Descriptions — Geography
of Courses

824. Legal Bases for Planning
Winter 3(3-0) U P 473; approval of school.
Analysis of legislation pertinent to planning, emphasis upon legislation for city and regional planning bodies and creation of special authorities with general planning responsibilities.

828. Planning Presentation Techniques
Fall 3(1-4) Approval of school.
Communication skills utilized by planners to present policy proposals to governmental decision makers and citizens. Speaking, writing, and small group leadership is integrated with essential planning graphic skills.

830. Development Project Eulation
Spring 3(2-2) Approval of school.
Planning evaluation methods and processes employed in the review of urban development proposals and projects, site plans, and public policies.

834. Planning Practicum I: Field Studies
Fall 3(0-6) Completion of the first year MUP Core Program or approval of school.
Field experience in the collection, analysis, and synthesis of information by individual students or student groups, to develop solutions to specific urban problems.

835. Planning Practicum II: Plan Making and Implementation
Winter 3(0-6) U P 834
Based on study and research done in U P 834, the preparation of plans appropriate to the study area and subject. The design of statutory measures and administrative policies for implementation.

836. Introduction to Design
Winter 3(0-6) U P 829 or approval of school.
Studio course emphasizing the role of planning in shaping the process of urban growth and development, and the role of physical form and structure in influencing cultural patterns.

842. An International Comparative Study of Urban Planning
Winter of odd-numbered years. 3(3-0)
Urban growth patterns, types, roles and design theory of new cities; techniques and organization for urban growth; selection of subject areas will be made according to the class composition.

850. Housing Program Planning
Spring of even-numbered years. 4(2-4)
Approval of school.
Regulation, stimulation, salvage, and replacement of housing through public policy and administrative procedures. Increasing role of private initiative as partner to public action through conservation, rehabilitation, and redevelopment practices. Evaluation of trends and needs; analysis of case studies.

854. Urban Transportation Planning
Spring of even-numbered years. 4(2-4)
Approval of school.
Examination of travel, land use, and transportation networks. Transportation planning data, processes, and plans, and their impact on theory and practice of metropolitan planning. Field work in current transportation issues.

858. Urban Land Policy and Regulation
Spring of odd-numbered years. 4(3-4)
Approval of school.
Public land use policy and legislation, and implementing governmental actions. Land use controls exercised by several levels of government. Field work in development and application of land use control instruments.

862. Development Planning and Administration
Spring of odd-numbered years. 4(2-4)
Approval of school.
Measurement of urban obsolescence and deterioration with accompanying analysis of symptoms and causes for a selected community. Comprehensive plan for urban renewal and development objectives will be developed and one or more project areas will be studied and processed in accordance with most effective techniques and administrative procedures. Emphasis to be placed on the objective of unified, revitalized community development.

889. Internship in Urban Planning
Fall, Winter, Spring, Summer. 2(0-8) or 3(0-15) May reenroll for a maximum of 8 credits. Graduate students in Urban Planning approval of school.
Individual experience in approved agencies and departments in the Lansing area.

897. Special Topics in Urban Planning
Fall, Spring. 3 to 4 credits. May reenroll for a maximum of 6 credits if different topic is taken.
Issues pertaining to urban planning as they arise out of current research, planning practice or the interplay of national issues and urban problems.

898. Master's Research Fall, Winter, Spring, Summer. 2 or 3 credits. Approval of school.
The research component of the Plan B option for the MUP degree.


GEOLOGICAL SCIENCES

(Name changed effective July 1, 1983. Formerly the Department of Geology.)

College of Natural Science

Geology

200. Geology of Human Environment (N)
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.
An exploration of social philosophical and political events which require a geological viewpoint for resolution. The application of geologic and social/historical information will also reinforce the concept of the scientific method.

200L. Laboratory—Geology of Our 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 301, or GLG 306.
The history of the earth based on geological, chemical, and paleontological evidence; the evolution of organic life.

205. Oceanology—The Marine Environment
Fall. 3(3-0)
Physical oceanography, including origins, hydrological, chemical, geological properties, and environmental quality of the oceans. Human-sea interactions are emphasized including marine utilization and pollution.

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 329; GLG 200 or G301.
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 humans.

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 geologic 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 aerial geologic maps and geologic cross sections studies 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.

308. Field Excursion—Central Appalachians
Spring. 2 or 3 credits. GLG 307.
Training in stratigraphic, sedimentological, paleontological, and structural principles as applied to field methods.
321. Mineralogy
Fall, 5(4-4) One term of chemistry.

322. Introduction to Optical Mineralogy
Winter, 1(0-3) GLG 321.
Basic principles underlying the use of the polarizing microscope. Recognition and understanding of fundamental optical properties. Identification of minerals and textures in thin sections of rocks.

327. Introduction to Geochemistry
Winter, 3(3-0) CEM 152, GLG 321.

335. Fossil Plants, Their History and Paleobotany
Spring, 3(3-0) One course in geology or botany or biology or approval of department.
Interdepartmental with the Department of Botany and Forestry Science; Juniors. Interdepartmental with the Department of Zoology.

341. Field Geology-Summer Camp
Summer, 8 credits. GLG 351, GLG 363, GLG 392, GLG 437, GLG 446 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. Field Techniques in Sedimentary Rocks
2 credits.
Field analysis of sedimentary rocks and fossils, emphasizing interpretation of ancient depositional environments, processes of sedimentation, and diagenetic and paleoenvironmental data. Measurement, detailed description, and synthesis of physically equivalent stratigraphic sections.

B. Methods of Geologic Mapping
2 credits.
Plane table surveys, aerial photo recognition and interpretation. Examination and interpretation of structural and textural relationships in igneous and metamorphic rocks.

C. Geologic Interpretation of Selected Areas
4 credits.
Independent mapping and interpretation.

346. Principles of Stratigraphy
Spring, 4(3-3) GLG 338, GLG 392, or approval of department.
Dynamic and event stratigraphy, facies analysis and depositional environments, and chronologic correlation using organic, seismic and magnetic data. Laboratory exercises in stratigraphic techniques. One required weekend field trip.

351. Structural Geology
Winter, 4(4-3) GLG 289, MTH 111.
Description, classification, and origins 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.

355. The Fossil Record of Organic Evolution
Spring, 3(3-0) One course in a natural science; Juniors. Interdepartmental with the Department of Zoology.

375. Introduction to Geophysics
Fall, 3(4-0) GLG 201; MTH 111; one year of physics.
Noncalculus introduction to the theory, terminology, and applications of geophysics to exploration, solid earth, and tectonic studies. Topics include reflection and refraction seismology, internal structure of the earth, gravity, paleomagnetism, lithospheric tectonics, global seismology, and planetary geology.

382. Sedimentology
Spring, 3(3-0) GLG 202, GLG 323, GLG 327; GLG 351 recommended.
Grain and aggregate properties of sediments; relationships of these properties to processes in the environment of deposition and to the postdepositional history.

40H. Honors Work
Fall, Winter, Spring; 1 to 3 credits. May enroll for a maximum of 9 credits. Approval of department.
Advanced geologic or geophysical field studies.

403. Fluvial Geomorphology
Fall, 4(3-4) Junior majors in GLG, C.E., and C.S.; one course in physical geography and junior standing in geology, civil engineering, or soil science.
Quantitative analyses of the fluvial processes associated with the development of drainage basin morphology, with emphasis on stream bed erosion and sediment transport. Field trips are required.

411. Hydrogeology
Winter, 3(3-2) One term of geology and trigonometry.
Principles of the sources, occurrence, and movement of ground water. Surface and subsurface investigations of ground water and elementary ground water hydrology.

413. Glacial Geology
Spring, 4(3-4) GLG 201.
Geological aspects of glaciers and glaciation. Theories of ice ages through geologic time. Origin and development of glacial geomorphic features. Character and chronology of the Pleistocene. Laboratory techniques with field trips to observe glacial materials and features of Michigan.

426. Optical and X-ray Mineralogy
Fall, 4(3-4) GLG 321, PHY 239 or PHY 289.
Theory, principle and application of the polarizing microscope and X-ray diffractometer in mineral analysis.

430. Vertebrate Paleontology
Winter, 4(3-3) ZOL 428 or approval of department. Interdepartmental with the Department of Zoology.
Fossil vertebrates with emphasis on the evolution of major groups. Laboratories on modern techniques and on the identification and interpretation of fossils.

437. Invertebrate Paleontology
Spring, 4(4-4) GLG 338 or ZOL 306 or approval of department. Interdepartmental with the Department of Zoology.
Systematics and paleobiology of the Porifera, Coelenterata, Bryozoa, Brachiopoda, Mollusca, Arthropoda, and Echinoidea. Laboratory exercises in their comparative and functional morphology. One required weekend field trip.

438. Evolutionary Paleontology
Winter, 4(3-4) GLG 338 or ZOL 389 or approval of department. Interdepartmental with the Department of Zoology.
Evolutionary consequences of the ecological properties of marine invertebrate populations, species, communities, and provinces. Discussion may include biogeography, diversity, and biotic interactions.

445. Field Studies
Fall, Winter, Spring; 1 to 3 credits. May enroll for a maximum of 9 credits. Approval of department.
Advanced geologic or geophysical field studies.

442. Petrology
Winter, 4(3-4) GLG 383, GLG 456.
Introduction to the chemical and physical processes that are responsible for the origin and evolution of igneous and metamorphic rocks. Laboratory studies of rock suites that illustrate basic processes in petrology.

474. Exploration Geophysics
Fall, 4(3-2) GLG 375; MTH 214; PHY 239 or PHY 289.
Techniques used in geophysical exploration, with applications in petroleum prospecting, mineral exploration, and engineering. Includes gravity, magnetic, seismic, electrical and other methods, and well logging. Interpretation of geophysical data.

475. Solid Earth Geophysics
Winter, 3(3-0) GLG 474, MTH 319, PHY 289 or approval of department.
Theoretical geophysics as applied to the solid earth. Geochronology, potential fields, gravity and magnetic fields of the earth, heat flow equation and solutions, rock and paleomagnetism, wave equation and body and surface waves, differential equations of mathematical physics used in geophysical analysis.

478. Exploratory Seismology
Spring, 4(4-4) GLG 474.
Theory and technique of field seismic exploration methods. An associated geophysical survey will be conducted and a report prepared.
479. Tectonophysics  
Spring. 3(3-0) GLG 351, GLG 375, MTH 112.  
Seismotectonics and geophysics of the lithosphere emphasizing recent developments in plate tectonics. Principles of seismographs, interpretation of seismograms, focal mechanisms, plate kinematics, tectonics of plate margins, seismicity, inter- and intra-plate stresses, paleocontinental reconstructions, and planetary evolution.

482A. Mineral Resources  
Spring of odd-numbered years. 4(4-0) GLG 321, GLG 351.  

482B. Mineral Resources Evaluation  
Spring of even-numbered years. 3(3-0) GLG 321, GLG 351.  
Emphasis on practical applications of geoscientific mineral resources and other extractive industries. Aspects of exploration and development of reserves including evaluation, grade estimation, drilling, recovery, and beneficiation.

483. Petroleum Geology  
Fall. 4(3-2) Approval of department.  
Fundamental principles of the origin, migration and accumulation of petroleum. Exploration techniques to include well drilling, electric and radioactivity logging, surface and subsurface exploration methods, seismic surveys, land leasing, and oil field development. Laboratory study of well log plotting and subsurface mapping technique.

497. Geochemistry  
Spring. 3(3-0) GLG 201; CEM 152 or approval of department.  
Oxidation-reduction systems, chemical weathering, stable and unstable isotopes, the geochemistry of ore-forming solutions, and the behavior of trace components in silicate melts.

800. Special Problems  
Fall. Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department.  
Special problems in hydrogeology, geomorphology, and glacial geology, mineralogy and crystallography, petrology, palaeochemistry, structural geology, and petrofabrics. Emphasis on creative thinking in petroleum exploration and development.

810. Seminar  
Fall. Winter, Spring. 1 to 3 credits. May reenroll for a maximum of 12 credits.  
Seminar relating to current research in geology.
891. Advanced Sedimentology
Fall. 3(2-4) GLG 392, GLG 462.
Origin, deposition and diagenesis of sandstones. Study includes thin section, X-ray, and SEM analysis of sediments.

892. Carbonate Petrology
Spring. 4(3-2) GLG 392, GLG 407.
Petrology, petrography, and geochemistry of carbonate sediments and rocks. Emphasis on diagenesis. Chemical and mineralogic trends through time. The role of diagenesis in petroleum reservoir potential.

893. Petrology of Weathering and Soil
Winter. 4(3-3) GLG 392 or GLG 497 or CSS 479 or GLG 498.
Application of petrological and geochemical principles to rock and mineral weathering, soil formation, and landscape evolution. Weathering and soils through geologic time.

894. Aqueous Geochemistry
Spring. 3(3-3) GLG 479; or a course in physical chemistry or approval of department.
Nature and regulation of electrolytes in solution (fresh water, seawater, brine); activity, complexity, and redox effects. Trace metals in solution. Carbonate, silica, alumina systems. Chemical weathering and mobility of elements.

895. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

900. Special Problems
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 9 credits. Approval of department. Special problems in hydrogeology, geomorphology and glacial geology, mineralogy and crystallography, petrology, paleontology, structural geology and petrofabrics, stratigraphy, aerogeology, geophysics, economic geology, petroleum geology, sedimentation, and geochemistry.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Earth Science
ES

445. Field Studies
Fall, Winter, Spring, Summer. 1 to 9 credits. May reenroll for a maximum of 15 credits. Approval of department. Experience and techniques in field investigation of the near surface layers of the earth.

446. Laboratory Investigations
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 15 credits. Independent laboratory investigation of materials and phenomena obtained from field studies.

800. Problems in Earth Science
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department. Independent study in topics related to earth science education.

GERMAN

See Linguistics and Germanic, Slavic, Asian and African Languages.

GERMAN AND RUSSIAN

See Linguistics and Germanic, Slavic, Asian and African Languages.

GREEK

See Romance and Classical Languages.

HEALTH EDUCATION, COUNSELING PSYCHOLOGY AND HUMAN PERFORMANCE — Descriptions of Courses

897. Dual Sports II
(HPR 107., HPE 107.) Fall, Winter, Spring, Summer. 1(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 12 credits in HCP 104 through HCP 111.
Development of sports skills and physical fitness through participation in dual sports activities.

898. Team Sports
(HPR 108., HPE 108.) Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 12 credits in HCP 104 through HCP 111.
Team sports skills and physical fitness through participation in group activities.

909. Aquatics
(HPR 109., HPE 109.) Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 12 credits in HCP 104 through HCP 111.
Aquatics skills, physical fitness, and water safety.

910. Gymnastics
(HPR 110., HPE 110.) Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 12 credits in HCP 104 through HCP 111.
Gymnastics skills and physical fitness through tumbling and apparatus.

111. Dance
(HPE 111., HPE 111.) Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Students are limited to a combined total of 12 credits in HCP 104 through HCP 111.
Beginning and intermediate folk dance, social dance, square dance, and dance class.

111. Dance
(HPE 211., HPE 211.) Fall, Winter, Spring. 2(0-3) May reenroll for a maximum of 12 credits if different activities or the same activities at higher levels are involved. Approval of school for Level II and higher.
Various graded levels of ballet, modern, and jazz dance.

270. The Healthy Lifestyle
(HPE 370.) Fall, Winter, Spring.
3(2-2) Study and assessment of cardiovascular risk factors, habits, and physical capacities to develop a personalized lifestyle for optimal health and longevity. Individual physical regimens required as part of the course.

Provisional Courses

Health Education, Counseling Psychology and Human Performance — Descriptions of Courses