October 9, 2015

To: Curriculum Committee:
Scott Delcourt
Ali Abedi
Pat Burnes
Deborah Rooks-Ellis
Grant Miles
Xuan Chen
Deborah Rollins
Matthew Biddle

Fr: Jessica Ouellette, Administrative Support Supervisor

Re: **Curriculum Committee, October 13 , Stodder Hall, Room #48**

The following courses will be presented on Tuesday, October 13 at 1:30 p.m. in the Graduate School's Conference Room, 48 Stodder Hall.

1. 1:35-1:45 **CMJ 693**
No Presentation required

2. 1:45-2:00 **BIO 580** and **BIO 583**
Dr. Kristy Townsend

3. 2:00-2:10 **SFR 521**
Dr Robert Wagner- telephone conference call

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GRADUATE SCHOOL

NEW COURSE PROPOSAL/MODIFICATION/ELIMINATION FORM FOR GRADUATE COURSES

GRADUATE PROGRAM/UNIT: Communication / Communication and Journalism Department

COURSE DESIGNATOR: CMJ COURSE NUMBER: 693 EFFECTIVE SEMESTER: Fall 2015

COURSE TITLE: CMJ 693 - Reading for Graduate Comprehensive Exams

REQUESTED ACTION:

NOTE: A complete syllabus is required for all new courses and for the addition of an electronic learning component [1] to an existing course.

NEW COURSE (check all that apply and complete Section 1):

- ☐ New Course
- ☐ New Course with Electronic Learning [1]
- ☐ Experimental

MODIFICATION (Check all that apply and complete Section 2):

- ☐ Designator Change
- ☐ Number Change
- ☒ Title Change
- ☒ Description Change
- ☐ Prerequisite Change
- ☐ Credit Change
- ☐ Cross Listing (must be at least 400-level) [2]
- ☐ Addition of Electronic Learning Component [1]
- ☐ Other (specify) _____

ELIMINATION:

- ☐ Course Elimination

ENDORSEMENTS (Print name)	Date	Sign Initials
Leader, Initiating Department/Unit(s)		
Nathan Stormer	8/18/15	NS
College(s) Curriculum Committee Chair(s) [if applicable]		
Laura Artesani	9/15/15	LA
College Dean(s)		
Timothy M. Cole	9/15/15	TMC
Graduate School		

1. If a course involves significant electronic access for the primary delivery of its content (more than 50%), the course proposal should specify faculty training/experience in use of technology and how the electronic delivery will be managed. Please consult with the Office of Distance Education for more information.
2. Courses cross-listed below 400-level require the permission of the Graduate School.

SECTION 1 (FOR NEW COURSE PROPOSALS):

Proposed Catalog Description (include designator, number, title, prerequisites, credit hours):

Components (type of course/used by Student Records for MaineStreet) – *Multiple selections are possible for courses with multiple non-graded components:*

- ☐ Applied Music
- ☐ Clinical
- ☐ Field Experience/Internship
- ☐ Research
- ☐ Studio
- ☐ Laboratory
- ☐ Lecture/Seminar
- ☐ Recitation
- ☐ Independent Study
- ☐ Thesis

Text(s) planned for use:

Course Instructor (include name, position, teaching load):

Reason for new course:

Does the course addition require additional department or institutional facilities, support and/or resources, e.g. new lab facilities, computer support and services, staffing (including graduate teaching assistants), or library subscriptions and resources?

- ◯ No. The department will not request additional resources for this course.
- ◯ Yes. Please list additional resources required and note how they will be funded or supported.

What other departments/programs are affected (e.g. course overlap, prerequisites)? Have affected departments/programs been consulted? Any concerns expressed? Please explain.

How often will this course be offered? Will offering this course result in overload salary payments, either through the college or CED, either to the instructor of this course or to anyone else as a result of rearranging teaching assignments?

SECTION 2 (FOR COURSE MODIFICATIONS):

Current catalog description (include designator, number, title, prerequisites, credit hours):

CMJ 693 - Reading for Master's Comprehensive
Reading for Master's Comprehensive
Prerequisites & Notes: permission.
Credits: 1

Proposed catalog description (include designator, number, title, prerequisites, credit hours):

CMJ 693 - Reading for Graduate Comprehensive Exams
Reading for Graduate Comprehensive Exams
Prerequisites & Notes: permission.
Credits: 1

Reason for course modification:

The recent addition of the I.Ph.D. in Communication and Mass Communication broadens the need for this course among our graduate students to Ph.D. students within the department who have completed their required program of study coursework for their degree, are in the process of preparing for their comprehensive exam, must maintain continuous enrollment as a graduate student, and are a semester away from beginning their dissertation research hours.

SECTION 3 FOR COURSE ELIMINATIONS:

Reason for Elimination

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NEW COURSE PROPOSAL/MODIFICATION/ELIMINATION FORM FOR GRADUATE COURSES

GRADUATE PROGRAM/UNIT: **SBE**

COURSE DESIGNATOR: **BIO** COURSE NUMBER: **583** EFFECTIVE SEMESTER: **Spg 2016**

COURSE TITLE: **Cell Biology (Lab)**

REQUESTED ACTION:

NOTE: A complete syllabus is required for all new courses and for the addition of an electronic learning component [1] to an existing course.

NEW COURSE (check all that apply and complete Section 1):

- [x] New Course
- [ ] New Course with Electronic Learning [1]
- [ ] Experimental

MODIFICATION (Check all that apply and complete Section 2):

- [ ] Designator Change
- [ ] Number Change
- [ ] Title Change
- [ ] Description Change
- [ ] Prerequisite Change
- [ ] Credit Change
- [x] Cross Listing (must be at least 400-level) [2]
- [ ] Addition of Electronic Learning Component [1]
- [ ] Other (specify) _____

ELIMINATION:

- [ ] Course Elimination

ENDORSEMENTS (Print name)	Date	Sign Initials
Leader, Initiating Department/Unit(s): Andrei Alyokhin	8/21/15	AA
College(s) Curriculum Committee Chair(s) (if applicable)		
College Dean(s): Pamela R. Reid	9/29/15	PRR
Graduate School		

1. If a course involves significant electronic access for the primary delivery of its content (more than 50%), the course proposal should specify faculty training/experience in use of technology and how the electronic delivery will be managed. Please consult with the Office of Distance Education for more information.
2. Courses cross-listed below 400-level require the permission of the Graduate School.

SECTION 1 (FOR NEW COURSE PROPOSALS):

Proposed Catalog Description (include designator, number, title, prerequisites, credit hours):

BIO 583 - Cell Biology Laboratory (Graduate Level)

A laboratory course consisting of exercises employing techniques commonly utilized in cell biological research, with an emphasis on skills essential for a career involving cell biology lab work including mammalian cell culture and cellular energetics. Note: Because of overlap, BIO 483 and BIO 583 cannot both be taken for degree credit. Lab 2.

Prerequisites: BIO 580 or concurrently; or consent of instructor.

Course Typically Offered: Spring

Credits: 1

Components (type of course/used by Student Records for MaineStreet) – *Multiple selections are possible for courses with multiple non-graded components:*

☐ Applied Music	☐ Clinical	☐ Field Experience/Internship	☐ Research	☐ Studio
☒ Laboratory	☐ Lecture/Seminar	☐ Recitation	☐ Independent Study	☐ Thesis

Text(s) planned for use:

Instructor will create a lab manual.

Course Instructor (include name, position, teaching load):

Kristy Townsend, Asst. Prof. Neurobiology, 50% teaching (Lab will be co-taught with existing SBE Teaching Assistant assigned for this lab course)

Reason for new course:

This new course represents a graduate level version of an already existing course: BIO480/483 (Cell Biology Lecture and Lab), and will be designated BIO580/583. This course will fulfill cell biology educational needs for graduate students at UMaine and specifically provide career-relevant skills and knowledge related to current cell biology research and techniques. There is not a graduate course offering like this at UMaine at this time, and this will fill an unmet need for the many graduate students requiring a course like this. To distinguish itself from the undergraduate portion of the course, graduate students in lecture are expected to complete an extra written assignment and to work at a higher level; graduate students in the lab are expected to carry out a mechanistic version of the independent research project and to also work at a higher level.

Does the course addition require additional department or institutional facilities, support and/or resources, e.g. new lab facilities, computer support and services, staffing (including graduate teaching assistants), or library subscriptions and resources?

◉ No. The department will not request additional resources for this course.

◯ Yes. Please list additional resources required and note how they will be funded or supported.

What other departments/programs are affected (e.g. course overlap, prerequisites)? Have affected departments/programs been consulted? Any concerns expressed? Please explain.

There is no overlap with existing grad courses or labs.

How often will this course be offered? Will offering this course result in overload salary payments, either through the college or CED, either to the instructor of this course or to anyone else as a result of rearranging teaching assignments?

Every spring, concurrent with BIO480/483

Syllabus for BIO583: *Graduate-level Laboratory in Cell Biology*

Spring 2016

Murray 204; Tu/Th 1-4pm

Professor: Kristy Townsend, Ph.D.

kristy.townsend@maine.edu

Prerequisites:
BIO 580 or concurrently; or consent of instructor.

Course Description
A laboratory course consisting of exercises employing techniques commonly utilized in cell biological research, with an emphasis on skills essential for a career involving cell biology lab work including mammalian cell culture and cellular energetics. Note: Because of overlap, BIO 483 and BIO 583 cannot both be taken for degree credit. Lab 2.

This laboratory course is a graduate companion to BIO483, and will serve as an upper-level introduction to the field of cell biology, including the following topics: cell-cell interaction, cellular differentiation and specialization, structure-function relationships, cellular signaling, cell organelles, and metabolism. The Laboratory will be held weekly and will follow the themes of the lecture. Lab exercises will include numerous hands-on, inquiry-based experiments as well as active learning activities and discussions, and will culminate in a student-driven mini-research project in cell biology. As part of this lab course, students will learn how to conduct mammalian cell culture, utilize sterile technique, and how to perform methods and techniques related to modern cell biology lab work, which may be relevant for future laboratory jobs, graduate school, or health careers. ***Additional Requirements to Earn Graduate Credit:*** Graduate students in the lab will complete their mini-research project to address a mechanistic question, which may or may not be connected to their thesis research. As part of this, they will write a protocol or SOP for the methods they use.

Grading:
- In-class thought questions and participation – 5%
- Lab Safety quiz and preparedness for lab each week – 5%
- Creation of an SOP or Protocol – 15%
- Two lab practical exams – 15% each, total 30%
- Two mini lab reports with interactive feedback with classmates online – 10% each, total 20%
- Final research project graded on originality, creative thought, final write-up, and adherence to cell biology techniques learned in lab – 25%

SYNAPSE: The course website is found on SYNAPSE under **BI580/583**. All course contents and the forum will be there, such as resources including: cell biology web links, videos, case

studies, course handouts, readings, and scientific resources. Synapse is a course management software run by UMaine's School of Biology and Ecology, and you can login to this resource with your UMaine ID. https://synapse.umaine.edu/

Course Manual: A laboratory manual for this course will be available for sale at the University Bookstore and is required for this lab course.

Learning Objectives

After completion of this course students are expected to:

- Understand General Lab Safety
- Grow, differentiate, passage, freeze down cell lines
- Culture primary cells
- Design and carry-out a cell-treatment study
- Collect cells for downstream molecular work, including a Bradford Assay
- Conduct Cellular Assays including cell metabolism, histology
- Utilize Proper sterile technique and molecular techniques
- Design an experiment based on a novel, testable hypothesis; create an SOP/protocol; carry out the experiment and analyze, interpret, and communicate the collected data.

Help outside of class:

Please email the professor with any questions about the course, lectures, or exams. If needed, we can arrange a mutually available time to meet at my office. Office hours are by appointment only.

Class Date	Lecture topics/themes	Assignments and Exams for Lab
Week 1 *Jan 19, 21*	Lab course intro and expectations/grading	Basic Lab Safety
Week 2 *Jan 26, 28*	Cell Membranes and Membrane Transport Cell cycle, cell death, cell division	Lab Safety Quiz Lab #1 - cell membrane transport and osmosis
Week 3 *Feb 2, 4*	Membrane-bound organelles: Nucleus, chromosomes (and DNA); cytosol	Lab #2 - extracting DNA from cells
Week 4 *Feb 6, 11*		Lab #3 - intro to cell culture
Week 5 *Feb 16, 18*	ER, Golgi, protein transport and folding	Lab #4 - protein lab & How to write a lab report
Week 6 *Feb 23, 25*	Lysosomes, endosomes, peroxisomes, vesicular transport	Lab Report #1 due Lab #5 - organelle lab

Week 7 *Mar 1, 3*	Cell-Cell communication; intracellular signaling	Lab Practical #1
Mar 5-20	*SPRING BREAK*	Review for Exam 2 on your break!
Week 8 *Mar 22, 24*		Independent Experiments Begin
Week 9 *Mar 29, 31*	Cytoskeleton, cell movement and structure	Lab #7 – cell motility lab
Week 10 *Apr 5, 7*	Mitochondria, cell metabolism, energy harvesting and expenditure, biosynthesis	Lab Report #2 due Lab #8 – cell metabolism lab
Week 11 *Apr 12, 14*	Special Topics Lectures: - Stem Cells - Newly discovered cell organelles - Techniques in Cell Biology	Lab Practical #2
Week 12 *Apr 19, 21*	Differentiation of specialized cells, cell development, cell integration at the tissue level	Lab #9 – differentiation of cells and designing your independent experiment
Week 13 *Apr 26, 28*		Independent Experiments Continue
Week 14 *May 3, 5*		Independent Experiments continue and conclude, final write-ups and SOP/protocols due by May 5

Course Policies:

Academic Honesty Statement: Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with disabilities statement: If you have a disability for which you may be requesting an accommodation, please contact Disabilities Services, 121 East Annex, 581-2319, as early as possible in the term.

Course Schedule Disclaimer (Disruption Clause): In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

Sexual Discrimination Reporting: The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of ***sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination*** involving members of the campus, **your teacher is required to *report*** this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

For *confidential resources on campus*: **Counseling Center: 207-581-1392** or **Cutler Health Center: at 207-581-4000**.

For *confidential resources off campus*: **Rape Response Services:** 1-800-310-0000 or **Spruce Run**: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help:

For *support services on campus*: **Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911**. Or see the OSAVP website for a complete list of services at http://www.umaine.edu/osavp/

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NEW COURSE PROPOSAL/MODIFICATION/ELIMINATION FORM FOR GRADUATE COURSES

GRADUATE PROGRAM/UNIT: **SBE**

COURSE DESIGNATOR: **BIO** COURSE NUMBER: **580** EFFECTIVE SEMESTER: **Spg 2016**

COURSE TITLE: **Cell Biology**

REQUESTED ACTION:

NOTE: A complete syllabus is required for all new courses and for the addition of an electronic learning component [1] to an existing course.

NEW COURSE (check all that apply and complete Section 1):

- [x] New Course
- [ ] New Course with Electronic Learning [1]
- [ ] Experimental

MODIFICATION (Check all that apply and complete Section 2):

- [ ] Designator Change
- [ ] Number Change
- [ ] Title Change
- [ ] Description Change
- [ ] Prerequisite Change
- [ ] Credit Change
- [x] Cross Listing (must be at least 400-level) [2]
- [ ] Addition of Electronic Learning Component [1]
- [ ] Other (specify) _____

ELIMINATION:

- [ ] Course Elimination

ENDORSEMENTS (Print name)	Date	Sign Initials
Leader, Initiating Department/Unit(s) Andrei Alyokhin	8/21/15	AA
College(s) Curriculum Committee Chair(s) [if applicable] Tom R. Reid	9/29/15	PRR
College Dean(s) Tom R. Reid	9/29/15	PRR
Graduate School		

1. If a course involves significant electronic access for the primary delivery of its content (more than 50%), the course proposal should specify faculty training/experience in use of technology and how the electronic delivery will be managed. Please consult with the Office of Distance Education for more information.
2. Courses cross-listed below 400-level require the permission of the Graduate School.

SECTION 1 (FOR NEW COURSE PROPOSALS):

Proposed Catalog Description (include designator, number, title, prerequisites, credit hours):

BIO 580 - Cell Biology (Graduate level)
Examines the fundamental cellular, sub-cellular and molecular characteristics of cells with emphasis on structure and function of organelle systems common to eukaryotic cells. Note: Because of overlap, BIO 480 and BIO 580 cannot both be taken for degree credit. Lec 3.

Prerequisites: BIO 200 or BIO 208 or SMS 201, and either CHY 252 or BMB 322; or consent of instructor.

Course Typically Offered: Spring

Credits: 3

Components (type of course/used by Student Records for MaineStreet) – *Multiple selections are possible for courses with multiple non-graded components:*

☐ Applied Music	☐ Clinical	☐ Field Experience/Internship	☐ Research	☐ Studio
☐ Laboratory	☒ Lecture/Seminar	☐ Recitation	☐ Independent Study	☐ Thesis

Text(s) planned for use:

Essential Cell Biology (Alberts)

Course Instructor (include name, position, teaching load):

Kristy Townsend, Asst. Prof. Neurobiology, 50% teaching

Reason for new course:

This new course represents a graduate level version of an already existing course: BIO480/483 (Cell Biology Lecture and Lab), and will be designated BIO580/583. This course will fulfill cell biology educational needs for graduate students at UMaine and specifically provide career-relevant skills and knowledge related to current cell biology research and techniques. There is not a graduate course offering like this at UMaine at this time, and this will fill an unmet need for the many graduate students requiring a course like this. To distinguish itself from the undergraduate portion of the course, graduate students in lecture are expected to complete an extra written assignment and to work at a higher level; graduate students in the lab are expected to carry out a mechanistic version of the independent research project and to also work at a higher level.

Does the course addition require additional department or institutional facilities, support and/or resources, e.g. new lab facilities, computer support and services, staffing (including graduate teaching assistants), or library subscriptions and resources?

◉ No. The department will not request additional resources for this course.

◯ Yes. Please list additional resources required and note how they will be funded or supported.

What other departments/programs are affected (e.g. course overlap, prerequisites)? Have affected departments/programs been consulted? Any concerns expressed? Please explain.

There is no overlap with other existing grad courses.

How often will this course be offered? Will offering this course result in overload salary payments, either through the college or CED, either to the instructor of this course or to anyone else as a result of rearranging teaching assignments?

Every spring, concurrent with BIO480/483

SECTION 2 (FOR COURSE MODIFICATIONS):

Current catalog description (include designator, number, title, prerequisites, credit hours):

Proposed catalog description (include designator, number, title, prerequisites, credit hours):

Reason for course modification:

SECTION 3 FOR COURSE ELIMINATIONS:

Reason for Elimination

Please return the completed form with appropriate signatures and documentation to the Graduate School.
5775 Stodder Hall, Room 42
Orono, Maine 04469-5775

Course Proposal Guidelines available at http://umaine.edu/graduate/system/files/files/CourseGuidelines.pdf

Syllabus for BIO580: *Graduate-level Cell Biology*

Spring 2016

Estabrooke 130; Tu/Th 11-12:15

Professor: Kristy Townsend, Ph.D.

kristy.townsend@maine.edu

Prerequisites:
BIO 200 or BIO 208 or SMS 201, and either CHY 252 or BMB 322; or consent of instructor. Note: Because of overlap, BIO 480 and BIO 580 cannot both be taken for degree credit.

Course Description
Examines the fundamental cellular, sub-cellular and molecular characteristics of cells with emphasis on structure and function of organelle systems common to eukaryotic cells. Note: Because of overlap, BIO 480 and BIO 580 cannot both be taken for degree credit. Lec 3.

This course is a graduate companion to BIO480, and will serve as an upper-level introduction to the field of cell biology, including the following topics: cell-cell interaction, cellular differentiation and specialization, structure-function relationships, cellular signaling, cell organelles, and metabolism. Class time will involve interactive lectures as well as research article discussions and other scientific discussions – participation in class (discussions and group activities), answers to written thought questions and case studies, as well as participation in online forums will be important aspects of the grade for this class. ***Additional Requirements for Graduate Credit:*** Graduate students in the lecture will complete an extra assignment to write a cell biology mini-review addressing 3-5 current/recent primary research articles, critically analyzing the methods and findings, and synthesizing the conclusions across the papers with added context and significance.

* A Laboratory Component for Cell Biology (BIO583) is also listed to accompany this course (Tues/Thurs afternoons in 204 Murray Hall)

Grading:
- Significant participation in class discussions, forums on the class website, and answers to in-class thought questions (unannounced) = 10% (for participation, not accuracy)
- Group case-studies (three throughout semester; 6% each) = 18%
- 3 exams and highest grade counts twice (as 4th exam), thus each exam worth 12% (= 48% total)

Succinct written assignments:
- 'Comment' on a recent primary research article (1pg) – 10%
- Mini-review on the action of a newly described cellular organelle or novel function of a known organelle (2pg) – 14%

**Exams will be comprised of multiple-choice questions and short-answers based on lectures and readings, and will probe your understanding of the content (not memorized facts). Therefore, ATTENDANCE in class is essential to do well on exams.

** Power points with images from course lectures will be made available on the website (Synapse) to study for exams.

SYNAPSE: The course website is found on SYNAPSE under **BI580/583**. All course content and the forum will be there, such as resources including: cell biology web links, videos, case studies, course handouts, readings, and scientific resources. Synapse is a course management software run by UMaine's School of Biology and Ecology, and you can login with your UMaine ID. https://synapse.umaine.edu/

iClickers: Students are required to obtain an iClicker and bring it to every class. Please see the clicker policy on Synapse for more details.

Learning Objectives

After completion of this course students are expected to:

- Understand cellular development and differentiation
- Appreciate different cell types, their specialization, and structure-function relationships
- Determine of how cells interact with each other, transport materials, and signal intracellularly
- Understand of subcellular organelles and their function
- Grasp the components and control of cellular metabolism

Help outside of class:

Please email the professor with any questions about the course, lectures, or exams. If needed, we can arrange a mutually available time to meet at my office. Office hours are by appointment only.

Required Readings

TEXTBOOK: Essential Cell Biology (Alberts)

For this course you will also be assigned primary and review articles from the scientific literature for class discussions (about one per week). These will supplement textbook readings and ensure we are learning up-to-date concepts. These journal articles are available via PubMed on the Fogler Library site, using your ID. We will also be reading lay/pop science articles that fit with the science theme each week. All of these readings, as well as other course resources and hand-outs (including in-class activities and case studies) are listed in the Bio480/580 Readings List and can be found on the SYNAPSE site. Please bring electronic or printed copies of these PDFs with you for use in class discussions.

Suggested/Optional Readings

1. The Elements of Style (Strunk and White) – a writing guide you'll find on nearly every scientist's desk – writing is a key aspect of certain assignments and essential for science
2. To fill in the gaps in your knowledge about Physiology you may want to consult: Vander's Human Physiology (Widmaier et al.)

3. To fill in the gaps in your background knowledge about cell/molecular biology please consult this free textbook available on PubMed: Alberts et al. Molecular Biology of the Cell http://www.ncbi.nlm.nih.gov/books/NBK21054/
4. Also see the course website on SYNAPSE for other resources including: cell biology web links, videos, case studies, course handouts, readings, and scientific resources.

Class Date	Lecture topics/themes and Discussions	Assignments and Exams
Week 1 *Jan 19, 21*	Course intro and expectations/grading Basic overview: What makes a cell a cell? Eukaryotic Cells	Other Readings - see separate list
Week 2 *Jan 26, 28*	Cell Membranes and Membrane Transport Cell cycle, cell death, cell division	Other Readings - see separate list How to analyze and critique primary research articles (Handouts and mini-quiz on Synapse)
Week 3 *Feb 2, 4*	Membrane-bound organelles: Nucleus, chromosomes (and DNA); cytosol	Other Readings - see separate list Case Study #1 Starts
Week 4 *Feb 6, 11*	Review for Exam 1; Exam 1 Feb 11	Other Readings - see separate list Review for Exam 1 Exam 1 Feb 11
Week 5 *Feb 16, 18*	ER, Golgi, protein transport and folding	Other Readings - see separate list Comment Assignment due
Week 6 *Feb 23, 25*	Lysosomes, endosomes, peroxisomes, vesicular transport	Other Readings - see separate list Case Study #2 Starts
Week 7 *Mar 1, 3*	Cell-Cell communication; intracellular signaling	Other Readings - see separate list
Mar 5-20	*SPRING BREAK*	Review for Exam 2 on your break!
Week 8 *Mar 22, 24*	Review for Exam 2; Exam 2 Mar 24	Review for Exam 2 Other Readings - see separate list

		Review for Exam 2 Exam 2 Mar 24 Chapter 6 of BEAR
Week 9 *Mar 29, 31*	Cytoskeleton, cell movement and structure	Other Readings - see separate list
Week 10 *Apr 5, 7*	Mitochondria, cell metabolism, energy harvesting and expenditure, biosynthesis	Other Readings - see separate list
Week 11 *Apr 12, 14*	Special Topics Lectures: - Stem Cells - Newly discovered cell organelles - Techniques in Cell Biology	Other Readings - see separate list Case Study #3 Starts
Week 12 *Apr 19, 21*	Differentiation of specialized cells, cell development, cell integration at the tissue level	Other Readings - see separate list
Week 13 *Apr 26, 28*	Previous week continued Review for Final Exam	Other Readings - see separate list
Week 14 *May 3, 5*	No Class May 3-- Mini-Review Assignment due FINAL EXAM - May 5	Review for Final Exam No Class May 3 -- Mini-Review Assignment due FINAL EXAM – May 5

Course Policies:

Academic Honesty Statement: Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with disabilities statement: If you have a disability for which you may be requesting an accommodation, please contact Disabilities Services, 121 East Annex, 581-2319, as early as possible in the term.

Course Schedule Disclaimer (Disruption Clause): In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the

syllabus that will supersede this version.

Sexual Discrimination Reporting: The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of **sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination** involving members of the campus, **your teacher is required to report** this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

For *confidential resources on campus*: **Counseling Center: 207-581-1392** or **Cutler Health Center: at 207-581-4000**.

For *confidential resources off campus*: **Rape Response Services:** 1-800-310-0000 or **Spruce Run**: 1-800-863-9909.

Other resources: The resources listed below can offer support but may have to report the incident to others who can help:

For *support services on campus*: **Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911**. Or see the OSAVP website for a complete list of services at http://www.umaine.edu/osavp/

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GRADUATE SCHOOL

NEW COURSE PROPOSAL/MODIFICATION/ELIMINATION FORM FOR GRADUATE COURSES

GRADUATE PROGRAM/UNIT: **School of Forest Resources**

COURSE DESIGNATOR: **SFR** COURSE NUMBER: **521** EFFECTIVE SEMESTER: **Fall 2015**

COURSE TITLE: **Research Methods**

REQUESTED ACTION:

NOTE: A complete syllabus is required for all new courses and for the addition of an electronic learning component[1] to an existing course.

NEW COURSE (check all that apply and complete Section 1):

- ☐ New Course
- ☐ New Course with Electronic Learning[1]
- ☐ Experimental

MODIFICATION (Check all that apply and complete Section 2):

- ☐ Designator Change
- ☐ Number Change
- ☐ Title Change
- ☐ Description Change
- ☐ Prerequisite Change
- ☐ Credit Change
- ☐ Cross Listing (must be at least 400-level)[2]
- ☐ Addition of Electronic Learning Component[1]
- ☒ Other (specify) Changed to meet RCR req.

ELIMINATION:

- ☐ Course Elimination

ENDORSEMENTS (Print name)	Date	Sign Initials
Leader, Initiating Department/Unit(s) STEPHEN SHALER, DIRECTOR SFR	4/SEPT.2015	SMS
College(s) Curriculum Committee Chair(s) (If applicable)		
SFR Graduate Coordinator M Day	4 Sept 2015	Michael E. Daye
College Dean(s) Edward N. Ashworth	9/11/15	ENA.
Graduate School		

1. If a course involves significant electronic access for the primary delivery of its content (more than 50%), the course proposal should specify faculty training/experience in use of technology and how the electronic delivery will be managed. Please consult with the Office of Distance Education for more information.
2. Courses cross-listed below 400-level require the permission of the Graduate School.

SECTION 2 (FOR COURSE MODIFICATIONS):

Current catalog description (include designator, number, title, prerequisites, credit hours):

SFR 521 – Research Methods
Credits: 3
Taught: Annually in fall semester
Course Description:
Provides graduate students with the fundamental research skills needed to successfully complete their graduate thesis research and introduce them to professional careers in research. Student learns how to plan, write, and critique scientific research proposals. Instruction focuses on direct, hands-on learning by writing a proposal that can serve as a graduate thesis research proposal. Students learn to pose relevant, interesting, and tractable researchable questions; design testable hypotheses; develop research goals and objectives; and apply critical thinking skills to design appropriate research methods.

Proposed catalog description (include designator, number, title, prerequisites, credit hours):

SFR 521 – Research Methods
Credits: 3
Taught: Annually in fall semester
Course Description:
Provides graduate students with the fundamental research skills needed to successfully prepare for their thesis research, as well as professional careers in scientific research. Students learn how to plan, write, and critique scientific research proposals. Instruction focuses on direct, hands-on learning by writing a proposal that can serve as a student's graduate thesis research proposal. Students learn to pose relevant, interesting, and researchable questions; design testable hypotheses; develop research goals and objectives; and apply critical thinking skills to design appropriate research methods. Key elements of research planning including funding, project management, responsible conduct in research, and journal publication are covered. Graduate students taking this course will meet the University of Maine's requirement for Responsible Conduct in Research training.

Reason for course modification:

New changes in this course are designed to allow graduate students successfully completing this course to also meet the University of Maine's requirement for Responsible Conduct in Research training. A new syllabus approved by Wendy Eckert and David Nievandt is attached.

SECTION 3 FOR COURSE ELIMINATIONS:

Reason for Elimination

Please return the completed form with appropriate signatures and documentation to the Graduate School.
5775 Stodder Hall, Room 42
Orono, Maine 04469-5775

Course Proposal Guidelines available at http://umaine.edu/graduate/system/files/files/CourseGuidelines.pdf

Responsible Conduct in Research portions highlighted in yellow

Syllabus

SFR 521 Research Methods

Fall Semester, 2015
3 credits

School of Forest Resources
University of Maine

Instructor:

Dr. Robert Wagner
263 Nutting Hall
School of Forest Resources
University of Maine
Office: (207) 581-2903
Cell: (207) 949-4067
Email: robert.wagner@maine.edu

Time & Location:

Time: Monday, 11:30 AM - 1:00 PM
Wednesday, 11:30 AM - 1:00 PM

Location: 17 Deering Hall

Course Overview:

Provides graduate students with the fundamental research skills needed to successfully prepare for their thesis research, as well as professional careers in scientific research. Students learn how to plan, write, and critique scientific research proposals. Instruction focuses on direct, hands-on learning by writing a proposal that can serve as a student's graduate thesis research proposal. Students learn to pose relevant, interesting, and researchable questions; design testable hypotheses; develop research goals and objectives; and apply critical thinking skills to design appropriate research methods. Key elements of research planning including funding, project management, responsible conduct in research, and journal publication are covered. Graduate students taking this course will meet the University of Maine's requirement for INT 601 Responsible Conduct of Research.

Course Objectives:

- **Understand the scientific process.** Students will understand the relationships between the research problem, research question, underlying theory, hypotheses, research objectives, data collection, hypothesis testing, evaluation of the underlying theory, and the formulation of new hypotheses or theories.

- **Understand the research planning process.** Students will understand the elements of research planning and the practical limitations that must be considered in addressing researchable questions. This includes an understanding of how the student's research question relates to a larger research problem, as well as how research is funded.

- **Understand the components of a research proposal.** Students will understand and develop all components of a research proposal, including the abstract, background, hypotheses, goals and objectives, rationale and significance, methods and materials, references, and budget.

- **Use critical thinking to develop and review research proposals.** Students will understand how to provide constructive, critical evaluations of research proposals. Students will understand how to critically evaluate published accounts of study designs. Students will participate in small group discussions and critique the research proposals of their peers.

- **Understand how to communicate research concepts and methods.** Students will understand how to discuss proposals, ask questions, and provide constructive criticism. Their written and oral communication skills will be improved through writing assignments, lectures, peer feedback, and oral presentations.

- **Understand the importance of objectivity and scientific ethics.** Students will understand how objectivity and truth are the cornerstones of science. Equally important, they will learn about intentional and unintentional scientific fraud and ways to avoid unintentional fraud.

- **Understand the publication process.** Students will understand the importance of publishing, how the publication process works, and how to respond to peer reviews.

- **Understand the principles, policies, and regulations associated with Responsible Conduct in Research.** Students will learn university policies associated with Responsible Conduct in Research; including research misconduct; conflict of interest and commitment; data management and ownership; use of human subjects; animal welfare; and mentor / trainee relationships & responsibilities. Students taking this course will meet the University of Maine graduate student requirement for the one-credit course INT 601 Responsible Conduct of Research (RCR).

Learning Activities:

- **Research proposal.** A written research proposal describing your proposed thesis research is required at the end the term. This proposal will be the culmination of written assignments throughout the course that focus on the individual elements of the research proposal.

Although this course provides structure, broad guidelines, and context for your research proposal, it is not a substitute for the frequent dialogue between you and your graduate advisor that is crucial for developing a successful thesis proposal.

- **Peer reviews.** Students will critique materials prepared by other students. This will provide you with valuable feedback and help you develop your ability to review scientific publications and proposals.

- **Class presentations.** Presentations given by the instructors and guest lecturers are described in the course schedule. These presentations will be reinforced by outside readings, course assignments, small group exercises, and classroom discussions.

- **Discussions.** Each class meeting will include time for classroom discussion, and some meetings will consist almost entirely of discussion-oriented activities. Students are encouraged to ask questions, make suggestions, and discuss relevant issues.

- **Readings.** A list of required readings is found in the *SFR 521 Class Schedule* document. Students are expected to read each of required readings before the assigned class period so that they will be able to actively discuss the readings during class. Required reading materials can be found in the *SFR 521 – Research Methods* folder on the UMaine Google Drive at: https://drive.google.com/a/maine.edu/?tab=mo#folders/0B-eOEO7CIQeoZnAzU0xVaHFfc2c. Students will be given access to this GDrive folder through their UMaine email address. Please check the class schedule regularly as this schedule and readings will be updated periodically.

Learning Outcomes:

At the conclusion of this course, students will be able to:

- Describe the key elements of the scientific method and a good researchable question
- Describe the key elements of a scientifically rigorous research proposal
- Recognize high-quality research proposals and provide constructive feedback on the research proposals of colleagues
- Critically evaluate experimental designs and other research methods
- Plan and write coherent and scientifically rigorous research proposals
- Describe the process of proposal submission and peer review
- Describe the process of journal publication submission and peer review
- Describe the key elements of effective scientific publications, oral presentations, and posters
- Discuss scientific ethics and their role in the scientific process
- Understand the principles and policies associated with Responsible Conduct in Research

Assignments:

During the course, each student will:

- Read and discuss key papers associated with scientific methods and concepts
- Write a research proposal
- Critique the research proposals of classmates.
- Make a public presentation of their research proposal.

Research Proposal:

Each student will prepare a written research proposal that will form the foundation for learning about the research principles and methods presented in class. The proposal will be organized in the following format:

I. TITLE PAGE
   A. Proposal title
   B. Names and addresses of investigators
   C. Date of submission.
II. ABSTRACT
III. TABLE OF CONTENTS
IV. PROJECT DESCRIPTION (15 page maximum)
   A. Introduction
      1. Background
      2. Goals
      3. Objectives
      4. Hypotheses
      5. Rationale & Significance
   B. Experimental Plan
      1. Methods
      2. Expected Results & Interpretations
      3. Timeline
V. REFERENCES TO PROJECT DESCRIPTION
VI. BUDGET
VII. FACILITIES & EQUIPMENT
VIII. APPENDICES TO PROJECT DESCRIPTION (Optional, if needed)

Prerequisites:

There are no class prerequisites for the class. All students must be enrolled graduate students.

Grading:

Activity	% of Final Grade
Written research proposal	60
Proposal presentation seminar	20
Peer evaluations	10
Participation in class discussions	10
TOTAL	**100**

Calculation of Final Course Grade	
Cumulative %	**Course Grade**
90.0 – 100.0	A
87.0 – 89.9	A-
83.0 – 86.9	B+
80.0 – 82.9	B
77.0 – 79.9	B-
73.0 – 76.9	C+
70.0 – 72.9	C
67.0 – 69.9	C-
60.0 – 66.9	D
<59.9	F

Course Text:

No text is required for this course. Required readings will be from articles, book chapters, and other publications. See separate *SFR 521 Class Schedule* for details on lectures, readings, and assignments. All readings will be available in the *SFR 521 – Research Methods* folder on the UMaine Google Drive at: https://drive.google.com/a/maine.edu/?tab=mo#folders/0B-eOEO7CIQeoZnAzU0xVaHFfc2c

Course Format:

Class periods will be used to discuss readings, present sections of student research proposals, and evaluate research proposals of fellow students. Several guest lectures will be provided on specialized topics for discussion. Separate study sessions may be organized by the instructor to provide opportunities for students to critically review proposal sections throughout the semester.

Instructor Availability:

Dr. Wagner will be available most days to answer questions. Please stop his office anytime, or make an appointment by phone or email.

Important University Policies Related to This Course:

Academic Honesty Statement: Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University.

Students with disabilities statement: If you have a disability for which you may be requesting an accommodation, please contact Disabilities Services, 121 East Annex, 581-2319, as early as possible in the term.

Course Schedule Disclaimer (Disruption Clause): In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

Sexual Discrimination Reporting
The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of **sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination** involving members of the campus, **your teacher is required to report** this information to the campus Office of Sexual Assault & Violence Prevention or the Office of Equal Opportunity.

If you want to talk in confidence to someone about an experience of sexual discrimination, please contact these resources:

> For *confidential resources on campus*: **Counseling Center: 207-581-1392** or **Cutler Health Center: at 207-581-4000**.
>
> For *confidential resources off campus*: **Rape Response Services:** 1-800-310-0000 or **Spruce Run**: 1-800-863-9909.
>
> **Other resources:** The resources listed below can offer support but may have to report the incident to others who can help:
>
> For *support services on campus*: **Office of Sexual Assault & Violence Prevention: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911**. Or see the OSAVP website for a complete list of services at http://www.umaine.edu/osavp/

Class Schedule

SFR 521 Research Methods

Fall Semester, 2015
3 credits

Time: **Monday, 11:30 AM - 1:00 PM**
Wednesday, 11:30 AM - 1:00 PM

Location: **17 Deering Hall**

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
8/31	**Introduction to Course** • Course overview • Reviewer Team assignments • Why does society invest in science? • Distinctions and definitions of "Research" • Three Rs of research • Where good ideas come from?	• Course Syllabus • Hather, et al. 2010. The United States of America and Scientific Research • Amount spent on scientific research in the US – Handout • Some important distinctions and definitions about research - Handout • Steven Johnson TED talk (http://www.ted.com/talks/steven_johnson_where_good_ideas_come_from?language=en)	• Discussion: o Why should the public or private industry pay for research in your field? o Why should the public or private industry pay for your proposed thesis research project? o What would be considered a successful outcome in your proposed research?

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
9/2	**What is Science?** • What is science? • Scientific method and reasoning • Developing a good scientific question / hypothesis • Value of dichotomous mechanistic hypotheses	**REQUIRED:** • Railsback, B. – What is Science? UGA class material. • Listen to Philosophy of Science interview about Karl Popper - MP3 file (50 min) • Okasha, S. 2002. Scientific Reasoning Chapter 2. • Prather, CM et al. 2009. Putting the "Ph" back into "PhD": framing graduate research in a theoretical context. Frontiers in Ecology and the Environment. 7: 389-390.	• Develop an example of applied and basic research in your field – Due 9/9.
9/7	**NO CLASS – Labor Day**		
9/9	**What is Science?** • Strong inference • Toy hypotheses vs. real hypotheses • Ideal vs. actual research • Basic vs. applied research	**REQUIRED:** • Platt, J.R. 1964. Strong inference. Science 146:347-353. • O'Conner, R. J. 2000. Why ecology lags behind biology. The Scientist 14(20): 35. • Kimmins, J.P. et al. 2005. Science in Forestry: Why does it sometimes disappoint or even fail us? For Chron 81(5): 723-734. • Baskerville, G. 1994. Gaelic poetry for deaf seagulls; encore. For. Chron. 70: 562–564.	• Present **example of applied and basic research** in your field.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
9/14	**Searching scientific literature relevant to your thesis:** • How to use library resources in the conduct of scientific research • Citation storage and retrieval systems **GUEST LECTURE - Martin Wallace, Fogler Library**	**REQUIRED:** • Davis, M. 2012. Scientific Papers and Presentations. Academic Press, San Diego, CA. Chapter 4 - Searching and Reviewing Scientific Literature	• Develop strategy for searching the literature in your field for your project – Due 9/16.
9/16	**Keep up with the literature and writing proposal titles:** • Reading the literature as a professional activity – how do you keep current? • How to write a good title for a research proposal	**REQUIRED:** • How to Keep Current with the Literature in your field – Wagner & White handout • How to Write a Good Title – Wagner & White handout	• Present **strategy for searching the literature** in your field to Reviewer Team. • Write a draft Title for your study plan/thesis – Due 9/21.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
9/21	**How is research funded?** • Formula funds – McIntire-Stennis • Request for Proposal (RFP) / Application (RFA) • Developing a research team • Brainstorming and writing a good proposal • Interdisciplinary and multi-institutional requirements and benefits	**REQUIRED:** • Where UMaine SFR gets its research funding – Handout • Advice on Writing Proposals to the National Science Foundation - Susan Finger • Amount spent on research by USFS - Handout • SFR granting sources – 2004-09 - Handout • Example RFPs from NSF and USDA – Handout with links • NSF Proposal Guidelines • AFRI Climate Change and Bioenergy 2011 RFP	• Present **Title** for your study plan/thesis to Reviewer Team. • Review and edit titles submitted by your Reviewer Team – Due 9/23. • Develop list (with help of your advisor) of the 3 major research-funding sources in your field. Include name of the funding source, general topic areas covered, and typical range of financial support - Due 9/23.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
9/23	**Elements of a good research proposal:** • Writing strong objectives and hypotheses statements • Wagon Wheel concept for proposal focus and structure • Writing a successful proposal • Review a good example proposal	**REQUIRED:** • The Research Proposal – OSU handout • Writing Good Scientific Hypotheses - Jumars • Davis, M. 2012. Scientific Papers and Presentations. Academic Press, San Diego, CA. Chapter 5 - The Proposal. • Ford, David E. 2000. Scientific Method for Ecological Research. Cambridge University Press, Cambridge, UK. Chapter 4: Development of a Research Plan. **SUGGESTED:** • Examples of successful proposals: o NRI red pine project o Wagner et al. NRI proposal o Wagner et al. Agenda 2020 proposal o Sharp proposal _Social science example o Outstanding thesis proposal from previous 521 class (Collum) • UW – Style points for scientific writing • Clarity in writing •	• Present **list of 3 major funding sources** in your field. • Write draft Goals, Objectives, and Hypotheses for thesis research – Due 9/28.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
9/28	**Analytical methods used for conducting research:** • Introduction to methods used in biophysical sciences • Introduction to methods used in social sciences • Quantitative vs. Qualitative approaches in research **GUEST LECTURERS – Drs. Aaron Weiskittel and Sandra DeUrioste-Stone**	• TBA	• Present **Goals, Objectives, and Hypotheses** for thesis research to Reviewer Team. • Edit Goals, Objectives, and Hypotheses of Reviewer Team members – Due 9/30.
9/30	**Qualitative methods in social science research:** **GUEST LECTURE – Dr. Sandra DeUrioste-Stone**	• TBA	• Return edited **Goals, Objectives, and Hypotheses** section to each Reviewer Team member and discuss. • Refine Goals, Objectives, and Hypotheses sections based on Reviewer Team feedback - Due 10/5. • Write topic/sentence outline of Introduction section (Background and Rationale & Significance sections) for your proposal – Due 10/5.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
10/5	**Analytical methods used in biophysical research:** • Hypothesis testing • Experimental design **GUEST LECTURE – Dr. Dr. Aaron Weiskittel**	**REQUIRED:** • Iles, K. Hypothesis Testing. Chapter 17. • Hurlbert, S.H. 1984. Pseudoreplication and the design of ecological field experiments. Ecological Monographs 54(2): 187-211.	• Present topic/sentence **outline of Introduction** section (including: Refined Goals, Objectives, and Hypotheses; and a topic/sentence outline for Background and Rationale & Significance sections) to Reviewer Team and discuss. • Convert topic/sentence outline for Background and Rationale & Significance sections to full text form, assemble full draft of Introduction, and distribute to Reviewer Team – Due 10/7.
10/7	**Analytical methods used in biophysical research:** • Sampling • Inference **GUEST LECTURE – Dr. Dr. Aaron Weiskittel**	**REQUIRED:** • Salsburg, D. 2001. The Lady Tasting Tea. W. H. Freedman and Company, 340 pp., ISBN 0-8050-7134-2. • Donato, D. C., J. B. Fontaine, J. L. Campbell, W. D. Robinson, J. B. Kauffman, B. E. Law. 2006. Post-Wildfire Logging Hinders Regeneration and Increases Fire Risk. Science 311: 352. Critiques/Responses: o Baird #1 & #2 o Newton et al. o Donato et al. supplement o Donato et al. response	• Return **edited full Introduction** section to each Review Team member and discuss. • Prepare topic/sentence outline of Methods section – Due 10/14.
10/12	**NO CLASS – Fall Break**		

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
10/14	**Analytical methods used in biophysical research:** • Presentation of data (graphs, tables, etc.) for written and oral settings **GUEST LECTURE – Dr. Dr. Aaron Weiskittel**	**REQUIRED:** • Cleveland, W.S. 1984. Elements of graphing data. Chap 2 – Principles of graph construction. Pp 21-101.	• Present topic/sentence **outline of Methods** section to Reviewer Team and discuss. • Convert topic/sentence outline for Methods section to full text form and distribute to Reviewer Team – Due 10/19
10/19	**Writing a strong Methods section:** • Expected Results & Interpretation section • Introduction to Logic Models	**REQUIRED:** • Review Methods section of Red Pine Example Proposal – pg 5-13. • Review Methods section of Sharp proposal (pp 12-15) – example thesis proposal from social sciences • McLaughlin and Jordan. 1999. Logic models: a tool for telling your program's performance story. Evaluation and Program Planning 22: 65-72. • Developing a logic model presentation (U. Wisconsin) • NIFA general logic model format • NEWBio proposal logic model example	• Return edited **full Methods** section to each Review Team member and discuss. • Prepare topic/sentence outline of Expected Results & Interpretations section – Due 10/21.
10/21	**Writing a strong Methods section:** • Timelines and Gantt charts **Writing a strong Abstract / Project Summary:**	**REQUIRED:** • Example Gantt charts • Landes – The scrutiny of the abstract • U. Kentucky - How to write a research abstract • Conte - Make a Great First Impression/ 6 Tips for Writing a Strong Abstract • Carol - How to write an abstract	• Present topic/sentence **outline of Expected Results & Interpretations** section to Reviewer Team and discuss. • Convert topic/sentence outline for Expected Results & Interpretations section to full text form and distribute to Reviewer Team – Due 10/26.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
10/26	**Developing Budgets, Budget Justifications, and Facilities & Equipment sections:** • Budget sheet design • University requirements / policies • Funding institution requirements / policies	**REQUIRED:** • Example budget forms: o ORSP Guide to budget preparation o UMaine ORSP template o Completed ORSP budget spreadsheet o Example budget from DOD proposal o Example of sample cost calculation spreadsheet from AFERP proposal o Example of Budget Justification	• Return **edited full Expected Results & Interpretations** section to each Review Team member and discuss. • Prepare Timeline section – Due 10/28.
10/28	**Responsible Conduct in Research:** • Rules of the Road • Research Misconduct • Conflict of Interest and Commitment	**REQUIRED:** • Steneck, N.H. 2007. ORI – Part I. Shared Values, pages 1-27. • Steneck, N.H. 2007. ORI - Conflicts of Interest, pages 67-79. • UMaine - Policy and procedures on alleged misconduct in research and other scholarly activities.	• Present **Timeline** section to Reviewer Team and discuss. • Prepare Abstract section – Due 11/2.
11/2	**Responsible Conduct in Research:** • Data Acquisition, Management, Sharing and Ownership **GUEST LECTURE – TBD**	**REQUIRED:** • Steneck, N.H. 2007. ORI - Data Management Practices, pages 87-99. • Borer, E.T., et al. 2009. Some simple guidelines for effective data management. Bull. of Ecol. Soc. Amer. Pgs 205-214.	• Return **Abstract** section to each Review Team member and discuss. • Prepare Budget section – Due 11/4.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
11/4	**Responsible Conduct in Research:** • Human Subjects • Animal Welfare **GUEST LECTURERS – Drs. Cindy Loftin and Sandra DeUrioste-Stone**	**REQUIRED:** • University of Maine Policies and Procedures for the Protection of Human Subjects of Research • Steneck, N.H. 2007. ORI - The Welfare of Laboratory Animals, pages 51-63. • Steneck, N.H. 2007. ORI - The Protection of Human Subjects, pages 35-47. • UMaine policy on human subjects research.	• Present **Budget** to Reviewer Team and discuss. • Prepare Facilities & Equipment section – Due 11/9.
11/9	**Responsible Conduct in Research:** • Mentor / Trainee Relationships & Responsibilities • Collaborative Research	**REQUIRED:** • Steneck, N.H. 2007. ORI - Mentor and Trainee Responsibilities, pages 103-113. • Steneck, N.H. 2007. ORI – Collaborative Research, pages 117-125.	• Present **Facilities & Equipment** section to each Review Team member and discuss. • Assemble all proposal sections into one document – Due 11/11.

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
11/11	**Disseminating Research Results:** • Journal publication process • Publication Practices and Responsible Authorship • Peer Review process • Authorship listing protocols and ethics	**REQUIRED:** • Steneck, N.H. 2007. ORI – Part IV. Reporting and Reviewing Research, pages 130-155. • Steneck, N.H. 2007. ORI – Part V: Safe Driving and Responsible Research, pages 160-163. • Weltzin etal. 2006. Authorship in ecology: attribution, accountability, and responsibility. Front Ecol Environ 2006; 4(8): 435–441. **OPTIONAL:** • Day, R. A. 1998. How to Write and Publish a Scientific Paper. Oryx Press, Phoenix, AZ. 275 p. o Chapter 32; Use and Misuse of English o Chapter 33; Avoiding Jargon o Chapter 12; How to Cite the References • Nicholas, K.A. and W.S. Gordon. 2011. A quick guide to writing a solid peer review. EOS, Trans. Am Geophys. Union 92(28): 1□2. • ESA Code of Ethics • ICMJE Code of Ethics & Conflict of Interest	• Present **full Proposal** to Reviewer Team and discuss. • Edit full proposal of each Reviewer Team member – Due 11/16.
11/16	**Disseminating Research Results:** • Technology transfer & outreach • Scientific conferences (oral and poster presentations • Review papers, books, books chapters, and syntheses	**REQUIRED:** • Davis, M. 2012. Scientific Papers and Presentations. Academic Press, San Diego, CA. o Chapter 16; The Oral Presentation o Chapter 17; Poster Presentations o Appendix 14; Oral Presentations at Meetings **OPTIONAL:** • Davis, M. 2012. Scientific Papers and Presentations. Academic Press, San Diego, CA. Chapter 20; To the International Student (OPTIONAL)	• Revise full proposal based on Reviewer Team edits and comments

Date	Classroom Topic	Readings	Assignments Blue = Assignment, Red = Assignment Due
11/18	**Lessons from a long career of writing successful research proposals:** **GUEST LECTURE / DISCUSSION - Drs. Ivan Fernandez and Sarah Nelson**		• Prepare draft PowerPoint presentation of research proposal
11/23	**Wrap-up & review:** • Team reviews of PowerPoint presentation • Final edits and discussion on written proposal		• Present PowerPoint presentations to Reviewer Team members for review and comment. • Prepare final PowerPoint presentation based on Reviewer Team feedback.
11/25	**NO CLASS – Thanksgiving Break**		
11/30	**Public presentations of full proposals**		• Oral presentations of proposals – 20 min each
12/2	**Public presentations of full proposals**		• Oral presentations of proposals cont'd – 20 min each
12/7	**Public presentations of full proposals**		• Oral presentations of proposals cont'd – 20 min each
12/9	**Completed research proposals due by 5:00 PM via email to instructor at robert.wagner@maine.edu**		

Acknowledgements:

We thank Drs. Glenn Howe and Lisa Ganio of Oregon State University for their contributions to the design and content of this course from their FS 521 Natural Resources Research Planning course.