct 2, 2013

Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP-6913: Bioinformatics,

Course Description
This course provides a broad introduction to computational approaches applied to biological and biomedical data. Methods covered may include hidden Markov models, Bayesian approaches, and graph-based approaches as applied to biological/biomedical problems.

Required Background:
Basic statistical knowledge. Some knowledge of machine learning.

Evaluation:
Assignments 25%
Project 20%
In-class examination 30%
Final examination 25%

Tentative Course Outline
1. Introduction to Bioinformatics
2. Machine learning foundations in bioinformatics
3. Model Assessment and Selection
   1. Ontologies and gold standards
   2. Cross-validation
   3. Performance evaluation
4. Probabilistic and graphical learning for biological sequences (hidden Markov models)
5. Biological networks analysis, modelling and inference
6. Graph-based approaches for genome assembly and mapping
7. Statistical methods for integration of heterogeneous data
8. Finding associations between phenotype and genotype

References
Request for Approval of a
Graduate Course

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

School of Graduate Studies, Memorial University of Newfoundland; St John’s, NL A1C 5S7 Canada Fax: 709.864.7502 eMail: sgs@mun.ca

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

Course No.: COMP 6915

Course Title: Machine Learning

I. To be completed for all requests:

A. Course Type:
   - [ ] Lecture course
   - [ ] Laboratory course
   - [ ] Directed readings
   - [ ] Lecture course with laboratory
   - [ ] Undergraduate course
   - [ ] Other (please specify)

B. Can this course be offered by existing faculty?
   - [ ] Yes
   - [ ] No

C. Will this course require new funding (including payment of instructor, labs, equipment, etc.)?
   - [ ] Yes
   - [ ] No

   If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 3hrs / week

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

G. Method of evaluation:

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<td>Other (specify): Project</td>
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<td>Final examination:</td>
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   Total: 95 5

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

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

1. duplication of thesis work
   Instructor's Initials
   
2. double credit
   
3. work that is a faculty research product
   
4. overlap with existing courses
   
Recommended for offering in the □ Fall □ Winter □ Spring 20____

Length of session if less than a semester:

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

Course Instructor

Approval of the head of the academic unit

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

Secretary, Faculty/School/Council

April 22, 2013.

Oct 2, 2013

Date

Date

Updated October 2011
COMP-6915: Machine Learning

Course Description
This course provides a broad introduction to machine learning. Topics covered include supervised learning methods, Ensemble learning, reinforcement learning, and model selection and performance evaluation. The course will also discuss recent applications of machine learning, such as to bioinformatics, games, robotic control, and data mining.

Required background
Basic statistical knowledge

Evaluation
In-class examinations 30%
Assignments 20%
Project 25%
Final examination 25%

Tentative Course Outline
1. Introduction to Machine Learning
   1. Definition and examples of machine learning tasks
   2. Types of learning
2. Linear methods for regression and classification
3. Model Assessment and Selection
   1. Bias, variance, overfitting, and model complexity
   2. Cross-validation
   3. Performance evaluation
4. Tree-based Methods
5. Random Forests
6. Support Vector Machines
7. Combining multiple learners (ensemble learning)
8. Relational learning (inductive logic programming)
9. Reinforcement learning

References
Request for Approval of a Graduate Course

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

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

Course No.: COMP 6922

Course Title: Compiling methods

I. To be completed for all requests:

A. Course Type:
   ☑ Lecture course
   ☐ Laboratory course
   ☐ Directed readings
   ☐ Lecture course with laboratory
   ☐ Undergraduate course
   ☐ Other (please specify)

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

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

If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
   see the attachment

G. Method of evaluation:

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

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

Instructor's initials

1. duplication of thesis work
   
2. double credit
   
3. work that is a faculty research product
   
4. overlap with existing courses
   
Recommended for offering in the  □ Fall  □ Winter  □ Spring  20__

Length of session if less than a semester:

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

[Signature]  
[Date]

Course instructor

[Signature]  
[Date]

Approval of the head of the academic unit

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

[Signature]  
[Date]

Secretary, Faculty/School/Council

Updated October 2011
COMP 6922: Compiling methods

Objectives: This course provides theoretical foundations for compiler design. Emphasis is on practical mechanisms of lexical and syntax analyses as well as code generation. Compiler writing tools are used for implementation of simple compiler projects.

Required background: Some background in formal languages and automata theory is required.

Outline:

- Overview of formal grammars and languages with basic grammar transformations
- Definition of programming languages, syntax and semantics, syntax-driven semantics, static and dynamic semantics
- Lexical, syntax and semantics analyses
- Recursive-descent parsing, code generation, error recovery
- Finite automata and scanning; LEX
- Bottom-up parsing methods, LR(k), SLR(k) and LALR(k) parsers, YACC
- Code generation and optimization methods

Evaluation:

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<tr>
<th>Component</th>
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<tr>
<td>Assignments</td>
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<td>Project</td>
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<td>Final examination</td>
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References:

Request for Approval of a Graduate Course

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

Course No.: COMP 6923

Course Title: Semantics of programming languages

I. To be completed for all requests:

A. Course Type: ☑ Lecture course ☐ Lecture course with laboratory
☐ Laboratory course ☐ Undergraduate course
☐ Directed readings ☐ Other (please specify)

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

C. Will this course require new funding (including Payment of instructor, labs, equipment, etc.)? ☐ Yes ☑ No
If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
see the attachment

G. Method of evaluation: Percentage

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<td>Assignments</td>
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<td>Final examination:</td>
<td>50%</td>
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<td>Total</td>
<td>100%</td>
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</table>

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

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

Instructor's initials

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

Recommended for offering in the ☐ Fall ☐ Winter ☐ Spring 20

Length of session if less than a semester:

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

W. M. [Signature]
Course Instructor

[Signature]
Approval of the head of the academic unit

April 20, 2013.
Date

Date

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

[Signature]
Secretary, Faculty/School/Council

Updated October 2011
COMP 6923: Semantics of programming languages

Objectives: The course discusses the essence of the programming language theory, i.e., the relation between the meaning of a computer program and the concrete and intricate ways in which programs are executed by a machine.

Required background: Practical knowledge of programming in a high-level language and good knowledge of basic discrete mathematics are required.

Evaluation:

- Assignments 25 %
- Project 25 %
- Final examination 50 %

Outline:

- overview of Chomsky hierarchy of grammars and languages, with emphasis on context-free grammars and languages and their basic properties, BNF and syntax definitions of programming languages
- small step operational semantics
- big step operational semantics
- denotational semantics
- axiomatic semantics

References:

Request for Approval of a Graduate Course

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

Course No.: COMP 6925  
Course Title: Advanced operating systems

I. To be completed for all requests:

A. Course Type: ☑ Lecture course  □ Laboratory course  □ Directed readings  □ Lecture course with laboratory  □ Undergraduate course\(^1\)  □ Other (please specify)

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

C. Will this course require new funding (including payment of instructor, labs, equipment, etc.)?  ☑ Yes  ☑ No  
   If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):  
   see the attachment

G. Method of evaluation:  

<table>
<thead>
<tr>
<th>Written</th>
<th>Percentage</th>
<th>Oral</th>
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<td>Other (specify):</td>
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<td>Final examination:</td>
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<tr>
<td>Total</td>
<td>100%</td>
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\(^1\) Must specify the additional work at the graduate level
II. To be completed for special/selected topics course requests only

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

Instructor's initials

1. duplication of thesis work

2. double credit

3. work that is a faculty research product

4. overlap with existing courses

Recommended for offering in the

☐ Fall ☐ Winter ☐ Spring 20__

Length of session if less than a semester:

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

W.M. [Signature]

Course instructor

[Signature]

Approval of the head of the academic unit

April 20, 2013.

Date

Oct 2, 20__

Date

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6925: Advanced operating systems

Objectives: This course extends the basic functions of operating systems to modern computer architectures, composed of many processors which are tightly-coupled (e.g., multi-core architectures or computer clusters) or loosely-coupled (i.e., distributed systems). Elements of performance analysis are included.

Background: Good understanding of the organization of computer systems and program execution at machine level are required.

Evaluation:
- Assignments 25%
- Project) 25%
- Final examination 50%

Outline:
- overview of operating system design, processes and process scheduling, resource management, mutual exclusion, deadlocks, deadlock detection and prevention, memory management
- real-time operating systems, hard and soft deadlines, real-time scheduling
- architecture of distributed operating systems, distributed mutual exclusion, distributed deadlock detection, distributed file systems, distributed shared memory
- resource security and protection, data security
- elements of queueing theory and performance evaluation

References:
Request for Approval of a Graduate Course

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

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

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

Course No.: COMP 6926

Course Title: Performance evaluation of computer systems

I. To be completed for all requests:

A. Course Type: ☒ Lecture course ☐ Laboratory course ☐ Directed readings ☐ Lecture course with laboratory ☐ Undergraduate course

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

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

If yes, please specify:

D. Credit hours for this course: 3

E. Estimated number of contact hours per semester: 36

F. Course description (reading list required):
see the attachment

G. Method of evaluation: Written Percentage Oral

Class tests
Assignments 25%
Other (specify): 25%
Final examination: 50%
Total 100%

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

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

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

Instructor’s initials

Recommended for offering in the [ ] Fall [ ] Winter [ ] Spring 20__

Length of session if less than a semester:

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

Course instructor

Approval of the head of the academic unit

Date

April 20, 20__

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

Secretary, Faculty/School/Council

Date

Updated October 2011
COMP 6926: Performance evaluation of computer systems

Objectives: The main objective of this course is to develop understanding of the modeling and performance analysis of discrete-event systems, and in particular, computer and communication systems.

Required background: Basic knowledge of probability theory and mathematical statistics and general familiarity with computer architecture and operating systems are expected.

Evaluation:
- Assignments 25 %
- Project 25 %
- Final examination 50 %

Outline:
- Introduction to mathematical methods used in performance analysis, discrete and continuous time systems, Markov models and their analysis
- Simulation techniques and elements of simulation languages, process-driven and event-driven simulation, organization of event-driven simulators and implementation issues, pseudo-random number generation, analysis and presentation of simulation results
- Elements of queueing theory: Kendall classification, basic queueing models, state diagrams and balance equations, open and closed network models, local and global balance, product-form solutions
- Operational analysis, operational variable and operational laws, mean value analysis (MVA)
- Other discrete-event models (e.g., timed automata, timed and stochastic Petri nets, etc.)

References:
DEPARTMENT OF COMPUTER SCIENCE
Proposed Calendar Changes for 2013-2014

The following excerpts are from the 2013-2014 University Calendar:

Revisions are noted in strikeout text; and changes and additions noted with bold text.

Pages 612-613

24.11.4 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. Normally, students will be expected to complete their course work during the fall and winter semesters. Courses might not be offered in the spring semester.

601W Work Term
6711 Syntax and Semantics of Programming Languages
6712 Compiling Techniques
6713 Software Engineering
6714 Functional Programming
6715 Logic Programming
6716 Concurrent Programming
6718-6719 Special Topics in Programming Languages
6720 Distributed and Parallel Computing
6721 Operating Systems Design
6722 Advanced Computer Architectures
6723 Microprocessor Systems
6724 VLSI Design (same as Engineering 9863)
6725 Computational Aspects of VLSI (same as Engineering 9864)
6726 Modelling and Analysis of Computing Systems
6727 Introduction to High-Performance Computer Systems
6728-6729 Special Topics in Computer Systems - Computer Networks
6731 Topics in Numerical Methods
6732 Matrix Computations
6738-6739 Special Topics in Numerical Methods
6741 Advanced Automata Theory
6742 Theory of Databases
6743 Complexity of Computational Problems
6745 Special Topics - Advanced Computational Geometry
6746 Parameterized Complexity Analysis: Foundations and Applications
6748-6749 Special Topics in Theoretical Computer Science
6751 Database Technology and Information Retrieval
6752 Applications of Computer Graphics
6753 Artificial Intelligence
6754 Post-Genomic Computational Biology
6755 Knowledge-Based Systems
6756 Digital Image Processing
6758-6769 Special Topics in Computer Applications
6770-6790 Special Topics in Computer Science (excluding 6783)
6783 Applied Algorithms
6901 Applied Algorithms
6902 Computational Complexity
6903 Concurrent Computing
6904 Advanced Computer Architecture
6907 Introduction to Data Mining
6908 Database Technology and Application
6910 Services Computing, Semantic Web and Cloud Computing
6911 Bio-inspired Computing
6912 Autonomous Robotics
6913 Bioinformatics
6915 Machine Learning
6916 Security and Privacy
6922 Compiling Methods
6923 Semantics of Programming Languages
6925 Advanced Operating Systems
6926 Performance Evaluation of Computer Systems
6999 Master's Project

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30.7.2 Courses

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

Programming Languages

6711 Syntax and Semantics of Programming Languages
6712 Compiling Techniques
6713 Software Engineering
6714 Functional Programming
6715 Logic Programming
6716 Concurrent Programming
6718-6719 Special Topics in Programming Languages

Computer Systems

6720 Distributed and Parallel Computing
6721 Operating Systems Design
6722 Advanced Computer Architectures
6723 Microprocessor Systems
6724 VLSI Design (same as Engineering 9863)
6725 Computational Aspects of VLSI (same as Engineering 9864)
6726 Modelling and Analysis of Computing Systems
6727 Introduction to High Performance Computer Systems
6728-6729 Special Topics in Computer Systems - Computer Networks

Numerical Computations

6731 Topics in Numerical Methods
6732 Matrix Computations
6738-6739 Special Topics in Numerical Methods

Theoretical Aspects

6741 Advanced Automata Theory
6742 Theory of Databases
6743 Complexity of Computational Problems
6745 Special Topics - Advanced Computational Geometry
6746 Parameterized Complexity Analysis: Foundations and Applications
6748-6749 Special Topics in Theoretical Computer Science

Applications

6751 Database Technology and Information Retrieval
6752 Applications of Computer Graphics
6753 Artificial Intelligence
6754 Post-Genomic Computational Biology
6755 Knowledge-Based Systems
6756 Digital Image Processing
6758-6769 Special Topics in Computer Applications
6770-6790 Special Topics in Computer Science

6901 Applied Algorithms
6902 Computational Complexity
6903 Concurrent Computing
6904 Advanced Computer Architecture
6907 Introduction to Data Mining
6908 Database Technology and Application
6910 Services Computing, Semantic Web and Cloud Computing
6911 Bio-inspired Computing
6912 Autonomous Robotics
6913 Bioinformatics
6915 Machine Learning
6916 Security and Privacy
6922 Compiling Methods
6923 Semantics of Programming Languages
6925 Advanced Operating Systems
6926 Performance Evaluation of Computer Systems
### Committees

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| **STUDENT UNIONS REPRESENTATIVES TO FACULTY COUNCIL** |
|---------------|---------------------------------------------------|
| MUNSU | Sean Kennedy, Devin Grant, Andrew O'Dea, Ryan Murphy |
| GSU | Barun Maity, Jinjun Tong, Marc Mackinnon, Joe Mersereau, Balogun Adeniyi |

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