848. **Legal Environment of Business**  
Fall, Spring. 3(3-0)  
R: Open only to students in the Professional Accounting, Master of Business Administration programs, and to students in programs for which GBE 848 is a catalog-listed requirement. The legal, political, and social environment of business and the structural framework in which law functions.

859. **Business Legal Environment**  
Spring. 2(2-0)  

880. **Corporate and Professional Social Responsibility**  
Fall, 3(3-0)  
R: Open only to graduate students in Business and students in programs for which GEL 880 is a catalog-listed requirement. Impact of corporations and professions in societies and across societies. Control of business organizations. Social and moral responsibilities of organizations. The individual's role in a business organization.

890. **Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Approval of department. Faculty-supervised independent study.

**GENETICS**  
College of Natural Science

860. **Genetics Seminar**  
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 12 credits in all enrollments for this course. Critical analysis of current literature. Student presentations.

844. **Chromosome Structure and Genetics**  
Spring of even-numbered years. 3(3-0) Interdepartmental with Zoology. Administered by Zoology. R: Approval of department. Classical and molecular genetics of chromosome structure and behavior in mitosis and meiosis. Synapsis and disjunction, exchange, centromeres, euchromatin, heterochromatin and transposable elements.

851. **Molecular Entomology**  
Fall, odd-numbered years. 3(3-0) Interdepartmental with Entomology. Administered by Entomology. Analysis of molecular processes unique to insects, and their potentials for genetic engineering.

880. **Laboratory Rotation**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to Ph.D. majors in Genetics. Participation in research with faculty members.

890. **Selected Topics in Genetics**  
Fall, Spring, Summer. 2 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course. P: ZOL 341. Topic selected from molecular genetics, physiological genetics, population genetics, quantitative genetics, microbial genetics, somatic cell genetics, behavioral genetics, human genetics, evolution, or radiology and mutagenesis.

999. **Doctoral Dissertation 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 Ph.D. students in Genetics.

**GEOGRAPHY**  
Department of Geography  
College of Social Science

913. **Introduction to Economic Geography**  
Spatial distribution of resources, population, enterprise, trade, consumption, and production. Interaction of those distributions at local to global scales.

151. **Cultural Geography**  
Fall, Spring of even-numbered years. 3(3-0) Systematic approach to the spatial distribution of cultural features, processes, and relationships.

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

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).

211. **Introduction to Geographic Information**  
Fall, Spring. 3(2-4) Principles and methods of spatial data collection, handling, analysis, and display. Introduction to remote sensing, geographic information systems, and cartography. SA: GEO 225

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

232. **Geography of Michigan**  
Fall of odd-numbered years. 3(3-0) Physical and cultural geography of Michigan.

250. **Geography of Recreation and Tourism**  
Fall of even-numbered years. 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**  
Fall of even-numbered years, Spring. 3(3-0) Relationships of running water, weathering, gravity, ice, waves, wind, and biota (including humans) to terrain and soils. Evolution of landscapes. Classical and modern interpretations.

313. **Introduction to Data Analysis for Urban and Regional Planners**  
Fall. 3(2-2) Interdepartmental with Urban Planning. Administered by Urban Planning. P: CPS 100 or CPS 130 or CPS 131; UP 201. Data gathering analysis, information presentation, and basic techniques of urban planning. Application of related computer programs and software.

314. **Methods for Investigation of Urban Systems**  

324. **Remote Sensing of the Environment**  
Fall, Spring. 4(2-4) Features and interpretation methods of remotely-sensed imagery, especially black-and-white and color infrared infrared. Physical features of radar, thermal, and multispectral imagery. Interpretation for agriculture, archaeology, fisheries, forestry, geography, landscapes, architecture, planning, and wildlife management.

326. **Thematic Cartography**  
Fall. 3(3-0) Principles and techniques of map making. Decision making in designing thematic maps.

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

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

337. **Geography of East Asia**  
Spring. 3(3-0) R: Not open to freshmen. Completion of Tier I writing requirement. Spatial patterns and processes of physical and human geography in China, Japan, Korea, and Taiwan. Emphasis on development problems, especially since 1950.

338. **Geography of Africa**  
Fall. 3(3-0) R: Not open to freshmen. Completion of Tier I writing requirement. 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.

401. **Geography of Plants of North America**  
Spring of even-numbered years, 3(3-0) R: Not open to freshmen and sophomores. Geography of Plants in North America with emphasis on the East. Related ecological principles, soils, and post-Pleistocene geologic history. Some field instruction.
402. Agricultural Climatology
Fall of even-numbered years. 3(3-0) Interdepartmental with Agricultural Engineering.
P: MTH 116. R: Not open to freshmen and sophomores.
Relationships between climate and agriculture in resource assessment, water budget analysis, meteorological hazards, pests, crop-yield modeling, and impacts of global climate change.

404. Synoptic Climatology
Fall. 4(4-0)
P: GEO 203.
Global climate patterns and their controls. Relationship between upper air flow and weather in the northern hemisphere westerlies.

405. Applied Synoptic Climatology: Principles and Methods
Spring of odd-numbered years. 4(3-2)
P: GEO 404 or approval of department; 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
Fall of odd-numbered years. 3(3-0)
P: GEO 506 or GLG 201 or GLG 412 or ISP 203. 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 203. Common geographic relationships among soils, landforms, and vegetation in lower Michigan. Description, analysis, and genesis of soils and landscapes. Surficial processes. Field trips required.

412. Glacial and Quaternary Geology
Spring of even-numbered years. 3(2-2) Interdepartmental with Geological Sciences. Administered by Geological Sciences.
P: GLG 201 or GLG 301 or GEO 408. R: Not open to freshmen and sophomores.
Glacial and Quaternary geology with emphasis on the midwestern United States. Laboratory focuses on glacial processes. One weekend field trip required.

413. Urban Geography
Fall. 3(3-0) Interdepartmental with Urban Planning.
P: GEO 113. R: Not open to freshmen and sophomores.
Theories and models of urban spatial form. Underlying structures and processes, sociospatial dimensions of modern urbanism. Differentiation and locational conflict in residential, commercial, and industrial space.

414. Geography of Transportation
Fall of odd-numbered years. 3(0-0) Interdepartmental with Urban Planning.
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.
P: GEO 113. R: Not open to freshmen.
Classical and neoclassical, static and dynamic models of industrial location and spatial organization. Land rent theory, Central place theory, Multi-local organization. Growth transmission.

418. The Ghetto
Fall of odd-numbered years. 3(0-0) Interdepartmental with Urban Planning.
P: GEO 415 or SOC 375 or UP 201 or ISS 320 or MC 343 or MC 384 or approval of department. R: Not open to freshmen and sophomores.
Analysis of the ghetto including its spatial organization and structure. Distribution of racial and ethnic populations. Emphasis on U.S. cities.

422. Map Production and Design
Spring. 4(2-4)
P: GEO 221.
Manual and automated techniques. Design solutions, map planning, overlay construction, user issues, typography, color theory, and color selection.

424. Advanced Remote Sensing
Fall. 4(3-2)
P: GEO 324. R: Not open to freshmen and sophomores.
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. Geographic Information Systems
Spring. 4(3-2) Interdepartmental with Urban Planning.
P: GEO 221.
Technical and theoretical issues in the design, evaluation, and implementation of geographic information systems for research and application.

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

452. Population and Development
Spring of odd-numbered years. 3(3-0)
P: GEO 113 or GEO 151 or GEO 230 or GEO 233 or GEO 335 or GEO 336 or GEO 337. Demographic issues related to economic development and environmental sustainability in selected world regions.

454. Spatial Aspects of Regional Development
Spring of odd-numbered years. 3(3-0)
P: GEO 113, or GEO 151, or GEO 230, or GEO 233, or GEO 335, or GEO 336, or GEO 337.
Spatial patterns and processes associated with regional development in selected world areas.

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

463. Introduction to Quantitative Methods for Geographers and Planners
Fall. 3(3-0) Interdepartmental with Urban Planning.
P: Completion of University mathematics requirement. R: Open only to majors in Geography, Urban Planning, and Landscape Architecture. Quantitative techniques in the analysis and classification of spatial data.

478. Urban Transportation Planning
Spring. 3(3-0) Interdepartmental with Urban Planning. Administered by Urban Planning.
P: UP 201, UP 314. R: Open only to majors in Geography or Urban and Regional Planning 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)
R: Open only to seniors in Geography. Completion of Tier I writing requirement. History, philosophy, and methodology of the geographic discipline as it has evolved within academic and social contexts.

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 complementary 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 and sophomores. Approval of department. Supervised original research on selected aspects of geography.

495. Field Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
R: Not open to freshmen and sophomores. Approval of department. Supervised field study in geography.

496. Internship in Geography
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.
R: Open only to juniors and seniors. Approval of department.
Individual experience in geography in an approved organization.

806. Advanced Geomorphology
Spring of even-numbered years. 3(3-0) Advanced study in geomorphology, surficial processes and soils.

809. Seminar in Physical Geography
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.
Review of research on selected topics in physical geography such as climatology, geomorphology, soils, or plant geography.

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.
P: 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.