

Proposal to Reorganize, Consolidate, and Reduce Academic Degree Programs in Geography at the University of Wyoming

November 1, 2018

(Draft Revisions as of January 20, 2019)

Under the auspices of University Regulation 2-13, the Division of Academic Affairs here presents a proposal to reorganize, consolidate, and reduce degree programs in Geography. This proposal has as its heart, two guiding principles: first, that Geography as a field of research and knowledge is and should remain an important and vibrant option at UW. Second that, at this time, it is not in the University's interest to serve that need through a stand-alone academic department. Instead, this proposal lays out an alternative structure for teaching, research, and service in Geography. Consistent with its first guiding principle, *the proposal recommends re-homing all faculty members in the department to other academic units*. No staff members are affected.

Major reasons for this recommendation are: a) enrollments are low in most programs; b) there are now insufficient financial resources to deliver the existing curriculum and degree programs in Geography, and c) the current offerings at the undergraduate level are replicable within other existing or proposed degree programs. These include existing programs housed in the Haub School of the Environment and Natural Resources, course work provided by faculty members with expertise in Geography and GIScience with homes in other units, and interdisciplinary multimodal curricula and programs in geospatial information science and technology that are being prepared for approval by the Board of Trustees. This situation qualifies these degrees for review under section III of the Regulation.

In accordance with University Regulation 2-13, this proposal is subject to review and comment by: students currently enrolled in the academic program, the academic degree program's staff and faculty, the academic degree program's school/college, the Associate Vice Provost for Undergraduate Education and the Associate Vice Provost for Graduate Education.

After reviewing submitted comments and making any necessary revisions, the Provost will submit the revised proposal, including a recommendation and supporting materials to the Faculty Senate, ASUW Senate, Staff Senate, and AA Deans and Directors for review and comment. The Provost will then review all submitted comments and provide a final proposal and recommendation to the President.

As required by University Regulation 2-13, the President shall make a final recommendation to the Board of Trustees within a maximum period of 120 days from the date of the release of this document, in this case, March 1, 2019.

Background

UW's Geography programs provide an education focused on spatial thinking and techniques, as well as human interactions with the physical environment. The interdisciplinary skills and knowledge provided to students in these programs are important to UW in the ways that they support environmental studies, Geography teachers for K-12 schools, and the exploding field of Geographic Information Science and Technology.

Coursework in geography was offered at UW as early as 1945 through the Department of Economics, Sociology, and Anthropology. A Geography Department was established in 1966, offering both bachelor's and master's level degrees. In the early 1980s, the department was re-named the Department of Geography & Recreation, as it hosted a program in outdoor recreation planning and management. By the late 1990s, the recreation and tourism faculty had dissolved, and the academic program was officially ended by 2005 due to perceived issues with academic quality.

In response to requirements laid out in the No Child Left Behind (NCLB) Act (2002), the Colleges of Education and Arts and Sciences did collaborate to establish three concurrent majors for students in the Secondary Social Studies Education degree: Geography, History, and Political Science. This move allowed the Secondary Social Studies Education degree to meet the NCLB criteria of "highly qualified teacher".

Concerned about its direction, Dean Paula Lutz and then Vice President for Academic Affairs David Jones engaged a team of external experts to visit the department and provide a report of their findings in the fall of 2015. The report assumed that the only option for supporting Geography at UW was as its own administrative unit. Nevertheless, the report's conclusions and recommendations are well aligned with this proposal's guiding principle that Geography as a field of research and knowledge is and should remain an important and vibrant option at UW. In fact, the closing paragraph of the report states:

"This is a time when the importance of geography is being increasingly recognized, when the university is tying its core mission to issues that are central to geography, and when geographic expertise is much needed to address the socioeconomic and environmental changes buffeting the State of Wyoming. At the same time, it is also a moment when the UW geography department is facing unprecedented challenges. It is clearly in the long-term interests of the institution to have a strong, vibrant geography program on campus."

Since 1990, the Geography Department has hosted the Wyoming Geographic Alliance (WGA), Wyoming's chapter of the National Geographic Society's National Geographic Alliance. According to its bylaws, the WGA is dedicated to facilitating geographic knowledge and literacy by providing professional development opportunities for educators, quality materials and experiences for students, and general information for the community at large. Over the last 25 years, it has hosted numerous summer institutes for teachers and annually hosts the State Geography Bee.

The department identifies faculty expertise in cultural geography, political geography, climatology, geovisualization, geospatial analysis, big data science, GIS, planning, environmental

change, biogeography, and conservation. The department sees its interdisciplinary connections across campus as a particular strength and its intellectual niche on campus as being “at the intersection of Environment and Society,” although other units also identify this domain as their primary area of focus, such as the Haub School.

The department has long cultivated interdisciplinary inquiry with cross-university collaboration with units such as American Studies, American Indian Studies, Global and Area Studies, and the Haub School of Environmental and Natural Resources. Collaboration across campus has been intellectual and academic as many of the units affiliated with UW Geography have faculty trained in geography. Examples include Botany, Geology and Geophysics, the School of Politics, Public Affairs, and International Studies, Ecosystem Science and Management, and the Wyoming Geographic Information Science Center (WyGISC).

Founded in 1996, WyGISC is an interdisciplinary research center focused on the development of geospatial information and technologies and their applications in science, education, government and business. Whereas three WYGISC faculty are also currently affiliated with the Geography Department, this unit has long reported directly to the Provost’s office.

Since its beginning, WyGISC has led the establishment of geographic information science as a critical area of science and technology related to energy, earth and computational science, and made significant contributions to place-based planning, management, and problem-solving in the environment and natural resources arena. In December 2017, the Provost’s Spatial Sciences Initiative Task Force recommended that WyGISC lead the development of a new cross-college interdisciplinary Geospatial Information Science & Technology (GIST) program focused on multi-mode delivery of innovative, undergraduate, graduate, and professional GIST curricula. The Notice of Intent for the new programs had been approved by the Board of Trustees, and the full feasibility study is under development, with anticipated Board consideration in spring 2019.

Present Status of the Department of Geography

In Fall of 2016, The Department of Geography was one of 14 small units in the Arts of Sciences that was directed to find a home with another unit as part of Dean Paula Lutz’s initiative to create administrative efficiencies as well as assure the viability of all departments with the College. By fall of 2017, the number of departments in the college had been reduced from 30 to 21, with only one small department, Geography, without a new home.

This, coupled with, the extant dispersal of geographic expertise in a number of other departments, low enrollment in existing Geography degrees combined with the availability of the ESS degree in the Haub School and strong campus-wide interest in developing interdisciplinary academic programs in Geographic Information Science Technology, as well as the need to provide instruction in geography in the most financially prudent way possible, has led to this proposal.

The present state of the department is outlined below, and a case is made for why its academic programs can no longer be delivered in their current configuration. A proposed

consolidation and reorganization are outlined, followed by a teach-out plan for existing students.

Faculty

The faculty of the department (Table 1) is currently comprised of five (5) tenure-track faculty, one of whom will be retiring in December 2018, two (2) visiting professors and one (1) adjunct professor who teaches online. In addition, three (3) research scientists (RS) at the Wyoming Geographic Information Center (WyGIS) also have partial appointments (0.25 FTE) on the Geography faculty; one faculty member in the School of Politics, Public Affairs, and international Studies has a partial (0.25 FTE) appointment in Geography. The faculty by rank and expertise are below and those with partial 0.25 FTE appointments are notated.

Table 1: Existing Geography Faculty by Rank and Expertise

Expertise	Faculty Member and Rank
<i>GIScience</i>	Jeffrey D. Hamerlinck (Senior Research Scientist, Director WyGIS) (0.25)
	Shannon E. Albeke (Associate Research Scientist, WyGIS,) (0.25)
	Paddington Hodza (Research Scientist, WyGIS) (0.25)
	Chen Xu, Assistant Professor*
<i>Social/Cultural Geography</i>	Yi- Ling Chen, Associate Professor (0.25)
	Nicholas Crane, Assistant Professor
<i>Biogeography,/Paleoecology</i>	Thomas Minckley, Associate Professor
<i>Climatology</i>	Jacqueline "J.J." Shinker, Associate Professor
<i>Food Systems, Sustainability, Qualitative Methods, Tourism</i>	Richard Vercoe, Visiting Professor
<i>Geomorphology</i>	Erich Mueller, Visiting Professor

Those faculty and research scientists with GIScience expertise (notated with an asterisk in *Table 1*), can join WyGIS in a reorganization, and in turn support the proposed interdisciplinary geospatial information science & technology curriculum. The faculty member primarily in the School of Politics, Public Affairs, and International Studies already has a primary academic home. There are three other tenure-track faculty members in the department who can be moved, in accordance with University of Wyoming Regulation 2-13, to other appropriate departments, as discussed on page 8 of this proposal.

Existing Academic Programs and Student Population

The Geography Department offers three graduate degrees, two undergraduate degrees, a concurrent degree with the College of Education, and three undergraduate minors as follows:

- Graduate Offerings
 - MA in Geography
 - MST (Master of Science in Teaching) in Geography
 - MP (Master in Planning)
- Undergraduate Offerings:
 - Geography (BA)
 - Geography (BS)
 - Concurrent degree with the College of Education Social Studies Education degree
 - Geography Minors
 - Geography
 - Geographic Information Sciences
 - Planning

As *Tables 2 and 3* illustrate, the faculty is struggling to deliver their programs with the current level of resources allocated to the Department. Even with two visiting professors, faculty resources are insufficient to support programs with six academic degree offerings and three minors.

Specific examples include:

- From 2011-17, the numbers of graduates across all 3 undergraduate programs have ranged only between 14-20 students per year;
- Between 2011-17, an average of 5 students graduated in the MA Geography programs per year;
- Between 2011-17, only one or fewer students have graduated annually with the Masters in Planning.
- The Masters of Science Teaching in Geography has had no graduates since 2011.
- Graduates with minors in Geography have dropped from 6 in 2011-12 to 2 in 2016-2017.

Further, of the 112 Geography courses (Appendix A) currently listed in the catalog, 30 (27%) have not been taught in the past 5 years

Table 2: Preliminary Headcount for All Geography Programs - Day 5 of the Fall 2018 Semester

Preliminary Headcounts
Fall 2018 Day 5

Program	Primary Majors	Secondary Majors	Total Majors
BA in Geography	9	4	13
BS in Geography	39	1	40
MA in Geography	13	1	14
Master in Planning	1	0	1
MST in Geography	2	0	2
Grand Total	64	6	70

Undergraduate Minors	
Geographic Information Science	10
Geography	5
Planning	0
Total Minors	15

Overlap with Existing Academic Degree Programs

The current degree offerings at the undergraduate level are replicable within other majors in other colleges (e.g. within the Haub School). An interdisciplinary multimodal curriculum and program in spatial sciences – an evolution in curriculum and structure critical to UW – requires that the institution takes a hard look at the current deployment of resources and minimize areas of replication.

The overlap with other curricula can be seen in the comparison between the Environmental System Science program and the Geography undergraduate curriculum (Table 4). The ESS degree captures much of the same content that a student with interests in physical geography or natural resource management might take within the Geography degree thereby offering students with those interests a comparable degree at UW.

The ESS program, which was revised and re-homed to the Haub School in 2016, is thriving as a result of the opportunity that was recognized to renovate the curriculum and organization. As a result, the program has gone from 6 students enrolled in its earlier incarnation (Spring 2015) to 84 students enrolled (Fall 2018). The rapid growth of ESS together with the content overlap with Geography programs that, suggests that ESS has more appeal to students. In addition, both the Haub School’s Environment and Natural Resource concurrent major and new degree in Outdoor Recreation and Tourism Management offers students significant opportunities to study human-environment interactions common to the discipline of Geography. There are also faculty across campus with substantial expertise that allow students to pursue interests related to nature and society relations and human-environment interactions. The proposed new GIST programs will be well positioned to meet student interests in the spatial sciences.

Recommendations

The following steps should be taken to reorganize, consolidate, and reduce academic programs in Geography:

- Suspend enrollment in all existing Geography degree programs, minors and certificates, with the exception of the Geography undergraduate minor;
- Discontinue the following degree programs: Geography BA, the Concurrent degree with the College of Education Social Studies Education degree, the current geographic information science certificate, the Geographic Information Sciences minor, the Planning minor and the MST in Geography;
 - “Teach out” currently enrolled students where possible, transferring remaining students to other degrees offered on campus as appropriate;
- Transfer oversight of the B.S. in Geography to the Department of Geology and Geophysics as a temporary measure pending further review as outlined below;
- Transfer the undergraduate Geography minor to Geology and Geophysics;
- Support students remaining in the M.A. in Geography and M.P. in Planning through the College of Arts and Sciences’ Dean’s Office;
- Convene a taskforce to consider the continuing viability of the B.S. and the M.A. in Geography, with recommendations due to the Office of Academic Affairs no later than October 15, 2019. The taskforce will conduct its review in the context of current instructional capacity, and plans for Geospatial Information Science & Technology (GIST) degree programs;
- Convene a taskforce to consider the continued viability of the Masters of Planning, with recommendations made to the Office of Academic Affairs no later than October 15, 2019;
- Transfer Geography faculty with Geographic Information Science expertise to the WyGISC, where they will support the new Geospatial Information Science & Technology (GIST) curriculum, the Notice of Intent for which was reviewed and approved by the Board of Trustees at its June 2018 meetings;
- Re-home the remaining faculty into other schools or departments where they can be successful such as the Department of Geology & Geophysics, the School of Politics, Public Affairs and International Studies or the Haub School of Environment and Natural Resources.;
- Redeploy remaining financial resources to accommodate growth of the proposed GIST programs as well as support the Geography minor and other continuing degrees;
- Re-home the Wyoming Geographic Alliance campus program to ensure its future success.

Table 3: Degrees Awarded – Academic Years 2013 - 2017

Degrees Awarded in the Department of Geography

Primary Degrees Awarded	Academic Year*				
	2012-13	2013-14	2014-15	2015-16	2016-17
Cert in Geographic Information Science & Technology	0	1	0	0	0
BA in Geography	4	3	5	2	2
BS in Geography	14	14	7	16	14
MA in Geography	6	7	2	5	2
Master in Planning	1	1	1	1	0
MST in Geography	0	0	0	0	0
Total Primary Degrees	25	26	15	24	18
Secondary Degrees Awarded					
BA in Geography	1	2	1	1	1
BS in Geography	0	0	1	1	0
MA in Geography	0	0	0	0	0
MA in Interdisc Water Resources	1	0	1	4	1
Master in Planning	0	0	0	0	0
MST in Geography	0	0	0	0	0
Total Secondary Degrees	2	2	3	6	2
Total Degrees Awarded					
Cert in Geographic Information Science & Technology	0	1	0	0	0
BA in Geography	5	5	6	3	3
BS in Geography	14	14	8	17	14
MA in Geography	6	7	2	5	2
MA in Interdisc Water Resources	1	0	1	4	1
Master in Planning	1	1	1	1	0
MST in Geography	0	0	0	0	0
Total Degrees	27	28	18	30	20
Undergraduate Minors					
Geographic Information Science	1	1	1	2	2
Geography	5	2	1	1	0
Planning	0	0	0	0	0
Total Minors	6	3	2	3	2

*The academic year includes fall, spring, & summer terms. For example, 2012-13 includes December 2012, May 2013, & August 2013.

RFI

OIA:SDW

10-Sep-18

SOURCE: Banner Student Information System & Historic OIA files.

**Table 4: Comparison between the Environmental System Science and
Geography Undergraduate Degree Requirements**
Highlights indicate overlapping requirements

Environmental System Science (68+ credit hours) Major in ESS requires declared minor in another area	Geography BA/BS (40 credit hours)
Foundations (23 credits)	Core Requirements (14 credit hours)
Intro to Systems Science (3 credits)	Geography 1000 World Regional Geography
Foundation of Bio Sciences ENR 1200 or LIFE 1010	Geography 1010 Intro to Physical Geography
Foundation of Earth Sciences ENR 1500, GEOG 1010 or GEOL 1100	Geography 1020 Intro to Human Geography
Foundation of Physical Sciences CHEM 1020, ESS/GEOL 2000 or PHYS 1110	Geography 2150 Foundations of GIS and Tech
Spheres (15 credits)	Content Area Requirements (26 credits) Must include 2 courses in each of 2 areas with courses across 3 of the 4 content areas
Anthrosphere (1 course) ANTH/ENR 4310 ENR/ GEOG 4040 or SOC 3950	Human Geography (2 courses)
Atmosphere (1 course) ATSC 2000, ATSC 2100, GEOG 3450 , or GEOL 3500	Physical Geography GEOG 3450 (an option) GEOG 3480 (an option)
Biosphere (1 course) GEOG 4460 , LIFE 2022, or LIFE 2023	GIS (2 courses) GEOG 4111
Lithosphere (2 courses) GEOG 3480 or GEOL 3500 AND ENR/REWM 4285, GEOL 2150, GEOL 3010, REWM 4700	Natural Resource Mgmt GEOG 4040 (an option) GEOG 4460 (an option)
Skills and Tools	
Calculus (1 course) Math 2200	
Data Analysis (1 course) ENR 4500 or GEOL 4525	
GIS/Remote Sensing (1 course) ANTH 4106, BOT/GEOG 3150, BOT/GEOG 4111 , or GEOG 2150	
Applied Experience (1 course) ESS 4970	

*Both degrees include courses that can fulfill University Studies Program (USP) requirements; USP requirements apply to all UW majors.

Note that the credit difference is largely due to the requirement that the ESS major requires a declared minor in another area, and has specific Skills and Tools that are embedded in the major.

Geography Minor

Retaining an undergraduate Geography minor allows continued recognition of the importance of the discipline, permits existing faculty to continue teaching in their areas of expertise, and continues to support the need for K-12 education in Geography. Currently the College of Education offers a Social Studies degree with concurrent major in geography. While not as extensive, the undergraduate minor will provide sufficient training to meet curricular needs at the K-12 level by providing the coursework necessary for students in the Social Studies degree with concurrent majors in History and Political Science.

The undergraduate minor has the following requirements in Geography, totaling 20 credit hours:

Required Courses - 11 hours

- GEOG 1010 Intro to Physical Geography (4)
- GEOG 1020 Intro to Human Geography (3)
- GEOG 2150 Foundations of GIS and Technology (4)

Electives - 9 hours chosen from:

- One 3000+ level course in human, cultural, or economic geography (3)
- One 3000+ level course in physical, environmental, or resource geography (3)
- Any other geography course(s)

Wyoming Geographic Alliance (WGA)

The Wyoming Geographic Alliance promotes Geography education across the state. UW's leadership role in the WGA will continue along with our commitment to the teaching of Geography at UW. WGA coordination will stay with a current Geography faculty member in the near term, and a stakeholder group will be convened to assist in discerning where its stewardship can thrive going forward.

UW Foundation Endowments

The Foundation Accounts for the department includes three accounts supporting faculty and staff enrichment, the department, and students through scholarships. These accounts would be distributed as follows:

- Faculty enrichment funding would proportionally follow the faculty to their new academic homes, as would departmental enrichment/excellence funding.
- Student scholarship funding would be awarded to students minoring in Geography, or in appropriate geography-related fields.

Teach-Out Plan

MA in Geography

The MA in Geography requires the following:

- GEOG 5000 Research Perspectives (3)
- GEOG 5001 Research in Geography Colloquium (2)
- GEOG 5002 Geography Graduate Seminar (1)
- Two technique courses totaling six or more credit hours.
- Thesis

Of the 14 students currently enrolled in the MA, all would have completed the GEOG 5000 requirement by the end of Fall 2018. The remaining required courses would be offered in Spring and Fall 2019. Techniques courses would remain available, and students would work individually with faculty advisors to complete their thesis and degree program.

Admissions to the MA in Geography would be suspended while a task-force convenes to determine the continued viability of the degree, perhaps, in the Haub School of Environment and Natural Resources.

Masters of Planning

Remaining students in the MP program would work with faculty advisors to complete required coursework and finish the thesis or plan B paper. Admissions to the Masters of Planning program would be suspended while a task force convenes to determine the continued viability of the degree.

MST in Geography

Admissions to the MST in Geography will be suspended, and it is recommended that this degree be discontinued. Remaining students in the MST program will work with faculty advisors to complete required coursework and finish the thesis or plan B paper.

BA in Geography

The BA and BS in Geography both require 14 credit hours of core requirements: GEOG 1000; GEOG 1010; GEOG 1020; and GEOG 2150. As subject matter critical to the Geography Minor, the College of Education Social Studies Education degree, and continuing education in geography for the liberal arts, each of the above courses would continue to be delivered every year.

In addition to the core requirements, the BA and BS in Geography requires 26 credit hours distributed among three content areas with at least two courses in each of two areas:

- Human Geography
- Physical Geography
- Geographic Information Science (GIS)
- Natural Resource Management

Current resources would allow for classes in these distributed content areas to be offered to remaining B.A. majors, with appropriate substitutions where necessary, over the next five to six years. If the B.S. can be retained given current faculty resources, this should provide a stable basis for the BA teach-out. Students would be advised by existing faculty and/or professional advisors to ensure proper enrollment. Students early in the BA degree would be advised regarding alternative curricula in GIS&T (if approved), the B.S. (if retained) and the Haub School of Environment and Natural Resources. Students currently enrolled in the Social Sciences Education degree with a concurrent major in Geography will be advised by faculty and/or professional advisors to ensure proper enrollment to complete their degree.

In the process of discontinuing a program, every reasonable effort would be made to allow students to complete their degrees. Program or campus transfers would be made if mutually acceptable to the student and the receiving department. Students would be provided advising assistance with respect to their academic program options.

Prospective Students. Efforts would be made to inform any student who has formally signaled an interest in Geography programs and to explain to them, through appropriate advisors across campus, what other program options are available. Admissions should consult with the College of Arts and Sciences to flesh out those options.

Stopped-out Undergraduate Students. A stopped-out student is one who was a previously enrolled degree-seeking student who suspended enrollment for one or more fall and/or spring term and who subsequently seeks to re-enroll). Stopped-out undergraduate students will not be re-admitted to an academic degree program that has been suspended or discontinued. Advising will be provided to allow such students to find an appropriate new academic degree program. The Director of the Advising, Career, and Exploratory Studies Center (ACES) will be contacted to assist in planning advising considerations.

Appendix A: Current Courses List

- 1000 [G&R 1000]. World Regional Geography. 3.** Covers the distributions, traits, and processes of the Earth's peoples and landscapes through the perspective of regional geography, which is the study of the spatial relationships of natural environments and human societies. Equivalent to INST 1060. Credit cannot be earned in both GEOG 1000 and INST 1060.
- 1010 [G&R 1010]. Introduction to Physical Geography. 4.** Systematically studies natural aspects of geographic environments, including weather and climate, landforms, soils and vegetation. Lab fee required.
- 1020 [G&R 1020]. Introduction to Human Geography. 3.** Analyzes spatial patterns of and interaction between the world's great cultural systems. Includes settlement patterns, behavioral patterns, agricultural land use and resource utilization.
- 1050 [G&R 1050]. Introduction to Environment and Natural Resources. 3.** Examines human interaction with environment, ranging from regional to global scales, from perspectives of environmental effects on human life, human effects on environment and approaches to environmental management.
- 1101. First-Year Seminar. 3.**
- 2150 [G&R 2150]. Foundations of Geo Information Science and Technology. 4.** Overviews the role of geographic information and technology in modern society. Includes discovery and accessing geospatial data and information for both research and enjoyment, with an emphasis on reading and analyzing maps and visualizations to support geographical reasoning. Lab provides hands-on experience working with maps and related geographic information technologies.
- 2370. Chicano History: Origins to 1900. 3.** General survey that traces the geographic distribution and historical processes that have shaped the life experiences, socio-economic development and cultural contributions of peoples of Mexican descent in the United States from their indigenous and Hispanic origins to the end of the 19th century. Cross listed with CHST/HIST 2370.
- 2550 [G&R 2550]. Recreation and Natural Resources. 3.** Introduces outdoor recreation agencies and programs; supply and demand for outdoor recreation resources; and relationship of recreation to the conservation of natural resources.
- 3010 [G&R 3010]. Geomorphology of Earth's Dynamic Landscapes. 3.** A Systematic exploration of Earth's surface, emphasizing the geographic distribution of various landforms and their evolution over time. Introduces general geomorphic principles and describes the application of these principles to specific landscape features. The processes that drive landscape change are examined through case studies, computer-based mapping exercises, and basic calculations. *Prerequisites:* One of the following: MATH 1050, 2200, 2205, STAT2050, 2070 and either GEOG 1010 or GEOL 1500.
- 3030 [G&R 3030]. Geography and Development. 3.** Examines distribution of wealth and poverty in the world; theories of development, from traditional modernization theories through Marxist critiques and sustainable development; and case studies from around the world of development successes and failures, chosen to illustrate and illuminate theories of development. *Prerequisite:* GEOG 1000 or 1020 or 9 credit hours of social science with global focus.
- 3050 [G&R 3050]. Economic Geography. 3.** Economic Geography is the study of the location, distribution and spatial organization of economic activities across the globe; specifically, how the economic realm is intertwined with other spheres of international social life. It explores the inherent logics and

mechanisms of the capitalist system, and the social and spatial inequalities that result. *Prerequisite:* 6 hours of Social Sciences or International Studies.

- 3150. Survey of Remote Sensing Applications. 3.** Provides an introduction to remote sensing with a survey of applications in different fields. It includes a brief introduction to fundamental of remote sensing and surveys applications of aerial photography, multi-and hyperspectral, active and thermal remote sensing, and global change remote sensing. Cross listed with BOT 3150. *Prerequisites:* completion of a USP QA course and one science course with laboratory.
- 3280. Spatial Methods. 4. [{none}<>COM3]** Introduction of statistical methods for the analysis of geo-spatial data; point, line/network, and areal units. The application of quantitative measurements to examining the spatial relationship of physical and socio-economic factors in problem-solving. *Prerequisites:* at least one geography course and completion of either STAT 2010, 2050, or 2070.
- 3400. Traditional Ecological Knowledge. 3.** Description of the interaction between economy, religion, language and the ecosystem for select indigenous peoples and discussion of the pedagogical methods for preserving their ecological knowledge. An examination of the conflict between contemporary society's demands and preserving traditional society's heritage. Cross listed with AIST 3400. *Prerequisite:* one course in American Indian culture.
- 3450 [G&R 3450]. Weather and Climate. 3.** Systematically examines elements and controls of weather and climate with application to regions. Cross listed with ENR 3450. *Prerequisite:* GEOG 1000, 1010 or 1020.
- 3480 [G&R 3480]. Environmental Change. 3.** Examines changes in the bio-physical environments and landscapes of Earth during its habitation by humans. Emphasizes integrated approaches to understanding environmental changes based on climatological, ecological, geological, archeological, and historical evidence. Explores how humans have modified Earth's environments and how societies have responded to natural and anthropogenic environmental change. Cross listed with ESS 3480. *Prerequisites:* GEOG 1010 or any USP S, SB, SE or SP/PN course; any WA/COM1 course.
- 3550 [G&R 3550]. Natural Hazards and Society. 3.** Considers societal structures and processes as they interact with hazards in the natural environment.
- 4000 [G&R 4000]. Terrain Analysis. 3.** Studies techniques for acquiring and analyzing spatial data from maps, remotely sensed imagery and field surveys for landscape assessment. Emphasizes deriving maps that describe physical suitability of landscapes for specific human activities. Field trip required. *Prerequisites:* GEOG 2150 and junior standing.
- 4013. Political Geography. 3.** Geographic space is subdivided into political units to aid human interaction and to facilitate political processes. Examines the spatial organization of political space and its effects upon political processes at varying geographic scales ranging from the local to international. Dual listed with GEOG 5013; cross listed with POLS 4013. *Prerequisite:* GEOG 1000 or 1020, or 9 hours of social science.
- 4020 [4420]. Geography and Tourism. 3.** Studies concepts, methods, conflicts and opportunities of national and international tourism. Emphasizes recreation and the environment. *Prerequisites:* GEOG 1000.
- 4040 [G&R 4040]. Conservation of Natural Resources. 3.** Geographically analyzes conservation of natural and human resources, as well as political, social and ethical ramifications of our environmental policy. Cross listed with ENR 4040. *Prerequisite:* 6 hours of geography or ENR.
- 4051 [G&R 4051]. Environmental Politics. 3.** Analyzes environmentalism as a political phenomenon. Provides students with a basic understanding of how to analyze political issues by: (1) examining the historical and contemporary issues that produce controversy over environmental matters; and (2) surveying the

impacts of these issues on the formulation and implementation of laws, policies, and regulations. Cross listed with AMST, ENR, POLS and REWM 4051. *Prerequisite:* POLS 1000.

4052 [G&R 4052]. Federal Land Politics. 3. Examines the political forces that have shaped and continue to shape federal land policy and management. Explores the interactions between democratic decision making and science in the management of federal lands. Surveys the sources of controversy over federal land management and methods for harmonizing public demands with technical expertise. Cross listed with POLS/ENR/AMST/REWM 4052. *Prerequisite:* POLS 1000.

4080 [G&R 4080]. Management of Major River Basins. 3. Examines geography of water resources, including distribution, water as a resource and water as a hazard to humans. Focuses on water management case studies on the scale of major river basins in North America and elsewhere in the world. *Prerequisites:* GEOG 4040 and junior standing. (Offered based on sufficient demand and resources)

4111. Remote Sensing of the Environment. 4. Combined lecture and laboratory course introduces students to the fundamentals of remote sensing with a strong emphasis on vegetation, land cover and environmental applications. Students learn to use digital spectral data to distinguish characteristics of the terrestrial biosphere important for ecological and land management applications. Dual listed with GEOG 5111; cross listed with BOT 4111. *Prerequisites:* QA and one science course with lab.

4113. Geological Remote Sensing. 4. Acquaints students with aircraft and spacecraft remote sensing of the environment, emphasizing geologic application to earth and other planetary bodies. Includes visible, infrared, ultraviolet, radio and radar sensing. Laboratory exercises are applications related to tectonics, geomorphology, paleoclimate, structure, stratigraphy, environmental geology and geologic hazards. Dual listed with GEOG 5113; cross listed with GEOL 4113. *Prerequisites:* GEOL 1005 or 1100 or 1200 or GEOG 1010 and MATH 1400/1405 or MATH 1450.

4200 [G&R 4200]. Introduction to Geographic Information Systems. 4. Fundamental concepts, theories and applications in geographic information systems and science. *Prerequisite:* GEOG 2150.

4210 [G&R 4210]. Advanced Geographic Information Systems. 4. Advanced study of programs, data structures, and techniques for spatial data display and analysis. Dual listed with GEOG 5210. *Prerequisite:* GEOG 4200.

4211. Advanced Remote Sensing of the Environment. 4. Includes lecture and laboratory. Specific topics include a review of remote sensing fundamentals and methods for using high spatial resolution data, hyperspectral data, active remote sensing, advanced image processing, advanced classification techniques and statistical techniques specific to exploring remotely sensed data. Cross listed with BOT 4211; dual listed with GEOG 5211. *Prerequisite:* BOT/GEOG/GEOL 4111.

4220. Spatial Modeling and Geocomputation. 4. Examines the theory and development of models of spatial patterns and process. Modeling these systems often required techniques not readily available in a GIS environment. Examines GIS and geocomputational methods to solve these problems as well as issues related to error, representation, and scale. Dual listed with GEOG 5220. *Prerequisite:* GEOG 4200/4210.

4310 [G&R 4310]. Foundations of Sustainable Planning. 3. Description and analysis of planning that involves a citizen involvement process to determine the future direction of a community or region. Sustainability concepts are described to provide a framework for social equity, environmental protection, and economic longevity, the fundamental elements of a community or regional comprehensive plan. Dual listed with GEOG 5310. *Prerequisite:* junior standing.

- 4325 [G&R 4325]. Legal Aspects of Planning. 3.** Review of the U.S. Constitution, federal and state laws and statutes, and pertinent court cases that directly relate to planning policy at the federal, state and local level. Examination of the legal system to provide services and protect the health, safety, and welfare of citizens with regard to private property rights. Dual listed with GEOG 5325. *Prerequisite:* junior standing, USP V course.
- 4330 [G&R 4330]. Land Use Planning. 3.** Advanced study of processes expressed as a specific activity on the land. An examination and analysis of the interacting environmental, economic, and social factors that produce the land activity. Dual listed with GEOG 5330.
- 4340 [G&R 4340]. Natural Resource Management on Western Reservations. 3.** Designed to examine natural resource management techniques on western reservations. Topics to be discussed will focus on the management and planning of water, grazing, extractive industries and forestry. Field work on the Wind River Indian Reservation is a part of the class. Cross listed with AIST 4340. *Prerequisite:* 6 hours of 2000-level AIST classes.
- 4370 [G&R 4370]. Environmental Planning. 3.** A planning-oriented approach to ecosystems theory based on the federal/legal regulatory foundation. An examination of scientific and alternative perspectives on the comparative dynamics of natural and human-oriented ecosystems and implementing strategies. Dual listed with GEOG 5370.
- 4390 [G&R 4390]. Rural & Small Town Planning. 3.** A single community planning problem is assigned. Student teams play the role of community planning staff. Teams experience defining community goals; communicating with others about these goals and problem perceptions; accomplishing necessary research; generating various solutions to problems they have perceived; selected from among these solutions, and formulating a single, integrated, comprehensive plan and documenting the plan and rationale behind it. Dual listed with GEOG 5390. *Prerequisite:* work at the 4000-level in one or more of the four substantive areas, and/or consent of the instructor.
- 4400 [G&R 4400]. Natural Resource Policy. 3.** Encompasses administrative policies and programs relating to natural areas. Emphasizes the national park system. *Prerequisite:* GEOG 4750.
- 4440. Advanced Global Climate Variability. 3 (Max. 9).** Climate varies. This fundamental aspect of the climate system can have major environmental and societal impacts to ecosystems, the hydrologic cycle and water resource management in arid environments such as the intermountain west. This course will utilize climate data and mapping tools to understand global and regional climate variability. Dual listed with GEOG 5440. *Prerequisite:* GEOG/ENR 3450 or instructor's consent.
- 4450 [G&R 4450]. Fluvial Geomorphology. 4.** A systematic examination of rivers and related land forms. Emphasizes understanding how processes of flow and sediment transport influence channel form and behavior. Considers rivers systems across a range of scales, from movement of individual sediment particles to organization of continental drainage basins. Explores connections to aquatic ecosystems and human impacts. Dual listed with GEOG 5450. *Prerequisite:* GEOG 3010 or GEOL 2100 or 2150.
- 4455. Remote Sensing of Hydrologic Systems. 4.** Explores the application of remote sensing data and techniques to the study of the hydrological systems and introduces the physical principles that enable the different elements of the hydrological system to be inferred from different types of image data and analysis. Dual listed with GEOG 5455. *Prerequisites:* junior standing and one prior course in remote sensing.
- 4460 [G&R 4460, 3460]. Biogeography. 3.** A systematic study of the distribution of plants and animals, communities and ecosystems, the processes that produce patterns of distribution and their change over

time. Interactions of climate, soil geomorphology, biota and human activities are emphasized. *Prerequisites:* junior standing and GEOG 1010 or LIFE 2022 or 2023.

4470 [G&R 4470]. Fire Ecology. 3. Natural and human-caused fires are an important phenomenon affecting ecosystems and human communities throughout the world. Explores the geography, ecology, and management of fires. Dual listed with GEOG 5470. *Prerequisite:* GEOG 4460, BOT 4700, LIFE 3400 or graduate standing.

4500 [G&R 4500]. The American Landscape. 3. Provides a basis for interpreting the nature and content of the contemporary landscapes of the United States by viewing those landscapes in the process of creation and change and investigates the relationship between landscape and American environmental attitudes. Students are introduced to research techniques and methodologies in historical geography. *Prerequisite:* GEOG 1010 or 1020, or 6 hours in social science.

4502. Images of Wyoming and the West. 3. The West is nothing more than a barren, desolate landscape to some while to others it offers great spiritual and cultural significance. Examines how individuals and groups perceive Wyoming and the West, how such perceptions have been constructed over time, and how these differing views create images of the region both real and imagined. Dual listed with GEOG 5502. *Prerequisites:* GEOG 1000 or GEOG 1020 and junior standing.

4550. Geography of Wine. 3. Examine the regional influence of climate, terrain and cultural characteristics on the production of grape varieties and demonstrate the implications of this influence on the location and distribution of wines produced. Discussion will focus on the world-wide production and consumption of wine and impacts of multi-national corporations. *Prerequisites:* junior standing and at least 21 years of age.

4560. Global Cities. 3. Globalization accelerates urbanization processes and creates a new type of city, the global city. This course introduces debates over global cities, urban culture, new urban landscapes, urban planning practices, and social disparity. It uses case studies on the cities around the world to explore the diversity of global city formation processes. Dual Listed with GEOG 5560; cross listed with INST 4560. *Prerequisite:* 9 hours of international studies or geography.

4570. Cultural Geography. 3. Cultural Geography is an overview in qualitative cultural landscape studies. The course emphasizes what a cultural landscape is, how it can be examined, and what can be learned from such landscapes. Students are exposed to readings in cultural geography from a wide array of viewpoints with an emphasis placed on classic works. Dual listed with GEOG 5570. *Prerequisites:* GEOG 1000 or GEOG 1020 and junior standing.

4580 [4572]. Sense of Place. 3. Examines how individuals and groups perceive specific geographic locations, how such perceptions are constructed, and how these differing views and feelings play out in our everyday. Dual listed with GEOG 5580. *Prerequisite:* GEOG 1000 or GEOG 1020.

4590 [4574]. Geography of Conflicts. 3. Explores the representation of place and how various groups often have differing views of how a place should be represented and/or thought of. Various local representations of contested land use, group place identity, and personal place identity are discussed. Dual listed with GEOG 5590. *Prerequisites:* GEOG 1000 or GEOG 1020 and junior standing.

4750 [G&R 4750, 4700]. Public Land Management. 3. Teaches management of the federal and public lands of the United States. Includes consideration of management issues, agencies and organizations, and management approaches for public lands and associated natural resources. Dual listed with GEOG 5750. *Prerequisite:* 6 hours of geography or ENR.

- 4875 [G&R 4875, 4950]. Independent Studies. 1-6 (Max. 6).** Considers current research topics in consultation with faculty member. Dual listed with GEOG 5875. *Prerequisite:* 9 hours in subject area of topic of current research.
- 4880 [G&R 4880, 4850]. Current Topics. 1-6 (Max. 9).** Special course on a topic of current interest. Dual listed with GEOG 5880. *Prerequisite:* junior standing.
- 4885 [G&R 4885, 4900]. Seminar: _____. 1-3 (Max. 6).** Faculty-student discussion, reading, and study focused on a selected topic and interest. Dual listed with GEOG 5885. *Prerequisite:* GEOG 4750.
- 4960 [4860, G&R 4860]. Field Studies. 1-6 (Max. 6).** Intensive introduction to field methods used in geographic research in one or more of the subdivisions of geography.
- 4965 [4865, G&R 4865]. Directed Studies/Research Problems. 1-6 (Max 6).** Intensive introduction to methods used in geographic research. *Prerequisites:* consent of instructor and at least 12 hours in geography.
- 4990 [4870, G&R 4990]. Internship/Practicum. 1-6 (Max. 12).** Experience in applying student skills and training in an agency, organization, or business. Offered for S/U only. Dual listed with GEOG 5990. *Prerequisites:* for majors only, minimum of 12 hours in the major, junior standing and consent of the instructor.
- 5000. Research Perspectives. 3.** Focuses upon the historical development, heritage and topical breadth of geography. Special emphasis is given to the changing approaches and philosophies for conducting research in geography. *Prerequisite:* graduate student admitted to our program, or, any other student with 15 hours of geography courses.
- 5001. Research in Geography Colloquium. 2.** Colloquium series and discussion to review and critique examples of current research in geography and allied disciplines. This course builds on the theoretical and philosophical foundations from Research Perspectives. *Prerequisite:* GEOG 5000.
- 5002. Geography Graduate Seminar. 2.** Research seminar providing third-semester graduate students a public and formal opportunity to present their research. *Prerequisite:* GEOG 5001.
- 5013. Political Geography. 3.** Geographic space is subdivided into political units to aid human interaction and to facilitate political processes. Examines the spatial organization of political space and its effects upon political processes at varying geographic scales ranging from the local to international. Cross listed with POLS 5013 and dual listed with GEOG 4013. *Prerequisite:* GEOG 1000 or 1020, or 9 hours of social science.
- 5050. Techniques in Environmental Data Management. 4.** Centers on the role of information technology in support of scientific research. Through integration of multiple software packages (e.g. Relational databases, ProgramR and ArcGIS), proven database designs, and SQL scripting, increased efficiency and utility will occur during data analyses. These information science principles are demonstrated using project-based examples. Cross listed with ECOL/ENR 5050. *Prerequisite:* graduate standing.
- 5060. Landscape Ecology. 3.** A study of structure, function, and change in the biosphere on the scale of kilometers. Includes a consideration of the effects of human land uses, natural disturbances, and other processes on landscapes. *Prerequisite:* GEOG 4460 or LIFE 3400 or BOT 4700.
- 5111. Remote Sensing of the Environment. 4.** Combined lecture and laboratory course introduces students to the fundamentals of remote sensing with a strong emphasis on vegetation, land cover and environmental applications. Students learn to use digital spectral data to distinguish characteristics of

the terrestrial biosphere important for ecological and land management applications. Dual listed with GEOG 4111; cross listed with BOT 5111. *Prerequisites:* QA and one science course with lab.

- 5113. Geological Remote Sensing. 4.** Acquaints students with aircraft and spacecraft remote sensing of the environment, emphasizing geologic application to earth and other planetary bodies. Includes visible, infrared, ultraviolet, radio and radar sensing. The laboratory exercises are applications related to tectonics, geomorphology, paleoclimate, structure, stratigraphy, environmental geology and geologic hazards. Dual listed with GEOG 4113; cross listed with GEOL 5113. *Prerequisites:* GEOL 1005 or 1100 or 1200 or GEOG 1010 and MATH 1400/1405 or MATH 1450.
- 5210. Advanced Geographic Information Systems. 4.** Advanced study of programs, data structures, and techniques for spatial data display and analysis. Dual listed with GEOG 4210. *Prerequisites:* GEOG 4200.
- 5211. Advanced Remote Sensing of the Environment. 4.** Includes lecture and laboratory. Specific topics include a review of remote sensing fundamentals and methods for using high spatial resolution data, hyperspectral data, active remote sensing, advanced image processing, advanced classification techniques and statistical techniques specific to exploring remotely sensed data. Dual listed with GEOG 4211; cross listed with BOT 5211. *Prerequisite:* BOT/GEOG/GEOL 4111/5111.
- 5220. Spatial Modeling and Geocomputation. 4.** Examines the theory and development of models of spatial patterns and process. Modeling these systems often requires techniques not readily available in GIS environment. Examines GIS and geocomputational methods to solve these problems as well as issues related to error, representation, and scale. Dual listed with GEOG 4220. *Prerequisite:* GEOG 4200/4210.
- 5310. Foundations of Sustainable Planning. 3.** Description and analysis of planning that involves a citizen involvement process to determine the future direction of a community or region. Sustainability concepts are described to provide a framework for social equity, environmental protection, and economic longevity, the fundamental elements of a community or regional comprehensive plan. Dual listed with GEOG 4310.
- 5325. Legal Aspects of Planning. 3.** Review of the U.S. Constitution, federal and state laws and statutes, and pertinent court cases that directly relate to planning policy at the federal, state and local level. Examination of the legal system to provide services and protect the health, safety, and welfare of citizens with regard to private property rights. Dual listed with GEOG 4325. *Prerequisite:* graduate standing.
- 5330. Land Use Planning. 3.** Advanced study of processes expressed as a specific activity on the land. An examination and analysis of the interacting environmental, economic, and social factors that produce the land activity. Dual listed with GEOG 4330. *Prerequisite:* graduate standing in GEOG.
- 5370. Environmental Planning. 3.** A planning-oriented approach to ecosystems theory based on the federal/legal regulatory foundation. An examination of scientific and alternative perspectives on the comparative dynamics of natural and human-oriented ecosystems and implementing strategies. Dual listed with GEOG 4370. *Prerequisite:* GEOG 4330/5330.
- 5390. Rural and Small Town Planning. 3.** A single community planning problem is assigned. Student teams play the role of community planning staff. Teams experience defining community goals; communicating with others about these goals and problem perceptions; accomplishing necessary research; perceived; selecting from among these solutions, and formulating a single, integrated, comprehensive plan, and documenting the plan and rationale behind it. Dual listed with GEOG 4390. *Prerequisite:* work at the 4000-level in one or more of the four substantive areas, and/or consent of the instructor.

- 5440. Advanced Global Climate Variability. 3 (Max. 9).** Climate varies. This fundamental aspect of the climate system can have major environmental and societal impacts to ecosystems, the hydrologic cycle and water resource management in arid environments such as the intermountain west. This course will utilize climate data and mapping tools to understand global and regional climate variability. Dual listed with GEOG 4440.
- 5450. Fluvial Geomorphology. 4.** A systematic examination of rivers and related land forms. Emphasizes understanding how processes of flow and sediment transport influence channel form and behavior. Considers rivers systems across a range of scales, from movement of individual sediment particles to organization of continental drainage basins. Explores connections to aquatic ecosystems and human impacts. Dual listed with GEOG 4450.
- 5455. Remote Sensing of Hydrologic Systems. 4.** Explores the application of remote sensing data and techniques to the study of the hydrological systems and introduces the physical principles that enable the different elements of the hydrological system to be inferred from different types of image data and analysis. Dual listed with GEOG 4455.
- 5470. Fire Ecology. 3.** Natural and human-caused fires are an important phenomenon affecting ecosystems and human communities throughout the world. Explores the geography, ecology, and management of fires. Dual listed with GEOG 4470. *Prerequisite:* GEOG 4460, BOT 4700, LIFE 3400 or graduate standing.
- 5502. Images of Wyoming and the West. 3.** The West is nothing more than a barren, desolate landscape to some while to others it offers great spiritual and cultural significance. Examines how individuals and groups perceive Wyoming and the West, how such perceptions have been constructed over time, and how these differing views create images of the region both real and imagined. Dual listed with GEOG 4502. *Prerequisite:* GEOG 1000 or GEOG 1020 and junior standing.
- 5560. Global Cities. 3.** Globalization accelerates urbanization processes and creates a new type of city, the global city. This course introduces debates over global cities, urban culture, new urban landscapes, urban planning practices, and social disparity. It uses case studies on the cities around the world to explore the diversity of global city formation processes. Dual Listed with GEOG 4560; cross listed with INST 5560. *Prerequisites:* 9 hours of international studies or geography.
- 5570. Cultural Geography. 3.** Cultural Geography is an overview in qualitative cultural landscape studies. The course emphasizes what a cultural landscape is, how it can be examined, and what can be learned from such landscapes. Students are exposed to readings in cultural geography from a wide array of viewpoints with an emphasis placed on classic works. Dual listed with GEOG 4570. *Prerequisite:* GEOG 1000 or GEOG 1020 and junior standing.
- 5580 [5572]. Sense of Place. 3.** Examines how individuals and groups perceive specific geographic locations, how such perceptions are constructed, and how these differing views and feelings play out in our everyday. Dual listed with GEOG 4580. *Prerequisites:* GEOG 1000 or GEOG 1020.
- 5590 [5574]. Geography of Conflicts. 3.** Explores the representation of place and how various groups often have differing views of how a place should be represented and/or thought of. Various local representations of contested land use, group place identity, and personal place identity are discussed. Dual listed with GEOG 4590. *Prerequisite:* GEOG 1000 or GEOG 1020 and junior standing.
- 5750. Public Land Management. 3.** Management of the federal and public lands of the United States. Includes consideration of management issues, agencies and organization, and management approaches for public lands and associated natural resources. Dual listed with GEOG 4750. *Prerequisite:* 6 hours in geography or ENR.

- 5790. Research Methods. 1-3 (Max. 9).** Introduction to the methodology of empirical research in related fields for advanced students. *Prerequisites:* 12 hours in the major and consent of instructor.
- 5870. Internship/Practicum. 1-12 (Max. 12).** Experience in applying student skills and training in an agency, organization, or business. Dual listed with GEOG 4870. *Prerequisite:* for majors only.
- 5875. Independent Study. 1-6 (Max. 6).** Considers current research topics in consultation with faculty member. Dual listed with GEOG 4875. *Prerequisite:* 9 hours in subject area of topic of current research.
- 5885. Seminar. 1-3 (Max. 6).** Faculty-student discussion, reading, and study focused on a selected topic of interest. *Prerequisite:* consent of instructor.
- 5900. Practicum in College Teaching. 1-3 (Max. 3).** Work in classroom with a major professor. Expected to give some lectures and gain classroom experience. *Prerequisite:* graduate standing.
- 5920. Continuing Registration: On Campus. 1-2 (Max. 16).** *Prerequisite:* advanced degree candidacy.
- 5940. Continuing Registration: Off Campus. 1-2 (Max. 16).** *Prerequisite:* advanced degree candidacy.
- 5959. Enrichment Studies. 1-3 (Max. 99).** Designed to provide an enrichment experience in a variety of topics. Note: Credit in this course may not be included in a graduate program of study for degree purposes.
- 5960. Thesis Research. 1-12 (Max. 24).** Graduate level course designed for students who are involved in research for their thesis project. Also used for students whose coursework is complete and are writing their thesis. *Prerequisites:* enrollment in a graduate degree program.
- 5990. Internship/Practicum. 1-12 (Max. 12).** Experience in applying student skills and training in an agency, organization, or business. Offered for S/U only. Dual listed with GEOG 4990. *Prerequisite:* graduate standing.

Appendix B: Courses by Area of Interest (omitting GIScience)

Focus on Physical Geography

GEOG 1010 Intro to Physical Geography (4)
GEOG 3010 Geomorphology (3)
GEOG 3450 Weather and Climate (3)
GEOG 3480 Environmental Change (3)
GEOG 3550 Natural Hazards and Society (3)
GEOG 4000 Terrain Analysis (3)
GEOG 4450 Fluvial Geomorphology (4)
GEOG 4460 Biogeography (3)
GEOG 4470 Fire Ecology (3)

Focus on Natural Resource Management

GEOG 4040 Conserv. of Nat Resources (3)
GEOG 1050 Intro Env & Nat Resources (3)
GEOG 2550 Recreation & Nat Resources (3)
GEOG 3400 Traditional Ecol. Knowledge (3)
GEOG 3550 Natural Hazards & Society (3)
GEOG 4000 Terrain Analysis (3)
GEOG 4051 Environmental Politics (3)
GEOG 4052 Federal Land Politics (3)
GEOG 4080 Mgmt. of Major River Basins (3)
GEOG 4111 Remote Sensing of Environ. (4)
GEOG 4310 Fdns Sustainable Planning (3)
GEOG 4340 NRM/Western Reservations (3)
GEOG 4370 Environmental Planning (3)
GEOG 4400 Nat Resource Policy (3)
GEOG 4420 Geography & Tourism (3)
GEOG 4460 Biogeography (3)
GEOG 4470 Fire Ecology
GEOG 4750 Public Land Mgt (3)

Focus on Human Geography

GEOG 1000 World Regional Geography (3)
GEOG 1020 Introduction to Human Geography (3)
GEOG 3030 Geography & Development (3)
GEOG 3050 Economic Geography (3)
GEOG 3550 Natural Hazards & Society (3)
GEOG 4013 Political Geography (3)
GEOG 4310 Fdns of Sustainable Planning (3)
GEOG 4325 Legal Aspects of Planning (3)
GEOG 4330 Land Use Planning (3)
GEOG 4390 Rural/Small Town Planning (3)
GEOG 4420 Geography and Tourism (3)
GEOG 4500 The American Landscape (3)

GEOG 4502 Images of WY & the West (3)
GEOG 4540 Topics in Cultural Ecology (3)
GEOG 4550 Geography of Wine (3)
GEOG 4560 Global Cities (3)
GEOG 4570 Cultural Geography (3)
GEOG 4572 Sense of Place (3)
GEOG 4574 Geography of Conflicts (3)

Focus on Planning

GEOG 4310 Fdns of Sustainable Planning (3)
GEOG 4330 Land Use Planning (3)
GEOG 4325 Legal Aspects of Planning (3)
GEOG 4340 NRM/Western Reservations (3)
GEOG 4370 Environmental Planning (3)
GEOG 4390 Rural/Small Town Planning (3)
GEOG 4400 Natural Resource Policy (3)
GEOG 4750 Public Land Management (3)

