

## GEOGRAPHY *College of Social & Behavioral Sciences and Social Work*

Stacy Warren, Chair	103 Isle Hall	509.359.2433
BA	Minor	Certificates

*Faculty:*

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### UNDERGRADUATE PROGRAMS

The Department of Geography and Anthropology offers courses of study leading to the Bachelor of Arts in Geography. A Minor in Geography is also offered, as well as Certificates in Geographic Information Systems (GIS) and Wetlands Science and Management. The Geography program is designed for students seeking professional careers in environmental fields, GIS, education and graduate study. Typical career fields include computer cartography and GIS, urban and regional planning, community development, environmental analysis, park ranger, intelligence analyst, hydrologist, climatologist, natural resources specialist, demographer, historic preservation specialist and numerous other related environmental fields.

The Department of Geography and Anthropology has a number of physical facilities available for student use in conjunction with coursework. Included are a cartography lab, a map library and a GIS and computer-mapping laboratory.

**Admissions Requirements for Geography and Anthropology:** Students who plan to become candidates for advanced degrees are advised to complete two years of a foreign language. Also, Geography majors are advised to take at least one course in statistics.

**Required courses in the following programs of study may have prerequisites. Reference the course description section for clarification.**

### BACHELOR OF ARTS (BA)

**STUDENT LEARNING OUTCOMES – STUDENTS WILL:**

- demonstrate proficiency in interpreting existing and creating new maps, in both paper and digital formats;
- demonstrate awareness of the diversity of cultural and natural landscapes on a global scale;
- demonstrate basic knowledge of the content and history of geography's main sub disciplines, including physical, human, regional and cartographic techniques;
- apply basic research methodologies and field techniques to geographic research;
- demonstrate communication skills and critical thinking abilities required to interpret and express geographic information in clear written form.

### GEOGRAPHY MAJOR (60–65 CREDITS)

The Geography program has four major missions: 1. providing general education courses to enrich the liberal arts offerings in both the sciences and social sciences; 2. offering specialized or more advanced courses to service other programs in the university; 3. providing a solid academic major for students wishing to pursue graduate study or work as a professional; and 4. supporting research, consulting and other services for the region. Cooperative studies and programs are coordinated with Environmental Science, Biology, Geology, History, Children's Studies, International Affairs, and Urban and Regional Planning.

*Note: two years of a single high school foreign language or one year of a single college level foreign language is required.*

### Required Courses

**Disciplinary Foundation Courses (10 credits)**

- GEOG 100 Fundamentals of the Physical Environment (5)
- GEOG 101 Fundamentals of Human Geography (5)

**CSBS Foundation Courses (5 credits)**

- CSBS 310 Foundations of Social and Behavioral Science Theory (5)

**Choose one of the following (5 credits)**

- CSBS 320 Introductory Statistics for the Social Sciences (5)
- CSBS 330 Integrated Social Science Methods (5)
- CSBS 331 Documents-Based Research Methods (5)
- GEOG 328 Geographic Information Systems I (5)

**Disciplinary Core Courses (20 credits)**

- GEOG 201 Introduction to Field Research (5)
- GEOG 227 Introduction to Map and Air Photo Analysis (3)
- GEOG 230 World Regional Geography (5)
- GEOG 392 History and Philosophy of Geography (2)
- GEOG 490 The Geographer's Capstone (5)

**Elective Concentration: Choose one of the following (20–25 credits)**

**CSBS Certificate Program**

Students may select one of the approved interdisciplinary certificate programs from the CSBS Certificate Program List, with approval of the Geography Program Director. Additional Geography electives may be required to reach the 20 credit minimum if the approved Certificate is less than 20 credits.

**Geography Graduate School Track**

Students may follow the traditional four field focus (human, physical, regional, technical) that is the expected preparation for graduate school. See full Geography Graduate School Track list below.

**Specialization Track**

Under certain circumstances, students may be allowed to design 20 to 25 credit group of electives that best expose them to the branch of geography they wish to pursue, with approval of the Geography Program Director.

**Geography Graduate School Track Coursework**

Select a minimum of 5 credits from each of the following four groups (20 credits minimum)

**Human:**

- GEOG 250 Global Economic Development (3)
- GEOG 317 Resources and Conservation (3)
- GEOG 355 The Geography of Theme Parks (2)
- GEOG 357 The Geography of Childhood (3)
- GEOG 406 Women and Men in the Cultural Landscape (1)
- GEOG 450 Global Transportation Development (3)
- GEOG 459 Political Geography (3)
- GEOG 465 Urban Geography: Origins, Forms and Functions (3)
- GEOG 469 Built Environments of North America: Symbol and Structure (3)

**Physical:**

- GEOG 204 Atmospheric Environment (5)
- GEOG 305 Introduction to Oceanography (5)
- GEOG/BIOG 306 Natural Vegetation Ecology of North America (5)
- GEOG/BIOG 312 Fundamentals of Soil Science (4)
- GEOG 314 Weather and Climate (5)
- GEOG 315 Surface Hydrology (4)
- GEOG 325 Wetland Science I (4)
- GEOG 410 Geomorphology (5)
- GEOG 420 Applied Geography Studies (2–5)

**Regional:**

- GEOG 330 Geography of the Pacific Northwest (4)
- GEOG 332 Geography of Latin America (4)
- GEOG 333 Geography of Monsoon Asia (4)
- GEOG 498 Seminar (Geography) (1–5)

**Techniques:**

- GEOG 328 Geographic Information Systems I (5)
- GEOG 329 Air Photo Interpretation (5)
- GEOG 420 Applied Geographic Studies (2–5)
- GEOG 427 Desktop Mapping (3)
- GEOG 428 Geographic Information Systems II (5)

<b>Disciplinary foundation credits</b>	<b>10 credits</b>
<b>Social and behavioral sciences foundation credits</b>	<b>10 credits</b>
<b>Disciplinary core credits</b>	<b>20 credits</b>
<b>Elective credits</b>	<b>20–25 credits</b>
<b>Minimum total credits for above major</b>	<b>60 credits</b>

*Note: a minor is strongly recommended for the Geography BA.*

## **CERTIFICATE**

### **STUDENT LEARNING OUTCOMES – STUDENTS WILL:**

- demonstrate mastery of foundational concepts of geographic information science;
- demonstrate mastery of foundational concepts of social context of geographic information;
- have the ability to critically evaluate quality and accuracy of spatial data;
- show demonstrated proficiency with GIS software;
- have the ability to communicate geographic information through well-designed maps;
- have the ability to work in teams.

### **CERTIFICATE IN GEOGRAPHIC INFORMATION SYSTEMS (24–30 CREDITS)**

The Certificate in Geographic Information Systems offers students an intensive, interdisciplinary course of study in the field of Geographic Information Systems (GIS) technology. Candidates must take four required classes and choose three additional classes from a list of options for a total of 24–30 credits. All students study a core of computer mapping and spatial analysis basics and then focus on their own application area (e.g. wildlife biology, wetlands, programming, cartographic design). An internship or similar participation in a ‘real world’ GIS project is a required component of the certificate program. This certificate program is open to all majors and post-degree students. In order to qualify for admission to the GIS Certificate Program, full-time EWU students must hold a **GPA** of 3.0 or higher and be entering or past their junior year, or obtain special permission from the certificate program advisor. Post-degree continuing education students who did not graduate from their previous school with at least a 3.0 will be admitted on a probationary basis. A 3.0 grade or higher must be earned in each course for it to count toward the Certificate.

#### **Required Certificate Courses (17 credits)**

- GEOG 328 Geographic Information Systems I (5)
- GEOG 428 Geographic Information Systems II (5)
- GEOG 429 Geographic Information Systems III (5)
- GEOG 493 GIS Portfolio (2)

#### **Electives**

#### **GIS Specialty—Choose one (3 credits)**

- GEOG 427 Desktop Mapping (3)
- or GEOG 499 Directed Study (3)

#### **Interdisciplinary—Choose one (1–5 credits)**

- GEOG 323 GIS Environmental Science (3)
- \*PLAN 496 Experimental Course (1–5 credits) can be substituted for the Interdisciplinary requirement on approval of the GIS Certificate Program advisor.

#### **Application Area: Choose one (3–5 credits)**

Student selects appropriate (non-GIS) course with approval of certificate advisor, to complement chosen application area focus, e.g. Soils, Wetlands, Visual Basic, Global Issues.

<b>Required program credits</b>	<b>17 credits</b>
<b>Elective credits</b>	<b>7–13 credits</b>
<b>Minimum total credits for above certificate</b>	<b>24 credits</b>

## **CERTIFICATE**

### **STUDENT LEARNING OUTCOMES – STUDENTS WILL:**

- demonstrate mastery of the foundational concepts of wetlands science;
- demonstrate mastery of the foundational concepts of the social context of wetlands;
- be able to identify and analyze wetlands landscapes in a field work setting;
- be able to communicate information about wetlands in written, oral, and mapped forms;
- be able to work in teams.

### **CERTIFICATE IN WETLANDS SCIENCE AND MANAGEMENT (31–33 CREDITS)**

The Certificate in Wetlands Science and Management provides EWU students with a focused training in the field of Wetland Science. The curriculum encompasses both the physical science that defines wetlands and the social context of wetlands in terms of their functions and value to society. Successful completion of the Wetlands Certificate requires 23 credits of required class work and 8 to 10 credits of electives for a total of 31 to 33 credits. Coursework is interdisciplinary, blending together classes from biology, geography and planning. This certificate program is open to all majors.

#### **Required Certificate Courses (23 credits)**

- BIOL 411 Field Botany (5)
- GEOG 312 Fundamentals of Soil Science (4)
- GEOG 325 Wetland Science I (4)
- GEOG 490 The Geographer’s Capstone (5)
- PLAN 430 Environmental Planning (5)

#### **Electives—Students must choose two courses (8 to 10 credits)**

- BIOL 405 Limnology (5)
- GEOG 315 Surface Hydrology (4)
- GEOG 328 Geographic Information Systems I (5)
- GEOG 410 Geomorphology (5)
- GEOG 470 Hydrogeology (4)
- PLAN 431 Environmental Impact Statements (3)
- PLAN 440 Land Use Planning (5)

Other courses can be substituted as electives if selected in consultation with and approved by the Wetlands Certificate coordinator.

<b>Required program credits</b>	<b>23 credits</b>
<b>Elective credits</b>	<b>8–10 credits</b>
<b>Minimum total credits for above certificate</b>	<b>31 credits</b>

## **MINOR**

### **GEOGRAPHY MINOR (14–15 CREDITS)**

#### **Required Courses (10 credits)**

- GEOG 100 Fundamentals of the Physical Environment (5)
- GEOG 101 Fundamentals of Human Geography (5)

#### **Electives (4–5 credits)**

Select courses in consultation with department advisor.

<b>Required program credits</b>	<b>10 credits</b>
<b>Elective credits</b>	<b>4–5 credits</b>
<b>Minimum total credits for above minor</b>	<b>14 credits</b>

## **GRADUATE PROGRAM**

The Department of Geography and Anthropology does not offer a graduate degree program but does offer graduate level coursework on a limited basis.

## Geography Courses

*Terms offered:* fall, winter, spring, summer (FWSU). If no terms are indicated check with the department or EagleNET.

### **GEOG 100 Fundamentals of the Physical Environment (5)**

[satisfies the GEGR for natural sciences, geography.]

An introduction to the principal components of the earth's natural systems of weather, climate, water, soils, natural vegetation and landforms and their interrelationships.

### **GEOG 101 Fundamentals of Human Geography (5)** [satisfies the GEGR for social sciences, list 2, anthropology, geography, psychology and sociology.]

An introduction to the study of spatial variations among human cultures and the patterns of interaction between humans and the natural environment, with special emphasis on topics including language, religion, demography, political systems, technology, agriculture, manufacturing and urbanization.

### **GEOG 115 Investigating Earth Science (5)**

*Prerequisite:* pre-university basic skills in mathematics.

[satisfies the GEGR for natural sciences, geology.]

For students planning to teach elementary school. Includes inquiry-based earth science investigations that support science instruction outlined in the National Science Education Standards and Washington Essential Academic Learning Requirements. (Cross-listed GEOL 115)

### **GEOG 201 Introduction to Field Research (5)**

This course presents the fundamentals of field research design and performance.

### **GEOG 204 Atmospheric Environment (5)**

[satisfies the GEGR for natural sciences, geography.]

An introduction to the earth-atmosphere system. The course surveys the physical nature of the atmosphere including weather elements, weather systems and climate. The course addresses the social and environmental issues related to natural and human induced changes in the composition of the atmosphere.

### **GEOG 227 Introduction to Map and Air Photo Analysis (3)**

*Prerequisite:* GEOG 100 or GEOG 101 or permission of instructor.

The focus of this course is mastering the uses of maps and remote imagery as sources of geographic information, both environmental and cultural. Special attention is directed toward maps as communication devices. The course is of value for those wishing to move on to cartography and geographic information systems (GIS) courses as well as general background for geography, social science and education majors.

### **GEOG 230 World Regional Geography (5)** [satisfies international studies university graduation requirement]

A survey of world geographical relationships. Includes an examination of the distribution of selected physical and human phenomena and the processes responsible for the distributions and the varying interrelationships from place to place between humans and the environment.

### **GEOG 250 Global Economic Development (3)**

This course is a survey of the patterns, structures and locational principles of economic activity, including world regional and historical economic development, natural resources, agriculture, manufacturing, transportation, communications and the distribution of service sectors. Particular emphasis will be placed on the process of globalization, free trade and the increasing significance of space and place in the 21<sup>st</sup> century global economy.

### **GEOG 299 Special Studies (1-15)**

*Prerequisite:* permission of the instructor, department chair and college dean.

Subjects studied vary according to faculty and student interest.

### **GEOG 300 Physical Geography (5)**

*Prerequisite:* GEOG 100 or permission of the instructor.

Systematic study of physical events and processes within the human environment including elements of landforms, weather and climate, vegetation and soils.

### **GEOG 301 Human Geography (5)**

*Prerequisite:* successful completion of ENGL 201.

A study of humans, focused on their interaction with the physical and cultural environments of the earth.

### **GEOG 305 Introduction to Oceanography (5)**

*Prerequisite:* mathematics clearance.

An introduction to the nature, occurrence, distribution and interrelationships of phenomena in the oceans, the basins and margins.

### **GEOG 306 Natural Vegetation Ecology of North America (5)**

*Prerequisite:* GEOG 100 or permission of the instructor.

This course is an introduction to the processes and patterns of vegetation, emphasizing the Pacific Northwest. (Cross-listed BIOL 306)

### **GEOG 312 Fundamentals of Soil Science (4)**

*Prerequisite:* successful completion of MATH 100 or mathematics clearance by test.

A general introduction to physical, chemical and biological properties of soils. (Cross-listed BIOL 312)

### **GEOG 314 Weather and Climate (5)**

*Prerequisite:* GEOG 204 or 10 credits of upper division science or permission of the instructor.

Includes the principles of meteorology, description and use of instruments, weather and climate controls.

### **GEOG 315 Surface Hydrology (4)**

*Prerequisite:* mathematics clearance.

A comprehensive treatment of the hydrologic environment of the earth. Topics include: components of the hydrologic cycles, hydrography of major climate regions, water quality assessment and global water resource problems.

### **GEOG 317 Resources and Conservation (3)**

Studies the nature and distribution of natural resources and problems and principles of their use and conservation.

### **GEOG 320 Middle Eastern History and Culture (5)**

Examines the various ethnic, religious and national communities of the Middle East in historical and contemporary context. (Cross-listed ANTH 320 and HIST 320)

### **GEOG 321 GIS for Social Sciences (3)**

*Prerequisite:* CPLA 101

Introduction to Geographic Information Systems (GIS) with an emphasis on its applications in the Social Sciences, including census data, demographic analysis, social justice and related mapping of social phenomena. Course includes hands-on GIS work in the lab.

### **GEOG 323 GIS for Environmental Sciences (3)**

*Prerequisite:* CPLA 101 or CPLA 120.

Introduction to Geographic Information Systems (GIS) with an emphasis on its application in the Environmental Sciences. Course includes hands-on GIS work in the lab. This course satisfies an option for the Certificate in GIS. (Cross-listed ENVS 323)

### **GEOG 325 Wetland Science I (4)**

*Prerequisite:* permission of the instructor.

An introduction to the fundamental processes that form and sustain wetlands. Emphasizes the distinctive hydrology, soils and vegetation of wetlands and field experience in delineation. Examines issues of regulation. Focus is on Pacific Northwest wetlands.

### **GEOG 328 Geographic Information Systems I (5)**

*Prerequisite:* Computer Literacy.

Introductory survey of geographic information systems. Focus is on (1) computer techniques for the input, storage, manipulation, analysis and output of spatial data and (2) the social and administrative creation and dissemination of geographic information. Lecture and laboratory.

### **GEOG 329 Air Photo Interpretation (5)**

*Prerequisite:* junior standing or permission of the instructor.

Aerial photographs as records of the earth surface; recognition, measurement and interpretation of natural and man-made features.

### **GEOG 330 Geography of the Pacific Northwest (4)**

*Prerequisite:* junior standing.

An introduction to regional geographic studies on a local scale. A survey and appraisal of the interrelated elements of the economy, resources, population and physical environment as they affect the growth and development of the region.

### **GEOG 332 Geography of Latin America (4)**

*Prerequisite:* junior standing.

The study of the physical and human geography of the Americas south of the Rio Grande. Emphasizes explanatory description.

### **GEOG 333 Geography of Monsoon Asia (4)**

This course is a regional study of non-Russian Asia and adjacent islands, from humid monsoon lands of the far east to the arid eastern Mediterranean.

### **GEOG 334 The Historical Geography of Canada (4)**

Canada occupies a strategic place in world geography owing to its central location with regard to Europe, Asia and the United States; its resource base, its role in regional and world organizations and the distinctive national characteristics and traditions that its peoples have developed. This course provides an overview of the major geographic regions of Canada based on physical environments, history, settlement patterns, natural resources, transportation and industry, urbanization and cultural and ethnic diversity. (Cross-listed HIST 334)

### **GEOG 335 The Geography of the Pacific Rim (4)**

The growing importance of the nations surrounding the Pacific Ocean in world economic development and international relations has been apparent since the early 1900s, but today—at the threshold of a new century—it is of critical importance. The destiny of the United States and the Pacific Northwest in particular, is inextricably linked to events in such places as China, Japan, the Korea, Indonesia, Australia, Latin America, Canada and Russia, to name but a few. This course will focus on the major trading nations of the Pacific Rim and examines their relationships with the nations of North America and each other with an approach that blends geography, economics, political science and cultural awareness.

### **GEOG 336 Geographies of Conflict in the Middle East (5)**

Examines the Middle East and its various ethnic, political, economic, religious and environmental conflicts from a geographic perspective. The course's holistic combination of geographic and anthropological inquiry will offer insights into how the natural environment and built environment interact and engage with the cultural and political landscapes of the Middle East. (Cross-listed ANTH 336 and HIST 336)

### **GEOG 355 The Geography of Theme Parks (2)**

*Prerequisite:* ENGL 201

Examination of the geographic history and characteristics of the theme park as a 'serious' part of the built environment. We consider the environmental, economic, political, cultural, architectural and technological impacts of theme parks on urban and suburban space around the world.

### **GEOG 357 The Geography of Childhood (3)**

*Prerequisite:* ENGL 201

Examination of the geographic aspects of childhood across space and time. Focus on how cultures in different places and at different times have created, maintained and controlled spaces for children, including where children are born, who cares for infants, the conditions of schooling, leisure spaces provided and the 'virtual geographies' of television and the Internet.

### **GEOG 390 Earth Science Teaching Methods (1)**

*Prerequisite:* GEOL 120, GEOL 121, GEOG 314, PHYS 121; EDUC 303 or permission of the instructor. SCED 390 co-requisite.

This course is designed for Earth Science majors planning to teach middle school, junior or senior high school. It includes the development of curriculum and the organization of teaching materials, techniques and evaluation. (Cross-listed GEOL 390)

**GEOG 392 Seminar in History and Philosophy of Geography (2)**

*Prerequisite:* junior standing or permission of the instructor.  
The development of geographic thought from early to contemporary time.

**GEOG 399 Directed Study (1-15)**

*Prerequisites:* permission of the instructor, department chair and college dean.

Individual study concerned with an appropriate problem closely directed by a geography staff member. Science or social studies credits may be earned depending on the nature of the problem undertaken. (*Maximum of 6 credits may be earned.*)

**GEOG 406 Women and Men in the Cultural Landscape (1)**

The created landscape reflects human values and experience. This course examines ways in which women and men create, use and experience the humanized landscape. We will examine spatial patterns of human activity from a variety of times and places, linking geographic theory to everyday environments. The course will include map work, slide analysis and a field exercise as tools for identifying and interpreting cultural landscapes. (Cross-listed WMST 406)

**GEOG 410 Geomorphology (5)**

*Prerequisite:* GEOG 100 or GEOL 121 or permission of the instructor.

This course treats the development of the surface features of the earth caused by mountain-building, weathering, erosion and deposition.

**GEOG 420 Applied Geographic Studies (2-5)**

*Prerequisite:* junior or permission of the instructor.  
Problem formulation and analysis as they apply to geographic studies. Practical use of geographical techniques mainly for student-originated studies. Credits vary, depending on type of study undertaken. (*May be repeated for different problems.*)

**GEOG 427 Desktop Mapping (3)**

*Prerequisite:* CPLA 101 or permission of the instructor.  
Advanced production of maps and related graphics using computer techniques. Emphasis is placed on the design and creation of thematic maps. Lecture and laboratory.

**GEOG 428 Geographic Information Systems II (5)**

*Prerequisite:* GEOG 328.  
Advanced course in geographic information systems and their applications. Through detailed examination of conceptual issues and in-depth laboratory work, students develop and implement a project that involves the computer analysis of spatial data. Lecture and laboratory.

**GEOG 429 Geographic Information Systems III (5)**

*Prerequisite:* GEOG 428, or instructor's permission.  
Advanced course in geographic information systems and their applications. Each student will be responsible for designing and carrying out a GIS project using real world data. Course required for certification in GIS.

**GEOG 436 Politics of Culture: Israel and Palestine (5)**

Examines the role of culture in the political struggles between Israelis and Palestinians. Explores the influence of national, religious, ethnic and historical narratives in the conceptualization of the Israeli-Palestinian conflict. This course will consider how a detailed knowledge of these 'politics of culture' can provide meaningful insights to potential avenues of cultural reconciliation and, ultimately, a more peaceful environment for Israelis and Palestinians. (Cross-listed ANTH 436 and HIST 436)

**GEOG 450 Global Transportation Development (3)**

*Prerequisite:* GEOG 101 or permission of the instructor.  
Transportation, involving the movement of goods, people and information, is the most tangible expression of interaction between regions and places. Because it is a major force in shaping the landscape, transportation studies assume a central position in the field of geography. The creation of rapid and economical access is central to the process of development at local, regional and national scales. Changes in modes of transport, particularly since the mid-19<sup>th</sup> century, have revolutionized trade, travel and communication. The evolution of transport networks has been critical in fostering urbanization and a specialized space economy. In this course we will explore the basic concepts of geographical transportation analysis and apply them to a variety of historical and contemporary topics.

**GEOG 459 Political Geography (3)**

*Prerequisite:* junior standing or permission of the instructor.  
Spatial aspects of political phenomena. Examines the geographical environment as it affects and is affected by political phenomena.

**GEOG 465 Urban Geography: Origins, Forms and Functions (3)**

Urbanization has been such a central aspect of human civilization that the forces affecting cities and towns are almost as diverse as those shaping culture itself. This course in urban geography will deal with two major aspects of urbanization: the role, purpose and evolution of cities; and the processes at work in our society that both create and transform the physical structure of cities. Because urban places are central to our economy as well as society, we will consider a broad and varied range of material from other academic disciplines, with the primary focus on the North American city.

**GEOG 469 Built Environments of North America: Symbol and Structure (3)**

*Prerequisite:* GEOG 101 or permission of the instructor.  
This course is a survey of North American architectural landscapes from the colonial period to the present. This course will examine such topics as the diffusion of major styles of residential, commercial and public architecture across the continent, the relationship of geology and climate to the availability of building materials and technology and the effects of these on the human built environment, especially in the Pacific Northwest. Special emphasis will be placed on the visual differentiation of building styles and the symbolic, political and philosophical foundations of architectural form and decoration. (Cross-listed HIST 469, PLAN 469)

**GEOG 490 The Geographer's Capstone (5)**

*Prerequisite:* senior standing or permission of the instructor. **[satisfies senior capstone university graduation requirement]**  
This course is a departmental capstone highlighting original geographic research projects designed by students, integrating both physical and human geography topics. The course culminates in a "Geography Conference" that students plan and host to display their work.

**GEOG 493 GIS Portfolio (2)**

*Prerequisite:* GEOG 429 or instructor's permission.  
Exit synthesis for the certificate in GIS or related GIS studies. Students will produce two versions of a GIS portfolio highlighting their GIS work, one in hard copy and one on the web using appropriate web publishing and map serving software.

**GEOG 495 Internship (1-15)**

*Prerequisite:* permission of the instructor, department chair and college dean.

**GEOG 497 Workshops, Short Courses, Conferences (1-15)**

**GEOG 498 Seminar (1-5)**  
*Prerequisites:* 15 credits successfully completed in geography or permission of the instructor.

Advanced group study. Discussion topics selected for each seminar.

**GEOG 499 Directed Study (1-15)**

*Prerequisite:* permission of the instructor, department chair and college dean.