

M O N T A N A B O A R D O F R E G E N T S

LEVEL II REQUEST FORM

Item No.:	138-1002-R0108	Date of Meeting:	January 10-11, 2008
Institution:	The University of Montana		
Program Title:	Dual B.S. degree in International Field Geosciences with University College Cork (Ireland) and University of Potsdam (Germany)		

Level II proposals require approval by the Board of Regents.

Level II action requested (check all that apply): Level II proposals entail substantive additions to, alterations in, or termination of programs, structures, or administrative or academic entities typically characterized by the (a) addition, reassignment, or elimination of personnel, facilities, or courses of instruction; (b) rearrangement of budgets, cost centers, funding sources; and (c) changes which by implication could impact other campuses within the Montana University System and community colleges. Board policy 303.1 indicates the curricular proposals in this category:

- 1. Change names of degrees (e.g. from B.A. to B.F.A.)
- 2. Implement a new minor or certificate where there is no major or no option in a major;
- 3. Establish new degrees and add majors to existing degrees;
- 4. Expand/extend approved mission; and
- 5. Any other changes in governance and organization as described in Board of Regents' Policy 218, such as formation, elimination or consolidation of a college, division, school, department, institute, bureau, center, station, laboratory, or similar unit.

Specify Request:

The University of Montana – Missoula requests permission to establish a dual degree program in International Field Geosciences with University College Cork (Ireland) and Potsdam University (Germany) using an award from the Transatlantic Degree Consortia Project.

Overview: The University of Montana – Missoula seeks permission to establish a dual B.S. degree program in International Field Geosciences with University College Cork (Ireland) and Potsdam University (Germany). Undergraduate students who complete the dual degree requirements will receive their degree jointly from each of the three partner institutions. In addition to meeting the requirements for the non-dual degree in Geosciences from The University of Montana-Missoula, the dual degree will require a year abroad experience and will focus specifically on field-based learning. Approximately \$1M in extramural funding has been recommended by the Transatlantic Joint Degree Consortium Project to establish this new degree. This amount includes \$408,000 to The University of Montana and €204,000 to each of the two European partner institutions for student and faculty mobilization overseas.

Need: Geoscience is the analysis of phenomena that shape the Earth at different time and length scales. Relevant topics include geologic processes associated with evolution of the continents, ocean basins, atmosphere and biosphere; surficial processes that shape landscapes; the search for economic geologic deposits; the analysis of global and local climate change; and the study of pollutants and their interaction with the environment. For Geoscience students seeking to optimize skill sets required for these analyses, field-based learning is an extremely powerful tool. Substantial time in the field places students into direct contact with their study subject (Earth), while providing a very efficient and effective means to cultivate marketable Geoscience skills.

Most phenomena that Geoscientists study either are inherently global in scope (e.g. plate tectonics) or involve analyses and results that can be applied at more than one locality around the Earth (e.g., the study of heavy metals in groundwater). Because of this close connection to the Earth as a planet, professional Geoscientists are likely to be more successful if their formal education provides a venue for understanding the subtleties of other cultures and peoples from different backgrounds. With exposure to cultural differences and a broader understanding of global socio-political issues, Geoscience students are better able to contribute to decisions involving the environment and its evolution at governmental, industry, and scientific levels. Those students whose formal undergraduate curriculum involves a significant international component and emphasis on field-based study, combined with rigorous training in mathematics, physics, chemistry and computational skills, are likely to be more successful in terms of academic performance, scientific development, and societal leadership. They are also likely to be better equipped to operate well at a professional level in the increasingly globalizing socio-economic and scientific frameworks of the modern world.

We seek permission to utilize the superb natural field Geoscience laboratories available in the western United States and in Europe as the basis for a dual Bachelor of Science undergraduate degree that focuses on the documentation, interpretation, and synthesis of critical Geoscience issues in a field-based setting.

This degree requires one year of international study, with exchange students completing formal study at each of the other two partner institutions. Funding from the Transatlantic Degree Consortium Project will support a total of 48 mobilized students over the four-year duration of the grant period. In addition to these 48 students, others may engage in the exchange activities and seek to fulfill the degree requirements but will do so without financial support from the

Transatlantic Degree Consortium Project. We expect the demand for this degree program to grow as it becomes established, as returning students relate their international experiences to their peers, and as we work to leverage the program with existing resources. We intend to continue the program following the end of the four-year grant period.

Institutional and System Fit: The Department of Geosciences at The University of Montana-Missoula currently offers B.S. Degrees in Geology, Environmental Geology, and General Geology. In separate requests, we seek permission to change these degree options to a B.S. in Interdisciplinary Geosciences and a B.S. in Geosciences with one track in Earth History, Evolution, and Resources and a second track in Water, Climate and Environment. The proposed dual B.S. degree in International Field Geosciences for which we seek permission in this application will have identical requirements to the non-dual B.S. degree in Geosciences but with the important addition that students must spend one year abroad, with time spent in residence at each of the two partner institutions (Potsdam and Cork), and with the addition of a cultural and linguistic component that is not explicitly required in the non-dual Geosciences degree. A key requirement of the proposed dual degree B.S. in International Field Geosciences is that students must complete two formal field-based courses at their home institution and at least one field-based course during their year abroad.

In addition to the different set of curricular requirements, students seeking the B.S. degree in International Field Geosciences will be subject to a rigorous series of assessment procedures, described in detail below, prior to and following their international exchange experience.

The proposed B.S. degree in International Field Geosciences serves to advance directly several of the strategic goals of the institution. As described in the Mission Statement for The University of Montana, the University seeks “to accomplish its educational mission, in part, by providing unique educational experiences through the integration of the liberal arts, graduate study, and professional training with international and interdisciplinary emphases.” A specific, formally articulated goal of the University is “to pursue aggressively the availability of opportunities for faculty, staff, and students to participate in international development projects, programs, and exchanges.” The proposed degree will accomplish these goals by combining rigorous training in Geosciences and allied sciences (math, physics, chemistry, computer science) with a linguistic and cultural component and in particular through the required year abroad experience. Through these requirements, the proposed degree will bring into sharper focus issues of global awareness for students seeking the degree. In addition, the regular presence of exchange students from University College Cork and Potsdam University will contribute to the establishment of a more globally aware student and faculty body within the Department of Geosciences at The University of Montana. An important additional layer of global awareness within each institution will be provided by exchange of up to 24 individual Geoscience faculty among The University of Montana, University College Cork, and Potsdam University that will be supported by funding from the Transatlantic Degree Consortium Project.

Along with its benefits for global awareness among student and faculty, the proposed B.S. degree in International Field Geosciences will contribute directly to two other important institutional-level strategic goals set forth by The University of Montana: 1) the expansion and diversification of study abroad opportunities and involvement of at least one-fourth of the undergraduate students in study abroad by 2009; and 2) increasing international student enrollments to 750 by the year 2009.

Because of its overseas exchange requirements, its specific cultural and linguistic requirements, and the fact that it will be jointly awarded by three accredited institutions of higher learning, the proposed dual B.S. degree in International Field Geosciences is substantially different than the proposed non-dual degree in Geoscience offered solely through The University of Montana-Missoula.

Degree Requirements: Following is a year-by-year break down of the requirements for UM-M students earning the dual B.S. degree in International Field Geosciences.

Required Core Coursework, Year #1 (UM-M):

GEOS 100	(2 cr)	General Geology
GEOS 101	(1 cr)	General Geology Laboratory
CHEM 151	(3 cr)	General Chemistry I
CHEM 152	(3 cr)	General Chemistry II
COMP 172	(3 cr)	Introduction to Computers
GERM 101	(4 cr)	German I ¹
GERM 102	(4 cr)	German II ¹
<i>Total</i>	<i>22 cr</i>	

Required Core Coursework, Year #2 (UM-M):

GEOS 200	(3 cr)	Earth History & Evolution
GEOS 226	(4 cr)	Earth Materials
GEOS 230	(4 cr)	Field Methods & Interpretation
MATH 152	(4 cr)	Calculus I ²
<u>or</u> MATH 158	(4 cr)	Applied Calculus ²
MATH 153	(4 cr)	Calculus II
<u>or</u> MATH 158	(4 cr)	Differential Equations
HIST 249	(3 cr)	Irish & Irish Americans ³
ENLT 322	(3 cr)	Irish Literature ⁴
<i>Total</i>	<i>29 cr</i>	

Required Core Coursework, Year #3 (overseas):

Option #1: Majority of time at Potsdam, minority of time at Cork

Required Coursework while in residence at Potsdam:

BW01	(3 cr)	Field course A - Norway
<u>and</u> BW02	(3 cr)	Field course B - Alps
<u>or</u> BP15	(6 cr)	Field course C – France
GERM	(6 cr)	German language and culture

Plus any three of the following required courses, in consultation with UM advisor:

¹ Fulfills language/symbolic systems portion of UM-M general education requirements.

² Fulfills mathematics portion of UM-M general education requirements.

³ Fulfills historical and cultural perspective of UM-M general education requirements.

⁴ Fulfills literary and artistic perspective of UM-M general education requirements.

BW04 (3 cr) Regional Geology
BW05 (3 cr) Paleoclimate & Quaternary Geology

BW06 (3 cr) Analysis of Geologic maps
BW07 (3 cr) Analytic Geochemistry
BW16 (3 cr) Natural Hazards
BW15 (3 cr) Tectonophysics & Rheology
BW11 (3 cr) Seismology
BW12 (3 cr) Seismics
BW13 (3 cr) Geoelectrics
BWP05 (3 cr) Sedimentary systems & stratigraphy
BWP06 (3 cr) Geomorphology
BWP16 (3 cr) Tectonics and geodynamics (6)

Optional courses:

BWP07 (3 cr) Basics in GIS (6)
or BWP08 (3 cr) Basics in Remote Sensing (6)
or BWP09 (3 cr) Numerical Methods (6)

Required Coursework while in residence at Cork:

GL2016 (2.5 cr) Easter Field Course – Scotland
or GL3019 (2.5 cr) Easter Field Course – Greece
or GL4008 (2.5 cr) Easter Field Course – Canary Islands

Plus any one of the following required courses, in consultation with UM advisor:

GL2011 (2.5 cr) Sedimentologic processes and petrology
GL2012 (2.5 cr) Igneous and Metamorphic Petrology
GL2015 (2.5 cr) Invertebrate Paleontology & Evol.
GL2018 (2.5 cr) Plate Tectonics & Global Geophys.
GL3010 (2.5 cr) Igneous petrogenesis & Geochem.
GL3011 (2.5 cr) Metamorphism & Geochronology
GL3012 (2.5 cr) Advanced Structural Geology
GL3013 (2.5 cr) Sedimentary Environments
GL3014 (2.5 cr) Stratigraphy & Geologic Maps
GL3017 (2.5 cr) Environmental Geology
GL3024 (2.5 cr) Terrestrial Ecosystems through time
GL4001 (2.5 cr) Micropaleontology & Palynology
GL4002 (2.5 cr) Petroleum Geology & Basin Analys.
GL4003 (2.5 cr) Appl. Geophys. & Computer Apps.
GL4004 (2.5 cr) Advanced Igneous Petrology
GL4005 (2.5 cr) Hydrogeology (5)

Total required, Option #1: 26 cr.

Required Core Coursework, Year #3 (overseas):

Option #2: Majority of time at Cork; minority of time at Potsdam:

Required Coursework while in residence at Cork:

GL2016	(2.5 cr)	Easter Field Course – Scotland
<u>or</u> GL3019	(2.5 cr)	Easter Field Course – Greece
<u>or</u> GL4008	(2.5 cr)	Easter Field Course – Canary Islands
GAEL	(5 cr)	Gaelic language and culture

Plus any four of the required UC-Cork courses listed above under option #1:

Required Coursework while in residence at Potsdam:

BW01	(3 cr)	Field course A - Norway
BW02	(3 cr)	Field course B - Alps
<u>or</u> BP15	(6 cr)	Field course C – France

Plus any one of the required University of Potsdam courses listed above under option #1:

Total Required, option #2: 26.5 cr.

Required Core Coursework, Year #4 (UM-M):

GEOS 429	(6 cr)	Field Geology
PHYS 121	(5 cr)	Physics I
<u>or</u> PHYS 221	(5 cr)	Physics I, calculus-based
PHYS 122	(5 cr)	Physics II
<u>or</u> PHYS 222	(5 cr)	Physics II, calculus-based

Plus any two of the following, in consultation with advisor:

GEOS 330	(3 cr)	Structural Geology
GEOS 305	(3 cr)	Science and Society ⁵
GEOS 306	(3 cr)	Igneous and Metamorphic Petrology
GEOS 310	(3 cr)	Invertebrate Paleontology
GEOS 432	(4 cr)	Architecture of Sedimentary Deposits
GEOS 433	(4 cr)	Sedimentary Petrology
GEOS 460	(3 cr)	Process Geomorphology
GEOS 430	(3 cr)	Global Tectonics
GEOS 480	(4 cr)	Hydrogeology
GEOS 320	(3 cr)	Global Water
GEOS 311	(3 cr)	Paleobiology
GEOS 327	(3 cr)	Geochemistry
GEOS 437	(4 cr)	Seismology and Magnetism
GEOS 438	(4 cr)	Gravity and Electromagnetics
GEOS 495	(3 cr)	Glacial and Alpine Processes
GEOS 382	(3 cr)	Global Change

Total Required 22-24 cr.

⁵ Fulfills ethical and human values perspective of UM-M general education requirements.

Additional Resources: No additional faculty or other resources are needed to establish and implement this degree. Student and faculty mobilization overseas for the first four years of the program will be supported by a \$1M grant from the Transatlantic Degree Consortium Project. This amount includes \$408,000 to The University of Montana and €204,000 to each of the two European partner institutions for student and faculty mobilization overseas.

Assessment: We propose to use a variety of means of assessing our program from both formative and summative standpoints. Both assessment types will involve the hiring of independent assessment specialists, one from the U.S. and the other from the E.U, and both of whom will be with the program from start to finish. Formative assessments used to shape the program as it evolves include **1)** direct tracking of the dual degree objectives listed above (numbers of mobilized students; numbers of peer-reviewed publications;

scholastic records of degree-seeking students; student persistence in the degree program from year-to-year; and student degree completion rates); **2)** Use of scaled survey and free-response questionnaires to mobilized students, given both prior to departure and upon return to their home country. These surveys will be geared towards assessing student perceptions of the degree impact on their Geoscience skills and their language and cultural training, in addition to gaining feedback regarding the success of the degree administrative and management services; **3)** Use of pre-mobilization and post-mobilization standardized exams, to be constructed jointly by the PIs and appropriate colleagues, and designed to test student proficiency in Geosciences, language training, and cultural competency; **4)** principal investigator interviews with students both prior to and after mobilization; and **5)** evaluator interviews with focus groups consisting of each class of mobilized students.

Upon return from the two EU host countries, UM will arrange for ACTFL Oral Proficiency Interviews (ACTFL ORI) to be utilized in order to test the level of proficiency achieved by UM mobilized students in the German language. The ACFTL OPI scores will be compared with those of non-mobilized UM and national results. The proficiency of mobilized students in Gaelic, for which ACFTL OPI as yet do not exist, will be determined through individual interviews conducted by faculty in the UCC Irish Modern Language Program prior to their return to the U.S.

Summative evaluation will be directed by the outside evaluators for the US and EU on each side and will include at a minimum: 1) incorporation of all student-based formative evaluation data described above; 2) interviews with principal investigators and other faculty participants; and 3) deployment of a scaled survey for degree graduates to be issued upon degree completion and one year following degree completion. The main objective of these follow-up surveys will be to assess the actual professional benefits of the degree.

Process leading to submission: The proposed dual BS degree in International Field Geosciences was initially discussed formally by the UM-M Geoscience faculty on November 16, 2006. In early May 2007, the UM-M faculty voted unanimously to support the creation of this degree, contingent upon funding from the Transatlantic Degree Consortium Project. Along with colleagues from University College Cork and Potsdam University, a proposal from the UM Department of Geosciences was submitted on May 26, 2007 to the U.S. Department of Education Fund for the Improvement of Secondary Education (FIPSE). Simultaneously, an

identical proposal was submitted by Irish and German Geoscience colleagues to the European Union education officials in Brussels. On July 16 2007, notification was received from the program director at FIPSE that the jointly-submitted grant proposal had been recommended for funding on both the US and EU sides. Actual funding grant paperwork was mailed from Washington on September 19. Student mobility utilizing support from the Transatlantic Degree Consortium Project cannot begin until the degree is approved and accredited.

This proposal was reviewed and approved by the affected departments as follows:

Department Name: Geosciences Date: November 16, 2006

The deans of the following Schools/Colleges reviewed & approved the proposal:

Dean of: Arts & Sciences Date: November 2007

The proposal was reviewed and approved by the Faculty Senate at the University of Montana Date: December 2007

[No outside consultants were employed for the development of this proposal.]