I. ASCRC General Education Form (revised 2/8/13)

Use to propose new general education courses (except writing courses), to change existing gen ed courses and to remove designations for existing gen ed courses.

Note: One-time-only general education designation may be requested for experimental courses (X91-formerly X95), granted only for the semester taught. A NEW request must be submitted for the course to receive subsequent general education status.

| Group (submit separate forms if requesting more than one general education group designation) | II: Mathematics | VII: Social Sciences |
| III: Language | VIII: Ethics & Human Values |
| III Exception: Symbolic Systems * | IX: American & European |
| IV: Expressive Arts | X: Indigenous & Global |
| V: Literary & Artistic Studies | XI: Natural Sciences |
| VI: Historical & Cultural Studies | w/ lab □ w/out lab X |

*Courses proposed for this designation must be standing requirements of majors that qualify for exceptions to the modern and classical language requirement

| Dept/Program | Geography | Course # | 411N |
| Course Title | Biogeography | Credits | 3 |

II. Endorsement/Approvals

Complete the form and obtain signatures before submitting to Faculty Senate Office

| Instructor | Staff |
| Phone / Email | 4347 |
| Program Chair | Sarah Halvorson |
| Dean | Jenny McNulty - Assoc. Dean |

| Please type / print name | Signature | Date |
|  |  | 2/22/13 |
|  |  | 2/22/13 |
|  |  | 2/22/13 |

III. Type of request

| New | One-time Only | Renew | X | Change | Remove |

Reason for Gen Ed inclusion, change or deletion

Description of change

IV. Description and purpose of new general education course: General Education courses must be introductory and foundational within the offering department or within the General Education Group. They must emphasize breadth, context, and connectedness; and relate course content to students’ future lives. See Preamble:

http://umt.edu/facultysenate/archives/minutes/gened/GE_preamble.aspx

Changing patterns of plant and animal distributions in space and time. Combination of historical and ecological approaches to biological species and communities. Study of external causes of plant and animal distributions, especially climatic change and human impact.

V. Criteria: Briefly explain how this course meets the criteria for the group. See:

http://umt.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx
| Courses explore a discipline in the natural sciences and demonstrate how the scientific method is used within the discipline to draw scientific conclusions. | Classroom discussion, exercises, group assignments, student presentations and field research are designed to impart an understanding of scientific method(s), reinforce critical thinking skills, and apply them to the complex interactions of biogeography. |
| Courses address the concept of analytic uncertainty and the rigorous process required to take an idea to a hypothesis and then to a validated scientific theory. | Context and historical progression of research methods are shown using examples of the major developers of biogeographical theory (Linnaeus, Compte de Buffon, v. Humboldt, Hooker, Gray, Darwin, Wallace, Haeckel, Hallam, Darlington, etc.). |
| Lab courses engage students in inquiry-based learning activities where they formulate a hypothesis, design an experiment to test the hypothesis, and collect, interpret, and present the data to support their conclusions. | This is not a lab course, but a field experience is an integral part of the course. Several ecosystems are visited and discussed in terms of the various theories reviewed in the course. |

**VI. Student Learning Goals:** Briefly explain how this course will meet the applicable learning goals. See: [http://umn.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx](http://umn.edu/facultysenate/documents/forms/GE_Criteria5-1-08.aspx)

- **understand the general principles associated with the discipline(s) studied;**
  - The course is process oriented. Students are expected to emerge from the course with critical thinking skills and an understanding of complex biological interactions in time and space based upon numerous examples discussed in class.

- **understand the methodology and activities scientists use to gather, validate and interpret data related to natural processes;**
  - Numerous case studies showcase the methods scientists have used to gather observations, translate those into hypotheses, and test their ideas over time.

- **detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments;**
  - Analysis of spatial and temporal patterns of change is intrinsic to biogeography – as are the cause-effect relationships that drive change.

- **understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning; and the means by which analytic uncertainty is quantified and expressed in the natural sciences.**
  - Students apply laws, such as those of disturbance and succession, in analyzing change. Modeling and quantification are basic to the course.

- **Statistical properties associated with sampling populations and anticipated responses are a central theme of the course.**

**VII. Justification:** Normally, general education courses will not carry pre-requisites, will carry at least 3 credits, and will be numbered at the 100-200 level. If the course has more than one pre-requisite, carries fewer than three credits, or is upper division (numbered above the 200 level), provide rationale for exception(s).
While it does have a 400-level designation, this course is approachable for students who haven’t done a full year of Biology and so it is more introductory than other offerings on campus which have a similar subject but require much more substantial preparation, which is why we feel the “N” designation is still applicable.

<table>
<thead>
<tr>
<th>VIII. Syllabus: Paste syllabus below or attach and send digital copy with form. ↓ The syllabus should clearly describe how the above criteria are satisfied. For assistance on syllabus preparation see: <a href="http://teaching.berkeley.edu/bgd/syllabus.html">http://teaching.berkeley.edu/bgd/syllabus.html</a></th>
</tr>
</thead>
</table>

See accompanying file.

**Please note:** Approved general education changes will take effect next fall.

General education instructors will be expected to provide sample assessment items and corresponding responses to the Assessment Advisory Committee.
Syllabus: Biogeography Spring 2013
GPHY 411N
9:40 am-11am Tuesdays and Thursdays
Instructor: Dr. Natalie Dawson
Main Hall 307, 243-6956, natalie.dawson@umontana.edu

Course description: Biogeography is the study of the spatial patterns of biological diversity. It is the science concerned with “where things are, and where they are not”. The objectives of this course are to further understand the historical and contemporary distribution of organisms, populations, and species in a rapidly changing world. We will synthesize concepts across a broad range of fields including paleontology, geology, climatology, evolution, and ecology to better understand the historical and contemporary distributions of species, and the changes in distributions over time with a focus on the driving forces of biogeographic change-evolution, dispersal, and extinction. Our classroom discussions will take us on intellectual journeys to remote islands and vast continents, while our class activities and case studies will give us tangible examples of the applications of biogeography across local and not-so-local environments.

Required Texts:
The Song of the Dodo by David Quammen
The Voyage of the Beagle by Charles Darwin

Additional readings will be available on line from the following sources (not inclusive):
The Malay Archipelago by Alfred Russell Wallace
The Future Eaters by Tim Flannery
Guns, Germs and Steel by Jared Diamond

Course Design: This course is meant to provide a foundational understanding in Biogeography. It is impossible to discuss all topics within this broad, synthetic field of study, but the focus in this course will be on biological mechanisms within the field of Biogeography. It will not cover any one topic in great depth, yet students will be able to focus on their own interests in their final projects. The course has two major components to it: Theoretical understandings of Biogeography and Case Studies. Theoretical ideas will be discussed in class lectures, case studies will be examined through readings, student led discussions, and class activities. The course uses a combination of in class activities, discussions, presentations, exams, and student projects to evaluate learning.

Course Goals:
1) Develop an appreciation for the patterns and processes that describe the biological diversity of life on earth
2) Think critically about historical biogeographic orientations of species across landscapes and the contemporary changes associated with fragmentation and anthropogenic activities.
3) Understand and use the scientific method to test gather data, test hypotheses and draw conclusions.
4) Encourage and promote a sense of discovery and creative observation through classroom discussions and activities!

The format for this course will be a combination of lectures and discussions. Usually, I will begin with lecture material, and follow up with student-led discussions for the remainder of the class periods. We will also have several in-class activities and assignments for which there may be no make-up available, so attendance is very important in this class.

**Student Presentations:**
You will be assigned one chapter from Darwin’s Voyage of the Beagle to present and discuss in class. Each class period a different student or students will present. Please include the following in your discussion powerpoint:
-find or reconstruct a map of the starting and ending points of your chapter of Darwin’s book, with place marks for each location stopped at, and dates associated with locations. You should be able to use Google Earth or Google Maps to do this.
For each species, lifeform, or physical feature of the ecosystem or place that Darwin describes, do the following:
-look up the species, ecosystem, or other feature using the web and other resources
-obtain and show pictures or photos of species, ecosystems, features...
-provide a short description of the evolutionary history and phylogeny of the species, or the geologic history of a place. Note the status of each species (endangered, extinct, threatened, etc.)

**Final Project** suggestions are listed on the moodle site. Students will have the option to choose between multiple project ideas, or synthesize their own project ideas. Graduate students will have to relate any project idea to their specific thesis or dissertation topics. In general, the final project is meant to stimulate your interest in an aspect of Biogeography, a field that encompasses evolution, ecology, paleontology, natural history, geology, geography, and conservation biology. Students are encouraged to pursue project topics with foci in any of these areas. Spatial context, the essence of biogeography, must be central in any final project and the final project ideas available on the course website provide suggestions for projects that have a spatial context focus.

**Grading-250 points possible**
In Class Assignments/Activities 20% (50 points)
Mid-Term 25% (60 points)
Final (inclusive) 25% (65 points)
Student-led discussion 10% (25 points)
Final Project 20% (50 points)

**Grading Scale:**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>95-100 A</td>
<td>77-79.9 C+</td>
</tr>
<tr>
<td>90-94.9 A-</td>
<td>73-76.9 C</td>
</tr>
<tr>
<td>87-89.9 B+</td>
<td>70-72.9 C-</td>
</tr>
<tr>
<td>83-86.9 B</td>
<td>Below 70 (same scale as above, but please strive for above a 70%)</td>
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<tr>
<td>80-82.9 B-</td>
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**SPRING 2013 – IMPORTANT DEADLINES FOR CHANGING COURSE OPTIONS**

February 5th - Last day to add classes via Cyberbear without instructor consent
February 6th - courses must be added with consent of instructor
February 15th - Last day to withdraw from a course with partial refund, last day to change grading option to audit
February 16th - April 8th - dropping a course requires a drop/add form with instructor and advisor signature.
April 9 - May 10 - At this point in the semester, students are only allowed to drop a class under very limited and unusual circumstances. Not doing well in a class, deciding you are concerned about how it might affect your GPA, etc. are not among those limited and unusual circumstances. Do it before April 8th if that is the case.

*Syllabus Statements Mandated by Academic Officers of The University of Montana*

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: http://life.umt.edu/vpsa/student_conduct.php.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading (Date posted is the date reading is due)</th>
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<tbody>
<tr>
<td>1/29/13</td>
<td>Introduction to Biogeography</td>
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<tr>
<td>1/31/13</td>
<td>History, Relationships, Philosophy</td>
<td>Quammen 11-21</td>
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<td></td>
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<td>Cox and Moore 1-22</td>
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<tr>
<td>2/5/13</td>
<td>History of Biogeography continued</td>
<td>Quammen 22-114</td>
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<tr>
<td>2/7/13</td>
<td>Case study: Asteraceae and Nothofagus</td>
<td>Heads 2006</td>
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<td></td>
<td></td>
<td>Darwin Chapters 1,2</td>
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<tr>
<td>2/12/13</td>
<td>The Niche and the Species</td>
<td>Darwin Chapters 3,4</td>
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<tr>
<td>2/14/13</td>
<td>Geography, Distribution of Species, Biomes, Communities</td>
<td>Darwin Chapter 5</td>
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<tr>
<td>2/19/13</td>
<td>Case study: Missoula Biogeography</td>
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<tr>
<td>2/21/13</td>
<td>The Processes of Biogeography: Dispersal, Immigration,</td>
<td>Quammen 115-259</td>
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<td></td>
<td>Speciation and Extinction</td>
<td>Darwin Chapter 6</td>
</tr>
<tr>
<td>2/26/13</td>
<td>The Processes of Biogeography: Dispersal, Immigration,</td>
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<tr>
<td></td>
<td>Speciation and Extinction</td>
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2/28/13  A primer in Plate Tectonics-and other biogeographic processes of geologic scale
3/5/13   A closer look at the Pleistocene
3/7/13   Earth, Climate, and Biogeography
3/12/13  Earth, Climate and Biogeography
3/14/13  Island Biogeography
3/19/13  Island Biogeography
3/21/13  Mid-Term Exam
3/26/13  Evolutionary Biogeography
3/28/13  Evolutionary Biogeography
4/2/13   Spring Break
4/4/13   Spring Break
4/9/13   Another look at Extinctions and the Fossil Record
4/11/13  Cases and Causes of Extinctions
4/16/13  Contemporary Biogeography: reserve design, global change, minimum viable populations, hybridization
4/18/13  Contemporary Biogeography: reserve design, global change, minimum viable populations, hybridization
4/23/13  Contemporary Biogeography: reserve design, global change, minimum viable populations, hybridization
4/25/13  Conservation Biogeography: Case Studies
4/30/13  Film: Guns, Germs and Steel

Darwin Chapter 7
Pielou 251-266
Darwin Chapter 8
Kaschner et al. 2011
Darwin Chapter 9
Quammen 407-449
Darwin Chapter 10, 11
Darwin Chapter 12
Quammen 261-381
Darwin Chapter 13
Darwin Chapter 14, 15
Darwin Chapter 16, 17
Darwin Chapter 18, 19
Darwin Chapter 20, 21
5/2/13  Film: Guns, Germs and Steel

5/7/13  Final Projects

5/9/13  Final Projects

5/13/13  Final Exam 8:00am-10:00am