

# GEOGRAPHY (GEOG)

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## **GEOG 100 Introduction to Planet Earth (3 credits)**

General Education: Natural/Integrated Science  
Natural environment; nature, distribution, and relationships of climate, landforms, oceans, vegetation, hydrography, and soils. Three lectures and one 2-hour lab per week; may involve evening classes. Typically Offered: Fall, Spring and Summer.

## **GEOG 100L Introduction to Planet Earth Lab (1 credit)**

General Education: Natural/Integrated Science  
Natural environment; nature, distribution, and relationships of climate, landforms, oceans, vegetation, hydrography, and soils. Three lectures and one 2-hour lab per week; may involve evening classes. Typically Offered: Fall and Spring.

## **GEOG 165 Human Geography (3 credits)**

General Education: International, Social and Behavioral Ways of Knowing  
General Education: International and Social and Behavioral Ways of Knowing. Intro to geographical dimension in human behavior and how this is evident in population distribution, rural and urban land use, and social, economic, and political attributes of societies. Typically Offered: Varies.

## **GEOG 200 World Cultures and Globalization (3 credits)**

General Education: International, Social and Behavioral Ways of Knowing  
Countries, regions, and peoples of the world; interrelationships between humans and their physical and cultural environments. Typically Offered: Spring. Cooperative: open to WSU degree-seeking students.

## **GEOG 203 (s) Workshop (1-16 credits)**

Credit arranged

## **GEOG 204 (s) Special Topics (1-16 credits)**

Credit arranged

## **GEOG 220 The Geography of Middle Earth (3 credits)**

The course will explore the various roles that geography and geographical thinking have had in Tolkien's master works and the ideas of imaginary worlds. It will cover the issues of landscape creation in an imagined environment as well as the nature of culture, language and civilization in Tolkien's realm. These ideas are transferable to real-world situations. The details of landscape, geology, biology, religion, politics and economics will also be discussed in the context of the various ethnolinguistic groups and geographically disparate groups. The approach will use humanistic geography, mythic metaphor and chorography as analytical tools.

## **GEOG 260 Introduction to Geopolitics (3 credits)**

General Education: International, Social and Behavioral Ways of Knowing  
The course introduces students to contemporary approaches to geopolitics through the exploration of key geographic concepts and the ideas of structure and agency. Topics include terrorism, nationalism, militarism, borders, and environmental geopolitics. Current events are discussed to exemplify the concepts.

## **GEOG 299 (s) Directed Study (1-16 credits)**

Credit arranged

## **GEOG 301 Meteorology (3 credits)**

Atmospheric processes that produce weather; temperature; moisture, clouds, and precipitation; synoptic-scale weather; severe storms; weather instrumentation, weather maps, and forecasting; influences of weather on humans and impacts of humans on weather. (Fall only)

**Prereqs:** MATH 143 or equivalent

## **GEOG 313 Global Climate Change (3 credits)**

Joint-listed with GEOG 513

Scientific basis of the climate system and global climate changes; process-based understanding of past, present and future climate change; natural and anthropogenic influences; interactions between climate, society and ecosystems; scientific review and politicization; climate change solutions and opportunities. Students in GEOG 513 will be required to solve additional quantitative problem sets and synthesize journal articles. (Fall only)

## **GEOG 317 Tree Rings and Environmental Change (3 credits)**

Joint-listed with GEOG 517

Principles, techniques, and interpretation in tree-ring science. Applications in climate, ecology, forestry, and earth sciences. The course objectives are (1) to become proficient with the field and laboratory skills commonly used in tree-ring research, (2) to develop an understanding of the diversity of the applications of tree-ring science, and (3) to apply the techniques and knowledge learned in the course in addressing a specific topic of interest within the broad realm of geographic research. Additional work required for graduate credit. Cooperative: open to WSU degree-seeking students. Typically Offered: Spring.

## **GEOG 330 Urban Geography (3 credits)**

Joint-listed with GEOG 531

Theory and models of the functions, origin, development, structure, and distribution of cities; land-use and housing, globalization and cities, neighborhood transition, urban economic development, and geographic aspects of city planning. Also considers urban social differences, inequality, and conflicts over the uses and meanings of city space. Graduate students are required to synthesize journal articles and complete an additional independent research paper.

## **GEOG 345 Global Economic Geography (3 credits)**

Joint-listed with GEOG 545

An overview of major developments and contemporary debates in the economic geography literature; economic globalization, the spatial dimensions of resource use, agriculture, industry, and post-industry landscapes, economic aspects of land-use change, location theory and case studies. Additional projects required for graduate credit.

## **GEOG 350 Sustainability of Global Development (3-4 credits)**

General Education: International

Joint-listed with GEOG 550

Geographic appraisal of resource problems and development potentials of the Third World. One hour additional meeting per week or project for fourth credit. Additional assignments and exams required for graduate credit. Typically Offered: Fall and Spring. Cooperative: open to WSU degree-seeking students.

## **GEOG 360 Population Dynamics and Distribution (3-4 credits)**

General Education: International

Effects of fertility, mortality, and migration on population size and distribution; demographic trends in U. S. and other societies and how these relate to economic, political, environmental, and other factors. One hour additional meeting per week or project for fourth credit. Additional assignments and exams required for graduate credit. (Spring only)

**GEOG 365 Geopolitics and Conflict (3 credits)**

General Education: International, Social and Behavioral Ways of Knowing  
Joint-listed with GEOG 565

Surveys the geographic distribution of political processes, actions, and outcomes at variety of spatial scales - international, national, and local. Topics include origins of the modern territorial state, conflicts over access to and use of space, access to natural resources, nationalism, elections, democratization, globalization, terrorism, and the politics of identity. Graduate students are required to complete an additional independent research paper. Typically Offered: Spring. Cooperative: open to WSU degree-seeking students.

**GEOG 385 Foundations of GIS (3 credits)**

Intro to basic concepts and applications of geographic information systems (GIS), lab exercises on PC-based GIS packages. Two lectures and 2 hours of lab per week. Cooperative: open to WSU degree-seeking students. Typically Offered: Fall, Spring.

**Prereqs:** basic knowledge of PC-based operating system.

**GEOG 390 Cartographic Design & Geovisualization (3 credits)**

Map projections, map generalization, cartographic design, map symbology, and typography; statistical, isarithmic and multivariate mapping; static versus dynamic mapping; interactive and internet mapping; cartographic animation; 2 hours of lab per week. (Spring only)

**Prereqs:** GEOG 385

**GEOG 400 (s) Seminar (1-16 credits)**

Credit arranged

**GEOG 401 Climatology (3 credits)**

Joint-listed with GEOG 512

Physical basis for climatic processes and patterns; mechanics of global atmospheric circulation; radiation balance and heat budget of the earth; models of weather patterns and climate. Additional assignments and quantitative exercises required for graduate credit. (Spring, alt/years)

**GEOG 402 GIS Skills Development (1-3 credits, max 6)**

Hands-on skills development in GIS and related technologies. Primary topics vary by semester, but may include topics such as GPS/GIS integration, web-based GIS, project management and cartographic design. May be taken for credit multiple times.

**GEOG 403 (s) Workshop (1-16 credits)**

Credit arranged

**GEOG 404 (s) Special Topics (1-16 credits)**

Credit arranged

**GEOG 407 Spatial Analysis and Modeling (3 credits)**

Joint-listed with GEOG 507

Introduces the basic theories and methods of spatial analysis used for statistical modeling and problem solving in human and physical geography. The special nature of spatial data (point, continuous, and lattice) in the social and physical sciences is emphasized. Topics include point pattern analysis, spatial autocorrelation analysis, spatial multivariate regression, local indicators of spatial association, and geographically weighted regression. Extra oral and/or written assignments required for graduate credit. Cooperative: open to WSU degree-seeking students.

**Prereqs:** STAT 431 or permission

**GEOG 410 Biogeography (3 credits)**

Geographic distributions of plant and animal species, and causes of patterns, including climate, geology, speciation, extinction, and migration. Typically Offered: Spring.

**Prereqs:** GEOG 100/GEOG 100L or FOR 221 or WLF 220. Cooperative: open to WSU degree-seeking students.

**GEOG 411 Natural Hazards (3 credits)**

Joint-listed with GEOG 561

Overview of the physical drivers and factors associated with natural hazards including impacts on community and landscape resilience and sustainability. Topics include geospatial analysis and modeling or projected risks and methods to monitor impacts of natural hazards on human communities and landscapes. Other topics include a survey of natural hazards, their controlling factors, and recognition of hazard potential, with an emphasis on floods, earthquakes, landslides, fires, volcanic eruptions, tsunamis, risk assessment, etc. Additional work required for graduate credit. Typically Offered: Fall (Even Years) and Summer. Cooperative: open to WSU degree-seeking students.

**GEOG 414 Socioeconomic Applications of GIS (3 credits)**

This course explores the use of geographic information systems (GIS) in various socioeconomic research fields including but not limited to urban planning, transportation, public health, environmental justice, crime analysis, and retail/business location etc. A major goal of this course is to teach students how to integrate geographical information techniques and data analytics with their future or ongoing research and real-world applications in the fields of social sciences. The course will be a combination of lectures and labs. The basic concepts, methodologies, and theories will be introduced in the lecture, and the lab sections are designed to give students hands-on experience using ArcGIS to complete a series of real-world projects.

**Prereqs:** GEOG 385 or equivalent

**GEOG 420 Land, Resources, and Environment (3 credits)**

Social, legal, cultural, political, and economic aspects of land-use control both in the United States and worldwide. Contrasts are made between indigenous and contemporary cultures within a sustainable geography-of-limits and political ecology framework. Cooperative: open to WSU degree-seeking students. Typically Offered: Fall.

**GEOG 424 Hydrologic Applications of GIS and Remote Sensing (3 credits)**

Joint-listed with GEOG 524

Concepts of area-based hydrologic modeling and assessment and the various types of spatially distributed information commonly used in these activities, such as topographic data, vegetation cover, soils and meteorologic data. Hands-on experience in manipulating these types of data sets for hydrologic applications via weekly ArcGIS lab exercises. Additional project work required for graduate credit. Recommended Preparation: FOR 462, or CE 325; or equivalent. Typically Offered: Fall. **Prereqs:** GEOG 385 or FOR 375 Cooperative: open to WSU degree-seeking students.

**GEOG 430 Climate Change Ecology (3 credits)**

Climate change impacts on ecosystems, plants, and animals; feedbacks to climate change; climate change mitigation related to ecosystems and species. Typically Offered: Spring.

**Prereqs:** BIOL 114 or ENVS 101 or GEOG 100 or FOR 221/REM 221/WLF 220 or Instructor Permission Cooperative: open to WSU degree-seeking students.

**GEOG 435 Climate Change Mitigation (3 credits)**

Joint-listed with GEOG 535

Technical, environmental, social and economic aspects of planning and implementing actions that reduce the emission of, or enhance sinks of greenhouse gases, from the local to international scale. Linkages are made to sustainable energy systems, sustainable community planning and transportation options; sustainable food systems, and international sustainable development goals. Environmental justice considerations and effective communication of climate change solutions are also discussed. Additional work will be required for graduate credit. Recommended preparation: GEOG 313 Typically Offered: Spring. Cooperative: open to WSU degree-seeking students.

**GEOG 453 Water and Energy Systems (3 credits)**

The class covers the basic science of water and energy and the applied interrelationships of those two resources in today's society. The broad spectrum coverage of the topic includes the energy linkage to both the supply and demand of water and also the water linkage to the supply of and demand for energy. The class includes development of systems dynamics models for describing the resource interactions. Recommended Preparation: Basic Physical Sciences.

**Prereqs:** MATH 143

**GEOG 455 Societal Resilience and Adaptation to Climate Change (3 credits)**

Consequences of human causes, mitigation and adaptations, community resilience strategies, and policy implications to human impacts of global climate change. Concentration on social science issues including opportunities and constraints for resilience and adaptation to global climate change. Recommended Preparation: GEOG 411.

**GEOG 475 Intermediate GIS (3 credits)**

Course covers in-depth geographic information systems models and applications. Topics include network analysis, watershed analysis, spatial interpolation, terrain mapping and analysis, 3D visualization, and GIS modeling. Students develop spatial analysis and modeling skills to solve real-world problems. Typically Offered: Spring.

**Prereqs:** GEOG 385

**Coreqs:** STAT 251 Cooperative: open to WSU degree-seeking students

**GEOG 479 GIS Programming (3 credits)**

Joint-listed with GEOG 579

Introduction to using computer programming to solve geospatial problems. Basic programming concepts as well as integration with ArcGIS are covered. Students learn Python and complete lab assignments on managing, processing, and plotting geographic and attribute data. Additional work will be required for graduate credit. Recommended preparation for graduate students: GEOG 525 Typically Offered: Fall.

**Prereqs:** GEOG 385 or equivalent Cooperative: open to WSU degree-seeking students.

**GEOG 483 Remote Sensing/GIS Image Analysis (3 credits)**

Joint-listed with GEOG 583

Concepts and tools for the processing, analysis, and interpretation of digital images from satellite and aircraft-based sensors. The integration of remotely sensed data and the other spatial data types within Geographic Information Systems. Additional assignments and exams required for graduate credit. Two lectures and 2 hours of lab per week. Cooperative: open to WSU degree-seeking students. Typically Offered: Spring.

**Coreqs:** GEOG 385 or FOR 375 or equivalent

**GEOG 487 (s) Topics in Geospatial Analysis (1-3 credits, max 6)**

Joint-listed with GEOG 587

Current topics and applications in remote sensing, GIS, and/or spatial analysis. Topics to vary by instructor and current trends in the field. Recommended preparation: At least 2 courses in GIS and/or 1 in remote sensing, depending on topic. Additional course project required for graduate credit. Typically Offered: Summer.

**GEOG 488 Geography of Energy Systems (3 credits)**

Joint-listed with GEOG 588

This course examines geographic dimensions associated with the production, distribution, acquisition, consumption and storage of energy. Geographic tools and techniques will be used to analyze, understand and deconstruct complexity and nuance across various modes of production, current topics and challenges along with future considerations such as transitioning to renewable energy sources. The course will split time between classroom settings, field trips to energy installations on campus and across the inland Northwest, in addition applied learning activities. Additional readings, assignments and project required for graduate credit. Typically Offered: Fall (Even Years). Cooperative: open to WSU degree-seeking students.

**GEOG 493 Senior Capstone in Geography (3 credits)**

General Education: Senior Experience

A capstone course in which students integrate their knowledge of human and physical geography, as well as geographic techniques, to propose solutions to real-world problems. Students gain experience in working in small groups and in written and oral presentation of project results, and will be evaluated with respect to the skills acquired in their degree program. Topics may include, but are not limited to, issues such as sustainable development in rural communities, global and regional food and energy distribution, quantifying and analyzing global or regional indicators of environmental and/or societal trends. Open to Senior geography majors or to nonmajors with Instructor Permission.

**Prereqs:** Department of Geography Majors or Permission

**GEOG 498 (s) Internship (1-16 credits)**

Credit arranged.

**GEOG 499 (s) Directed Study (1-16 credits)**

Credit arranged

**GEOG 500 Master's Research and Thesis (1-16 credits)**

Credit arranged

**GEOG 501 (s) Seminar (1-16 credits)**

Credit arranged

**GEOG 502 (s) Directed Study (1-16 credits)**

Credit arranged

**GEOG 503 (s) Workshop (1-16 credits)**

Credit arranged

**GEOG 504 (s) Special Topics (1-16 credits)**

Credit arranged

**GEOG 507 Spatial Analysis and Modeling (3 credits)**

Joint-listed with GEOG 407

Introduces the basic theories and methods of spatial analysis used for statistical modeling and problem solving in human and physical geography. The special nature of spatial data (point, continuous, and lattice) in the social and physical sciences is emphasized. Topics include point pattern analysis, spatial autocorrelation analysis, spatial multivariate regression, local indicators of spatial association, and geographically weighted regression. Extra oral and/or written assignments required for graduate credit. Cooperative: open to WSU degree-seeking students.

**Prereqs:** STAT 431 or permission

**GEOG 513 Global Climate Change (3 credits)**

Joint-listed with GEOG 313

Scientific basis of the climate system and global climate changes; process-based understanding of past, present and future climate change; natural and anthropogenic influences; interactions between climate, society and ecosystems; scientific review and politicization; climate change solutions and opportunities. Students in GEOG 513 will be required to solve additional quantitative problem sets and synthesize journal articles. (Fall only)

**GEOG 515 Pyrogeography (3 credits)**

An introduction to the field of pyrogeography that focuses on the fire being a cornerstone of a sustainable society in the Anthropocene. Topics include the global study of the past, present, and projected distribution of wildfire and the interconnection with fire ecology and cultural geography. The course will include readings and discussions of recent scientific literature. Typically Offered: Summer.

**GEOG 517 Tree Rings and Environmental Change (3 credits)**

Joint-listed with GEOG 317

Principles, techniques, and interpretation in tree-ring science. Applications in climate, ecology, forestry, and earth sciences. The course objectives are (1) to become proficient with the field and laboratory skills commonly used in tree-ring research, (2) to develop an understanding of the diversity of the applications of tree-ring science, and (3) to apply the techniques and knowledge learned in the course in addressing a specific topic of interest within the broad realm of geographic research. Additional work required for graduate credit. Cooperative: open to WSU degree-seeking students. Typically Offered: Spring.

**GEOG 524 Hydrologic Applications of GIS and Remote Sensing (3 credits)**

Joint-listed with GEOG 424

Concepts of area-based hydrologic modeling and assessment and the various types of spatially distributed information commonly used in these activities, such as topographic data, vegetation cover, soils and meteorologic data. Hands-on experience in manipulating these types of data sets for hydrologic applications via weekly ArcGIS lab exercises. Additional project work required for graduate credit. Recommended Preparation: FOR 462, or CE 325; or equivalent. Typically Offered: Fall. Cooperative: open to WSU degree-seeking students.

**GEOG 525 Graduate GIS Fundamentals (3 credits)**

Introductory graduate level course in Geographic Information Systems (GIS). Students will learn how to use GIS to manage, integrate, analyze, and visualize geospatial data and information. GIS can be used to explore patterns and relationships in geographic data, seek explanations, and develop solutions to pressing problems. The basic concepts of GIS will be introduced in the lecture, and the lab section will help students develop ArcGIS Pro skills. We explore the theory underlying sources of spatial data such as passive and active remote sensing imagery and apply geo-analytical and data exploration methods to integrated problems. Typically Offered: Spring.

**GEOG 531 Urban Geography (3 credits)**

Joint-listed with GEOG 330

Theory and models of the functions, origin, development, structure, and distribution of cities; land-use and housing, globalization and cities, neighborhood transition, urban economic development, and geographic aspects of city planning. Also considers urban social differences, inequality, and conflicts over the uses and meanings of city space. Graduate students are required to synthesize journal articles and complete an additional independent research paper.

**GEOG 535 Climate Change Mitigation (3 credits)**

Joint-listed with GEOG 435

Technical, environmental, social and economic aspects of planning and implementing actions that reduce the emission of, or enhance sinks of greenhouse gases, from the local to international scale. Linkages are made to sustainable energy systems, sustainable community planning and transportation options; sustainable food systems, and international sustainable development goals. Environmental justice considerations and effective communication of climate change solutions are also discussed. Additional work will be required for graduate credit. Recommended preparation: GEOG 313 Typically Offered: Spring. Cooperative: open to WSU degree-seeking students.

**GEOG 545 Global Economic Geography (3 credits)**

Joint-listed with GEOG 345

An overview of major developments and contemporary debates in the economic geography literature; economic globalization, the spatial dimensions of resource use, agriculture, industry, and post-industry landscapes, economic aspects of land-use change, location theory and case studies. Additional projects required for graduate credit.

**GEOG 550 Sustainability of Global Development (3-4 credits)**

General Education: International

Joint-listed with GEOG 350

Geographic appraisal of resource problems and development potentials of the Third World. One hour additional meeting per week or project for fourth credit. Additional assignments and exams required for graduate credit. Typically Offered: Fall and Spring. Cooperative: open to WSU degree-seeking students.

**GEOG 560 Population Dynamics and Distribution (3-4 credits)**

Effects of fertility, mortality, and migration on population size and distribution; demographic trends in U. S. and other societies and how these relate to economic, political, environmental, and other factors. One hour additional meeting per week or project for fourth credit. Additional assignments and exams required for graduate credit. (Spring only)

**GEOG 561 Natural Hazards (3 credits)**

Joint-listed with GEOG 411

Overview of the physical drivers and factors associated with natural hazards including impacts on community and landscape resilience and sustainability. Topics include geospatial analysis and modeling or projected risks and methods to monitor impacts of natural hazards on human communities and landscapes. Other topics include a survey of natural hazards, their controlling factors, and recognition of hazard potential, with an emphasis on floods, earthquakes, landslides, fires, volcanic eruptions, tsunamis, risk assessment, etc. Additional work required for graduate credit. Typically Offered: Fall (Even Years) and Summer. Cooperative: open to WSU degree-seeking students.

**GEOG 565 Geopolitics and Conflict (3 credits)**

General Education: International, Social and Behavioral Ways of Knowing  
Joint-listed with GEOG 365

Surveys the geographic distribution of political processes, actions, and outcomes at variety of spatial scales - international, national, and local. Topics include origins of the modern territorial state, conflicts over access to and use of space, access to natural resources, nationalism, elections, democratization, globalization, terrorism, and the politics of identity. Graduate students are required to complete an additional independent research paper. Typically Offered: Spring. Cooperative: open to WSU degree-seeking students.

**GEOG 579 GIS Programming (3 credits)**

Joint-listed with GEOG 479

Introduction to using computer programming to solve geospatial problems. Basic programming concepts as well as integration with ArcGIS are covered. Students learn Python and complete lab assignments on managing, processing, and plotting geographic and attribute data. Additional work will be required for graduate credit. Recommended preparation for graduate students: GEOG 525 Typically Offered: Fall. Cooperative: open to WSU degree-seeking students.

**GEOG 583 Remote Sensing/GIS Image Analysis (3 credits)**

Joint-listed with GEOG 483

Concepts and tools for the processing, analysis, and interpretation of digital images from satellite and aircraft-based sensors. The integration of remotely sensed data and the other spatial data types within Geographic Information Systems. Additional assignments and exams required for graduate credit. Two lectures and 2 hours of lab per week. Cooperative: open to WSU degree-seeking students. Typically Offered: Spring.

**Coreqs:** GEOG 385 or FOR 375 or equivalent

**GEOG 587 (s) Topics in Geospatial Analysis (1-3 credits, max 6)**

Joint-listed with GEOG 487

Current topics and applications in remote sensing, GIS, and/or spatial analysis. Topics to vary by instructor and current trends in the field. Recommended preparation: At least 2 courses in GIS and/or 1 in remote sensing, depending on topic. Additional course project required for graduate credit. Typically Offered: Summer.

**GEOG 588 Geography of Energy Systems (3 credits)**

Joint-listed with GEOG 488

This course examines geographic dimensions associated with the production, distribution, acquisition, consumption and storage of energy. Geographic tools and techniques will be used to analyze, understand and deconstruct complexity and nuance across various modes of production, current topics and challenges along with future considerations such as transitioning to renewable energy sources. The course will split time between classroom settings, field trips to energy installations on campus and across the inland Northwest, in addition applied learning activities. Additional readings, assignments and project required for graduate credit. Typically Offered: Fall (Even Years). Cooperative: open to WSU degree-seeking students.

**GEOG 591 History and Philosophy of Geography (3 credits)**

Evolution of geography as a discipline, focusing on post-scientific revolution developments and identification of major themes in contemporary geographic thought.

**GEOG 593 Geovisualization (3 credits)**

Covers methods for visualization and analyzing of spatial data. This includes modern data visualization techniques such as incorporation of modeling results, remote sensing and geographic information system layers, and dynamic virtual assets within virtual environments. Typically Offered: Spring and Summer.

**GEOG 596 Geography Department Seminar (1 credit)**

Weekly or bi-weekly department seminar with talks given by visiting and local speakers on topics relevant to geography.

**GEOG 597 (s) Practicum (1-16 credits)**

Credit arranged. Graded pass/fail.

**GEOG 598 (s) Internship (1-16 credits)**

Credit arranged. Practical, on-the-job experience with governmental agencies or commercial establishments; oral and written reports are presented in which the student reviews and constructively criticizes the experience gained; salary may be received for services performed.

**GEOG 599 (s) Research (1-16 credits)**

Credit arranged. Research not directly related to a thesis or dissertation.

**GEOG 600 Doctoral Research and Dissertation (1-45 credits)**

Credit arranged