

Faculty of Science

Office of the Dean
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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, May 15, 2019 at 1 p.m. in C-2004.

AGENDA

- 1. Regrets**
- 2. Adoption of the Minutes of March 20, 2019**
- 3. Business Arising from the Minutes**
- 4. Correspondence:** None
- 5. Graduate Strategic Enrolment Management (SEM) Plan** – Dr. Aimée Surprenant, Associate Vice-President (Academic) and Dean, Graduate Studies
- 6. Reports of Standing Committees:**
 - A. Undergraduate Studies Committee:**
 - a. Department of Ocean Sciences, Proposal for a new Special Topics Course: OCSC 4921, Special Topics in Reproductive Strategies of Marine Animals, for information only, Paper 6.A.a (pages 5-19)
 - b. Department of Ocean Sciences, Proposal for a new Special Topics Course: OCSC 4910, Hot Topics in Oceanography, for information only, Paper 6.A.b (pages 20-32)
 - B. Graduate Studies Committee:**
 - a. Department of Mathematics and Statistics, Request for Approval of a Graduate Course: MATH 6333, Representation Theory, Paper 6.B.a (pages 33-38)
 - b. Department of Mathematics and Statistics, Request for Approval of a Graduate Course: MATH 6329, Galois Theory, Paper 6.B.b (pages 39-43)
 - c. Department of Psychology, Calendar changes, new course: PSYC 7021, Practicum in Adult Assessment and Diagnosis II, Paper 6.B.c (pages 44-52)
 - C. Nominating Committee:** None
 - D. Library Committee:** None
- 7. Report of Teaching Consultant**
- 8. Reports of Delegates from Other Councils**
- 9. Report of the Dean**
- 10. Question Period**
- 11. Adjournment**



Mark Abrahams, PhD
Dean of Science



Faculty of Science

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**FACULTY OF SCIENCE
FACULTY COUNCIL OF SCIENCE
MINUTES OF MEETING OF MARCH 20, 2019**

A meeting of the Faculty Council of the Faculty of Science was held on Wednesday, March 20, 2019, at 1:00 p.m. in room C-2045.

FSC 2664

Present

Biochemistry

M. Berry, R. Bertolo, V. Booth, J. Brunton, S. Harding, M. Mulligan

Biology

T. Chapman, B. Staveley

Chemistry

S. Pansare

Computer Science

S. Bungay

Earth Sciences

G. Dunning, P. Morrill

Mathematics & Statistics

J. Craighead, D. Pike, S. Sullivan

Physics & Physical Oceanography

S. Curnoe

Psychology

K. Fowler, C. Thorpe, C. Walsh

Dean of Science Office

K. Foss, G. Jackson, T. Mackenzie, R. Newhook, L. Zedel

CITL

A. Todd

Graduate Students

P. Isesele

FSC 2665

Regrets

G. Fletcher, S. Mantyka, K. Poduska

- FSC 2666 Adoption of Minutes**
Moved: Minutes of the February 20, 2019, meeting be adopted (Sullivan/Berry). **One Abstention. Carried.**
- FSC 2667 Business Arising:**
It is noted that Greg Dunning and John Hanchar of the Department of Earth Sciences did attend the February 20, 2019 Faculty of Science Faculty Council meeting. The Dean reminded all members to sign the attendance sheet.
- FSC 2668 Correspondence:** None
- FSC 2669** Dr. Gavan Watson, Associate Vice-President, Teaching and Learning, and Director, CITL, and Dr. Kim Myrick, Assistant Director, Teaching and Learning, CITL, presented on the Teaching and Learning Framework.
- FSC 2670 Reports of Standing Committees:**
- A. Undergraduate Studies Committee:**
Presented by Shannon Sullivan, Chair, Undergraduate Studies Committee
 - a.** Department of Ocean Sciences, Special Topics course, OCSC 4920, Special Topics in Crustacean Biology, approved by the committee and presented to Faculty Council for information only.
 - B. Graduate Studies Committee:** None
 - C. Nominating Committee:** None
 - D. Library Committee:** None
- FSC 2671 Report of Teaching Consultant:** None
- FSC 2672 Report of the Dean**
Presented by Mark Abrahams, Dean.
1. A reminder that Phase II OFI funding competition is nearing the April 11 deadline for expressions of interest. As a reminder, proposals are meant for a large research consortia. Individuals that are not currently part of a consortia are asked to send their key information to the committee tasked with helping individuals join consortia. Members of the committee are Uta Passow (passow@mun.ca), Helen Zhang (bzhang@mun.ca), Heather O'Brien (HSSResearchAdmin@mun.ca), and Kelley Santos (Kelley.Santos@mi.mun.ca).
 2. The Ocean Supercluster will be having a collaboration event in Halifax on March 26 at the Halifax Convention Centre. It is intended to build and strengthen relationships, share capabilities, and learn how to activate and accelerate cross-sectoral

partnerships. There is a desire at Memorial University to broaden the level of engagement, but, unfortunately, there will not be a similar event in St. John's, and there is no opportunity to participate by video conference. For that reason, I have asked Len Zedel to attend this event on behalf of the Faculty of Science, so I am hoping that he might be able to identify opportunities that might exist for the faculty in Science.

3. As a reminder, MUNFA will be holding a ratification vote on the new collective agreement tomorrow. If the membership votes to accept this deal, the university is expected to do the same through a special meeting of the executive committee of the Board of Regents. After that, a special committee will be struck to look at teaching equivalencies across the university.

FSC 2673 Question Period

The Dean confirmed that Ron Haynes has set up a meeting with Stephen Greene, Chief Information Officer and Director of IT Services, regarding the space in the Henrietta Harvey Building.

If MUNFA ratifies the new collective agreement, the special committee will be tasked with reviewing teaching equivalencies across the university. Currently, there is no uniformity or university-wide policy on teaching equivalencies. This committee will be tasked with creating a university-wide teaching equivalencies document.

Representatives of the Department of Mathematics and Statistics inquired about when the UAP report would go public, since they would like to use it as a tool for public support with the upcoming election. The Dean suggested that they speak with Allison Coffin, the new leader of the NDP. They could have a conversation with her and give her a tour without providing her with the report.

FSC 2674 Adjournment

The meeting adjourned at 1:40 p.m.



Office of the Registrar

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April 8, 2019

TO: All Members of Faculty Council, Faculty of Science

FROM: Tracey Edmunds, Secretary, Committee on Undergraduate Studies
Faculty of Science (Acting)

SUBJECT: **Proposals for Calendar Changes**

At a meeting held on April 3rd, 2019 the Faculty of Science Committee on Undergraduate Studies approved a proposal for a New Special Topics Course from the Department of Ocean Sciences, and agreed that the following item should be forwarded to Faculty Council for information:

1. Department of Ocean Sciences

- (a) Proposal for a New Special Topics Course: OCSC 4921 Special Topics in Reproductive Strategies of Marine Animals

Tracey Edmunds

Tracey Edmunds

Memorial University of Newfoundland Undergraduate Calendar Change Proposal Form Cover Page

LIST OF CHANGES

Indicate the Calendar change(s) being proposed by checking and completing as appropriate:

- New course(s): OCSC 4921 Special Topics in Reproductive Strategies of Marine Animals
- Amended or deleted course(s):
- New program(s):
- Amended or deleted program(s):
- New, amended or deleted Glossary of Terms Used in the Calendar entries
- New, amended or deleted Admission/Readmission to the University (Undergraduate) regulations
- New, amended or deleted General Academic Regulations (Undergraduate)
- New, amended or deleted Faculty, School or Departmental regulations
- Other:

ADMINISTRATIVE AUTHORIZATION

By signing below, you are confirming that the attached Calendar changes have obtained all necessary Faculty/School approvals, and that the costs, if any, associated with these changes can be met from within the existing budget allocation or authorized new funding for the appropriate academic unit.

Signature of Dean/Vice-President: _____

Date: _____

Date of approval by Faculty/Academic Council: _____

Memorial University of Newfoundland Undergraduate Calendar Change Proposal Form Senate Summary Page for Courses

COURSE NUMBER AND TITLE

OCSC 4921 Special Topics in Reproductive Strategies of Marine Animals

RATIONALE

The proposed course is designed to benefit the undergraduate programs in the Department of Ocean Sciences, giving students a comprehensive understanding of the principles and evolution of sexual reproduction in marine animals. This course is novel, as there is currently no course on Reproductive Strategies listed in the calendar and no other similar course (focusing on marine animals) at Memorial University. Successful reproduction is one of the major biological problems marine animals face and they exhibit a diversity of strategies by which to accomplish it. This course focuses on this diversity from an evolutionary ecological perspective and is intended to be broad in scope, covering topics such as gamete size, sex ratio, hermaphroditism, age at maturity, reproductive allocation, mating systems, sexual selection, alternative reproductive strategies and parental care. It will touch on variety of marine animals, including polychaete worms, echinoderms, molluscs, crustaceans, tunicates, cnidarians, fishes, and marine birds and mammals, with a focus on some model species/taxa. By the end of the course, students should have an understanding of the evolutionary forces shaping reproductive strategies of marine animals and their ecological context. The course may also be of interest to students in Biology and Psychology.

CALENDAR CHANGES (new entry under 12.9 Ocean Sciences)

4921 Special Topics in Reproductive Strategies of Marine Animals explores the principles and tactics of reproduction in an evolutionary ecology context, with an emphasis on adaptations to the marine environment. It focuses on the behavioural, ecological and life-history means by which marine animals maximize their lifetime reproductive success. The course covers such topics as hermaphroditism, sex ratio, reproductive allocation, mating systems, sexual selection, sexual dimorphism, and parental investment. Various reproductive strategies are exemplified in the major groups of marine animals.

PR: OCSC 1000, Biology 2600 and 2900

ADDITIONAL INFORMATION REQUIRED FOR NEW COURSE PROPOSALS

Sample Course Outline and Method of Evaluation

Format

3 hours divided into 2 periods per week, which entail a combination of lectures and paper discussions.

Proposed Course Outline

Week 1

1.1 Class

Course Overview: Introduction to Reproductive Strategies

1.2 Class

Optimality and frequency dependence

Week 2

2.1 Class

Gamete size: isogamy versus anisogamy in marine animals

2.2. Class

Hermaphroditism

Week 3

3.1 Class

Sex ratio adjustment in hermaphroditic shrimp

3.2 Class

Age at maturity and fisheries induced evolution

Week 4

4.1 Class

Semelparity vs iteroparity in marine animals

4.2 Class

Classifying mating systems in marine animals

Week 5

5.1 Class

Mate choice in sessile vs mobile marine animals

5.2 Class

Mate competition

Week 6

6.1 Exam: Mid-term examination

6.2 Class

Diversity of secondary sexual traits in marine animals

Week 7

Break

Week 8

8.1 Class

Postcopulatory sexual selection (sperm competition & selection) in aquatic environments

8.2 Class

Alternative reproductive strategies and tactics

Week 9

9.1 Class

Diversity of parental care in marine animals

9.2 Class

Sexual Conflict

Week 10

10.1 Class

Non-genetic parental (maternal & paternal) effects

10.2 Class

Marine reserves and reproductive responses

Week 11

11.1 Class

Climate change and reproductive phenology

11.2 Class

Case study: Reproductive success and effects of escapes from net-pen aquaculture on wild fish populations

Week 12

12.1 Class

Case study: Reproductive failure and incipient extinction of African penguins related to overfishing on forage species

12.2. Class

Case studies on reproductive strategies within example taxa (marine invertebrates - echinoderms; guest lecture?)

Week 13

13.1 Class

Case studies on reproductive strategies within example taxa (marine invertebrates - crustaceans; guest lecture?)

13.2 Class

Case studies on reproductive strategies within example taxa (fish/sea birds/marine mammals; guest lecture?)

TBD: Final Examination

Evaluation

Assignments - Thought problems (2 pages; 4 x 5% each; wks 2, 4, 9, 11)

Mid-term exam (30%; week 6)

Participation in class discussions (10%)

Final exam (40%)

Bibliography

No specific textbook required. Peer-reviewed journal articles of relevance will be identified prior to the start of each semester and linked to each lecture and accessed through the course Brightspace website.

Examples:

Parker, G.A. 2014. The sexual cascade and the rise of pre-ejaculatory (Darwinian) sexual selection, sex roles, and sexual conflict. Doi: 10.1101/cshperspect.a017509

Charnov, E.L. and Hannah, R.W. 2002. Shrimp adjust their sex ratio to fluctuating age distributions. *Evolutionary Ecology Research* 4: 239-246.

Klug, H. and Bonsall, M.B. 2014. What are the benefits of parental care? The importance of parental effects on developmental rate. *Ecology and Evolution* <https://doi.org/10.1002/ece3.1083>

Chapman, T., Arnqvist, G., Bangham, J. and Rowe, L. 2003. Sexual conflict. *Trends in Ecology and Evolution* 18:41–47. DOI: [10.1016/S0169-5347\(02\)00004-6](https://doi.org/10.1016/S0169-5347(02)00004-6)

Sherley, R.B., Winker, H., Altwegg, R. van der Lingen, C.D., Votier, S.C. and Crawford, J.M. 2015. Bottom-up effects of a no-take zone on endangered penguin demographics. *Biology Letters* 11: 20150237. <http://dx.doi.org/10.1098/rsbl.2015.0237>

Andersson, M. and Simmons, L.W. 2006. Sexual selection and mate choice. *Trends in Ecology and Evolution* doi:10.1016/j.tree.2006.03.015

Evans, J.P., Wilson, A.J., Pilastro, A. and Garcia-Gonzalez, F. 2019. Ejaculate-mediated paternal effects: evidence, mechanisms and evolutionary implications. *Reproduction* 157: R109-R126. <https://doi.org/10.1530/REP-18-0524>

Immler, S., C. Hotzy, G. Alavioon, E. Petersson, and G. Arnqvist. 2014. Sperm variation within a single ejaculate affects offspring development in Atlantic salmon. *Biol. Lett.* 10:20131040. doi: [10.1098/rsbl.2013.1040](https://doi.org/10.1098/rsbl.2013.1040)

Gianasi, B.L., Hamel, J.-F. and Mercier, A. 2018. Full allogeneic fusion of embryos in a holothuroid echinoderm. *Proceedings of the Royal Society, B* 285: 20180339. <http://dx.doi.org/10.1098/rspb.2018.0339>

Sydean, W.J., Poloczanska, E., Reed, T.E. and Thompson, S.A. 2015. Climate change and marine vertebrates. *Science* 350:772-777. DOI: 10.1126/science.aac9874

Instructor

Dr. Ian A. Fleming, Professor, Department of Ocean Sciences.

Email: ifleming@mun.ca

Memorial University of Newfoundland

Undergraduate Calendar Change Proposal Form

Appendix Page

From	Response Received
Grenfell campus	No
Faculty of Business Administration	Yes
Faculty of Education	No
Faculty of Engineering & Applied Science	Yes
Faculty of Humanities & Social Science	No
Faculty of Science	Yes
Department of Biochemistry	
Department of Biology	X
Department of Chemistry	X
Department of Computer Sciences	
Department of Earth Sciences	X
Department of Economics	
Department of Geography	X
Department of Mathematics and Statistics	
Department of Physics and Physical Oceanography	X
Department of Psychology	X
Marine Institute	Yes
School of Medicine	Yes

Request for feedback and responses are provided in the Appendix.

LIBRARY REPORT

Attached.

RESOURCE IMPLICATIONS

Since this new course will be taught by an existing faculty member at the Department of Ocean Sciences, no additional instructional costs are required.

APPENDIX – CONSULTATIONS

REQUEST SENT ON 7 MARCH 2019

From: Fletcher, Garth [<mailto:fletcher@mun.ca>]

Sent: Thursday, March 7, 2019 1:31 PM

To: Associate Dean of Science (Undergraduate) <adsu@mun.ca>; BiocDHundergrad <biocdhundergrad@mun.ca>; Business <fa.ad.undergrad@mun.ca>; chemconsult@mun.ca (<chemconsult@mun.ca> <chemconsult@mun.ca>); 'cs-chair@mun.ca' <cs-chair@mun.ca>; Earth Sciences <eascugcon@mun.ca>; Locke, Wade <wlocke@mun.ca>; Hicks, Sue <shicks@mun.ca>; Engineering <enrconsult@mun.ca>; Alcock, Erin <ekalcock@mun.ca>; Grenfell Campus <associatevpoffice@grenfell.mun.ca>; Faculty of Humanities and Social Sciences <hss@mun.ca>; 'mathconsult@mun.ca' <mathconsult@mun.ca>; Steele, Dr. Margaret: Dean of Medicine <DeanofMedicine@med.mun.ca>; 'miugconsultations@mi.mun.ca' <miugconsultations@mi.mun.ca>; Catto, Norm <ncatto@mun.ca>; Physics Head <physicshead@mun.ca>; psychology.head@mun.ca; Suzanne Dufour <sdufour@mun.ca>; Chapman, Tom <tomc@mun.ca>

Cc: amercier@mun.ca

Subject: New course OCSC 4921

Colleagues could you please review our new course proposal OCSC 4921 entitled “Reproductive Strategies of Marine Animals” and send your comments back to me at your convenience.

Regards

Garth

Garth L. Fletcher
Head and Professor Emeritus
Department of Ocean Sciences
Ocean Sciences Centre
Memorial University
St John’s NL
Canada, A1C 5S7

FEEDBACK RECEIVED

PSYCHOLOGY

From: Head Psychology

Sent: March-07-19 2:19 PM

To: Fletcher, Garth <fletcher@mun.ca>; Associate Dean of Science (Undergraduate) <adsu@mun.ca>; BiocDHundergrad <biocdhundergrad@mun.ca>; Business <fba.ad.undergrad@mun.ca>; chemconsult@mun.ca (chemconsult@mun.ca) <chemconsult@mun.ca>; 'cs-chair@mun.ca' <cs-chair@mun.ca>; Earth Sciences <eascugcon@mun.ca>; Locke, Wade <wlocke@mun.ca>; Hicks, Sue <shicks@mun.ca>; Engineering <engrconsult@mun.ca>; Alcock, Erin <ekalcock@mun.ca>; Grenfell Campus <associatevpoffice@grenfell.mun.ca>; Faculty of Humanities and Social Sciences <hss@mun.ca>; 'mathconsult@mun.ca' <mathconsult@mun.ca>; Medicine <deanofmedicine@med.mun.ca>; 'miugconsultations@mi.mun.ca' <miugconsultations@mi.mun.ca>; Catto, Norm <ncatto@mun.ca>; Physics Head <physicshead@mun.ca>; psychology.head@mun.ca; Suzanne Dufour <sdufour@mun.ca>; Chapman, Tom <tomc@mun.ca>

Cc: amercier@mun.ca

Subject: RE: New course OCSC 4921

Hi Garth,

I think this looks like a very well-designed, innovative course.

Kind regards,

Ken

Ken Fowler PhD
Professor/Department Head
Department of Psychology
Memorial University of Newfoundland
St. John's NL
Canada
AIB 3X9

GEOGRAPHY

From: Catto, Norm

Sent: March-07-19 3:11 PM

To: Fletcher, Garth <fletcher@mun.ca>

Subject: RE: New course OCSC 4921

Dear Garth:

No issues.

Norm Catto

Head, Department of Geography
Memorial University
St. John's NL A1B 3X9
Canada
1-709-864-7463
Fax 1-709-864-3119

MEDECINE

From: DeanofMedicine@med.mun.ca [mailto:DeanofMedicine@med.mun.ca]
Sent: March-07-19 4:00 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: RE: New course OCSC 4921

Looks great

Margaret Steele

BUSINESS

From: Associate Dean of Under Graduate Faculty of Business Administration
[mailto:adundgradfba@mun.ca]
Sent: March-07-19 3:56 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: Re: New course OCSC 4921

Hello:

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

--larry

PHYSICS

From: Physics Head
Sent: March-08-19 12:53 PM
To: Fletcher, Garth <fletcher@mun.ca>; saika@mun.ca; Goulding, Rick <rgoulding@mun.ca>
Subject: Re: New course OCSC 4921

Hi Garth,

This doesn't affect any of our Physics programs, so we don't have any substantive comments.

Kris

Kristin Poduska, Ph.D.
Professor and Head
Department of Physics and Physical Oceanography Memorial University of Newfoundland St. John's, NL
A1B 3X7 Canada
URL: <https://www.mun.ca/physics/>

EARTH SCIENCES

From: Earth Sciences Chair of Undergraduate Matters [mailto:eascugcon@mun.ca]
Sent: March-12-19 1:33 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: Re: New course OCSC 4921

Dear Garth,

This course proposal looks fine to me.

Cheers,
Penny Morrill
Chair of the Earth Sciences Undergraduate Matters Committee

CHEMISTRY

From: Department of Chemistry Consult [mailto:chemconsult@mun.ca]
Sent: March 18, 2019 10:34 AM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: Re: New course OCSC 4921

Hi Garth,

This course seems a well thought out and exciting addition to the Ocean Sciences program. On behalf of the chemistry department, I'd like to add my enthusiastic support.

Chris Flinn
Deputy Head, Undergraduate studies
Chemistry Department
Memorial University

MARINE INSTITUTE

From: MIUG Consultations <MIUGconsultations@mi.mun.ca>
Sent: Tuesday, March 19, 2019 8:53 AM
To: Fletcher, Garth
Subject: RE: New course OCSC 4921

Dear Garth,

Thank you for the opportunity to review and comment on the proposal for the new course OCSC 4921. The Marine Institute is happy to support the proposal.

Regards,
Bev

Bev Fleet
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0369
FAX: 709-778-0535
Bev.Fleet@mi.mun.ca

ENGINEERING

From: Engineering Consult <enrconsult@mun.ca>
Sent: Thursday, March 21, 2019 11:55 AM
To: Fletcher, Garth; George,Glyn; Fisher, Andrew; bruce.quinton@mun.ca
Subject: Re: New course OCSC 4921

Dear Garth,

Thank you for the opportunity to comment on the proposed new Ocean Sciences course OCSC 4921.

I see no impact on Engineering programs and I am happy to support this initiative.

Best regards,

Bruce
Vice-chair, CUGS (Engineering)
Committee on Undergraduate Studies
Faculty of Engineering and Applied Science
Memorial University of Newfoundland
St. John's NL A1B 3X5

BIOLOGY

From: Suzanne Dufour [mailto:sdufour@mun.ca]
Sent: March-25-19 4:10 PM
To: Fletcher, Garth <fletcher@mun.ca>; Jody-Lynn Burke <jrotchford@mun.ca>
Subject: Re: New course OCSC 4921

Dear Garth,

The Biology Undergraduate Studies Committee has reviewed an earlier version of this proposal and submitted comments. We have no additional comments on this revised version.

Best wishes,

Suzanne



Collection Development Division
Queen Elizabeth II Library

26 March 2019

To: Garth Fletcher, Department of Ocean Sciences
From: Erin Alcock, Science Research Liaison Librarian
Subject: New Course Proposal, OCSC 4921

I have reviewed the new course proposal for OCSC 4921 – Special Topics in Reproductive Strategies of Marine Animals. I have determined that the Memorial University Library system has adequate resources to support the objectives of this course.

Books on this topic are held at the Queen Elizabeth II Library and the Dr. C.R. Barrett Library at the Marine Institute. We also have many electronic books, primary part of our Springer package that will be relevant for students studying and doing research in this area. Online subscriptions to relevant journals are numerous. Items not currently in the collection can be ordered through Document Delivery or ordered for the collection in paper or e-format, based upon preference, comfortably within current budget allocations.

Items will be discovered in subject specific databases such as ASFA (Aquatic Science and Fisheries Abstracts), Biological Abstracts, Web of Science and Scopus.



Office of the Registrar

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May 3, 2019

TO: All Members of Faculty Council, Faculty of Science

FROM: Tracey Edmunds, Secretary, Committee on Undergraduate Studies
Faculty of Science (Acting)

SUBJECT: **Proposals for Calendar Changes**

At a meeting held on May 1st, 2019 the Faculty of Science Committee on Undergraduate Studies approved a proposal for a New Special Topics Course from the Department of Ocean Sciences, and agreed that the following items should be forwarded to Faculty Council for information:

1. Department of Ocean Sciences

- (a) Proposal for a New Special Topics Course: OCSC 4910 Hot Topics in Oceanography

Tracey Edmunds

Tracey Edmunds

Memorial University of Newfoundland Undergraduate Calendar Change Proposal Form Cover Page

LIST OF CHANGES

Indicate the Calendar change(s) being proposed by checking and completing as appropriate:

- New course(s): Special Topics course - OCSC 4910 Hot Topics in Oceanography
- Amended or deleted course(s):
- New program(s):
- Amended or deleted program(s):
- New, amended or deleted Glossary of Terms Used in the Calendar entries
- New, amended or deleted Admission/Readmission to the University (Undergraduate) regulations
- New, amended or deleted General Academic Regulations (Undergraduate)
- New, amended or deleted Faculty, School or Departmental regulations
- Other:

ADMINISTRATIVE AUTHORIZATION

By signing below, you are confirming that the attached Calendar changes have obtained all necessary Faculty/School approvals, and that the costs, if any, associated with these changes can be met from within the existing budget allocation or authorized new funding for the appropriate academic unit.

Signature of Dean/Vice-President: _____

Date: _____

Date of approval by Faculty/Academic Council: _____

Memorial University of Newfoundland Undergraduate Calendar Change Proposal Form Senate Summary Page for Courses

COURSE NUMBER AND TITLE

OCSC 4910 Hot Topics in Oceanography

RATIONALE

The proposed course will explore fundamental science behind current oceanographic topics of key importance to the general public. This course is designed to provide a critical scientific understanding of the research on a given topic, spur discussion, and challenge students to see issues from all sides so that they are scientifically and socially prepared to speak on topics important to the public. While they will receive exposure to many of these topics in other courses, this offering would be unique in that it will challenge students to think of these issues from both a scientific and societal perspective. This course will be a valuable senior elective for students enrolled in the undergraduate programs offered by the Department of Ocean Sciences, and it may also be of interest to other students, including but not restricted to those in Biology, Earth Sciences and Environmental Sciences.

Prospective topics include: climate change and ocean circulation; harmful algal blooms; the war on plastics, wastewater (is dilution the solution to pollution?); overfishing vs aquaculture; marine protected areas; ocean acidification; bioprospecting – a sea of opportunities; sea level rise; who owns the Arctic - exploring the implications of an expanding Northwest passage; coral reefs – who cares if they disappear?; not in my backyard - regulating upstream land use. While most of these topics will be covered within the course, the instructor will allow some flexibility to ensure that current events (e.g. hurricanes, oil spills, and emerging marine resources) could be substituted in to capture the opportunity to engage students in current issues.

CALENDAR CHANGES (new entry under 12.9 Ocean Sciences)

4910 Hot topics in Oceanography explores the fundamental science behind current oceanographic topics of key importance, challenging students to think of these issues from both a scientific and societal perspective. Topics of current interest are covered, for example sea level rise, ownership of the Arctic, marine protected areas, climate change, harmful algal blooms, coral reefs, and marine bioprospecting. Lectures are subdivided between learning scientific principles and using them inside student-led debates.

LC: one hour per week

OR: two hours per week discussion and debate, either face to face or online

PR: OCSC 1000 and a minimum of 3 credit hours at the 3000 level in any Science course

Memorial University of Newfoundland Undergraduate Calendar Change Proposal Form Appendix Page

CONSULTATIONS SOUGHT

From	Response Received
Grenfell campus	No
Faculty of Business Administration	No
Faculty of Education	No
Faculty of Engineering & Applied Science	YES
Faculty of Humanities & Social Science	No
Faculty of Science	YES
Department of Biochemistry	
Department of Biology	X
Department of Chemistry	
Department of Computer Sciences	
Department of Earth Sciences	
Department of Economics	
Department of Geography	X
Department of Mathematics and Statistics	X
Department of Physics and Physical Oceanography	X
Department of Psychology	X
Marine Institute	YES
School of Medicine	YES

See Appendix.

LIBRARY REPORT

See Appendix.

RESOURCE IMPLICATIONS

Since this new course will be taught by an existing faculty member at the Department of Ocean Sciences, no additional instructional costs are required.

ADDITIONAL INFORMATION REQUIRED FOR NEW COURSE PROPOSALS

Sample Course Outline and Method of Evaluation

Proposed Course Outline

Each topic will be covered in a series of lecture periods, with 1/3 of each topic section providing a lecture on the fundamental scientific data related to the subject being discussed; 1/3 being a round table discussion of the information being provided through the media and exploring the various perspectives; and the final 1/3 of each topic will be a student-led debate where students will be asked to represent multiple sides of the issue to understand the perspectives of others that they may or may not necessarily agree with. Students will be required to develop points for the debate (grounded in scientific knowledge), describe what they believe is the key issue underlying the confusion or interest surrounding the topic, and prepare a 3-sentence “elevator talk” that they would be able to present if asked about these topics in a public (non-scientific/academic) setting.

Week	PROSPECTIVE TOPICS
1	Climate change and ocean circulation
2	Harmful algal blooms
3	The war on plastics
4	Wastewater- Is dilution the solution to pollution?
5	Overfishing vs aquaculture
6	Marine protected areas
7	Ocean acidification
8	Bioprospecting – a sea of opportunities
9	Sea level rise
10	Who owns the Arctic- exploring the implications of an expanding Northwest Passage
11	Coral reefs - who cares if they disappear?
12	Not in my backyard - regulating upstream land use

Format

1 hour of lecture per week, complemented by 2 hours per week of discussion and debate, portions of which can occur face to face or online.

Evaluation

Assignments (60%) - Each week students will be asked to prepare a 2-page written assignment that includes a list points for the debate, a description of what they believe is the key issue underlying the confusion or interest surrounding the topic and a 3-sentence “elevator talk” that they would be able to provide if asked about these topics in a public (non-scientific/academic) setting. Each of the 12 weekly assignments will account for 5% of the final mark.

Debate & Discussion (15%) – Students will be graded based on their level of preparedness to orally discuss the topic and the level of active engagement in the discussion.

Final Exam (25%) – The final exam will evaluate the student’s level or understanding of the core science behind the topics discussed.

Bibliography: No specific book required as the course material will come from a number of different sources including scientific journal articles and news articles (e.g. CBC, New York Times, other popular news outlets).

Instructor

Dr. Rachel Sipler, Assistant Professor, Department of Ocean Sciences.

Email: resipler@mun.ca

APPENDIX

Request for Feedback sent 5 April 2019

Subject: New course OCSC 4910

Date: Fri, 5 Apr 2019 19:07:53 +0000

From: Fletcher, Garth <fletcher@mun.ca>

To: Associate Dean of Science (Undergraduate) <adsu@mun.ca>, BiocDHundergrad <biocdhundergrad@mun.ca>, Business <fba.ad.undergrad@mun.ca>, chemconsult@mun.ca (chemconsult@mun.ca) <chemconsult@mun.ca>, 'cs-chair@mun.ca' <cs-chair@mun.ca>, Earth Sciences <eascugcon@mun.ca>, Locke, Wade <wlocke@mun.ca>, Hicks, Sue <shicks@mun.ca>, Engineering <enrconsult@mun.ca>, Alcock, Erin <ekalcock@mun.ca>, Grenfell Campus <associatevpoffice@grenfell.mun.ca>, Faculty of Humanities and Social Sciences <hss@mun.ca>, 'mathconsult@mun.ca' <mathconsult@mun.ca>, Medicine <deanofmedicine@med.mun.ca>, 'miugconsultations@mi.mun.ca' <miugconsultations@mi.mun.ca>, Catto, Norm <ncatto@mun.ca>, Physics Head <physicshead@mun.ca>, psychology.head@mun.ca <psychology.head@mun.ca>, Suzanne Dufour <sdufour@mun.ca>, Chapman, Tom <tomc@mun.ca>

CC: amercier@mun.ca <amercier@mun.ca>

Colleagues could you please review our new course proposal OCSC 4910 entitled "Hot topics in Oceanography" and send your comments back to me at your convenience.

Regards

Garth

Garth L. Fletcher
Head and Professor Emeritus
Department of Ocean Sciences
Ocean Sciences Centre
Memorial University
St John's NL
Canada, A1C 5S7

TEL: 709-864-3276

FAX 709-864-3220

Email fletcher@mun.ca

Feedback received

GEOGRAPHY

From: Catto, Norm

Sent: April-08-19 7:46 AM

To: Fletcher, Garth <fletcher@mun.ca>

Subject: RE: New course OCSC 4910

Dear Garth:

Some of the topics listed overlap with courses in our department. Although I don't have a ready solution, it would be good if courses were more widely advertised and available to students outside our own departments. This applies to our courses as well.

Best wishes
Norm

Norm Catto
Head, Department of Geography
Memorial University
St. John's NL A1B 3X9
Canada
1-709-864-7463
Fax 1-709-864-3119

On 16-Apr.-2019 12:09 p.m., Annie Mercier wrote:

Dear Norm:

Many thanks for providing feedback.

We agree; since these are meant to be "hot topics" they will evolve in time but, no matter what, they will always be covered to some extent in other courses. The topics are by nature quite broad (e.g. aspects of climate change, pollution, overfishing, coral reefs) so they are unlikely to be fully covered in any single course. The proposed course will be unique in its format and in expecting that student not only explore the fundamental principles (science) behind the topic but also learn to discriminate between available sources and develop arguments on both sides of a debate. Critical analysis will be key (i.e. beyond "traditional learning").

We will advertise this and other Special Topics courses as broadly as we can, on our website and through social media.

All the best,
Annie

Annie Mercier, PhD
Professor and Deputy Head,
Department of Ocean Sciences
Memorial University (Ocean Sciences Centre)
St. John's, NL, Canada, A1C 5S7
Tel: (709) 864-2011
Email: amercier@mun.ca
www.mun.ca/osc/amercier/bio.php

MEDECINE

From: cvardy@mun.ca [mailto:cvardy@mun.ca]
Sent: April-08-19 1:56 PM
To: Fletcher, Garth <fletcher@mun.ca>
Cc: DeanofMedicine@med.mun.ca
Subject: FW: New course OCSC 4910

Good afternoon Dr. Fletcher

The Faculty of Medicine supports the new course proposal for OCSC 4910.

Regards

CATHY VARDY, MD, FRCPC | VICE DEAN AND PROFESSOR OF PEDIATRICS

Faculty of Medicine
Health Sciences Centre
Room M2M319
Memorial University of Newfoundland
St. John's, Newfoundland | A1B 3V6

PSYCHOLOGY

From: Head Psychology
Sent: April 8, 2019 8:27 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: RE: New course OCSC 4910

Hi Garth,

Looks like a very topical and thorough course...Should attract much student interest.

Ken

ENGINEERING

From: Engineering Consult <enrconsult@mun.ca>
Sent: Tuesday, April 9, 2019 8:10 AM
To: Fletcher, Garth
Cc: Fisher, Andrew; Edmunds, Jayde; Bruce Quinton
Subject: Re: New course OCSC 4910

Dear Dr. Fletcher,

Thank you for the opportunity to comment on the proposed new course OCSC 4910 "Hot Topics in Oceanography".

If this is a special topics course, then it needs no approval beyond the Faculty of Science. Despite the variability in the topics that may be covered from one semester to the next, it could be a regular course that could be added to lists of elective courses for your students.

I see no impact on Engineering programs and I am happy to support this new course.

Yours sincerely,

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

SCIENCE

From: Associate Dean of Science (Undergraduate)
Sent: April-15-19 3:52 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: RE: New course OCSC 4910

Hi Garth,

The Dean's office is concerned about having a fourth year course that anyone can take as long as they have taken a half course at the 1000 level.

We feel that if this is a 4000 level course, there should be 2nd and 3rd year requirements.

Travis

DR. TRAVIS FRIDGEN | ASSOCIATE DEAN OF SCIENCE
(Administration & Undergraduate)
Professor of Chemistry
Memorial University
St. John's, NL , Canada A1B 3X7
T 709-864-8155
<http://www.faculty.mun.ca/tfridgen/>

On 16-Apr.-2019 10:36 a.m., Annie Mercier wrote:

Dear Travis:

Many thanks for providing feedback on the proposal.

The course was originally designed by the instructor to be accessible to students from a diversity of programs rather than exclusively to students in Ocean Sciences (to help diversify the perspectives). In light of your concerns, I have consulted with the instructor and with OSCUP. We take your point that students could gain access to the course too early, without the appropriate background. To remediate this while maintaining broad access, we propose the following prerequisites: OCSC 1000 and a minimum of 3 credit hours at the 3000 level in any Science course.

Best regards,

Annie

Annie Mercier, PhD
Professor and Deputy Head,
Department of Ocean Sciences
Memorial University (Ocean Sciences Centre)
St. John's, NL, Canada, A1C 5S7
Tel: (709) 864-2011
Email: amercier@mun.ca
www.mun.ca/osc/amercier/bio.php

MATHEMATICS

From: Math Consult [mailto:mathconsult@mun.ca]
Sent: April-16-19 2:33 PM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: RE: New course OCSC 4910

Math and Stats has no comments.

Personally, I think this is a great course! Very happy to see a course like this at Memorial!

Tara

--

Tara Stuckless
HH 3004, ext. 8914
Chair, Undergraduate Studies Committee
Dept. of Mathematics and Statistics

MARINE INSTITUTE

From: MIUG Consultations [mailto:MIUGconsultations@mi.mun.ca]
Sent: April-17-19 11:28 AM
To: Fletcher, Garth <fletcher@mun.ca>
Cc: Fred Anstey <Fred.Anstey@mi.mun.ca>
Subject: RE: New course OCSC 4910

Dear Garth,

Thank you for the opportunity to review and comment on the proposal for the new course OCSC 4910. Your new course was sent to the School of Ocean Technology and the School of Fisheries for consultation. Both Schools replied with favorable comments, with Fred Anstey, Head of the School of Fisheries, being very supportive. The Marine Institute is happy to support the proposal.

Regards,
Bev

Bev Fleet
Chair, Undergraduate Studies Committee
Marine Institute, Memorial University
TEL: 709-778-0369
FAX: 709-778-0535
Bev.Fleet@mi.mun.ca

PHYSICS

From: Physics Head
Sent: April-18-19 9:18 AM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: Re: New course OCSC 4910

Hi Garth,

Comments from us in Physics are minimal. Below is from our undergrad studies.

“This proposed course will have no effect on our programs. Nothing seems wrong with this type of course. “Hot topics” seems a little colloquial.”

Kris
 Kristin Poduska, Ph.D.
 Professor and Head
 Department of Physics and Physical Oceanography
 Memorial University of Newfoundland
 St. John's, NL A1B 3X7
 Canada
 URL: <https://www.mun.ca/physics/>

BIOLOGY

Subject:Re: New course OCSC 4910

Date: Thu, 18 Apr 2019 17:39:06 -0230

From: Suzanne Dufour <sdufour@mun.ca>

To: Fletcher, Garth <fletcher@mun.ca>, Annie Mercier <amercier@mun.ca>, Jody-Lynn Burke <jrotchford@mun.ca>

Dear Garth,

The Biology Undergraduate Committee has reviewed the proposed course OCSC 4910. We feel it is an interesting course and see the value of having students engage with material that forces them to look at science in a societal context. One concern that was brought up was the fact that this is proposed to be a 4th year (4000-level) course, yet it only has one 1000-level course as prerequisite. We recommend that students should also have completed an appropriate number of credit hours before being able to enroll in this course - this would effectively ensure that the course is available to more advanced students, rather than students in their second semester, while also accommodating students from different programs. We also wonder how the course will deliver the knowledge and skills to the students so that they will be able to critically evaluate these important ocean issues in a societal context. Our students have very little grounding in economics, social science and politics, and so without some basic training and exposure to this ideas, the weekly debates might be somewhat shallow. Perhaps by integrating some guest lectures from across disciplines (e.g., Barb Nies is a social scientist who has done lots of ocean-themed work; there are folks in Geography, History, PoliSci, Economics, who could contribute) this can be achieved? The two papers below are potentially helpful "food for thought" in the preparation of this course, and could also be useful introductory readings for the students (students in Conservation Biology II read the Bennett et al. 2016 annually and find it helpful and eye opening).

Bennett, NJ et al. 2015. Conservation social science: understanding and integrating human dimensions to improve conservation. Biological Conservation DOI: 10.1016/j.biocon.2016.10.006

Bennett, NJ. et al. 2016. Mainstreaming the social sciences in conservation. Conservation Biology. DOI: 10.1111/cobi.12788

Best wishes,
 Suzanne

On 22-Apr.-2019 11:09 a.m., Annie Mercier wrote:

Dear Suzanne:

Many thanks for your valuable input.

To make sure the students are adequately prepared, we have now adjusted the prerequisites to: OCSC 1000 and a minimum of 3 credit hours at the 3000 level in any Science course.

We thank you for your thoughtful feedback regarding incorporation of societal aspects through guest lectures and introductory readings. We will pass them along to the instructor. Importantly, she has successfully taught a course like this one before (in a previous position). So with her experience and your suggestions, we are confident the course will be a success.

All the best,
Annie

Annie Mercier, PhD
Professor and Deputy Head,
Department of Ocean Sciences
Memorial University (Ocean Sciences Centre)
St. John's, NL, Canada, A1C 5S7
Tel: (709) 864-2011
Email: amercier@mun.ca
www.mun.ca/osc/amercier/bio.php

Library Report

From: Alcock, Erin
Sent: April-23-19 9:06 AM
To: Fletcher, Garth <fletcher@mun.ca>
Subject: Re: New course OCSC 4910

Dr. Fletcher,

I have reviewed the course proposal and find that the MUN Library system will have more than sufficient resources to support OCSC 4910. Both the scientific and societal aspects of this course will be well covered in the periodical literature and accessed easily through our numerous databases. I am happy to provide a more thorough analysis if required.

Please accept my apologies for missing this yesterday.

Best,

Erin Alcock

--

Erin Alcock
Science Research Liaison Librarian
QEII Library : Memorial University of Newfoundland
ekalcock@mun.ca : 709-864-8316



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 gs@mun.ca

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

Course No.: Math ~~6326~~ 6333

Course Title: Representation theory

I. To be completed for all requests:

A. Course Type: Lecture course Lecture course with laboratory
 Laboratory course Undergraduate course¹
 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. Will additional library resources be required (if yes, please contact munul@mun.ca for a resource consultation)? Yes No

E. Credit hours for this course: 3

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

G. Method of evaluation:	Written	Percentage	Oral
Class tests	20		<input type="checkbox"/>
Assignments	30		<input type="checkbox"/>
Other (specify):			<input type="checkbox"/>
Final examination:	50		<input type="checkbox"/>
Total			

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

Y. Soliman
Course instructor

February 23, 2019
Date

[Signature]
Approval of the head of the academic unit

March 12, 2018
Date

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

Secretary, Faculty/School/Council

Date



Department of Mathematics and Statistics

St. John's, NL Canada A1C 5S7
 Tel: 709 864 8784 Fax: 709 864 3010
 mathstat@mun.ca, www.mun.ca/math

Representation Theory

Course proposal

Math 6333

1 Description

A representation of an algebraic object is a realization of this object via linear transformations of a vector space. With the help of a representation, the algebraic object takes a concrete form; after choosing a basis of the vector space, the object is in fact represented by explicit matrices. This point of view is in a sense opposite to the idea to study the algebraic object abstractly by investigating only the relations between its elements.

Representations can be considered for many algebraic objects, such as groups, both finite and infinite, associative algebras, Lie algebras, and many others. Two representations are considered equivalent if one arises from the other by a change of basis. It turns out that algebraic objects can have different representations that are not equivalent. The basic question of representation theory is to understand in which essentially different forms an algebraic object can be realized.

Because the question of how an algebraic object can be realized is fundamental, representation theory has many applications, not only in pure mathematics, but also in information theory, computer science, and especially in theoretical physics, notably for the construction of quantum-field theoretical models in elementary particle physics. A particular famous instance of the latter was the prediction of the Ω^- -particle from the representation theory of the Lie group $SU(3)$ by Murray Gell-Mann in 1961, one of the things for which he was awarded the Nobel prize in physics in 1969.

2 Objectives

The objective of the course is to introduce the student to representation theory, beginning with the representation theory of finite groups over algebraically closed fields of characteristic zero. This includes especially the theory of group

characters. As an important example, the representation theory of the symmetric group will be treated, whose representations can be described via Young tableaux. If there is still time at the end of the course, a variety of topics can be covered, for example, the representation theory over fields of positive characteristic, the so-called modular representation theory. Another possible topic would be the generalization of the theory from finite groups to compact Lie groups. This relates to the representation theory of another algebraic object, namely Lie algebras, leading to the theory of weights.

3 Prerequisites

Although there are no formal prerequisites, it is expected that the student is familiar with linear algebra, comparable to the material taught in MATH 6351 (Advanced Linear Algebra). Also expected is some familiarity with abstract algebra, especially group theory, as taught for example in one of the courses MATH 3320, MATH 4321, or MATH 6320.

4 Course outline

1. Representations

- Definition of a representation
- Subrepresentations and factor representations
- Irreducibility and complete reducibility of a representation
- Basic examples: Symmetric and alternating groups of small order
- Tensor products of representations

2. Characters

- Definition of a character
- Schur's lemma
- Orthogonality relations
- Character tables
- Examples of character tables

3. The group algebra

- Definition of the group algebra
- Maschke's theorem on the semisimplicity of the group algebra
- Wedderburn-Artin theory of semisimple algebras

4. Induced representations

- Definition of an induced representation
- Character of an induced representation
- Frobenius' reciprocity theorem
- Theorems of Artin and Brauer

5. Representations of symmetric groups

- Partitions
- Young diagrams and Young tableaux
- Specht modules
- Frobenius' formula for the characters of the representations
- Hook length formula for the dimensions of the representations

5 Evaluation

Although the precise evaluation scheme is left to the individual instructor, a possible evaluation would consist of a contribution of 30 % of the final mark for homework, consisting of a weekly exercise sheet of about four problems, 20 % of the final mark for a written midterm examination with a duration of about an hour, and the remaining 50 % for a written final examination with a duration of two to three hours.

6 Textbooks

W. Fulton/J. Harris: Representation theory—a first course, Grad. Texts Math., Vol. 129, Springer, Berlin, 2004

J.-P. Serre: Linear representations of finite groups. Grad. Texts Math., Vol. 42, Springer, Berlin, 1977

E. B. Vinberg: Linear representations of groups, Basler Lehrbüch., Vol. 2, Birkhäuser, Basel, 1989

*Changes to the Univeristy Calendar (2018-19) regarding the degree of Master of Science***25.18.3 Courses**

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

Mathematics

:6320 Group Theory
 6321 Ring Theory
 6322 Nonassociative Algebra
 6323 Homological Algebra
 6324-6329 Special Topics in Algebra
 6330 Analytic Number Theory
 6331 Algebraic Number Theory
 6332 Point Set Topology
6333 Representation Theory
 6340 Graph Theory
 6341 Combinatorial Design Theory
 6342 Advanced Enumeration
 6343-6349 Special Topics in Combinatorics
 6351 Advanced Linear Algebra
 :

*Changes to the Univeristy Calendar (2018-19) regarding the degree of Doctor of Philosophy***32.25.4 Courses**

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

Mathematics

:
 6320 Group Theory
 6321 Ring Theory
 6322 Nonassociative Algebra
 6323 Homological Algebra
 6324-6329 Special Topics in Algebra
 6330 Analytic Number Theory
 6331 Algebraic Number Theory
 6332 Point Set Topology
6333 Representation Theory
 6340 Graph Theory
 6341 Combinatorial Design Theory
 6342 Advanced Enumeration
 6343-6349 Special Topics in Combinatorics
 6351 Advanced Linear Algebra
 :



School of Graduate Studies

Request for Approval of a Graduate Course

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

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

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

Course No.: Math 6329

Course Title: Galois theory

I. To be completed for all requests:

A. Course Type: Lecture course Lecture course with laboratory
 Laboratory course Undergraduate course¹
 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. Will additional library resources be required (if yes, please contact munul@mun.ca for a resource consultation)? Yes No

E. Credit hours for this course: 3

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

G. Method of evaluation:	Written	Percentage	Oral
Class tests	20		
Assignments	30		
Other (specify):			
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:

- | | |
|--|-----------------------|
| | Instructor's initials |
| 1. duplication of thesis work | YS |
| 2. double credit | YS |
| 3. work that is a faculty research product | YS |
| 4. overlap with existing courses | YS |

Recommended for offering in the Fall Winter Spring 20 19

Length of session if less than a semester: N/A

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

Y. Soumichäuser
Course instructor

April 17, 2019
Date

[Signature]
Approval of the head of the academic unit

April 23, 2019
Date

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

Secretary, Faculty/School/Council

Date



Department of Mathematics and Statistics

St. John's, NL Canada A1C 5S7
 Tel: 709 864 8784 Fax: 709 864 3010
mathstat@mun.ca, www.mun.ca/math

Galois Theory

Proposal for a Special Topics Course

1 Generalities

Galois theory grew out of the attempt to solve polynomial equations. An important topic in high-school mathematics is the quadratic formula, which gives explicitly the solutions of a quadratic equation in terms of its coefficients. For centuries, mathematicians wondered whether there are similar formulas for equations of higher degree. The formula for cubic equations, i.e., polynomial equations of degree 3, was found in the 16th century during the renaissance by S. del Ferro, N. Tartaglia, G. Cardano, and others; the story of its discovery and the various intrigues surrounding it have been the subject of much historical research and even novels. A formula for quartic equations, i.e., equations of degree 4, was found by Cardano's student L. Ferrari relatively shortly thereafter.

This, of course, left open the question whether similar formulas exist for quintic equations or equations of higher degree. It again took centuries before it was realized that such formulas do in fact not exist. A proof of this result was first published by P. Ruffini in 1799; but, due to remarkable circumstances, his result did not attract much attention. The result became better known when it was rediscovered by N. H. Abel in 1824. Both Ruffini's and Abel's proofs are not completely rigorous by today's standards; in fact, the necessary theory was not fully developed by that time. A major contribution toward the further development of that theory was made by É. Galois, who, however, did not have the time to bring this theory to its finished form, as he died young in a duel on May 30, 1832. The course is about the theory that arose from his manuscripts.

2 Description

It is the objective of this special topics course to introduce the student to Galois theory. A basic concept of the theory is the notion of a field and the related notion of a field extension. It is necessary to contemplate field extensions,

because the solutions of a polynomial equation do usually not lie in the same field in which the coefficients of the equation lie, but rather in an extension of that field. An important result obtained relatively early in the course is the fundamental theorem of Galois theory, which relates the subfields of a field to subgroups of a certain automorphism group, the so-called Galois group. It is this result that makes it possible later to relate the existence of a formula for the solution of the general polynomial equation of degree 5 or higher to certain group-theoretical properties of the symmetric group, and to prove in this way that such a formula does not exist.

The course then progresses by developing this theory further. Fundamental topics are the splitting field of a polynomial, multiple roots of a polynomial and separability, primitive elements and normal bases, and the classification of finite fields. After developing the theory to this point, it is possible to prove the non-existence of the above-mentioned formula.

There are additional topics to be discussed after achieving this goal. These are in particular cyclotomic polynomials and cyclotomic fields, as well as the existence of an algebraic closure for any field. Time permitting, additional topics can be included, like trace and norm, composites of fields, and Kummer extensions.

3 Prerequisites

Although there are no formal prerequisites, it is expected that the student is familiar with linear algebra, comparable to the material taught in MATH 6351 (Advanced Linear Algebra). Also expected is some familiarity with abstract algebra, especially group theory, as taught for example in one of the courses MATH 3320, MATH 4321, or MATH 6320.

4 Course outline

1. Groups and fields
 - Dedekind's independence theorem for characters
 - The Galois group
 - The fundamental theorem of Galois theory
2. Fields and polynomials
 - The splitting field of a polynomial
 - Separable polynomials and separable field extensions

- Normal field extensions
 - Primitive elements
 - Normal bases
 - Finite fields
3. The solvability of polynomial equations by radicals
 - Galois' criterion
 - The general equation of n -th degree
 4. Additional topics in field theory
 - Cyclotomic polynomials and their irreducibility
 - Cyclotomic fields and their Galois groups
 - Algebraic closures

5 Evaluation

Although the precise evaluation scheme is left to the individual instructor, a possible evaluation would consist of a contribution of 30 % of the final mark for homework, consisting of a weekly exercise sheet of about four problems, 20 % of the final mark for a written midterm examination with a duration of about an hour, and the remaining 50 % for a written final examination with a duration of two to three hours.

6 Textbooks

The material of the course is covered in full in standard textbooks on abstract algebra, such as

D. S. Dummit/R. M. Foote: Abstract algebra, 3rd ed., Wiley, Hoboken, 2004

T. W. Hungerford: Algebra, Grad. Texts Math., Vol. 73, Springer, Berlin, 1974

N. Jacobson: Lectures in abstract algebra III: Theory of fields and Galois theory, Grad. Texts Math., Vol. 32, Springer, Berlin, 1964

There are, however, also special books concerned only with this topic, such as

P. Morandi: Fields and Galois theory, Grad. Texts Math., Vol. 167, Springer, Berlin, 1996

J. J. Rotman: Galois theory, 2nd ed., Universitext, Springer, Berlin, 1998



Department of Psychology

Memorial University of Newfoundland
 Science Building Room 2065
 St. John's, NL Canada A1B 3X9
 Tel: 709 864 8496 Fax: 709 864 2430
 psych@mun.ca www.mun.ca

Date: March 29, 2019

TO: School of Graduate Studies

FR: Department of Psychology

RE: Proposed Calendar Changes to implement changes in required courses for the Psy.D. program

The department would like to improve our Psy.D. program by requiring an additional course and no longer requiring one other course.

First, we are proposing to add an additional required class to the PsyD program curriculum. This class would be called PSYC 7021 – Practicum in Adult Assessment and Diagnosis II. For reasons explained in more detail below, we are essentially proposing to split PSYC 7020 – Practicum in Adult Assessment and Diagnosis into two courses, where PSYC 7020 would be renamed to PSYC 7020 – Practicum in Adult Assessment and Diagnosis I and PSYC 7021 would allow us to expand on this content and focus on additional skill development. Currently, PSYC 7020 is offered in the Winter semester of year 1. We propose to move PSYC 7020 to the Fall of Year 1 and offer PSYC 7021 in the Winter semester of Year 1.

The demands of PSYC 7020 as it is currently offered exceeds the expectations of a graduate course. The number of direct hours that the students are currently required to devote to PSYC 7020 is 56, far exceeding the 39 direct hours normally required in our non-lab courses. The students also are required to spend considerable amount of time outside of class on reading, writing, and practice. PSYC 7020 is an important foundational course. The content is required for them to be successful in their clinical practicums within Eastern Health and it provides students with the experience necessary to complete their comprehensive exams. Students can also count the assessment hours towards the required number of comprehensive assessments necessary for their APPIC applications, making them more competitive for these internships. The amount of foundational content that is required to be taught in the course necessitates this condensed learning timeline, but it also means that the students do not have much time for the learning to be consolidated or to develop confidence in their application of these skills. Given the importance of these skills and that assessment is a core competency identified by the Canadian Psychological Association, we feel strongly that we need to spread the content over two semesters as to allow us to provide the students with more opportunity to build competence and confidence with the material, thus better preparing them to use the skills in future.

The number of direct teaching hours that the instructor is required to commit to PSYC 7020 is 82. The reason that instructor contact time is so much greater in PSYC 7020 than other PsyD classes is that the instructor has to both teach the students interviewing and assessment skills and be physically present for each of the student's individual assessments. Each student is required to complete one comprehensive assessment in order to pass the course. A comprehensive assessment involves interviewing the client and administering at least three measures (including at least one each from cognitive, personality, and symptom

categories). The time required to interview and administer the measures is approximately 5-6 hours for each client. Because the students are working with an actual client, the assessment needs to be conducted under the professional licence of a registered psychologist. With a cohort of 6 students, the instructor is required to spend 36 hours supervising these assessments, which does not include the time needed to teach skills in interviewing, measure administration and interpretation, and report writing.

Essentially, as it currently operates, PSYC 7020 serves as both a class where students are learning how to administer and interpret psychological tests and also as a practicum where they are expected to apply these skills with a real client and provide feedback on the assessment results. The addition of the new class (PSYC 7021) would allow us to use PSYC 7020 to focus on the acquisition of skills in clinical interviewing, diagnosis, and the administration and interpretation of selected instruments and PSYC 7021 will focus on the application of these skills to client care and to develop competence in case formulation, case consultation, report writing, and the provision of feedback to clients. It would take pressure off the students and faculty to allow for better overall opportunities and consolidation of learning.

In addition to adding this new course as a required course for the program, we also propose to no longer require PSYC 6632 – Community Interventions. The content of this course is not required by the Canadian Psychological Society for accredited clinical psychology programs. For this reason, we have decided to remove this course to create room for the above proposed PSYC 7021. The teaching capacity that was used to teach PSYC 6632 would be shifted to teach PSYC 7021.

The proposed calendar changes are below, with additions in underline and deletions in strikethrough. The course approval form and proposed course syllabus for PSYC 7021 are attached.

35.3 Program of Study

Students are required to successfully complete at least 63 credit hours in regulation graduate courses. These include:

- a. 6 credit hours in statistics and research design courses (6000, 6602);
- b. ~~30~~ 27 credit hours in core courses (6611, 6612, 6620, 6623, 6630, 6631, ~~6632~~, 6633, 6650, 6670);
and
- c. ~~27~~ 30 credit hours in practicum courses (7010, 7020, 7021, 7022, 7030, 7031, 7032, 7033, 7034, 7035).

Students must also complete a year-long internship, pass a comprehensive exam and successfully complete a research thesis.

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35.4 Courses

- 6000 Advanced Statistics
- 6001 Research Design
- 6602 Research Design in Clinical Psychology
- 6611 Ethics of Professional Practice
- 6612 Adult Psychopathology
- 6614 Selected Topics in Psychopathology
- 6620 Principles of Adult Assessment and Diagnosis
- 6621 Principles of Child Assessment and Diagnosis
- 6622 Selected Topics in Assessment and Diagnosis
- 6623 Child Psychopathology, Assessment and Diagnosis
- 6630 Principles of Intervention with Adults
- 6631 Principles of Intervention with Children

- 6632 Community Interventions
- 6633 Clinical Psychopharmacology
- 6634 Selected Topics in Intervention
- 6640 Consultation Processes
- 6650 Supervision
- 6660-6669 Special Topics in Clinical Psychology
- 6670 Interprofessional Education (*3 credit hours over six terms: Fall and Winter terms for Years 1, 2, and 3*)
- 7010 Practicum in Ethics and Relationship Skills
- 7020 Practicum in Adult Assessment and Diagnosis I
- 7021 Practicum in Adult Assessment and Diagnosis II
- 7022 Practicum in Child Assessment and Diagnosis
- 7030 Practicum in Assessment and Intervention I
- 7031 Practicum in Assessment and Intervention II
- 7032 Practicum in Assessment and Intervention III
- 7033 Practicum in Advanced Assessment and Intervention I
- 7034 Practicum in Advanced Assessment and Intervention II
- 7035 Practicum in Rural Intervention and Interprofessional Practice
- 7050 Practicum in Supervision I
- 7051 Practicum in Supervision II



Request for Approval of a Graduate Course

Paper 6.B.c (page 47 of 52)

School of Graduate Studies

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.: PSYC7021

Course Title: Practicum in Adult Assessment II

I. To be completed for all requests:

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

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: teaching assistants and standardized patients - to be covered by department funds

D. Will additional library resources be required (if yes, please contact munul@mun.ca for a resource consultation)? Yes No

E. Credit hours for this course: 3

F. Course description (reading list required):
See Attached Draft Syllabus

G. Method of evaluation:	Written	Percentage	Oral
Class tests			
Assignments			
Other (specify):	100%		
Final examination:			

Total Pass/Fail

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:

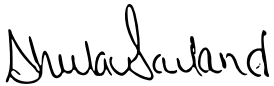
Instructor's initials

- 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 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



January 20, 2019

Course instructor

Date

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

NEW GRADUATE COURSE PROPOSAL

1. COURSE INFORMATION

Psychology 7021: Practicum in Adult Assessment II (to be offered in Winter 2020)

2. COURSE DESCRIPTION

The purpose of this course is to provide students with the opportunity to apply the skills in clinical interviewing, diagnosis, and the administration and interpretation of selected instruments learned in PSYC7020 and build competence in case formulation, case consultation, report writing, and the provision of feedback to clients. Students will work with both standardized patients and community referrals. Students will conduct a comprehensive assessment, integrate these findings into a final report, and provide feedback to the client and/or referral source. Students will also observe the assessments conducted by their peers, actively participate in case consultation, and provide feedback to other students on their cases. The comprehensive reports will consist of at least one cognitive, one personality, and one symptom scale as determined by the referral question.

3. RESOURCE IMPLICATIONS

This course will be taught by an existing faculty member (S. Garland) but will require funds to cover the extra teaching by an existing faculty and the use of standardized patients.

4. RATIONALE

The Doctor of Psychology students are not currently meeting the assessment training hours to be competitive nationally for psychology internships. This course will significantly increase PsyD student's assessment training hours and build more advanced assessment skill making them competitive for CPA accredited internship sites. In addition, students will be able to enter community practicum sites in Eastern Health with advanced diagnostic and case conceptualization skills that will facilitate assessing more complex patients that require more specialized mental health services.

5. REQUIRED TEXTS

- Groth-Marnat, G. (2016). Handbook of Psychological Assessment (6th Ed), Hoboken. NJ: John Wiley & Sons.
- Lichtenberger, E. O. & Kaufman, A. S. (2012). Essentials of WAIS-IV Assessment (2nd Ed). Hoboken. NJ: John Wiley & Sons.
- Morey, L. C. (2003). Essentials of PAI Assessment. Hoboken. NJ: John Wiley & Sons.
- Sommers-Flanagan, J. & Sommers-Flanagan R. (2016). Clinical Interviewing (6th Ed). Hoboken. NJ: John Wiley & Sons.
- Suhr, J.A. (2015) Psychological assessment: A problem-solving approach. Guilford Press.

6. FORMAT

This is an intensive 12-week practicum with 360-degree evaluation (self, peer, and instructor). All students will conduct a comprehensive assessment and observe the assessments conducted by their classmates. Each individual assessment consists of an interview (8 hours), case formulation (4

hours), administration of measures (8 hours), scoring of the measures (2 hours), interpretation of the measures (2 hours), writing and revising the assessment reports (12 hours), and providing feedback to the client and/or referring provider and debriefing (12 hours). The total number of student hours is 48 hours.

7. SAMPLE COURSE OUTLINE

Weeks 1-3	Interviewing and Case Formulation (12 hours)
Week 4-6	Test Administration and Interpretation (12 hours)
Week 7-9	Case Consultation and Report Writing (12 hours)
Week 10-12	Feedback Sessions and Debriefing (12 hours)

8. ASSESSMENT OF LEARNING **See Assessment Rubrics Below**

Final Assignment: Comprehensive Report

Complete a comprehensive assessment (client interview, test administration, scoring, and interpretation) and submit a written report integrating the findings. Students are expected to respect confidentiality and to behave in a professional and ethical manner at all times. The student will participate in a feedback session with the client and referral source to present the report and findings. This report will be reviewed by the assigned TA and instructor in advance of the final report and feedback session.

Pass/Fail (A Pass is required to successfully complete the course).

Measure Administration and Interpretation Assessment Rubric. To pass the assignment all assessment criteria must be met at least at an adequate level.

Assessment criteria	Level of performance		
	Excellent/ good	Adequate	Not met
	STUDENT DEMONSTRATES BASIC COMPETENCY		STUDENT NOT COMPETENT
Test administration			
Follows test manual administration and instruction	All instructions in manual followed.	Occasional errors in testing but not sufficient to reduce the validity of the test	Significant errors in test administration which make this administration invalid
Organisation and familiarity with materials	Student is well organised during the testing and displays proficiency and confidence in handling test materials, application of discontinue rules, prompts etc, and manages use of record sheet smoothly	Student is moderately organised, shows some signs of hesitation or uncertainty in handling materials and administering items but this does not reduce the validity of the test	Student not appropriately prepared for administration of the test. Student is disorganised, confused or fails to respond appropriately to errors or misunderstandings made by 'client', or fails to seek additional information when required. Likely to make the administration invalid
Appropriate interpersonal interaction during testing	'Client' set at ease, manages a good pace in the assessment, speaks clearly, is pleasant and encouraging without violating administration rules	Student shows some nervousness in the interaction, make need to adjust the pace or volume of their speech a little or may make awkward remarks, but is generally pleasant and appropriate and validity of test not reduced	Inappropriate feedback to 'client' about progress, speaks unclearly, (mumbles, too loud, too soft, too fast), shows own discomfort in situation. Likely to make the administration invalid
Record form			
Record form correctly filled out	Student has used all required parts of form and information is in correct sections	Mostly correct use of record form, with one or two minor omissions that make no significant impact to the outcome of the assessment, responses recorded verbatim	Student has not used the form correctly, multiple errors in form use, responses not recorded verbatim. Errors reduce validity of assessment
Scoring is correct	Scoring is correct, and where interpretation is required, student has made a good effort at a correct interpretation	There may be minor errors in scoring, that have no substantive impact of the outcome of the assessment	Significant errors have been made in scoring such as failing to apply discontinue rules or to count all items, poor decisions made in applying scoring rules. Errors reduce validity of assessment

Comprehensive Report Evaluation Criteria

Assessment criteria	Level of performance		
	Excellent/Good	Adequate	Not met
Background Information	<p>Reason for referral presents a clear guide for the evaluation.</p> <p>Background information presents a picture of the client and sets up a foundation for understanding his or her strengths and needs.</p> <p>Observations are written clearly and in observable terms.</p>		
Data Analysis and Interpretation: Information typically included	<p>Interpretations of data are reasonable and accurate and explain the individual's functioning on a given instrument.</p> <p>Interpretations of data include discussion of normative performance (e.g. Scaled Scores, Standard Scores, t-Scores, Percentile Ranks).</p> <p>Interpretations of data are reasonable and accurate and explain the individual's functioning and behaviours on a given task.</p> <p>Interpretations of data are free of psychometric inaccuracies and/or conceptual misunderstandings.</p>		
Synthesis and Application	<p>Conclusions provide the essential information regarding the student, avoids introducing new data, and offers a summary of strengths and needs.</p> <p>Conclusion answers the referral questions or addresses the reason for referral and guides interventions offered.</p> <p>Report functions as a problem-solving assessment linking recommendations to interventions.</p> <p>Recommendations are realistic and consistent with evaluation findings and can be understood by the reader.</p>		
Style, Clarity, and Communication	<p>Report is readable, absent of jargon, consistent, and easy to understand.</p> <p>Report is organized, logical, meaningful, and appropriate in length.</p> <p>Content is free of typographical errors and misspellings. Grammar and sentence structure are appropriate.</p>		