New Graduate Course Approval Cover Form
Montana State University

This four-page form collects basic information about the proposed new course, provides information on the approval process, and includes all required approvals. Additional information (see INFO sheet) is also required as part of the New Course Packet.

Proposed New Course Information

Requested Rubric, Course Number, Core Designation (if needed): BIOE 514

Course Title: Ecological Modeling
Abbreviated Course Title (≤ 30 chars): Fall 2014
First Semester to be Offered: Dr. Ben Poulter
Submitted by: 406 551 3969 benjamin.poulter@montana.edu
Submitter's Contact Info: Phone, Email: Instructor:
Department: Ecology
College: Letters and Science

New Graduate Course Review Process

Instructor completes the New Course Packet.

Department Head's signature indicates that course has been approved by the process used within the Department.

The Chair of the College Curriculum Committee signs to indicate College academic approval (if required).

The College Dean signs to indicate that adequate resources are available to offer the course. Supporting information (Dean's Statement) is typically required.

The New Course Packet (as PDF) is submitted to the Graduate School for approval by the Dean.

Provost's Office reviews the new course request.

Approved new course sent to Registrar for inclusion in the Catalog and Schedule of Classes.

APPROVALS

Submitter *
Department Head *
Chair, College Curriculum Comm. *
Graduate School Dean *

Note: This diagram illustrates the typical flow path, but at any review step there can be a request for additional information or modifications. Careful review in early steps is the best way to speed the overall process. * Special topics courses (≥91) do not require review by the College Curriculum Committee, but cannot be offered more than two times without committee review.
INFORMATION NEEDED FOR COMMON COURSE NUMBERING

The process for identifying a common course number for a new course is as follows:

1. Course learning outcomes are prepared for the new course.
2. The person submitting the new course request looks at the CCN website to see if a course with similar outcomes already exists in the MUS system.

   www.mus.edu/Qtools/CCN/ccn_default.asp

   • If a course exists with at least 80% of the same outcomes, the course is considered “equivalent” to the proposed new course, and the new course should use the existing rubric and course number.

   • If no “equivalent” course is found, the person submitting the new course request should identify a unique course number that has not been used by any other course in the MUS system.

3. The requested rubric and course number are submitted as part of the new course packet.
4. The Provost’s Office submits the learning outcomes and the requested rubric and course number to the MUS to have a course number assigned to the course. (This will typically be the requested course number, but it could be changed.)
5. The assigned common course number is reported back to the person submitting the new course request.

Requested Rubric, Course Number, Core Designation (if needed):

<table>
<thead>
<tr>
<th>Course Title:</th>
<th>BIOE 514 Ecological Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbrev. Course Title</td>
<td></td>
</tr>
<tr>
<td>Credits:</td>
<td>3</td>
</tr>
<tr>
<td>Department Offering Course:</td>
<td>Ecology</td>
</tr>
<tr>
<td>College:</td>
<td>Letters and Science</td>
</tr>
</tbody>
</table>

Is this course “equivalent” to a course in the MUS System?: □ Yes ✔ No

Learning Outcomes for the Course:

The course will provide students with i) skills in conceptualizing environmental problems within a numerical modeling framework, ii) examples of modeling from plant level to landscape level, using biogeochemical and biogeography models, and iii) experience with computational tools required for ecological modeling. Developing an ecological model requires a broad understanding of a range of theoretical, quantitative, and qualitative disciplines. Students will be introduced to modeling using a combination of creativity as well as exposure to modeling theory. Examples of models used in current biogeography and biogeochemical approaches will be provided, ranging from photosynthesis, water-transport, carbon allocation, and disturbance, with a particular focus on fire. Computational skills in terms of understanding principals of coding in R, handling of data types, and processing of data will be introduced. Students will be evaluated with exams and class projects.
INFORMATION REQUIRED BY THE REGISTRAR

The data needed to enter the new course into the MSU Catalog and Schedule of Classes is collected on this page. Once the new course has been approved, this page is automatically forwarded to the Registrar for data entry.

Assigned Rubric, Course Number, Core Designation (if needed):

Course Title (for Catalog):

Course Title (for Schedule of Classes, 30 characters, max.):

First Semester to be Offered: Fall 2014

Restricted Entry/Consent of Instructor Required: Yes

Instructor's GID (last 4 digits only): 9906

Department Offering Course: Ecology

College: Letters and Science

Is the requested course number available? (x4155 to check): Yes

Frequency of course offering: Annually

Semester(s) offered (check all that apply): Fall

Summer Options (check all that apply): First 6 weeks

Credits by mode of instruction: Lecture: 3

Seminar: 

Independent Study: 

Lab/Studio: 

Recitation/Discussion: 

TOTAL CREDITS: 3

Primary Mode(s) of Delivery: Face-to-face

Web-Enhanced (small on-line comp.)

On-Line Only

Blended (significant on-line portion)

Time and Location — Call the Registrar's Office at x4155 to find a time and location for the course.

Assigned Day(s): Tu

Assigned Time(s): 14:00-16:00, 14:00-15:00

Assigned Building: Lewis

Assigned Room: 307

Capacity (room capacity, or enrollment "cap"): 20

Co- and Pre-Requisites — Courses numbered 200 and above are normally expected to have prerequisites. When listing multiple prerequisites, please separate courses with "and" if both are required, or "or" if only one is required.

Prerequisite(s):

Co-Requisite(s):

BIOE 370

Course Description — Provide a course description of 40 words or less for the MSU Catalog.

Interactions and feedbacks between vegetation, disturbance, and climate will be explored using biogeography and biogeochemical models. Theory and computational techniques in ecological modeling.
DEAN'S STATEMENT

The reviewing committees are being asked to take a closer look at the resources required for each proposed new course. In many cases new courses will replace existing courses and the new course request is effectively resource neutral, however that is not always the case. For example, a new elective course that would result in distributing an existing student population across a larger number of courses would represent a significant increase in expenditures for the new course, and no increase in total student credit hours. A funding mechanism for such a course would need to be identified. The Dean’s Statement is the place to document how the costs of the proposed new course will be covered.

No funding mechanism is requested

Ben Polter, May 21, 2014

Course covered by current teaching load in dept.

Michael J. Feitler, 5/27/14
Ecological Modeling BIOE 514  
Dr. Ben Poulter, Department of Ecology

Many ecological processes take place at time scales that are either too fast or slow, or occur at spatial scales either too small or large, for direct observation. With a wealth of ecological data steadily accumulating from various networks of vegetation plots (e.g., US Forest Inventory Analysis), ecosystem experiments (e.g., Next Generation Ecosystem Experiments), plant traits (e.g., TRY) and remote sensing (e.g., European Space Agency Climate Change Initiative), it is becoming increasingly possible to understand ecosystem processes across the complete range of scales to address questions related to i) climate change impacts, ii) disturbance regimes, iii) land management, and iv) land-surface feedbacks, for example. This course will introduce students to ecological modeling as a tool for integrating data from observations and experiments with theoretical approaches, with a particular focus on terrestrial ecosystems. A comprehensive range of topics will be covered; including those related to ecosystem development (i.e., establishment, growth, competition, mortality and disturbance), issues associated with aggregating and scaling ecological data, and introduction to various approaches used for computer modeling. By the end of the course, students will be expected to understand a variety of approaches for abstracting observed ecosystem processes to models, have a background in the technical tools available to construct computer models, and be able to critically evaluate modeling approaches used in major synthesis assessments such as the Intergovernmental Panel on Climate Change Reports.

When (Fall):
Tuesdays 14:00-16:00  
Thursdays 14:00-15:00

Where:
Lewis room 307

Expected Textbook:
Consider a Cylindrical Cow by Dr. John Harte
Ecological Climatology by Dr. Gordon Bonan

Prerequisites:
Students are expected to have completed the foundational courses in statistics, mathematics and ecology. The course is open to upper-level Undergraduates, and to Graduate students.