GEOGRAPHY GEO

Department of Geography
College of Social Science

113 Introduction to Economic Geography
Fall, Spring. 3(3-0)
Spatial distribution of resources, population, enterprise, trade, consumption, and production. Interaction of those distributions at local to global scales.

151 Introduction to Human Geography
Fall, Spring. 3(3-0)
Systematic study of spatial patterns and processes that have shaped human use and alteration of the world.

203 Introduction to Meteorology
Fall. 3(3-0)
Fundamentals of meteorology. Energy balance, adiabatic processes, horizontal motion, cyclogenesis, and severe weather.

204 World Regional Geography
Fall. 3(3-0)
In a time of increasing globalization of economic, political and technological processes, different societies on different continents are responding in various ways. This course explores the conditions that contribute to diversity in different world regions-including economic, social, political and environmental processes.

206 Physical Geography
Fall, Spring. 3(3-0)
Geographic and functional interrelationships within the physical environment: Earth-sun relationships, weather, climate, soils, vegetation and landforms (terrain characteristics).

206L Physical Geography Laboratory
Fall, Spring. 1(0-2) P: GEO 206 or concurrently
Geographic aspects of weather, climate, soil, vegetation, and terrain. Interpretation and application of maps and remotely sensed imagery.

208 Physical Geography of the National Parks
Fall of odd years. 2(2-0) Interdepartmental with Park, Recreation and Tourism Resources. Administered by Geography.
Physical features such as geology, landforms, biota, and waters of United States and Canadian national parks, forests, seashores and lakeshores. Emphasis on formation and distribution.

221 Introduction to Geographic Information
Fall, Spring. 3(3-0)
Principles and methods of spatial data collection, handling, analysis, and display. Introduction to remote sensing, geographic information systems, and cartography.

221L Introduction to Geographic Information Laboratory
Fall, Spring, Summer. 1(0-2) P: GEO 221 or concurrently RB: Basic computer and math skills
Basic skills for working with Geographic Information Systems, remotely sensed imagery, design of maps, geospatial tools and technologies for data analysis and problem-solving.

259 Geography of Recreation and Tourism
Fall. 3(3-0)
Cultural, physical, and biotic factors affecting the distribution of recreation and tourism resources and participation. U.S. and international examples and case studies.

306 Environmental Geomorphology
Spring of odd years. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geography. P: CSS 210 or GEO 206 or GEO 333 or GLG 201 or GLG 304 or ISP 203A
Relationships of running water, weathering, gravity, ice, waves, wind, and biota (including humans) to terrain and soils. Evolution of landscapes. Classical and modern interpretations.

314 Methods for Investigation of Urban Systems
Spring. 4(3-2) Interdepartmental with Urban Planning. Administered by Urban Planning. P: STT 201 and CSE 101
Models, approaches, and techniques for urban and regional problem analysis, research, program evaluation, and project management. Application of related computer software.

324 Remote Sensing of the Environment
Fall. 4(2-4) SA: GEO 224
Features and interpretation methods of remotely-sensed imagery, especially black-and-white and color infrared airphotos. Basic features of radar, thermal, and multispectral imagery. Interpretation for agriculture, archaeology, fisheries, forestry, geography, landscape architecture, planning, and wildlife management.

325 Geographic Information Systems
Fall. 3(2-2) P: GEO 221 and GEO 221L
Technical and theoretical issues in the design, implementation, and use of geographic information systems for research and applications.

330 Geography of the United States and Canada
Fall, Spring, Summer. 3(3-0) SA: GEO 230
Regional analysis. Evolution and status of environmental, demographic, economic, and sociocultural patterns and processes.

333 Geography of Michigan and the Great Lakes Region
Spring. 3(3-0) SA: GEO 233
Michigan's physical, historical, and economic geography. Interrelationships between the physical environment (rocks, landforms, soils, climate, vegetation, hydrology) and historical and contemporary land uses. Demographic and agricultural patterns. Human history and settlement patterns. Contemporary recreational opportunities.

335 Geography of Latin America
Fall. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen.
Physical and human geography of Latin America. Current development issues, especially people-environment interaction in urban and rural areas. Topics include migration, urbanization, and industrialization.

336 Geography of Europe
Fall of odd years. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen.
Major regions and nations, including their physical resources, peoples, political structures, and economies.

337 Geography of Asia-Pacific
Spring. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen.
Spatial patterns and processes of economic, urban, human and physical geography in eastern Asia, including China, Korea, Japan, Australia, New Zealand, the Indian subcontinent and other Asian countries. Contemporary regional development.

338 Geography of Africa
Fall. 3(3-0) P: Completion of Tier I writing requirement. R: Not open to freshmen.
Physical and human geography of Africa. Current development issues, especially people-environment interaction in urban and rural areas. Topics include drought, agricultural patterns, hunger, rural development, migration, and urbanization.

339 Geography of the Middle East and North Africa
Spring. 3(3-0)
Physical and human geographies of the Middle East and North Africa. Historical and contemporary topics of ethno-nationalism, religion, state-building, and peace and conflict. Current issues of environment, development, urbanization, and global interactions.

363 Introduction to Quantitative Methods for Geographers
Fall. 3(3-0) RB: Completion of University mathematics requirement. SA: GEO 463
Quantitative techniques in the analysis and classification of spatial data.

370 Introduction to Zoogeography
Fall. 3(3-0) Interdepartmental with Fisheries and Wildlife and Zoology. Administered by Zoology. P: (ZOL 355)
Patterns of geographical distribution of animals and the ecological and historical processes leading to these patterns.

401 Geography of Plants of North America
Spring of even years. 3(3-0) P: GEO 206 R: Not open to freshmen or sophomores.
Geography of Plants in North America, including the ecological processes and human impacts responsible for this geography. Opportunity for field study.

402 Agricultural Climatology
Fall of even years. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Geography. P: MTH 110 or MTH 116 R: Not open to freshmen or sophomores.
Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.

403 Dynamic Meteorology (W)
Spring. 3(3-0) P: (MTH 234 and GEO 203) and completion of Tier I writing requirement RB: GEO 405 R: Open to juniors or seniors or masters students or doctoral students.
Principles of fluid dynamics and their application to the atmosphere.

405 Weather Analysis and Forecasting
Spring of odd years. 4(3-2) P: GEO 203 and (MTH 110 or MTH 116)
Dynamic and thermodynamic principles of atmospheric science applied to the development and evolution of extratropical cyclones. Laboratory sessions include analysis of current observations and satellite imagery.

407 Regional Geomorphology of the United States
Spring of odd years. 3(3-0) P: GEO 306 or GLG 201 or GLG 412 or ISP 203A or ISP 203B
Geomorphic characteristics of physiographic regions of the United States.

408 Soil Geomorphology Field Study
Fall. 4(2-4) P: CSS 210 or GEO 306 or GLG 201 or GLG 412 or ISP 203A or ISP 203B R: Not open to freshmen or sophomores.
Common geographic relationships among soils, landforms, and vegetation in lower Michigan. Description, analysis, and genesis of soils and landscapes. Surficial processes.

409 Global Climate Change and Variability
Fall of odd years. 3(3-0) P: GEO 206
Analysis of climate change and variability at various time and space scales. Climate systems, paleoclimatology, global warming, climate models, and climate impact assessment.

410 Geography of Food and Agriculture
Fall. 3(3-0) P: Completion of Tier I Writing Requirement RB: GEO 113 or GEO 151 or GEO 204 or GEO 206 or ISS 310 R: Not open to freshmen or sophomores.
Spatial patterns of contemporary global agriculture and food systems. Human-environment geography of select agricultural practices and food systems. Effects of agricultural practices on natural and human resources.

411 Stream Systems and Landforms
Spring of even years. 3(3-0) P: GEO 206 or GEO 306 or GLG 201 or GLG 431 or approval of department R: Open to juniors or seniors or graduate students.
Themes associated with stream systems. Evolution of drainage basins and channel hydrology. The nature of flowing water, stream discharge, and flooding. Controls of stream behavior. Channel patterns and landform development. Character of Michigan stream systems. Field project.

412 Glacial Geology and the Record of Climate Change
Spring. 3(3-0) Interdepartmental with Geological Sciences. Administered by Geological Sciences. RB: GLG 201 or GEO 306 or GEO 408 or GLG 301 R: Not open to freshmen or sophomores.
In-depth analysis of glacial geology and the record of climate change, with emphasis on North America and Europe. One weekend field trip required.

413 Urban Geography
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. R: Not open to freshmen or sophomores.
Theories and models of urban spatial form. Underlying structures and processes. Socio-spatial dimensions of modern urbanism. Differentiation and locational conflict in residential, commercial, and industrial space.

414 Geography of Transportation
Fall of odd years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. P: GEO 113 R: Not open to freshmen.
Spatial principles of transportation. Theories of interaction, network structures, and location-allocation models. Role of transport and transport planning.

415 Location Theory and Land Use Analysis
Fall. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. P: GEO 113 or UP 201 RB: One of the prerequisites or an introductory ECON course. R: Not open to freshmen or sophomores.
Classical and neoclassical, static and dynamic models of industrial location and spatial organization. Land rent theory. Central place theory. Multilocational organization. Growth transmission.

418 The Ghetto
Fall of odd years. 3(3-0) Interdepartmental with Urban Planning. Administered by Geography. R: Not open to freshmen or sophomores.
Analysis of the ghetto including its spatial organization and structure. Distribution of racial and ethnic populations. Emphasis on U.S. cities.

419 Applications of Geographic Information Systems to Natural Resources Management
Spring. 4(2-4) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Biosystems Engineering and Forestry and Fisheries and Wildlife. Administered by Fisheries and Wildlife. P: GEO 221
Application of geographic information systems, remote sensing, and global positioning systems to integrated planning and management for fish, wildlife, and related resources.

423 Cartographic Design and Production
Fall. 4(2-4) P: GEO 221
Elements of map design including planning, layout, typography, color theory and selection, and user issues. Techniques of map production, for both printed and electronic display.

424 Advanced Remote Sensing
Spring. 4(3-2) RB: GEO 324
Interaction of solar radiation with the atmosphere, lithosphere, hydrosphere, and biosphere. Introductory digital image processing. Earth-resources satellite sensors, data products, and applications. Radar and thermal remote sensing.

425 Problems in Geographic Information Science (W)
Spring. 3(2-2) Interdepartmental with Urban Planning. Administered by Geography. P: GEO 325 or GEO 492
Advanced theoretical and technical issues in geographic information science utilizing a problems oriented approach. Development and implementation of geographic information science solutions and formal documentation of work.

426 Thematic Cartography
Spring. 4(3-2) P: GEO 221 SA: GEO 326
Principles, techniques, and decision making in thematic mapping. Use of computer-mapping and geographic information systems (GIS) software to produce individual thematic maps and map series. Electronic delivery of thematic maps.

428 Digital Terrain Analysis
Fall of even years. 4(3-2) P: GEO 221 and GEO 325 R: Open to juniors or seniors.
Theoretical and technical issues of collection, management, analysis, and display of terrain data. Application of photogrammetry, geographic information systems, and cartography.

432 Environmental Ethics (W)
Fall. 3(3-0) P: Completion of Tier I writing requirement. R: Open only to juniors or seniors.
Ethical dimensions of environmental and spatial issues and associated public policies

433 Geography of Michigan Field Study
Summer of even years. 3 credits. P: GEO 333 or approval of department
Field study of Michigan's physical, agricultural, and urban landscapes. Interactions with representatives of agriculture, industry, and government. Field trips required. Offered first half of semester.

435 Geography of Health and Disease
Fall. 3(3-0) R: Not open to freshmen or sophomores.
Spatio-environmental concepts and techniques applied to health problems. Disease transmission cycles, community nutrition, and health-care planning.

436 Spatial Analysis of Populations
Spring. 3(3-0) R: Not open to freshmen or sophomores.
Concepts and methods to measure and evaluate geo-spatial and temporal trends in populations and their components, such as natality, mortality, migration, and characteristics at different geographic scales. Sources of spatial population data. Visualization and analysis of data in a geographical information system.

440 Critical Geopolitics
Spring of even years. 3(3-0) R: Not open to freshmen.
Political geographies of origins and conduct of nation-states. Identity-place dynamics. Colonialism and imperialism. Geopolitics and geopolitical ideas. Resource and environmental politics. Resistance and terrorism.

441 Geography of Language and Religion
Spring of odd years. 3(3-0) R: Not open to freshmen.
Geographic survey of world languages and religions in terms of their origins, diffusions, and changes, their ecological relationships, and their impacts on spatial organization.

450 Smart Growth and Strategic Land Use Decision Making
Fall, Spring. 3(3-0) Interdepartmental with Environmental Economics and Policy and Environmental Studies and Agriscience and Urban Planning. Administered by Environmental Studies and Agriscience. RB: EC 201 or UP 201 or GEO 113 R: Not open to freshmen or sophomores.
Theories and models of smart growth and strategic land use planning and decision making. Intergovernmental coordination, regional socioeconomic development and environmental sustainability. Land use research and leadership development.

453 Metropolitan Environments: Urban Forms and Land Uses
Spring. 3(2-2) P: GEO 221
Land use change, the physical fabric of the city, and the growth of regional centers in the American urban landscape. Issues associated with urban developments, practices and patterns in the 20th century and the resulting metropolitan form and function. Extensive use of geographic information software in spatial analysis.

454 Geography of Environment and Development
Spring of odd years. 3(3-0) P: GEO 113 or GEO 151 or GEO 330 or GEO 333 or GEO 335 or GEO 336 or GEO 337 or GEO 338
Spatial patterns and processes associated with regional development in selected world areas.

459 Tourism in Regional Development
Spring of odd years. 3(3-0) RB: GEO 259 or PRR 213
The role of tourism in regional development. Examples from Michigan, and the United States and other nations. Environmental considerations.

472 Ecological Monitoring and Data Analysis
Fall. 3(2-2) Interdepartmental with Forestry. Administered by Forestry. P: ((MTH 124 or MTH 132) and completion of Tier I writing requirement) and (STT 201 or STT 224 or STT 231 or STT 421)
Design of ecological monitoring systems and analysis of resulting ecological data sets. Monitoring system design, model specification and implementation, and computational considerations from both a design- and model-based perspective. Hands-on introduction to statistical software.

478 Urban Transportation Planning
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning. R: Open only to juniors or seniors in the Urban and Regional Planning major or Geography major or approval of department.
Principles of decision-making in urban transportation planning. Demand and supply analysis, social and environmental impacts, implementation programs. Use of computer models.

480 Senior Seminar (W)
Fall. 3(3-0) P: Completion of Tier I Writing Requirement R: Open to seniors in the Geography major.
History, philosophy, and methodology of the geographic discipline as it has evolved within academic and social contexts.

485 Senior Seminar in Geography Education
Spring of even years. 3(3-0) P: (GEO 113 or GEO 151) and (GEO 204 and GEO 206 and GEO 221 and (GEO 330 or concurrently) and (GEO 333 or concurrently)) R: Open only to students in the Geography disciplinary teaching minor.
Geography educational standards will guide the development of knowledge and technical expertise of future K-12 teachers. Emphasis will be on continued learning of geography, integration of physical and human concepts, the role of representation (maps, etc.), and the use of current events, local observations, and technology to integrate geography into the K-12 curriculum.

490 Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Supervised individual study in an area supplementary to regular courses.

492 Geographic Research Problems
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department.
Supervised original research on selected aspects of geography.

494 Remote Sensing Field Techniques
Summer. 2(0-4) P: GEO 424
Collection and processing of field data to coordinate with remotely sensed imagery. Data correction and analysis. The use of global positioning systems (GPS) receivers and of sensors for determining chlorophyll levels and other biophysical properties. Hands-on experiences; considerable time outdoors.

495 Field Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
Supervised field study in geography.

498 Internship in Geography
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
Individual experience in geography in an approved organization.

802 Geospatial Technology
Fall. 3(3-0) RB: Familiarity with coordinate systems.
Comprehensive introduction to geotechnologies. Concepts and theories of remote sensing to include image interpretation and processing, Global Positioning Systems, spatial data structures, and geographic information systems.

813 Seminar in Urban and Economic Geography
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: Two of GEO 413, GEO 414, GEO 415, GEO 416, GEO 417, GEO 418.
Review of research on selected topics in urban and economic geography.

814 Applied Research Methods for Planning and Development
Spring. 3(2-2) Interdepartmental with Urban Planning. Administered by Urban Planning. RB: UP 813 R: Open only to graduate students in the Urban and Regional Planning major or Public Administration major or Geography major.
Techniques in urban and regional planning analysis. Forecasting models. Methods of urban project evaluation.

816 The World System of Cities
Spring. 3(3-0) Interdepartmental with Global Urban Studies Program. Administered by Geography. R: Open to graduate students.
Modern global economic restructuring and its social, economic, and political impacts on the world system of cities

817 China and Globalization
Fall of even years. 3(3-0) Interdepartmental with Global Urban Studies Program. Administered by Geography. RB: GEO 113 or GEO 204 or GEO 337 or GEO 413 R: Open to graduate students.
Theoretical debates and empirical discussions on current social, economic, environmental, and spatial challenges facing contemporary urban China in an era of globalization. Comparative and thematic approach.

819 Spatial Epidemiology and Medical Geography
Spring. 3(3-0) Interdepartmental with Epidemiology. Administered by Epidemiology. P: EPI 810 or GEO 435 R: Open to graduate students in the Department of Epidemiology or in the Department of Geography or approval of department. SA: HM 819
Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health.

820 GIS and Management
Fall. 3(3-0) P: GEO 425 or approval of department RB: Students should be familiar with GIS Technology
Exploration of the professional field of geographic information science (GIS) career management opportunities, organizational structures, and applications within the public, commercial and academic sectors.

821 GIS Practicum
Spring. 3(3-0) P: (GEO 425 or approval of department) and (GEO 820 or approval of department) RB: Students should be knowledgeable in the application of GIS technology
Instructor-guided geographic information science (GIS) practicum connecting University faculty and students with local communities. Students are assigned a community GIS project and work collaboratively to develop a proposal, manage the project, and present the output.

825 Geoprocessing
Spring. 4(4-0)
Integration of digital remote sensing data, geographic information systems, spatial analysis, and expert systems in solving research problems. Class research project.

826 Geocomputation
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
Research on topics in cartography, geographic information systems, and remote sensing.

827 Digital Image Processing and Analysis
Fall. 4(2-4) P: GEO 424
Use of computer to classify and enhance satellite images and to extract information from them. Combining images from different sources. Accuracy assessment of resulting information.

854 Economics of Planning and Development
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning. RB: UP 801
The physical urban environment and local economic development.

858 Gender, Justice and Environmental Change : Issues and Concepts
Fall. 3(3-0) Interdepartmental with Anthropology and Criminal Justice and Forestry and Fisheries and Wildlife and Sociology. Administered by Fisheries and Wildlife. RB: Background in social science, environmental science, or natural resources.
Issues and concepts related to gender, ecology, and environmental studies. Key debates and theoretical approaches to addressing environmental issues from a gender and social justice perspective. Gender and environment issues and processes from a global perspective.

859 Gender, Justice, and Environmental Change: Methods and Application
Spring of even years. 3(3-0) Interdepartmental with Anthropology and Forestry and Fisheries and Wildlife and Resource Development and Sociology. Administered by Anthropology. RB: Background in social science, environmental science, or natural resources.
Methods and case studies related to gender, ecology, and environmental studies. Methodological and fieldwork issues from a feminist perspective in international and intercultural contexts. Qualitative and quantitative methods for integrating social and environmental data.

865 Advanced Quantitative Methods in Geography
Spring. 4(4-0) RB: GEO 363
Statistical and mathematical approaches. Multiple regression, principal components and factor analysis, discriminant analysis. Related taxonomic methods.

866 Spatial Data Analysis
Fall. 4(3-2) Interdepartmental with Statistics and Probability. Administered by Geography. RB: (GEO 363 or STT 421 or STT 430) or equivalent quantitative methods courses. SA: GEO 466
Theory and techniques for statistical analysis of point patterns, spatially continuous data, and data in spatial zones.

868 Spatial Regression and Modeling
Fall. 3(3-0) P: GEO 865 or approval of department RB: Linear regression and data analysis at graduate level SA: GEO 867
Using spatial regression to address geographic problems. Modeling spatial processes with continuous and discrete dependent variables. Maximum likelihood estimation. Bayesian approaches.

869 Geosimulation
Spring. 3(3-0) Interdepartmental with Environmental Science and Policy. Administered by Geography. RB: Basic understanding of data structures and algorithms covered in an introductory course of any programming language. R: Approval of department.
Theoretical concepts related to simulating dynamic geographic phenomena in the intersection between human and natural systems. Innovative agent-based methodology applied to complex social-environmental systems. Hands-on experience of agent-based modeling, with special emphasis on modeling human decision-making and its impact on the natural environment.

871 Seminar in Physical Geography
Fall. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in physical geography R: Approval of department.
Research on topics in physical geography.

872 Seminar in Human Geography
Fall. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in human geography R: Approval of department.
Research on topics in human geography.

873 Seminar in Human-Environment Geography
Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in human geography and one course in physical geography. R: Approval of department.
Research on topics in human-environment geography.

874 Seminar in Geographic Information Science
Spring. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: at least one course in geographic information science, cartography or remote sensing R: Approval of department.
Geographic information science (GIS) applications to social and environmental problems. Theory and related issues.

875 Tourism and Global Change
Spring of odd years. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies. Administered by Community, Agriculture, Recreation and Resource Studies.
Inter-relationship among tourism and economic, social, political, and environmental forces. Local, national, and international levels. Focus on vulnerable, less developed regions with the lowest natural levels of adaptation to global, social, and environmental change.

886 Research Design in Geography
Spring. 3(3-0) R: Approval of department.
Research and writing in geography. Identification of geographic problems and their relative importance. Structuring and stating hypotheses. Data acquisition and tests for validity.

890 Advanced Readings in Geography
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.
Advanced independent readings.

892 Advanced Research in Geography
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
Advanced independent research.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to graduate students in the Geography major.
Master's thesis research.

986 Theories and Philosophies in Geography
Spring of odd years. 3(3-0) R: Open to doctoral students in the Geography major.
Historical development of the discipline within social and intellectual contexts. Philosophical approaches behind geographic research and theory.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
Doctoral dissertation research.