

Descriptions – Forestry

of Courses

850. *Administering the Public Land Agency*

Spring. 4(4-0) FOR 450 or approval of department.

Case studies of administrative problems in land management agencies. Students are organized as teams and prepare team reports on specified aspects of each case.

855. *The Research Process in Natural Resources*

Fall. 3(3-0) Approval of department. Interdepartmental with and administered by the Department of Resource Development.

Research and decision processes as applied in natural resource investigations. Research organization and applications of research results. Oriented to management, social science, and policy studies. Preparation of project proposals.

899. *Master's Thesis Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

909. *Timber Economics*

Fall of odd-numbered years. 3(3-0) FOR 457, FOR 809, EC 800, EC 801, EC 802.

Economic theory relevant to study of timber production, regional and national timber supply, demand and price, the effect of institutional factors, and other topics by review of past research.

910. *Resource Economics Proseminar*

Spring. 3(3-0) May reenroll for a maximum of 9 credits. Approval of department. Interdepartmental with the departments of Agricultural Economics and Resource Development.

A seminar wherein advanced graduate students in the fields of resource economics participate with faculty in the joint conduct of a major research project in resource economics and policy.

960. *Simulation Models in Natural Resource Management*

Winter of odd-numbered years. 3(3-0) RD 855 and knowledge of FORTRAN programming or approval of department. Interdepartmental with and administered by the Department of Resource Development.

The role of simulation models in developing management strategies. Applications of computer simulation in natural resources. Modeling of decision systems in natural resources management.

975. *Least Squares Analysis and Linear Programming in Forestry Research*

Fall of odd-numbered years. 4(4-0) MTH 112, STT 423, CPS 110 or CPS 120.

Application of least squares analysis and linear programming to problems in forestry research. Include both linear and nonlinear least squares models. Case studies from several forestry disciplines.

976. *Multivariate Methods in Forestry Research*

Winter of even-numbered years. 4(4-0) FOR 975 or approval of department.

Application of multivariate techniques such as principal components, canonical analysis, factor analysis, and clustering to problems in forestry research. Case studies drawn from several forestry disciplines.

999. *Doctoral Dissertation Research*

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

FRENCH

See Romance and Classical Languages.

GENETICS

College of Natural Science

800. *Genetics Seminar*

Fall, Winter, Spring. 1(1-0) May reenroll for a maximum of 12 credits. Approval of director.

Student seminar to cover genetics subjects not considered in formal courses. Course is also intended to give students experience in reviewing and organizing literature in a subject, and orally presenting and defending the analysis.

804. *Gene Transmission*

Fall. 3(3-0) ZOL 441 or approval of instructor.

Molecular and formal genetic studies of the replication, recombination, repair and segregation of genetic information in procaryotes and eucaryotes. Experimental design and methodology will be emphasized.

805. *Genetic Organization, Action and Regulation*

Winter. 3(3-0) GEN 804.

Molecular and formal genetic studies of the organization, expression and regulation of gene activity in procaryotes and eucaryotes. Experimental design and methodology will be emphasized.

806. *Population and Quantitative Genetics*

Spring. 3(3-0) ZOL 441 or approval of instructor.

Genetics of quantitative characteristics in populations with special reference to polygenic variation and its interactions with environment, gene action and its measurement, mating systems, and selection.

880. *Special Problems*

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of instructor.

Students with special interests and abilities may study published literature in a selected genetics topic or they may carry on research in the laboratory on a selected subject in collaboration with genetics faculty.

890. *Selected Topics in Genetics*

Fall, Winter, Spring, Summer. 2 to 5 credits. May reenroll for a maximum of 9 credits. ZOL 441 and approval of instructor.

Topics will be selected from molecular genetics, physiological genetics, population genetics, quantitative genetics, evolution, radiology and mutagenesis, microbial genetics, somatic cell genetics, behavioral genetics, and human genetics.

999. *Doctoral Dissertation Research*

Fall, Winter, Spring, Summer. 3 to 12 credits. Majors.

Research for the doctoral dissertation in genetics.

GEOGRAPHY

GEO

College of Social Science

Courses are classified as follows:

Cultural--170, 201, 801, 901.

Economic--213, 409, 435, 809, 835, 906.

Field Techniques--415, 850.

Geographic Education--458.

Historical--310, 810, 910.

Independent Research--400H, 411, 818, 899, 918, 999.

Medical--470, 870, 970.

Physical--206, 206L, 429, 430, 431, 432, 451, 834, 902.

Political--170, 908.

Population--215, 320, 836, 934.

Quantitative Methods--427, 428, 811.

Regional--204, 300, 315, 316, 321, 322, 340, 342, 360, 365, 812, 912.

Recreational and Environmental--100, 307, 309, 828.

Theory and Philosophy--150, 425, 825, 826.

Urban--318, 401, 402, 403, 466, 805.

Visual Media and Techniques--122, 223, 224, 424, 426, 446.

100. *Man, Location and Environment*

Fall, Winter, Spring. 3(3-0)

Concepts, theory, and methods of modern Geography.

122. *The World of Maps*

Fall, Winter, Spring. 3(3-0)

Discussion of types, practical applications, and sources of maps.

150. *Geography of Selected Current Problems*

Fall, Winter, Spring. 2(2-0)

The geographic perspective is used to examine U.S. and world problems of major concern such as international conflicts, environment quality, spatial change, and economic development.

170. *Future Worlds (S)*

Fall, Spring, Summer. 3(3-0)

Geographical approach to environmental, biological, economic, social and political problems facing mankind between now and year 2000.

1DC. *Introduction to Resource Ecology*

For course description, see Interdisciplinary Courses.

201. *Geography of Culture*

Fall, Winter, Spring. 3(3-0)

A systematic discussion of cultural geography, stressing cultural processes and relationships.

204. *World Regional Geography (S)*

Fall, Winter, Spring, Summer. 4(4-0)

Man's relationship with natural and cultural environments.

206. *Physical Geography*

Fall, Winter, Spring, Summer. 4(4-0)

Analysis of weather, climate, landforms, soils, water and biotic factors of man's environment, including their spatial, genetic, and functional interrelationships.

206L. *Physical Geography Laboratory*

Fall, Winter, Spring. 1(0-2) GEO 206 or concurrently.

Laboratory study of geographic aspects of map interpretation, aerial photographs, weather, climate, soils, landforms, and vegetation.

- 1DC. Introduction to Latin America I**
For course description, see *Interdisciplinary Courses*.
- 213. World Economic Geography**
Fall, Winter, Spring, Summer. 4(4-0)
Emphasis on distribution of natural resources, industries and service activities, stressing factors of location and economic concepts of locational change.
- 215. World Food Issues**
Spring. 3(3-0) *Interdepartmental with Food Science*.
Food resources as related to world distributions of population, soil, water, fuel and minerals. Special attention to urbanization, irrigation, and future food needs and global constraints.
- 223. Introduction to Cartography**
Fall, Winter, Spring. 4(2-4)
Principles and techniques of constructing maps and other graphic devices. Types of map reproduction.
- 224. Remote Sensing: Airphoto Interpretation**
Fall, Winter, Spring. 4(2-4) *Sophomores*.
Use of aerial photographs in the identification and interpretation of physical and cultural features of the terrestrial environment. Includes principles of photogrammetry, and stresses application and practice.
- 1DC. Introduction to Contemporary China**
For course description, see *Interdisciplinary Courses*.
- 300. North America**
Fall, Winter, Spring. 3(3-0)
Human and physical geography of North America, north of the Mexican border.
- 307. Geography of Environmental Quality**
Spring. 3(3-0) *Sophomores or approval of department*.
Identification of the physical, cultural and psychological factors which constitute human environments, and how they vary and may be modified or controlled.
- 309. Geography of Recreation**
Winter. 3(3-0)
Natural and cultural factors influencing the use of space for recreation. Emphasis on recreation land use in the United States and current problems and conflicts.
- 310. Historical Geography of the United States**
Spring. 3(3-0)
Reconstruction of geographies of the United States as they existed in the past.
- 315. South America**
Spring. 3(3-0) *Sophomores or approval of department*.
Regional geography of South America with special attention to contemporary geographic problems.
- 316. Middle America**
Winter. 3(3-0) *Sophomores or approval of department*.
Interpretation of physical and cultural environment of Mexico, Central America, and the West Indies. Special attention to contemporary geographic problems.
- 318. Cities of the World**
Fall, Winter, Spring. 3(3-0)
A cross-cultural examination of cities, their historic growth, regional functions, and internal dynamics.
- 320. Geography of Population**
Fall. 3(3-0)
Relationship of the size, composition, and distribution of population to geographic variations in the nature of places.
- 321. Africa**
Fall. 3(3-0) *Sophomores or approval of department*.
Emphasis on continent south of Sahara: environments, peoples, problems, and potentials.
- 322. Africa: Contemporary Problems**
Spring. 3(3-0) *Sophomores or approval of department. GEO 321 recommended*.
Major development problems examined from environmental, historical, economic, and social perspectives.
- 340. Western Europe**
Winter. 3(3-0) *Sophomores or approval of department*.
Geographic analysis of physical and human character and resources of Western Europe (Scandinavia, British Isles, Benelux, Germany, France and Switzerland). Emphasis on major problems.
- 1DC. Contemporary South Asia**
For course description, see *Interdisciplinary Courses*.
- 342. Eastern and Southern Europe**
Spring. 3(3-0) *Sophomores or approval of department*.
A geographical analysis of countries of Eastern and Southern Europe with emphasis on economic, political, social and ethnic problems.
- 351. Weather and Climate**
Fall. 3(3-0)
Non-mathematical treatment of general weather processes and patterns, including surface and middle atmospheric (jet stream) features, with emphasis on the U.S.
- 360. The Soviet Union**
Fall. 3(3-0) *Sophomores or approval of department*.
A geographical analysis of the Soviet Union and its inhabitants with emphasis on economic, social, political and ethnic problems.
- 365. China**
Winter. 3(3-0)
The physical and human geography of China and their relationship to the development problems of the country, with emphasis on the post-1949 period.
- 400H. Honors Work**
Fall, Winter, Spring. 1 to 16 credits.
Approval of department.
- 401. The Ghetto**
Fall, Spring. 4(4-0) *Juniors or approval of department. Interdepartmental with and administered by the Department of Urban and Metropolitan Studies*.
Analysis of the ghetto including its spatial organization, structure and distribution of non-white and ethnic populations in cities with emphasis on the United States.
- 402. The Geography of the City**
Spring. 4(3-0) *Interdepartmental with the Department of Urban and Metropolitan Studies*.
Spatial theories, concepts, and designs of internal urban economic, social, and political structures.
- 403. The American City and Its Region**
Winter. 3(3-0)
The regional system of cities in terms of size, spacing, and functional relationships.
- 407. Michigan**
Fall, Spring. 3(3-0) *Sophomores or approval of department*.
Selected aspects of the physical and cultural geography of Michigan.
- 408. Canada**
Spring. 3(3-0) *Sophomores or approval of department*.
An analysis of the physical, economic and cultural patterns of Canada.
- 409. Geography of Transportation**
Fall. 3(3-0)
Analysis of spatial principles of transportation, including theories of interaction, network structures, and the role of transport in space-economy.
- 411. Problems in Geography**
Fall, Winter, Spring, Summer. 1 to 6 credits. *Approval of department*.
Research on specialized geographic problems.
- 415. Field Techniques**
Fall. 4(1-7) *May reenroll for a maximum of 8 credits. Approval of department*.
Basic methods for making physical and cultural observations and measurements including map reading, photo interpretation, field sketch mapping, compass traverses, sampling, questionnaire design, interviewing, analysis and reporting. Requires work off campus.
- 424. Advanced Remote Sensing Techniques**
Spring. 4(2-4) *GEO 224*.
Extraction, analysis, and interpretation of information obtained from remote sensors including conventional, infrared and radar imagery. Introduction to stereo-plotting devices, stressing theories of remote sensing and applications.
- 425. Development of Geographic Thought**
Spring. 3(3-0) *Approval of department*.
Evolution of geographic thought from antiquity to the present emphasizing developments in 20th century America. Survey of the theory and methodology of contemporary geography.
- 426. Advanced Cartography**
Spring. 4(1-6) *GEO 223*.
Development of advanced skills in construction of maps, including ink drafting, lettering systems, map projections, scribing and photo reproduction.
- 427. Quantitative Methods in Geography**
Fall. 4(4-0) *Approval of department*.
Basic quantitative techniques used in the analysis and classification of geographic data.

Descriptions – Geography

of

Courses

428. Computer Mapping in Geography

Spring. 4(4-0) CPS 120.

The preparation of computer maps and the application of the computer to the development and testing of models in geography.

429. Landforms of North America

Winter, Spring. 3(3-0) May reenroll for a maximum of 6 credits. GEO 206, GLG 201 or approval of department.

Study of the surface features of eastern U.S.A. (winter term) and western U.S.A. (spring term).

430. Climates of the World

Spring. 3(3-0) GEO 206 or approval of department.

Regional analysis of the world's weather and climate.

431. Landform Analysis

Fall. 3(3-0) GEO 206, GLG 201 or approval of department.

A problem approach is utilized to explain classical and contemporary interpretations of the nature of selected landforms, including treatment of related tools and techniques. Option for some field study.

432. Biogeography

Spring. 3(3-0) GEO 206 or approval of department.

Patterns of vegetation, with emphasis on forests of eastern North America. Option for some field study.

435. Land Use and Location Theory

Spring. 3(3-0) GEO 213 or approval of department.

Location principles and theories of economic activities, including methods of regional analysis.

446. Production Cartography

Winter. 4(2-4) GEO 223 or approval of department.

Deals with the technical aspects of map and graphics production both as a sequence of operations and as a series of problems of organizations. Theoretical and applied aspects, process photography, typography, and proofing.

451. Climatic Patterns and Atmospheric Circulation

Winter. 4(3-0) GEO 206 or approval of department.

Relationship between weather, climate, and upper air flow, with emphasis on this climatology of North America.

458. Geography for Teachers

Winter. 3(3-0)

Problems and practices of teaching geography in elementary and secondary schools.

466. Social and Spatial Approaches to Community Service

Spring. 3(3-0) GEO 201 or S W 205 or approval of department. Interdepartmental with the School of Social Work.

Analysis of major themes in social service planning: communities and neighborhoods, public policy administration, social service networks, location of public facilities, evaluation and accountability of service systems.

470. Geography of Health and Disease

Fall, Winter. 3(3-0)

Spatio-environmental concepts and the techniques applied to health problems: disease transmission cycles, community nutrition and health-care planning.

801. Seminar in Cultural Geography

Fall. 3(3-0) Approval of department.

Theory, methodology, and techniques in cultural geography.

805. Seminar in Urban Geography

Spring. 3(3-0) Approval of department.

ment.

Selected research topics on the geography of the city.

809. Seminar in Transportation Geography

Winter. 3(3-0) Approval of department, GEO 409.

Selected research topics.

810. Seminar in Historical Geography

Winter. 3(3-0) Approval of department.

ment.

Approaches in research in historical geography.

811. Advanced Quantitative Methods in Geographic Research

Winter. 4(2-4) Approval of department, GEO 427.

Statistical and mathematical approaches to spatial distributions and areal data.

812. Regional Seminar

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 9 credits. Approval of department.

Selected research topics in regional geography.

818. Readings in Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 15 credits. Approval of department.

825. History and Philosophy of Geography

Fall. 3(3-0) Approval of department.

Analysis of the monographic and serial literature dealing with the theory and evolution of geographic science.

826. Research Design in Geography

Winter, Spring. 3(3-0) Approval of department.

Formalized approach to research and writing in geography: Identification of geographic problems and their relative importance, structuring and stating hypotheses, data acquisitions, and tests for validity.

828. Seminar in Recreation Geography

Spring. 3(3-0) GEO 309 or approval of instructor.

Selected current problems in recreation geography in the U.S. and abroad.

834. Seminar in Physical Geography

Winter, Spring. 3(3-0) May reenroll for a maximum of 9 credits. Approval of department.

Analysis of classical and contemporary problems in physical geography treated as follows: climatology (winter), biogeography (spring), geomorphology (spring).

835. Seminar in Location Theory

Fall. 3(3-0) Approval of department, GEO 435.

Recent developments and research in location analysis and regional science.

836. Population Geography Seminar

Spring. 3(3-0) Approval of department.

Studies of particular topics and problems in population geography.

IDC. Subsaharan Africa Seminar

For course description, see Interdisciplinary Courses.

846. Seminar in Cartography

Winter. 3(3-0) May reenroll for a maximum of 12 credits. Approval of department.

Selected research topics in cartographic theory and map design.

850. Advanced Field Techniques

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits.

Instruction and practical training in the selection, data-gathering, on-site analysis, and presentation of geographic field problems.

870. Seminar in Medical Geography

Winter. 3(3-0)

Spatio-environmental analysis of selected health problems.

899. Master's Thesis Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

901. Problems in Cultural Geography

Fall, Winter, Spring. Variable credit. May reenroll for a maximum of 6 credits. Approval of department.

Special research problems.

902. Problems in Physical Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits.

Supervised research in specific topics of physical geography.

906. Problems in Economic Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits. Approval of department.

Special research problems.

908. Problems in Political Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits. Approval of department.

Special research problems.

910. Problems in Historical Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits. Approval of department.

Special research problems in historical geography.

912. Independent Study in Regional Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 15 credits. Approval of department.

Individual studies in regional geography.

918. Problems in Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 9 credits. Approval of department.

Research on specific geographical problems.

934. Problems in Population

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 9 credits. Approval of department.

Special research problems.

970. Problems in Medical Geography

Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 6 credits. Approval of department.

Selected research topics in medical geography.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

GEOLOGY**GLG****College of Natural Science****200. The Geology of Man's Environment**

Fall, Winter, Spring, Summer. 3(3-0) Not open to Geology majors. Credit will be given in only one of the following: GLG 200, GLG 201, GLG 306.

Man and his geologic environment: earthquakes, volcanoes, landslides, subsidence, flooding, coastal erosion, hydrology and human use, waste disposal, geologic aspects of environmental health, resources and energy, environmental law.

200L. Laboratory--Geology of Man's Environment

Fall, Winter, Spring, Summer. 1(0-3) GLG 200 or concurrently.

Laboratory study of geologic processes associated with environmental hazards. Emphasis placed on land-use planning, applying geologic criteria to evaluate land potentials.

201. Earth Processes

Fall, Winter, Spring, 4(4-2) Credit will be given for only one of the following: GLG 200, GLG 201, GLG 306.

Physical processes concerning evolution of Earth and its environments. Conservation and interaction of energy and matter through time. Laboratory stresses interpretation of process through studies of geologic data.

202. Evolution of the Earth

Fall, Winter, Spring, 4(4-2) GLG 200; or GLG 201; or GLG 306.

Integration of physical, chemical and biological processes from which man's present environment has evolved; problems and controversies in the development of ideas of geologic and organic evolution.

205. Oceanology--The Marine Environment and Man

Fall. 3(3-0)

Physical oceanography, including origin, hydrologic, chemical, geological properties; and environmental quality of the oceans. Man-sea interactions are emphasized including resource utilization and pollution.

221. Minerals, Rocks and Fossils

Spring 3(2-3) Not open to majors.

Description, occurrence and identification of minerals, rocks, fossils, and additional features of especial significance to general science teachers and other earth science interest groups.

282. Energy Resources of the Earth

Winter. 3(3-0)

World energy resources of petroleum, coal, and atomic fuel. Social, political, economic and environmental problems of fuels.

300. Solar System Geology

Winter. 4(4-0) AST 119 or AST 217 or AST 229; GLG 200 or GLG 201.

The origin, relationships, make-up and features of the bodies in the solar system emphasizing recent space exploration results and developing theories.

302. Vertebrate Life of the Past

Fall. 3(3-0) One course in a physical or biological science or Juniors. Interdepartmental with the Department of Zoology.

Fossil vertebrates from fish to man.

304. Geology of Michigan

Fall. 3(3-0) GLG 200 or GLG 201 and/or GLG 202; or approval or department.

A historical accounting of the physical, historical and economic geology of Michigan and its environs; a course designed for students seeking an overall picture of the rather unique Michigan geological environment.

306. Engineering Geology

Fall, Spring, 3(3-2) Credit will be given for only one of the following: GLG 200, GLG 201, GLG 306. Sophomore Engineering students.

Fundamental principles of geology as applied to civil engineering practice. Minerals and rocks, aerial photographs, topographic and areal geologic maps and geologic cross sections studied in laboratory. Source of geologic literature and maps.

307. Geology Central Appalachians

Winter. 1(0-2) GLG 200, or GLG 201, or GLG 202, or concurrently.

General geology of the Central Appalachians. A preparatory course for GLG 308. Field excursions--Central Appalachians during spring vacation.

308. Field Excursion--Central Appalachians

Spring. 2 or 3 credits. GLG 307.

Training in stratigraphic, sedimentological, paleontologic, and structural principles as applied to field methods.

321. Mineralogy

Fall. 5(4-4) One term of chemistry.

Basics of crystallography, crystallography, and crystal chemistry. The classification, occurrence, composition and identification of minerals. Mineral genesis.

322. Optical Mineralogy

Winter. 4(3-4) GLG 321.

Continuation of GLG 321 with emphasis on the theory, principles and mineralogical applications of the polarizing microscope. Identification, textural relationships and determination of composition of the non-opaque rock-forming minerals in thin-section.

323. Introduction to Optical Mineralogy

Winter. 1(0-3) GLG 321.

Basic principles underlying the use of the polarizing microscope. Recognition and understanding fundamental optical properties. Identification of minerals and texture in thin sections of rocks.

335. Fossil Plants, Their History and Paleocology

Spring. 3(3-0) One course in geology or botany or biology or approval of department. Interdepartmental with the Department of Botany and Plant Pathology.

History of plants through geologic time; their form and evolution; how and where found, identified and reconstructed; their use in determining ancient geographic patterns, paleoenvironments, paleoclimates and community structure. Field trip.

337. The Fossil Record of Organic Evolution

Spring. 3(3-0) One course in a natural science; Juniors. Interdepartmental with the Department of Zoology.

The direct evidence for organic evolution in the fossil record. Evolution of life from prebiological systems to man. Impact of fossil discoveries on human thought.

344. Field Geology--Summer Camp

Summer. 9 credits. GLG 202, GLG 363. Trigonometry; GLG 446, GLG 437, GLG 451 recommended.

Methods and techniques of geological surveying and mapping. Field interpretation of geological phenomena in igneous, metamorphic and sedimentary rocks in northern Michigan and Wisconsin.

A. Introduction to Field Techniques
3 credits.

Introduction to field techniques with stress in those that apply to sedimentary rocks. Stratigraphic correlation.

B. Methods of Geological Mapping
4 credits.

Plane table surveys, aerial photo and reconnaissance mapping. Examination and interpretation of structural and textural relationships in igneous and metamorphic rocks.

C. Geologic Interpretation of Selected Areas
2 credits.

Independent mapping and interpretation.

351. Structural Geology

(451.) Fall. 4(2-6) GLG 202; MTH 111.

Description, classification, and origin of secondary structures such as folds, faults, joints, cleavages, foliations and lineations. Three-dimensional visualization stressed in economic laboratory problems involving descriptive geometry, stereographic projections, areal, and structural geologic maps.

363. Lithology

Spring. 4(3-4) GLG 321.

Processes that form igneous and metamorphic rocks, origin, distribution, variation and occurrence of rock. Study of rock properties in the field, in laboratory, and with the microscope.

375. Introduction to Geophysics

Winter. 3(3-0) GLG 201; MTH 111; PHY 239 or PHY 289.

Earth's interior, lithospheric tectonics, and geophysical exploration including: refraction seismology, gravity, magnetism, earth's internal structure, global seismicity, plate tectonics, structure of plate margins, and planetary geology.