

GEOGRAPHY

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Undergraduate Degrees

Bachelor of Arts (BA)

- Geography (<http://catalog.ewu.edu/archives/2016-2017/social-behavioral-sciences-work/geography/geography-ba>)

Undergraduate Minors

- Geography (<http://catalog.ewu.edu/archives/2016-2017/social-behavioral-sciences-work/geography/geography-minor>)

Undergraduate Certificates

- Geographic Information Systems (<http://catalog.ewu.edu/archives/2016-2017/social-behavioral-sciences-work/geography/geographic-information-systems-certificate>)
- Wetlands Science and Management (<http://catalog.ewu.edu/archives/2016-2017/social-behavioral-sciences-work/geography/wetlands-science-management-certificate>)

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.

Graduate Certificates

- Geographic Information Systems (<http://catalog.ewu.edu/archives/2016-2017/social-behavioral-sciences-work/geography/graduate-certificate-gis>)

Geography Courses

GEOG 100. FUNDAMENTALS OF THE PHYSICAL ENVIRONMENT. 5 Credits.

Satisfies: a GECCR 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 Credits.

Satisfies: GECCR 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 Credits.

Cross listed: GEOL 115.

Pre-requisites: pre-university basic skills in mathematics.

Satisfies: a GECCR 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.

GEOG 195. INTERNSHIP. 1-15 Credits.

GEOG 201. INTRODUCTION TO FIELD RESEARCH. 5 Credits.

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

GEOG 204. ATMOSPHERIC ENVIRONMENT. 5 Credits.

Satisfies: a GECCR 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 226. INTRODUCTION TO GIS SOFTWARE DESIGN. 2 Credits.

This course provides hands-on experience and teaches students technical proficiency using GIS software through demonstration and laboratory exercises.

GEOG 227. INTRODUCTION TO MAP AND AIR PHOTO ANALYSIS. 3 Credits.

Pre-requisites: GEOG 100 or GEOG 101 or permission of instructor.

The primary focus of this course is mastering the uses of maps and remote imagery as sources of geographic information, both environmental and cultural. Special attention will be directed toward maps as communication devices. The course assumes no specific prior knowledge about maps and mapping and will be of value for those wishing to move on to cartography and geographic information systems (GIS) courses as well as general background for social science and education majors.

GEOG 230. WORLD REGIONAL GEOGRAPHY. 5 Credits.

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 Credits.

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 21st century global economy.

GEOG 299. SPECIAL STUDIES. 1-15 Credits.

Pre-requisites: permission of the instructor, department chair and college dean.

Subjects studied vary according to faculty and student interest.

GEOG 300. PHYSICAL GEOGRAPHY. 5 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: mathematics clearance.
An introduction to the nature, occurrence, distribution and interrelationships of phenomena in the oceans, the basins and margins.

GEOG 306. VEGETATION ECOLOGY OF NORTH AMERICA. 5 Credits.

Cross listed: BIOL 306.
Pre-requisites: GEOG 100 or permission of the instructor.
This course is an introduction to the processes and patterns of vegetation, emphasizing the Pacific Northwest.

GEOG 312. FUNDAMENTALS OF SOIL SCIENCE. 4 Credits.

Cross listed: BIOL 312.
Pre-requisites: MTHD 104 or clearance by test.
A general introduction to physical, chemical and biological properties of soils.

GEOG 314. WEATHER AND CLIMATE. 5 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

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 Credits.

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

GEOG 321. GIS FOR SOCIAL SCIENCES. 3 Credits.

Pre-requisites: 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 Credits.

Cross listed: ENVS 323.
Pre-requisites: 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.

GEOG 325. WETLAND SCIENCE I. 4 Credits.

Pre-requisites: 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 INFO SYSTEMS I. 5 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

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 Credits.

Cross listed: HIST 334.
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.

GEOG 335. GEOGRAPHY OF THE PACIFIC RIM. 4 Credits.

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 Koreas, 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 Credits. Cross listed: ANTH 336, HIST 336.

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.

GEOG 355. THE GEOGRAPHY OF THEME PARKS. 2 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credit.

Cross listed: GEOL 390.

Pre-requisites: 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.

GEOG 392. SEMINAR IN HISTORY AND PHILOSOPHY OF GEOGRAPHY. 2 Credits.

Pre-requisites: junior standing or permission of the instructor.

The development of geographic thought from early to contemporary time.

GEOG 396. EXPERIMENTAL COURSE. 1-6 Credits.**GEOG 398. SEMINAR. 2 Credits.****GEOG 399. DIRECTED STUDY. 1-6 Credits.**

Notes: maximum of 6 credits may be earned.

Pre-requisites: permission of the instructor.

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.

GEOG 406. WOMEN AND MEN IN THE CULTURAL LANDSCAPE. 1 Credit.

Cross listed: WMST 406.

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.

GEOG 410. GEOMORPHOLOGY. 5 Credits.

Pre-requisites: 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 Credits.

Notes: May be repeated for different problems.

Pre-requisites: junior or permission of the instructor.

Credits vary, depending on type of study undertaken. Problem formulation and analysis as they apply to geographic studies. Practical use of geographical techniques mainly for student-originated studies.

GEOG 427. DESKTOP MAPPING. 3 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: 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 Credits.

Pre-requisites: GEOG 428 or permission of the instructor.

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 Credits.

Cross listed: ANTH 436, HIST 436.

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.

GEOG 437. WOMEN AND ISLAM. 5 Credits.

Cross listed: ANTH 437, HIST 437, WMST 437.

Pre-requisites: junior or senior standing.

This course examines the status and identity of women in Islamic communities throughout the world and assesses how different interpretations of Islam, as a simultaneous religious, social, cultural, political and economic system, influences perceptions of women within Islamic communities. It further considers the perceptions of Islam vis-à-vis women and Islamic women themselves by non-Muslim communities.

GEOG 438. PEACE, VIOLENCE AND CULTURE. 5 Credits.**Cross listed:** ANTH 438, HIST 438.**Pre-requisites:** junior or senior standing.

This course is a collective exercise in critical thinking on the intersection and interaction of peace, violence and culture. It explores the cultural dimensions of peace and violence, including the role of culture in defining and understanding the manifestation and enactment of peace and violence both by and against individuals as well as groups.

GEOG 449. GIS SPATIAL ANALYSIS FOR THE ENVIRONMENTAL SCIENCES. 5 Credits.**Cross listed:** GEOL 449, ENVS 449.**Pre-requisites:** GEOG 328, GEOG 323 or ENVS 323.

This is an advanced course where students learn to build Geographic Information System models for environmental applications. In the course, students design, collect data, process data and build several spatial models of increasing complexity. Students will learn advanced techniques in Geographic Information Systems including raster processing, analysis methods and layout design and document their projects in a report form and create production quality maps. This course stresses independent project design and the development of problem solving skills.

GEOG 450. GLOBAL TRANSPORT DEVELOPMENT. 3 Credits.**Pre-requisites:** 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-19th 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 Credits.**Pre-requisites:** 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 Credits.

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 Credits.**Cross listed:** HIST 469, PLAN 469.**Pre-requisites:** 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.

GEOG 470. GIS PROGRAMMING. 5 Credits.**Pre-requisites:** GEOG 428 or permission of instructor.

This is an advanced GIS course that focuses on the computer programming languages utilized within GIS software. A variety of GIS-related programming languages, methods and techniques are surveyed. Students gain direct experience developing algorithms, reading existing code and writing their own programs in a selected programming language. This is a lab-intensive class; prior computer programming experience recommended but not required.

GEOG 490. THE GEOGRAPHER'S CAPSTONE. 5 Credits.**Pre-requisites:** 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 Credits.**Pre-requisites:** GEOG 429 or permission of the instructor.

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 IN GEOGRAPHY. 1-15 Credits.**Pre-requisites:** permission of the instructor, department chair and college dean.**GEOG 496. EXPERIMENTAL COURSE. 1-5 Credits.****GEOG 497. WORKSHOP, SHORT COURSE, CONFERENCE, SEMINAR. 1-15 Credits.****GEOG 498. SEMINAR. 1-5 Credits.****Pre-requisites:** 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 Credits.**Pre-requisites:** permission of the instructor, department chair and college dean.**GEOG 505. SPATIAL THEORY. 5 Credits.**

This seminar focuses on the development and evolution of spatial theory both within and beyond the discipline of geography. Working from a global perspective, students explore and critically compare seminal theoretical contributions and their broader social contexts that underscore specific moments in the history of geographical studies. We investigate the ways in which contemporary western geographic thought is inseparable from the interconnected global networks within which it emerged. Original texts are used as often as possible and form the core of seminar discussion material.

GEOG 510. SEMINAR IN CRITICAL GIS. 5 Credits.

This class explores the evolution of theory and practice in critical GIS and current trends that characterize its content. Students will be exposed to the breadth of geographic thought related to critical GIS as we examine the major paradigms, sub-fields, and epistemological approaches in the field.

GEOG 515. SPATIAL METHODS. 5 Credits.

This course provides advanced experience with the qualitative and quantitative methods of spatial research. Students research, compare and critically apply a variety of geographic methods to different case study scenarios in order to develop proficiency across the spectrum of geographic methods. Priority is given to contemporary digital methods, but older forms are introduced for comparative purposes also. Throughout the course, students build up a suite of methods they then will apply later in the program to their own research.

GEOG 521. GIS FOR SOCIAL SCIENCES. 5 Credits.

This course emphasizes the application of Geographic Information Systems 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 522. RESEARCH DESIGN. 3 Credits.

Cross listed: ANTH 522.

Provides for the continued development of a practical toolkit with which to conduct applied social science research. Addresses research design elements necessary in areas such needs assessments and program evaluations through techniques such as participatory research, action research, evaluation, assessment and surveying. The course covers development of research proposals for independent, grant funded or contract designs.

GEOG 523. GIS FOR ENVIRONMENTAL SCIENCE. 3 Credits.

This course emphasizes the application of Geographic Information Systems in the Environmental Sciences, including mapping and analysis of topographical, hydrological, geological, biological, and other environmental data. The course includes hands-on GIS work in the lab.

GEOG 524. GIS FOR PUBLIC HEALTH. 5 Credits.

This course introduces students to Geographic Information Systems (GIS) applications in the field of public health. Students learn basic digital mapping and spatial analysis concepts and techniques that can be applied toward the study of the health and wellness of populations. Students gain hands-on experience working with GIS software in a laboratory setting.

GEOG 525. DATA ANALYSIS AND VISUALIZATION. 3 Credits.

Cross listed: ANTH 525.

Pre-requisites: ANTH 522 or GEOG 522.

This course introduces students to data analysis and data visualization. In particular, students will learn basic data analysis approaches, explore their use and apply them to qualitative and quantitative data sets. In addition students will synthesize the results of their data analysis into a variety of data visualization formats.

GEOG 527. DESKTOP MAPPING. 3 Credits.

This course explores the various ways that spatial information is communicated through cartographic and related methods. The course covers both contemporary theories of cartographic visualization and applied digital design strategies. Includes hands-on lab work using GIS and related mapping software.

GEOG 528. GEOGRAPHIC INFORMATION SYSTEMS I. 5 Credits.

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.

GEOG 531. TOPICS IN SOCIAL JUSTICE. 5 Credits.

Notes: may be repeated for credit when topics differ.

This seminar examines the breadth of research in human geography focused on issues related to social justice. Through an intensive engagement with relevant literature, students will be exposed to a series of select historical and contemporary debates in critical human geography as we examine the ontological, epistemological and practical dilemmas concerning research driven by and concerned with social justice.

GEOG 533. TOPICS IN ENVIRONMENTAL JUSTICE. 5 Credits.

Notes: may be repeated for credit when topics differ.

This seminar examines the breadth of research in human and physical geography focused on issues related to environmental justice. Through an intensive engagement with relevant literature and contemporary data, students will be exposed to a series of select historical and contemporary debates in critical geographic studies as we examine the ontological, epistemological and practical dilemmas concerning research driven by and concerned with environmental justice.

GEOG 536. GIS PROGRAMMING. 5 Credits.

Pre-requisites: GEOG 528.

This is an advanced course in GIS programming concepts and techniques. Students will be exposed to both legacy and contemporary programming languages integrated with GIS packages. Emphasis will be on creating and interpreting scripts using languages supported by current GIS software. The course includes hands-on GIS and programming work in the lab.

GEOG 538. GEOGRAPHIC INFORMATION SYSTEMS II. 5 Credits.

Pre-requisites: GEOG 528.

This course focuses on the design and implementation of geographic information system database structures. Emphasis is on the construction and analysis of contemporary and legacy vector structures, with basic exploration of raster structures. The course includes hands-on GIS work in the lab.

GEOG 548. GEOGRAPHIC INFORMATION SYSTEMS III. 5 Credits.

Pre-requisites: GEOG 528 and GEOG 538.

This is an advanced course in GIS project design and execution. Students will be expected to work independently on a "real-world" GIS project based on either thesis research or an on-going project developed with a community partner. Students will oversee all stages of the project from design to data collection to presentation of results. The course is required for the GIS Certificate program.

GEOG 549. GIS PORTFOLIO. 2 Credits.

Pre-requisites: GEOG 548 or permission of the instructor.

Advanced GIS course for students finishing their graduate degree and/or GIS Certificate program. This class will offer students the opportunity to review and revise previous work, arrange it into a portfolio, provide supporting documentation and metadata, and, optionally, create a web page featuring the portfolio material.

GEOG 597. WORKSHOP, SHORT COURSE, CONFERENCE, SEMINAR. 1-5 Credits.**GEOG 599. DIRECTED STUDY. 1-5 Credits.**

Pre-requisites: permission of the instructor, department chair and college dean.

GEOG 600. THESIS. 5 Credits.

Notes: may be repeated.

Pre-requisites: permission of the instructor, department chair and college dean.

The goal of this course is the successful production of a master's thesis of defensible quality. The master's thesis will be the presentation of original research in the field of geography and critical GIS. This document provides partial fulfillment of the MA requirement. This course provides an opportunity to sharpen research, writing and organizational skills under the direction of the student's graduate committee.

GEOG 601. RESEARCH PROJECT. 5 Credits.

Notes: may be repeated.

Pre-requisites: permission of the instructor, department chair and college dean.

The goal of this course is the successful completion of a master's research project of defensible quality. The research project will be the culmination of applied research in the field of geography and critical GIS. This research project provides partial fulfillment of the MA requirement for student's not pursuing the thesis track. This course provides the opportunity to sharpen research, writing, cartographic, advocacy and organizational skills under the direction of the graduate committee.

GEOG 696. COLLEGE TEACHING INTERNSHIP. 5 Credits.