499. 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 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 8 credits in all enrollments for this course. 
R: Not open to freshmen and sophomores. Approval of department. Supervised field study in geography.

500. 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. 
R: Open only to juniors and seniors. Approval of department. Individual experience in geography in an approved organization.

505. Topics 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 topics in physical geography such as climatology, geomorphology, soils, or plant geography. 
Q: GEO 834

510. Topics 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. 
Q: Two of GEO 401, GEO 403, GEO 435 QA: GEO 895

515. Topics in Location Theory and Transportation 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 location theory and transportation geography. 
Q: Two of GEO 401, GEO 403, GEO 435 QA: GEO 885

525. Map Automation Fall of even-numbered years. 3(2-2) Use of computers in cartography. Cartographic algorithms, interpretation, and line generalization. Program intelligence. Cartographic data bases. 
Q: GEO 223 QA: GEO 448

525. Geoprocessing Spring of odd-numbered years. 4(4-0) Integration of digital database, geographic information systems, spatial analysis, and expert systems in solving research problems. Class research project. 
Q: GEO 424

65. Topics in Regional Geography Fall of even-numbered years, Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. 
Review of research on contemporary geographic issues in different world regions. 
Q: GEO 840

865. Advanced Quantitative Methods in Geography Spring. 4(4-0) 
Q: GEO 487 QA: GEO 861

886. Research Design in Geography Spring. 3(3-0) Research and writing in geography. Identification of geographic problems and their relative importance. Structuring and writing hypotheses. Data acquisition and tests for validity. 
Q: GEO 826

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. 
Q: GEO 838

892. Advanced Research in Geography Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. 
R: Open only to graduate students in Geography. 
Q: GEO 892

896. Theory and Methods in Geography Spring. 3(3-0) 
R: Open only to Ph.D. students in Geography. 
Modern methodological and philosophical approaches to geographic research. 
Q: GEO 459, GEO 625

999. Doctoral Dissertation Research Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course. 
Q: GEO 999

103. Oceanography Fall. 4(4-0) 
P: CEM 142 or CEM 152 or PHY 184 or PHY 232 or CEM 141, PHY 135 or CEM 141, PHY 211 or CEM 151, PHY 231. 
Physical, chemical, biological, and geological aspects of oceanography: ocean circulation, waves, tides, thermal properties, chemical properties of ocean water, ocean productivity, shoreline processes, and sedimentation. 
Q: CEM 141 or CEM 151 or PHY 239 or CEM 141, PHY 238 or CEM 151

321. Mineralogy and Geochemistry Fall. 4(3-2) 
P: CEM 142 or CEM 152. 
Geochemical properties and processes in the origin, modification, structure, dynamics and history of Earth materials. Crystallography and crystal chemistry. 
Mineral classification and identification. 
Q: CEM 141 or CEM 151 or LBS 181 QA: GLG 332, GLG 325, GLG 327

351. Structural Geology Fall. 4(3-2) 
P: GLG 201 or GLG 501, GLG 381, MTH 116. 
Structural geology. Mechanical behavior and kinematic history of the lithosphere. Stress and strain. Deformation features such as folds, faults and microstructure. 
Q: GLG 201, MTH 116 QA: GLG 351

411. Hydrogeology Fall. 4(3-2) 
P: MTH 116 R: Not open to freshmen and sophomores. 
Principles of the source, occurrence and movement of groundwater emphasizing geologic factors and controls. 
Q: MTH 109 or MTH 111 QA: GLG 411

412. Glacial and Quaternary Geology Spring of odd-numbered years. 3(2-2) 
Interdepartmental with Geography. 
P: GLG 201 or GLG 501 or GEO 406 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. 
Q: GLG 201, QA: GLG 415

413. Environmental Geochemistry Spring. 3(3-0) 
P: GLG 201 or GLG 501; CEM 141 or CEM 151. 
Natural and anthropogenic processes affecting environmental chemistry with emphasis on the water cycle. Chemical equilibria, kinetics, geochemical cycling, acid rain, carbon dioxide and the greenhouse effect. 
Q: GLG 520 or GLG 201, CEM 151 QA: GLG 419

422. Organic Geochemistry Fall. 3(3-0) 
P: CEM 141 or CEM 152 or CEM 138H; GLG 201 or GLG 301; PHY 183 or PHY 183B or PHY 251 or PHY 231B 
Organic geochemistry applied to global cycling of organic matter and individual compounds in the environment. 
Q: GLG 201, GLG 201 or GLG 301, PHY 237 or PHY 287
**GERMAN**

**Department of Linguistics and Germanic, Slavic, Asian and African Languages**

**College of Arts and Letters**

101. *Elementary German I*  
Fall, Spring, Summer. (4-1)  
German language, civilization, and culture for beginning students. Work on all language skills with emphasis on speaking.  
Q: GRM 101, GRM 102

102. *Elementary German II*  
Fall, Spring, Summer. (4-1)  
P: GRM 101 or designated score on German placement test. R: Not open to students with credit in GRM 200. Further study of German language, civilization, and culture for beginning students. Continued work on all language skills with emphasis on speaking.  
Q: GRM 101 QA: GRM 102, GRM 105

200. *Second-Year German I* with Review  
Fall, Spring. (4-1)  
P: Designated score on German placement test or approval of department. R: Not open to students with credit in GRM 102 or GRM 201. Rapid review and strengthening of vocabulary, grammar, and conversation skills for incoming freshmen and transfer students. Reading, viewing, and discussion of a broad range of cultural texts and materials from the German-speaking world.  
Q: GRM 103 QA: GRM 201, GRM 202

201. *Second-Year German I*  
Fall, Spring. (4-0)  
P: GRM 102 or designated score on German placement test. R: Not open to students with credit in GRM 200. Intermediate-level development of all language skills. Reading, viewing, and discussion of a broad range of cultural materials from the German-speaking world.  
Q: GRM 103 QA: GRM 201, GRM 202

202. *Second-Year German II*  
Fall, Spring. (4-0)  
P: GRM 200 or GRM 201 or designated score on German placement test. R: Open only to graduate students. Further intermediate-level work on all language skills, based on topics such as popular music, literature, film, current events, and culture. Transition course to advanced work in German studies.  
Q: GRM 201 QA: GRM 202, GRM 203

290. *Independent Study*  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department.  
Special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.  
Q: GRM 299

301. *Advanced German Language and Culture I*  
Fall, Spring. (3-0)  
P: GRM 202 or designated score on German placement test.  
Work on advanced speaking, listening comprehension, reading, and writing skills through intensive work with authentic texts dealing with contemporary issues relating to the German-speaking world. Selected review of grammar and syntax.  
Q: GRM 203 QA: GRM 321, GRM 322

302. *Advanced German Language and Culture II*  
Fall, Spring. (3-0)  
P: GRM 301 or designated score on German placement test. R: Not open to students with credit in GRM 312. Further work on advanced speaking, listening comprehension, reading and writing skills, through intensive work with original texts dealing with contemporary issues relating to the German-speaking world. Oral reports and longer writing and listening comprehension exercises.  
Q: GRM 321 QA: GRM 322, GRM 323

311. *Advanced German: Business Emphasis I*  
Fall. 3(0-0)  
P: GRM 202 or designated score on German placement test. R: Not open to freshmen. Not open to students with credit in GRM 301 or GRM 302. Development of proficiency through readings, discussions, assignments based on materials dealing with the German economic system and Germany in world trade. Taught in German.  
Q: GRM 303 QA: GRM 331, GRM 332

312. *Advanced German: Business Emphasis II*  
Spring. 3(0-0)  
P: GRM 311 or designated score on German placement test. R: Not open to freshmen. Not open to students with credit in GRM 302. Further readings, discussions, and assignments based on materials dealing with key areas of German business such as management and corporate hierarchies. Taught in German. Research paper required.  
Q: GRM 332 QA: GRM 332, GRM 333

320. *Appreciation of German Literature*  
Spring. 3(0-0)  
P: GRM 202 or designated score on German placement test. Close readings of shorter literary texts in German. Discussion of literary values and the relationship of literature to the individual and society. Methods of better understanding texts and interpreting their meaning. Temporary approval effective from Spring Semester 1995 through Spring Semester 1995.  
Q: GRM 203 QA: GRM 351, GRM 352, GRM 353

340. *German Life and Literature: Contemporary Period*  
Fall, Spring. 3(0-0)  
P: GRM 202 or designated score on German placement test. Past-World War II Germany through analysis of selected literary texts, documentary material, and film. Topics include problems of recovery and prosperity, partition and reunification, and Germany in Europe.  
Q: GRM 203 QA: GRM 353, GRM 357

341. *German Life and Literature: Historical Perspectives*  
Fall, Spring. 3(0-0)  
P: GRM 202 or designated score on German placement test.  
Historical, social, and cultural developments in the German-speaking world as revealed in textual materials. Taught in German.  
Q: GRM 203 QA: GRM 353, GRM 357

400. *Reading German for Graduate Students*  
Fall of even-numbered years. 5(0-0)  
R: Open only to graduate students, or approval of department.  
German grammar and syntax, with emphasis on reading and translation in specialized fields.  
Q: GRM 410, GRM 411

420. *Language through Media in Contemporary Germany*  
Fall. 4(0-0)  
P: GRM 302 or GRM 312.  
Written and oral analysis of relevant issues in contemporary Germany as depicted in German media. Major writing project.  
Q: GRM 320 or GRM 333 QA: GRM 421, GRM 429

440. *German Life and Literature: Cultural Differences*  
Fall. 3(0-0)  
A student may earn a maximum of 4 credits in all enrollments for this course.  
P: GRM 340 or GRM 341, HST 205 or HST 206.  
Values and beliefs of marginalized groups in German society including religious minorities and foreign workers, refugees, women. German immigrants in the United States as seen through their writings. Influence of historical and cultural developments.  
Q: GRM 353 or GRM 337

**GRM**

**392. Special Problems in Geophysics and Geodynamics**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 371 or GLG 471 or GLG 472. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individual study on problems in applied and solid-earth geophysics, global and regional geodynamics, and polar earth sciences.  
Q: GLG 375 or GLG 474 or GLG 477 QA: GLG 805, GLG 868

**393. Special Problems in Hydrogeology**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 411 or GLG 421. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individual study on the movement, occurrence and composition of groundwater in geologic environments.  
Q: GLG 411 or GLG 412

**394. Special Problems in Paleobiology**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 461. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individual study in invertebrates, vertebrate and plant paleobiology.  
Q: GLG 807

**395. Special Problems in Petrology**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 481. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individual study on current problems in petrology.  
Q: GLG 492 QA: GLG 802

**396. Special Problems in Sedimentology and Stratigraphy**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 481. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individualized study of problems in sedimentology and stratigraphy.  
Q: GLG 804, GLG 805, GLG 806

**397. Special Problems in Structural Geology and Tectonics**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
P: GLG 351. R: Open only to graduate students in Geological Sciences. Approval of department.  
Individual study on rock deformation or major expressions of deformation. Two-seven weeks of field study during term breaks may be required.  
Q: GLG 531 QA: GLG 801

**399. Master's Thesis Research**  
Fall, Spring. 1 to 10 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to M.S. students in Geological Sciences.  
Q: GLG 899

**399. Doctoral Dissertation Research**  
Fall, Spring. 1 to 48 credits. A student may earn a maximum of 89 credits in all enrollments for this course.  
R: Open only to Ph.D. students in Geological Sciences.  
Q: GLG 999