George Mason University
Graduate Course Approval/Inventory Form

Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate: __X__ **NEW** ____ **MODIFY** ____ **DELETE**

Local Unit: SCS **Graduate Council Approval Date:**

Course Designation: EOS **Course Number:** 721

Full Course Title: Biogeography

Abbreviated Course Title (24 characters max.): Biogeography

Credit hours: 3: 3: 0 **Programs of Record:** ESS M.S., CSI Ph.D.

Repeatable for Credit? ___ D=Yes, not within same term Up to hours
___ T=Yes, within the same term Up to hours
_X_ N=Cannot be repeated for credit

Activity Code (please indicate): _X_ Lecture (LEC) ___ Lab (LAB) ___ Recitation (RCT)
___ Studio (STU) ___ Internship (INT) ___ Independent Study (IND) ____ Seminar (SEM)

Catalog Credit Format 3: 3: 0 **Course Level**: GF(500-600) ____ GA(700+) __X_

Maximum Enrollment: 15 **For NEW courses, first term to be offered:** F04

Prerequisites: Courses in ecology, chemistry, and geology

Catalog Description (35 words or less): Provides the student with a broad understanding of how physical geography and the environment influence the spatial and temporal distribution of plants and animals on the surface of the Earth.

For MODIFIED or DELETED courses as appropriate:
Last term offered: Previous Course Abbreviation: Previous number:

Description of modification:

APPROVAL SIGNATURES:
Submitted by: _____ email: _____

Department/Program: _____ Date: _____

College Committee: _____ Date: _____

Graduate Council Representative: _____ Date: _____

GEORGE MASON UNIVERSITY
Course Coordination Form

Approval from other units:

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

Unit:	Head of Unit's Signature:	Date:
Unit:	Head of Unit's Signature:	Date:
Unit:	Head of Unit's Signature:	Date:
Unit:	Head of Unit's Signature:	Date:
Unit:	Head of Units Signature:	Date:

Graduate Council approval: _____ Date: _____

Graduate Council representative: _____ Date: _____

Provost Office representative: _____ Date: _____

Course proposal to the Graduate Council
by
The School of Computational Sciences

1. COURSE NUMBER AND TITLE

EOS 721 Biogeography

Prerequisites: Courses in ecology, chemistry, and geology

Catalog description: Provides the student with a broad understanding of how physical geography and the environment influence the spatial and temporal distribution of plants and animals on the surface of the Earth.

2. COURSE JUSTIFICATION

Course objectives: The objectives are to provide

- the first principles underlying the distribution of species, populations, communities and biomes on the surface of the Earth;
- the first principles underlying the distribution of species, populations, communities and biomes over geological time; and
- the theory and practice of using biogeographical information in order to understand current and topical areas in ecology and the environmental sciences (e.g., biological diversity, conservation biology, climate change, and invasive species).

Course necessity: In SCS, we have courses addressing different spheres of the Earth, but not the biosphere. This course is specifically focused on the spatial dimension of the biosphere. It is important to provide a comprehensive understanding and coverage of the Earth systems.

Course relationship to Exiting Programs: This course will satisfy the elective requirement on the human and biological dimensions of the MS in ESS. Ph.D. students in the Earth Observing track can take the course as an elective. Students in MS in Geography will also find this course very appropriate.

Course relationship to Other Existing Courses: This is no course either in SCS or in CAS addressing the macro-scale issues and patterns of the biosphere from a geographical perspective.

3. APPROVAL HISTORY

4. SCHEDULING AND PROPOSED INSTRUCTORS

Time of initial offering: Fall 2004.

Proposed instructors: Dr. George Taylor

5. TENTATIVE SYLLABUS: See attached.

Biogeography: Space, Time, and Life
EOS 721
George Taylor
School of Computational Sciences
703-993-4039

I. INTRODUCTION, COURSE OBJECTIVES AND EXPECTATIONS

Objective: Provide the student with a broad understanding of how physical geography and the environment influence the spatial and temporal distribution of plants and animals on the surface of the Earth.

This objective is met by a combination of activities designed to provide an understanding of the following:

- first principles underlying the distribution of species, populations, communities and biomes on the surface of the Earth;
- first principles underlying the distribution of species, populations, communities and biomes over geological time; and
- discuss the theory and practice of using biogeographical information in order to understand current and topical areas in ecology and the environmental sciences (e.g., biological diversity, conservation biology, climate change, and invasive species).

II. FIRST PRINCIPLES

Objective: Develop a knowledge base in biogeography based on the following:

Physical geography
Physical environment and the distribution of life
Biological interactions and the distribution of life
Disturbance and landscape ecology
Communities and biomes
Changing continents and climate
Dispersal, Colonization and Invasion
Evolution, speciation ands extinction
Biogeographical regions of the Earth
Biogeography and human evolution
Humans as a force in biogeography

III. Biogeography: Theory and Practice

Objective: Using timely case studies, develop a framework for understanding how the issues evolved and the consequences for science and policy. For each topic, the initial discussion focuses on general principles followed by an in-depth presentation/discussion of one noteworthy aspect (a case study) of the topic. These are candidates for this discussion:

Invasive species
Case Study: Invasive species in aquatic and terrestrial ecosystems
Climate change
Case Study: Changes in temperature and distribution of forests

Wetlands
    Case Study: Ecology, distribution and management
Biological Diversity
    Case Study: Island Biogeography and Deforestation in the Tropics
Conservation biology
    Case Study: Spatial and temporal sanctuaries for rare and endangered species
Tools for biogeographers
    Case Study: Application of GIS
    Case study: Application of ecological modeling

Course Prerequisites: Chemistry, Physics, and Ecology

Class Schedule: The class meets once weekly for 3 hours

Class Format: Each of the case study topics will be developed by the instructor at the first part of class. The last half of the class will be devoted to discussion, and the discussion will be led by a *rappateur*. The *rappateur* will be one or several graduate students, and their manner of handling and directing of the discussion will be worked out *a priori* with the instructor.

Course Expectations: Students are expected to (i) read selected background chapters from the text by MacDonald, (ii) read class assignments from a selection of more advanced articles from the literature as provided by the instructor, (iii) and provide a critical analysis of a select issue in biogeography (of the student's own choosing) demonstrating his/her ability to evaluate the scientific rationale for alternative positions and solutions regarding the significance of an issue. The last expectation will be met in the form of a written report (~ 15 pages) and as an oral presentation and defense.

Course Grading: Grading is based on (i) two take-home examinations (30% each), (ii) written report/term paper plus oral presentation (25%), and (iii) class participation and role as rappateur (15%).

Course Texts:

MacDonald, Glen. 2003. *Biogeography: Introduction to Space, Time and Life*. John Wiley and Sons. New York, NY.

Schlesinger, William. 2002. *Biogeochemistry: An Analysis of Global Climate Change*. John Wiley and Sons, New York

Course Instructor. The principal instructor is G. Taylor, who is responsible for all class activities. The instructor is available for consultation at any time although it is encouraged that an appointment be arranged.