

1975-1976

UNIVERSITY OF CINCINNATI BULLETIN



1975-1976

DIVISION OF GRADUATE EDUCATION AND RESEARCH

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

128 Division of Graduate Education and Research

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. Prereq.: Math 107-8-9, or permission of instructor.

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. 2:00-5:00; Spr. Qtr. M 2:00-5:00.

15-041-791. **Regional Concept.** Seminar focusing on economic spatial systems in Latin America. 4 gr. cr. Aut. Qtr. 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.

15-041-795. **Contemporary Research Frontier.** Seminar. 4 gr. cr. Win. Qtr.

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

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 permission of instructor. 3 gr. cr. ea. Qtr. Hinman, Miller, Zannaras. (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.

Geology

Head: Kilinc; Teaching Staff: Briskin, Caster, De Jong, Durrell, Fleming, Grover, Huff, Jenks, 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

15-040-501, 502. **Petrology.** Hand lens petrography, thin section studies of common rocks. 3 gr. cr. Aut., Win. Qtrs. Larsen.

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

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.** utilization of subsurface water.

15-040-574. **Glacial Geology.**

15-040-576. **Advanced Geology.** Historical and regional geology.

15-040-580. **Advanced Geology.** theories of landscape evolution.

15-040-621, 622. **Introductory Geology.** various geologic problems.

15-040-631. **Clay Mineralogy.** cation-rehydration reactions in clays.

15-040-632. **Clay Mineralogy.** diagenesis. Problems in diagenesis.

15-040-641, 642, 643. **Optical Mineralogy.** of transparent substances.

15-040-648. **Thermodynamics.** to geological problems. 4 gr. cr.

15-040-651, 652. **Geologic Paleontology.** paleontological problems.

15-040-664. **Metamorphic Geology.** calculations, lab methods.

15-040-665. **Metamorphic Geology.**

15-040-666. **Seminar in Metamorphism.** Grover, Kilinc, Larsen.

15-040-668. **Mineral Chemistry.** reactions; controls of mineral stability.

15-040-669. **The Rock-Tectonics Connection.** use as petrogenetic indicators.

15-040-673. **Structural Geology.**

15-040-674, 675, 676. **Geology.**

15-040-677. **Regional Geology.**

15-040-678. **Regional Geology.**

Primarily for Graduate Students
15-040-701, 702, 703. **Advanced Sedimentology.** Spr. Qtr. Maynard, Pryor.

15-040-711. **Microplate Tectonics.** Briskin.

15-040-712. **Microplate Tectonics.** geologic-paleogeographic reconstructions.

15-040-731. **Geochemistry of Fluids.** fluids under metamorphic conditions.

15-040-751. **Seminar in Petrology.**

15-040-775. **Field Studies in Geology.** Spring vacation or summer break.

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.

15-040-574. Glacial Geology. 3 gr. cr. Aut. Qtr. Durrell.

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during the Summer of 1975. Historical and regional geology. Conferences and report in Aut. Qtr. 3 gr. cr. Aut. Qtr. Pryor.

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

15-040-648. Thermodynamics in Geological Processes. Principles of thermodynamics and their application to geological problems. 4 gr. cr. Aut. Qtr. Kilinc.

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

15-040-664. Metamorphic Petrology I. Principles and methods: minerals, phase relations, analysis and calculations, lab methods. 4 gr. cr. Aut. Qtr. Larsen.

15-040-665. Metamorphic Petrology II. Occurrence, genesis, petrography. 4 gr. cr. Win. Qtr. Larsen.

15-040-666. Seminar in Metamorphic Petrology. Major problems, current literature. 3 gr. cr. Spr. Qtr. Grover, Kilinc, Larsen.

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.

Primarily for Graduate Students

15-040-701, 702, 703. Advanced Sedimentology. Aut., Win. Qtrs.: Principles of physical and chemical sedimentology. Spr. Qtr.: Modern and ancient depositional environments. 4 gr. cr. ea. Qtr. Maynard, Potter, Pryor.

Seminar

15-040-711. Micropaleontology I. Biology, taxonomy, systematics of selected Protista. 3 gr. cr. Aut. Qtr. Briskin.

Seminar

15-040-712. Micropaleontology II. Biostratigraphy, chronostratigraphy, Holocene and Pleistocene paleoecologic-paleocirculation models. 3 gr. cr. Win. Qtr. Briskin.

15-040-731. Geochemistry of Hydrothermal Processes. Geochemistry of processes involving hydrothermal fluids under metamorphic and igneous conditions. 3 gr. cr. Win. Qtr. Kilinc.

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.

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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.

15-040-821. 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.

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. 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.

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.

15-040-891. Research — Geology Applied to Engineering. Credit arranged. Offered ea. Qtr.

15-040-892. Research — Geochemistry. Credit arranged. Offered ea. Qtr.

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 1975-1976: 561, 562, Interpretation of Aerial Photographs; 572, Physiography of Western U.S.; 573, Physiography of Eastern U.S.; 578, 579, World Physiography; 611, Seminar in Paleocology; 661, 662, Igneous Petrology; 663, Seminar in Igneous Petrology; 672, Elementary Structural Analysis; 681, Geochemistry of Natural Waters; 691, 692, The Solid Earth; 776, Field Studies in Igneous and Metamorphic Petrology; 814, 815, 816, Advanced Sedimentary Petrology; 873, Seminar in Economic Geology.

Germanic Languages and Literatures

Head: Slessarev; Director, Graduate Studies: Richert; Teaching Staff: Freund, Friedrichsmeyer, Galt, Glenn, Harris, Hermlin, Obrath, Richert, Smith, Stern, and adtl. staff. All located 730-742 Old Chem.

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., Spr. Qtrs. TTh 9.30-11.00. Staff.

15-010-533. Advanced Stylistics. 3 ug., 4 gr. cr.

15-010-551. Survey of German literature on the change of ideas and

15-010-552. Survey of German literature on Impressionism, Expressionism and Post-Romanticism

15-010-553. Survey of German literature on Impressionism, Expressionism and Post-Romanticism. 4 gr. cr. Spr. Qtr. MWF 11.00-12.00.

15-010-571. Methods of Teaching German. theories of language teaching. 4 gr. cr. Qtr. W 4:00-6:00. Galt.

15-010-572. Methods of Teaching German and suitable pedagogical methods. 4 gr. cr. Win. Qtr. W 6:10-7:10.

15-010-590. Linguistics and German literature. 4 gr. cr. Spr. Qtr. TTh 11.00-12.00.

For Graduate Students only
15-010-690. Methods of Teaching German of literary scholarship. 4 gr. cr.

15-010-652. Advanced German literature. cr. Aut. Qtr. TTh 2:00-3:30.

15-010-653. Advanced German literature. the arts. 4 gr. cr. Win. Qtr.

15-010-654. Advanced German literature. to the present. 4 gr. cr. Spr. Qtr.

15-010-701. Middle High German, the transition from Old High German to Middle High German.

15-010-702. Middle High German. Qtr. Tu 4:00-6:00.

15-010-703. Topics in Middle High German. poet will be read, discussed, and analyzed. required. 4 gr. cr. Spr. Qtr.

15-010-711. Topics in Middle High German. W 1:00-3:00. Hermlin.

15-010-737. Topics in Middle High German. works mirror the rural life.

15-010-747. Topics in Middle High German. with attention to other areas.

15-010-778. Literature of the Middle Ages. Hermlin.

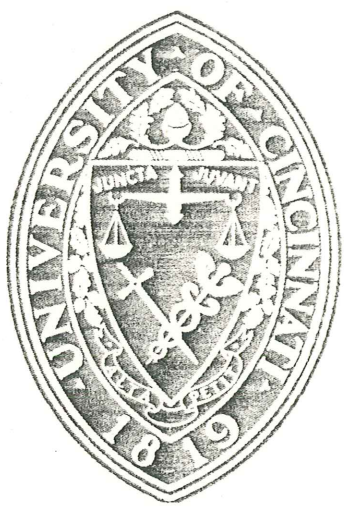
15-010-779. Das deutsche Mittelalter. from the history of the German people.

Pro-Seminars
15-010-852. Gunter. pro-seminar. 4 gr. cr. Aut. Qtr.

15-010-853. Klopstock. pro-seminar. 4 gr. cr. Aut. Qtr.

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1975-1976

McMICKEN COLLEGE OF ARTS AND SCIENCES

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Cincinnati, Ohio 45221
Telephone 513-475-8000

15-041-211. Geography of Latin America. Systematic topical and regional analysis of Central and South America. Economic and social geography stressed. 3 ug. cr. Spr. Qtr.

15-041-216. Geography of Europe. Systematic topical and regional analysis of Europe. 3 ug. cr. Win. Qtr.

15-041-241. Geography of Australia and the Southwest Pacific. Regional economic development in Australia, New Zealand, Melanesia; immigration policies; alternative urban futures; environmental management. 3 ug. cr. Win. Qtr.

Urban and Economic Geography

15-041-321. Urban Geography: Comparative. Comparative analysis of leading world cities in differing economies and cultures; the urban network of the United States. 3 ug. cr. Aut. Qtr.

15-041-322. Urban Geography: Historical. Origin, location, and evolution of cities. History of urban development from ancient times through the twentieth century. 3 ug. cr. Win. Qtr.

15-041-341. Economic Geography. Manufacturing, agriculture, and services as related to resources and location. Regional economic systems. Location theory. 3 ug. cr. Aut., Win. Qtrs.

15-041-560. Marketing and Transportation Geography. Concepts and techniques of economic and urban geography as applied to productive and service locations and spatial interaction. 3 ug. cr. Spr. Qtr. Prereq.: 341 or permission of instructor.

15-041-572. Urban Geography: Systematic. Central place theory, economic base study, form and function; the relation of theory to urban planning. 3 ug. cr. Spr. Qtr. Prereq.: Geog. 321 or 322 or permission of instructor.

Geographical Theory and Techniques

15-041-501, 502, 503. Problems in Geography. Individual research problems. Credit depends on amount of work completed. Offered ea. Qtr. Hours to be arranged.

15-041-574. Introductory Cartography. Map compilation, generalization, symbolization. Drafting and lettering techniques. Reproduction. Maps as a research and teaching tool. 3 ug. cr. Win. Qtr.

15-041-578. History and Philosophy of Geography. Growth of geographic thought from Greco-Roman to German, French, British, Russian, and American Schools with emphasis on contemporary problems. 3 ug. cr. Win. Qtr.

15-041-579. 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.

15-041-582. Contemporary Geographical Theory. Geography as a discipline; recent major conceptual statements in geography, analyzing meaning and significance to the field as well as relationships to other fields. 3 ug. cr. Aut. Qtr.

15-041-585, 586. Geographic Methods: Quantitative Techniques. Introduction to areal statistics, computer mapping, and computer use. 3 ug. cr. Aut., Win. Qtrs.

15-041-601, 602, 603. Field Projects. Execution of individual field projects under regular faculty supervision. Credit varies with work completed. Offered ea. Qtr. Hours to be arranged.

Geology

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

Entering freshmen intending to major in Geology may apply for the W. H. Bucher Scholarship (see page 21).

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 may 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, 301-2-3, 331, 405-6, 445, 501-2, 521-2-3, 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 321-2, 525 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-week 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 introductory 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 1975. 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 metals and industrial minerals. 3 ug. cr. Aut. Qtr. No prereq.

15-040-282. Geology and Technology of Energy Resources. A survey of energy problems: geology, distribution, consumption, conservation; alternate future sources. 3 ug. cr. Spr. Qtr. No prereq.

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. For non-science majors.

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.

15-040-303. Introduction to Optical Crystallography. Use of polarizing microscope for recognition of transparent minerals in immersion media. 3 ug. cr. Spr. Qtr.

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.

15-040-445. Quantitative Geological methods. The application of mathematical and computer techniques in the solution of geological problems. 3 ug. cr. Spr. Qtr.

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

15-040-487, 488, 489. Individual Work in Geology. Credit depends on amount of work done. May be entered any quarter. Staff.

15-040-501, 502. Elementary Petrology. Hand lens petrography, thin section studies of common rocks. 3 ug. cr. Aut., Win. Qtrs.

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.

15-040-551. 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.

15-040-574. Glacial Geology. 3 ug. cr. Aut. Qtr.

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during September 1975. Conferences and report in Autumn Quarter. 3 ug. cr. Aut. Qtr. Prereq.: Permission of instructor.

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.

15-040-621, 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.

15-040-648. Thermodynamics in Geological Processes. Principles of thermodynamics and their application to geological problems. 4 ug. cr. Aut. 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.

15-040-653. Megasedimentology. The study of on- and off-shore basins. Methods and principles; case histories and written reports. 3 ug. cr. Spr. Qtr. Prereq.: Geol. 531-2-3.

15-040-664. Metamorphic Petrology I. Principles and methods: minerals, phase relations, analysis and calculations, lab methods. 4 ug. cr. Aut. Qtr. Prereq.: 301-2-3 and 501-2.

15-040-665. Metamorphic Petrology II. Occurrence, genesis, petrography. 4 ug. cr. Win. Qtr. Prereq.: 664.

15-040-666. Seminar in Metamorphic Petrology. Major problems, current literature. 3 ug. cr. Spr. Qtr. Prereq.: 665.

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.: Geol. 302, 331. Prereq. or req.: Geol. 501-2.

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.

15-040-693. **Modern Concepts in Oceanography.** Water masses, surface and thermohaline circulation, oceanic-atmospheric interactions, productivity and marine life, deep-sea sediments and geological implications. 3 ug. cr. Spr. Qtr.

Germanic Languages and Literatures

Head: Professor Slessarev; Undergraduate Director: Obrath; Teaching Staff: Freund, Friedrichsmeyer, Galt, Glenn, Harris, Hermlin, Obrath, Richert, Slessarev, Smith, Stern, and additional staff.

German 101-2-3, 104-5-6, 201-2-3 and 204-5-6 will not count toward a major in German. All courses beyond these levels shall be offered as 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. Upon petition German 171-2-3 may be counted toward a major in German.

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.

The department has also established a second major in *German Studies* for which students must take 30 credits in the German Department and can acquire the other 24 credits in related courses in either Anthropology, Art History, Economics, Geography, History, Linguistics, Music History, Philosophy or Political Science. German 171-2-3 is strongly recommended. The selection of the related courses must be discussed with the German undergraduate adviser Karl W. Obrath, or the special adviser for German Studies, Alan Galt.

Students of the German Department can participate in the Interdepartmental *Program in Comparative Literature*. For the requirements of this program see Professor Obrath, 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 26 of this *Bulletin*. Adviser for this International Business Option: Mr. Gault, 742 Old Chemistry Bldg.

Note: The language requirement may be satisfied in *one of four* 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. (4) By taking German 107 (admission by permission of instructor only).

A Placement test will be required of all students who have taken two or more years of a modern foreign language and desire to continue that language in college for credit. The test is given prior to registration in this college. Such students will enroll for the language course indicated by their test scores, or, if such scores are satisfactory, may have the requirement waived.

15-010-101, 102, 103. **Elementary German.** This course followed by 201-2-3 or 204-5-6, will satisfy the language requirement. Some assignments require attendance in the language laboratory. 3 ug. cr. ea. Qtr.

15-010-104, 105, 106. **Elementary German with Conversation.** This course will satisfy the language requirement. Some assignments require attendance in the language laboratory. 5 ug. cr. ea. Qtr.

15-010-107. **Individualized Elementary German.** Program tailored to individual needs. Fulfills language requirement. 1-15 ug. cr. Offered ea. Qtr. May be repeated for a maximum of 15 cr. hrs. Adm. by permission of instructor.

15-010-111, 112. **Accelerated Beginning German.** (Equivalent of 101-2-3.) Computer-assisted German instruction in its beginning program, utilizing a course-writer. 5 ug. cr. Win. Qtr.; 4 ug. cr. Spr. Qtr.

15-010-201, 202, 203. **Intermediate German: General Readings.** Readings and discussions of German literature and culture, with grammar review. Open to students who have successfully completed German 101-2-3 or equivalent. Some assignments will require attendance in the language laboratory. 3 ug. cr. ea. Qtr. Not open to students who successfully completed 104-5-6.