

UNIVERSITY OF CINCINNATI BULLETIN
Announcement
of



*Division of Graduate
Education and Research*

1974-1975

Published by the University of Cincinnati
Van Wormer Administration Building
Cincinnati, Ohio 45221
Telephone 513-475-8000

15-041-704, 705, 706. Staff Seminar. Forum for discussing research papers by visiting speakers, faculty, graduate students. Credit varies with extent of student's participation. 1-15 gr. cr. Ea. Qtr. F 2:00-5:00. Stafford.

15-041-715. Introduction to Graduate Geography. A common first term for all incoming graduate students, focusing on geographic research problems, data, and techniques. 12 gr. cr. Aut. Qtr. MW 2:00-5:00; MWF 1:00-2:00.

15-041-731. Seminar: Man's Physical Environment. Work processes at earth-atmosphere interface; imbalances and resulting environmental problems. 4 gr. cr. Win. Qtr. Tu 2:00-5:00. Shelton. Prereq.: Perm. of instr.

15-041-775. Seminar in Behavioral Geography. Theory and methodology of spatial behavior; environmental cognition, space preferences, and decision-making. 4 gr. cr. Spr. Qtr. W 2:00-5:00. Lloyd.

15-041-778. Seminar in Geographic Development. Approaches to a theory of geographic development, emphasizing man-environment relationships. Models on the village, town, project level. 4 gr. cr. Spr. Qtr. Tu 2:00-5:00. Roder.

15-041-780. Geographic Methods: Advanced Quantitative Techniques. Quantitative analysis of spatial distributions, associations, series. Problems, applications. 4 gr. cr. Win. Qtr. MWF 1:00-2:00. Lloyd. Prereq.: Math 107-8-9, or perm of instr.

15-041-781. Research Seminar in Population Geography. Population growth, distribution, redistribution. Pre-industrial, industrial, post-industrial sociocultural systems; geographic-demographic implications. 4 gr. cr. Aut. Qtr. Th 2:00-5:00. Wolf.

15-041-782. Seminar in Historical Geography. Settlement origins and dispersal, comparing Anglo-America and Australia; evolution of regions and urban networks; use of archival maps. 4 gr. cr. Win. Qtr. W 2:00-5:00. Ryan.

15-041-785, 786. Seminar in the Location Theory Research Cluster. Urban-economic-transportation geography reflected in professional literature of last decade; movement, networks, nodes, hierarchies, surfaces, spatial decision making; perception, institutional settings; seminar papers required. 4 gr. cr. Win. Qtr. M 2:00-5:00, Barber; Spr. Qtr. M 2:00-5:00, Stafford.

15-041-788. Seminar: Geography of Manufacturing. Geographic location theory in relation to secondary production. 4 gr. cr. Win. Qtr. Th 2:00-5:00. Stafford.

15-041-789. Research Seminar: Geography of Transportation. Current approaches in network analysis, at a variety of scales, intra-urban and inter-urban. 4 gr. cr. Spr. Qtr. Th 2:00-5:00. South.

15-041-792. Geographic Methods: Research Models. Application of mathematical, methods to relationships indicated by geographic theory. Construction, use of multi-variate spatial models. 4 gr. cr. Spr. Qtr. MWF 1:00-2:00 Barber.

15-041-797. Seminar in Graduate Research II. Research design; preparation of thesis or dissertation proposal. 4 gr. cr. Aut. Qtr. TTh 11:00-12:30. Stafford.

15-041-810. Research Orientation. For Ph.D. students. Designed to facilitate research specialization. 4 gr. cr. Win. Qtr. TTh 11:00-12:30. Roder.

15-041-814, 815, 816. Interdisciplinary Seminar: Frontiers of Urban Research. Current research trends and techniques in the urban aspects of sociology, history, and geography, and the inter-relations among these research strands. Admission by perm. of instr. 3 gr. cr. ea. Qtr. Hinman, Miller, Lloyd (Cross-listed with History and Sociology.)

15-041-871. Thesis Research. Independent individual research in the preparation of the thesis for the M.A. degree. Offered ea. Qtr. Credits to be arranged.

15-041-971. Dissertation Research. Preparation of the Ph.D. dissertation. Offered ea. Qtr. Credits to be arranged.

Courses Omitted in 1974-1975: 531, 2. Advanced Physical Geography, 710, 11. Seminar: Geographic Communication I, II; 721. Modern Concepts in Regional Geography: U.S. and Canada; 730. Modern Concepts in Regional Geography: Australia and Southwest Pacific; 765. Seminar: Spatial Behavior of Large Organizations; 772. Seminar: Urban Blight; 773. Seminar in Cultural Geography Theory; 783. Advanced Geography of U.S.; 784. Seminar in Location Theory Research Cluster; 791. Regional Concept; 795. Contemporary Research Frontier; 878. Growth of Geographic Thought

GEOLOGY

Head: Lattman; Teaching Staff: Briskin, Caster, Davis, De Jong, Durrell, Fleming, Grover, Huff, Jenks, Kitiivic, Larsen, Maynard, Potter, Pryor, Sunderman.

The Department offers work leading to the degrees of Master of Science and Doctor of Philosophy.

A student admitted to graduate work in geology must have at least a B-plus average in his major and 3 referees, and is expected to have satisfactorily passed one-year courses in physics and chemistry and an approved course in calculus. A summer field course in geology or its equivalent, such as a summer at a marine biological station for paleontology majors, is required before admission or early in the graduate program. Also a student must have taken GRE and AGRE.

Interviews and early exploratory conferences are required to help determine the student's prior training and aptitude for advanced studies and independent research.

A requirement for either graduate degree is the satisfactory completion of a thesis or dissertation describing the results of the student's research work. 15 to 20 credit hours of advanced course work in allied sciences may be taken in place of M.S. thesis by students not planning to work toward a doctorate.

All graduate students are required to take Geology 651-652.

For Advanced Undergraduate and Graduate Students

15-040-037, 038, 039. Geology Seminar. Expected of all graduate students majoring in geology. No credit.

15-040-501, 502, 503. Petrology. Aut. Qtr.: The polarizing microscope; Win., Spr. Qtrs.: The rock cycle, hand lens petrography, thin section studies of rocks. 3 gr. cr. ea. Qtr.

15-040-521, 522, 523. Paleontology. Fundamental concepts; paleobiology and the geological occurrence and significance of fossil organisms. 3 gr. cr. ea. Qtr. Davis.

15-040-525. Advanced Historical Geology. Evolution of higher forms of plant and animal life and their significance in interpretation of earth history. 4 gr. cr. Spr. Qtr. Caster.

15-040-531, 532, 533. Stratigraphy and Sedimentation. Physical and biological processes, environmental interpretation, facies analysis, stratigraphic analysis, basin analysis, and tectonics. 3 gr. cr. ea. Qtr. Pryor.

15-040-551. Engineering Geology. Physical properties of earth materials and their response to short term stresses. Field trips. 3 gr. cr. Aut. Qtr. Fleming.

15-040-552. Hydrogeology. The geology of groundwater. A study of the occurrence, movement and utilization of subsurface water. 3 gr. cr. Win. Qtr. Fleming.

15-040-561, 562. Interpretation of Aerial Photographs. 3 gr. cr. Win., Spr. Qtrs. Durrell.

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during the Summer of 1974. Historical and regional geology. Conferences and report in Aut. Qtr. 3 gr. cr. Aut. Qtr. Pryor.

15-040-578. World Physiography. 3 gr. cr. Aut. Qtr. Durrell.

15-040-580. Advanced Geomorphology. The physics and chemistry of processes of erosion, equilibrium theories of landscape evolution. 3 gr. cr. Win. Qtr. Lattman.

15-040-611. Seminar in Paleocology. Survey and discussion of the literature on ecologic modeling and on paleocologic interpretation. 3 gr. cr. Aut. Qtr.

15-040-613. Ichnology and Trace Fossils. Survey of literature and materials on biogenetic sedimentary features, their geologic occurrence, biologic significance, interpretation. 3 gr. cr. Spr. Qtr.

15-040-621, 622. Introduction to Geochemistry. Introduction to the application of chemical principles to various geologic problems. 3 gr. cr. Aut., Win. Qtrs. Maynard.

15-040-631. Clay Mineralogy I. Structural mineralogy, polytypism, ion exchange properties and dehydration-rehydration reactions in clays. 3 gr. cr. Aut. Qtr. Huff.

15-040-632. Clay Mineralogy II. Geology of clays. Clay formation in soils, continental and marine environments. Problems in diagenesis. 3 gr. cr. Win. Qtr. Huff.

15-040-641, 642, 643. Optical Mineralogy. Crystal optics, use of the polarizing microscope for recognition of transparent substances in immersion media and thin sections. 3 gr. cr. ea. Qtr. Sunderman.

15-040-651, 652. Geological Data Analysis. Application of statistics, computing to diverse geological, paleontological problems. Case histories. 3 gr. cr. Aut., Win. Qtrs.

15-040-663. Seminar in Igneous

15-040-668. Mineral Chemistry of mineral stability. 3 gr. cr. W

15-040-669. The Rock-forming genetic indicators. 3 gr. cr. Sp

15-040-673. Structural Geology

15-040-674, 675, 676. Geology

15-040-677. Regional Geology

15-040-678. Regional Geology

15-040-691, 692. The Solid earth. 3 gr. cr. Aut., Win. Qtrs

Primarily for Graduate Students
15-040-711. Micropaleontology, Radiolaria, Coccoliths, D

15-040-712. Micropaleontology, Deep Sea Drilling Project

15-040-713. Micropaleontology, climatic models of Holocene

15-040-751. Seminar in Physics

15-040-775. Field Studies in tation or in June. Report. 2 gr

15-040-777. Field Studies in Report. 2 gr. cr. Jenks

15-040-778. Field Studies in cr. DeJong.

15-040-780. Methods of Geology

15-040-814, 815, 816. Advan tion, origins, geological inter

15-040-821. Seminar in Pale

15-040-822, 823. Seminar in Win., Spr. Qtrs

15-040-844. Seminar in Geology

15-040-874, 875, 876. Geology

15-040-881. Research in Geology

15-040-882. Research in Geology

15-040-883. Research in Geology

15-040-884. Research in Geology

15-040-885. Research in Geology

- 15-040-663. Seminar in Igneous Petrology. Major problems, current literature. 3 gr. cr. Spr. Qtr.
- 15-040-668. Mineral Chemistry. Crystal chemistry; mineral solution models; inter- and intracrystalline reactions; controls of mineral stability. 3 gr. cr. Win. Qtr. Grover.
- 15-040-669. The Rock-forming Minerals. Crystal chemistry, phase relations of rock-forming minerals, their use as petrogenetic indicators. 3 gr. cr. Spr. Qtr. Grover.
- 15-040-673. Structural Geology II. Interpretation of tectonic structures. 3 gr. cr. Win. Qtr. DeJong.
- 15-040-674, 675, 676. Geology of Ore Deposits. 3 gr. cr. ea. Qtr. Jenks.
- 15-040-677. Regional Geology. (The Evolution of North America.) 3 gr. cr. Aut. Qtr. DeJong.
- 15-040-678. Regional Geology. (Mountain Belts outside North America.) 3 gr. cr. Spr. Qtr. DeJong.
- 15-040-691, 692. The Solid Earth. Advanced review of major units of the earth; major geological processes shaping the earth. 3 gr. cr. Aut., Win. Qtrs. Kilinc.
- Primarily for Graduate Students
- 15-040-711. Micropaleontology I. Biology, morphology, taxonomy, biogeography of selected microfossils — Foraminifera, Radiolaria, Coccoliths, Diatoms. 3 gr. cr. Aut. Qtr. Briskin.
- 15-040-712. Micropaleontology II. Cenozoic planktonic foraminifera, morphology, Phylogeny, biostratigraphy, paleobiology. Deep Sea Drilling Project Leg 22. 3 gr. cr. Win. Qtr. Briskin.
- 15-040-713. Micropaleontology III. Ecology, paleoecology of Cenozoic planktonic foraminifera. Paleocirculation and paleoclimatic models of Holocene and Pleistocene. 3 gr. cr. Spr. Qtr. Briskin.
- 15-040-751. Seminar in Physical Geology. 3 gr. cr. Spr. Qtr. Fleming.
- 15-040-775. Field Studies in Modern and Ancient Depositional Environments. 10 to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. Pryor.
- 15-040-777. Field Studies in Mining Geology — Ore Deposits. 10 to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. Jenks.
- 15-040-778. Field Studies in Structural Geology. 10 to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. DeJong.
- 15-040-780. Methods of Geological Instruction. Credits to be arranged. Offered ea. Qtr.
- 15-040-814, 815, 816. Advanced Sedimentary Petrology. Advanced study of major groups of sedimentary rocks, composition, origins, geological interpretations. 4 gr. cr. ea. Qtr.
- 15-040-821. Seminar in Paleontologic Principles. 3 gr. cr. Aut. Qtr.
- 15-040-822, 823. Seminar in Megascopic Paleontology. Reading knowledge of German and French desirable. 3 gr. cr. Win., Spr. Qtrs.
- 15-040-844. Seminar in Geomorphology. 3 gr. cr. Spr. Qtr. Lattman.
- 15-040-874, 875, 876. Universal Stage Microscope Studies. 2 gr. cr. ea. Qtr. Sunderman.
- 15-040-881. Research — Special Problems — Paleontology. Credit arranged. Offered ea. Qtr.
- 15-040-882. Research — Mineralogy, Geochemistry. Credit arranged. Offered ea. Qtr.
- 15-040-883. Research — Structural Geology. Credit arranged. Offered ea. Qtr.
- 15-040-884. Research — Petrology. Credit arranged. Offered ea. Qtr.
- 15-040-885. Research — Economic Geology. Credit arranged. Offered ea. Qtr. Jenks.

- 15-040-886. Research — Geomorphology and Remote Sensing. Credit arranged. Offered ea Qtr.
- 15-040-887. Research — Sedimentary Petrology. Credit arranged. Offered ea. Qtr.
- 15-040-888. Research — Stratigraphy — Sedimentary. Credit arranged. Offered ea Qtr.
- 15-040-889. Research — Clay Mineralogy. Credit arranged. Offered ea. Qtr.
- 15-040-890. Research — Geophysics (Paleomagnetism). Credit arranged. Offered ea Qtr. DeJong.
- 15-040-891. Research — Geology Applied to Engineering. Credit arranged. Offered ea. Qtr. Fleming.
- 15-040-893. Master's Thesis Research. Credit arranged. Offered ea Qtr.
- 15-040-971. Doctoral Dissertation Research. Credit arranged. Offered ea. Qtr. Permission of adviser required.

Courses Omitted in 1974-1975: 572, Physiography of Western U.S.; 573, Physiography of Eastern U.S.; 574, Glacial Geology; 581, Basic Photography for Geological Sciences; 648, Thermodynamics of Geological Processes; 649, 650, Phase Equilibria; 664, Metamorphic Petrology I; 665, Metamorphic Petrology II; 666, Seminar in Metamorphic Petrology; 672, Elements of Structural Analysis; 701-2-3, Advanced Sedimentology; 731, Geochemistry of Hydrothermal Processes; 732, Geochemistry of Hydrothermal Ore Deposits; 776, Field Studies in Igneous and Metamorphic Petrology; 779, Field Studies in Volcanology; 873, Seminar in Economic Geology.

GERMANIC LANGUAGES AND LITERATURES

Head: ; Acting Head: Slessarev; Director of Grad. Studies: Glenn; Teaching Staff: Abt, Carnes, Clark, Friedrichsmeyer, Glenn, Harris, Merkel, Obrath, Richert, Slessarev, Smith, Stern. (All located 730-742 Old Chemistry Building)

Students electing work in this department should have completed an undergraduate major in German or its equivalent. For precise requirements consult our *Guidelines to Graduate Studies*. This department offers work leading to the degrees of Master of Arts, Master of Arts in Teaching and Doctor of Philosophy in Germanic Languages and Literatures. The M.A.T. program is specifically designed for future high school and junior college teachers. It is conducted in collaboration with the College of Education; students can earn their teaching certificate together with the M.A.T. in a two-years sequence. For full program descriptions contact the Department.

For Advanced Undergraduate and Graduate Students

- 15-010-531, 532. Advanced Composition and Conversation. Topical conversations for students wishing greater perfection in spoken and written German before entering Advanced Stylistics. 3 ug., 4 gr. cr. ea. Qtr. Aut., Win. Qtrs. TTh 9:30-11:00. Carnes, Richert.
- 15-010-533. Advanced Stylistics. A study of the German prose composition and practical stylistic exercises. 3 ug., 4 gr. cr. Spr. Qtr. TTh 9:30-11:00. Merkel.
- 15-010-551. Survey of German Literature, Part I: Major trends from 750 to 1750 with particular emphasis on the change of ideas and forms. 3 ug. 4 gr. cr. Aut. Qtr. MWF 11:00-12:00. Richert.
- 15-010-552. Survey of German Literature, Part II: Major trends of Storm and Stress, Classicism, Romanticism and Post-Romanticism. 3 ug., 4 gr. cr. Win. Qtr. MWF 11:00-12:00. Slessarev.
- 15-010-553. Survey of German Literature, Part III: Major trends from 1850 to present: Realism, Naturalism, Impressionism, Expressionism, Post-War Literature, Literature of German Democratic Republic. 3 ug., 4 gr. cr. Spr. Qtr. MWF 11:00-12:00. Friedrichsmeyer.
- 15-010-571. Methods in Teaching Grammar and Linguistics. Intensive two weeks prior to Aut. Critical analysis of current theories of language teaching on high school, college levels. Equiv. to Ed. 303. 3 ug., 4 gr. cr. Dates to be announced. Obrath.
- 15-010-572. Methods of Teaching Literature. (Eve.) Workshop. Various approaches to literary interpretation and suitable pedagogical methods. Recommended for prospective high school, college teachers. 3 ug., 4 gr. cr. Win. Qtr. W. 6:10-9:20. Abt.
- 15-010-583. The Dramas of Bertolt Brecht. An analysis of his drama and dramaturgy. Team-taught by Profs. Bahr, Stern. 3 ug., 4 gr. cr. Spr. Qtr. M. 4-6.

For Graduate Students
15-010-650. Advanced
politics, society, arts, t

15-010-651. Advanced
ions. 4 gr. cr. Spr. Qtr.

15-010-690. Methods
ship. 4 gr. cr. Aut. Qtr.

15-010-710. Topics in
mation. Readings: Celta
Qtr. W 1:00-3:00. Carn

15-010-719. Topics in
on basis of representat

15-010-746. Topics in
sent. 4 gr. cr. Spr. Qtr.

15-010-764. Topics in

15-010-775. German F
the German fable from

15-010-776. Goethe's
cal Alterswerk. 4 gr. cr.

15-010-777. German F
stition, witchcraft, cust

Pro-Seminars
15-010-850. Ludwig T
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15-010-851. J.M.F. Len
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Seminars
15-010-901, 902. Fent
other European realists.

15-010-903, 904. Boll
Spr. Qtrs. Win. Spr. Qtr

15-010-951. History of
and special field. 4 gr.

15-010-952. History of
German. 4 gr. cr. Win. Qtr

Research
15-010-971. Masters

15-010-971. Doctoral

15-010-997. Seminar

15-010-999. Seminar

SCARD: 15-010-999
15-010-999. Seminar
Comparative Lit. Seminar
Carnes

UNIVERSITY OF CINCINNATI BULLETIN

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of



*McMicken College
of Arts and Sciences*

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15-041-679. **Field Work and Research Methods.** Training in field study, methods and techniques, including mapping, air photo use, interviewing, and report writing, with stress on urban areas. 3 ug. cr. Spr. Qtr.

15-041-680. **Geographic Methods: Quantitative Techniques.** Introduction to areal statistics, computer mapping, and computer use. 3 ug. cr. Spr. Qtr.

For Honors Courses, see Honors section of this Bulletin.

GEOLOGY

Head: Professor Lattman; Teaching Staff; Caster, Durrell, Jenks, Larsen, Potter, Pryor, Huff, Sunderman; Briskin, Davis, DeLong, Fleming, Grover, Kilinc, Maynard.

Entering Freshmen intending to major in Geology may apply for the W. H. Bucher Scholarship (see page 23).

Geol. 101-2-3 is preliminary to all advanced courses in geology. Students who have completed 104-5-6 and wish to major in geology will be asked to take 101-2-3.

To qualify for the B.S. degree in geology a student shall include in his program Geol. 271 (or 272 or 273), 301-2, 321-2, 331, 405-6, 501-2-3, 525; Chem. 101-2-3, 111-2-3, 9 to 14 credits of Calculus or other approved Mathematics courses and 9 to 15 credits of physics or biology. In addition to the basic core of geology courses listed above, at least 18 credits in advanced courses in geology must be elected and should include 521-2-3 or 531-2-3 and 677 where feasible. Students majoring in Geology are strongly advised to develop a reading capability in a foreign language, preferably in French, German or Russian.

The B.S. major may lead to graduate work in geology, usually considered essential for a professional career. A properly planned program may lead to the M.S. degree one year after obtaining the B.S. Typical programs may be obtained from the adviser.

All students are required to take a six to eight weeks' summer field course or its equivalent. Alternative acceptable field training may be obtained by summer work at a marine biological station or with one of the geological surveys, or by summer field employment by a mining or oil company, with the approval of the staff.

Each autumn some students majoring in geology will be invited to attend a four-day field trip and should anticipate living expenses of about \$25.

15-040-101,102,103. **Introduction to Geology.** A survey of physical and historical geology. Lect. and Lab. 5 ug. cr. ea. Qtr. 101: Weathering; Mass wasting; Streams; Ground Water; Glaciers; Oceanography. 102: Volcanoes; Minerals; Rocks; Geologic time; Metamorphism; Sedimentation; Seismology; Mountain building; Ore deposits; Sea-floor spreading. 103: Stratigraphy; Paleontology; History of North America.

15-040-104,105,106. **Geology of Man's Environment.** An elementary course for those not expecting to major in earth sciences. Fulfills B.A. science requirement when taken with an elementary course in another science. 3 ug. cr. ea. Qtr.

15-040-151. **Urban Geology.** Basic principles and concepts in geology are applied to problems of the urban environment. 3 ug. cr. Aut. Qtr. Not open to Geology majors.

15-040-271. **Geologic Demonstration Trip.** A two-weeks' field trip. September 1973. One-hour conference weekly. 3 ug. cr. Aut. Qtr.

15-040-281. **Geology and Technology of Mineral Resources.** Geologic, environmental, economic and human factors in supplying growing population with essential earth materials; survey of Ohio's mineral industry. 3 ug. cr. Aut. Qtr.

15-040-282. **Geology of Economic Mineral Deposits.** The energy crisis: geology of present and future energy sources. Geology of essential metallic and industrial mineral deposits. 3 ug. cr. Win. Qtr.

15-040-289. **Principles of Oceanography.** The history of ocean basins, oceanic circulation, oceanic sediments, oceanic pollution and the atmospheric-oceanic system. 3 ug. cr. Spr. Qtr.

15-040-301, 302. **Mineralogy.** Crystallography, crystal chemistry, atomic structures, geochemistry, and systematics of the common minerals. 4 ug. cr. Aut., Win. Qtrs. Prereq.: College chemistry or permission of instructor.

15-040-321,322. **Historical Geology.** The physical and biological history of the earth with particular emphasis on North America. Field trips. 4 ug. cr. Aut., Win. Qtrs. Prereq.: Geol. 101-2-3.

15-040-331. **Elementary Structural Geology.** Description of tectonic structures. Laboratory methods in Structural Geology. Field trip. 3 ug. cr. Aut. Qtr.

15-040-405. **Principles of Geomorphology.** Fundamental concepts of land forms in terms of lithology, structure and geologic history. 3 ug. cr. Aut. Qtr. Prereq.: Geol. 331 or permission of instructor.

15-040-406. **Major Problems in Geology.** A study of current major problems relating to the interpretation of the origin of the earth's crust. 3 ug. cr. Spr. Qtr.

15-040-037,038,039. **Geology Seminar.** Expected of all juniors and seniors majoring in geology. No credit.

15-040-477. **Introduction to Field Geology.** An introduction to field mapping techniques, section measurement and geologic sampling. 3 ug. cr. Aut. Qtr.

15-040-501,502,503. **Elementary Petrology.** Aut. Qtr.: The polarizing microscope; Win., Spr. Qtrs.: The rock cycle, hand lens petrography, thin section studies of rocks. 3 ug. cr. ea. Qtr. Prereq.: Geol. 302.

15-040-521, 522, 523. **Paleontology.** Fundamental concepts; paleobiology and the geological occurrence and significance of fossil organisms. 3 ug. cr. ea. Qtr. Prereq.: Geol. 322, or permission of instructor.

15-040-525. **Advanced Historical Geology.** Evolution of the higher forms of plant and animal life and their significance in the interpretation of earth history. 4 ug. cr. Spr. Qtr.

15-040-531,532,533. **Stratigraphy and Sedimentation.** Physical and biological processes, environmental interpretation, facies analysis, stratigraphic analysis, basin analysis, and tectonics. 3 ug. cr. ea. Qtr.

15- 51. **Engineering Geology.** Physical properties of earth materials and their response to short term stresses. Field trips. 3 ug. cr. Aut. Qtr. Prereq.: Geol. 331, 405, or permission of instructor.

15-040-552. **Hydrogeology.** The geology of groundwater. A study of the occurrence, movement, and utilization of subsurface water. 3 ug. cr. Win. Qtr.

15-040-561,562. **Interpretation of Aerial Photographs.** 3 ug. cr. Win., Spr. Qtrs.

15-040-576. **Advanced Geology Field Trip.** A two weeks' field excursion during September 1973. Conferences and report in Autumn Quarter. 3 ug. cr. Aut. Qtr. Prereq.: Permission of instructor.

15-040-578. **World Physiography.** 3 ug. cr. Aut. Qtr.

15-040-580. **Advanced Geomorphology.** The physics and chemistry of processes of erosion, and equilibrium theories of landscape evolution. 3 ug. cr. Win. Qtr. Prereq.: Geol. 405 or permission of instructor.

15-040-611. **Seminar in Paleocology.** Survey and discussion of the literature on ecologic modeling and on paleoecologic interpretation. 3 ug. cr. Aut. Qtr.

15-040-613. **Ichology and Trace Fossils.** Survey of the literature and materials on biogenetic sedimentary features, their geologic occurrence, biologic significance, and interpretation. 3 ug. cr. Spr. Qtr.

15-040-621,622. **Introduction to Geochemistry.** Introduction to the application of chemical principles to various geologic problems. 3 ug. cr. Aut., Win. Qtrs.

15-040-631. **Clay Mineralogy I.** Structural mineralogy, polytypism, ion exchange properties and dehydration-rehydration reactions in clays. 3 ug. cr. Aut. Qtr.

15-040-632. **Clay Mineralogy II.** Geology of clays. Clay formation in soils, continental and marine environments. Problems in diagenesis. 3 ug. cr. Win. Qtr.

15-040-641, 642, 643. **Optical Mineralogy.** Crystal optics, use of the polarizing microscope for recognition of transparent substances in immersion media and thin sections. 3 ug. cr. ea. Qtr.

15-040-651,652. **Geological Data Analysis.** Application of statistics and computing to diverse geological and paleontological problems. Many case histories. 3 ug. cr. ea. Qtr. Aut., Win. Qtrs. Prereq.: Permission of instructor.

15-040-663. **Seminar in Igneous Petrology.** Major problems, current literature. 3 ug. cr. Spr. Qtr.

15-040-668. **Mineral Chemistry.** Crystal chemistry; mineral solution models; inter-and intracrystalline reactions; controls of mineral stability. 3 ug. cr. Win. Qtr. Prereq.: Permission of instructor.

15-040-669. **The Rock-forming Minerals.** The crystal chemistry and phase relations of the rock-forming minerals and their use as petrogenetic indicators. 3 ug. cr. Spr. Qtr. Prereq.: Geol. 668.

15-040-673. **Structural Geology II.** Interpretation of tectonic structures. 3 ug. cr. Win. Qtr. Prereq.: Geol. 331 or permission of instructor.

15-040-674,675,676. **Geology of Ore Deposits.** 3 ug. cr. ea. Qtr. Prereq.: Permission of instructor.

15-040-677. **Regional Geology.** (The evolution of North America.) 3 ug. cr. Aut. Qtr. Prereq.: Permission of instructor.

15-040-678. **Regional Geology.** (Mountain Belts outside North America.) 3 ug. cr. Spr. Qtr. Prereq.: Permission of instructor.

For Honors Courses, see Honors section of this **Bulletin**.

GERMANIC LANGUAGES AND LITERATURES

Acting Head: Professor Slessarev; Teaching Staff: Friedrichsmeyer, Glenn, Merkel, Stern; Harris, Richert; Abt; Carnes; Clark, Obrath, Smith.

German 101-2-3, 104-5-6, 201-2-3 and 204-5-6 will not count toward a major in German. German 231-2-3, 401-2-3 or equivalents, 437-8-9, shall be offered as a part of the requirement toward a major in German. In addition, German majors are expected to select German 171-2-3 as one of their elective courses in preparation for Part I (German Culture) of their Comprehensive Examinations.

All advanced courses in German, except Senior Readings (437-8-9), may be entered at the beginning of the Winter or Spring Quarter, with the instructor's permission. Students with previous German must take the placement test to be placed in the course indicated by their scores.

Related courses in the Department of English recommended for majors:

15-003-504,505,506. **Introduction to Folklore.** A survey of the forms and content of folklore with emphasis on oral, traditional narrative.

15-002-587,588. **Old Norse.** An introduction to the Old Norse language and literature.

Students of the German Department can participate in the Interdepartmental **Program in Comparative Literature**. For the requirements of this program see Professor Friedrichsmeyer, 741 Old Chemistry Building.

Linguistics: For Linguistic course offerings in German, see Linguistics section of this **Bulletin**.

The International Business Option is another interdisciplinary program, available to students in German. For details on the joint program see the description on page 28 of this **Bulletin**. Adviser for this International Business Option: Ms. Clark, 742 Old Chemistry Bldg.

Note: The language requirement may be satisfied in **one of three** ways. (1) By taking one or more nonelementary courses for a total of 9 credits. (2) By taking German 101-2-3 (3 hours per week), followed by German 201-2-3 or 204-5-6 (3 hours per week). The fulfillment of the requirement in this manner requires **two years** of study; the emphasis is placed on the acquisition of **reading skill** in German. (3) By taking German 104-5-6 (5 hours per week). The fulfillment of the requirement in this manner requires **one year** of study; the emphasis is placed upon the acquisition of **conversational skill** in German.