UNIVERSITY OF CINCINNATI BULLETIN

1978-1979

DIVISION OF GRADUATE EDUCATION AND RESEARCH

Published by the University of Cincinnati
Office of the University Bulletin
118 French Hall
Cincinnati, Ohio 45221

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: Annis, Briskin, DeJong, Durrell, Grover, Huff, Jenks, Larsen, Maynard, Meyer, Nash, Potter, Pryor, Sunderman.

The Department offers work leading to the degrees of Master of Science (with or without thesis option) 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 the M.S. (thesis) and the Ph.D. is the satisfactory completion of a thesis or dissertation describing the results of student's research work. The non-thesis M.S. option — students not planning to work toward a doctorate may petition to enter the non-thesis Master's program. This requires (1) 15 to 20 credit hours of approved, advanced work in an allied discipline, and (2) completion of an approved research project under the supervision of a faculty member.

A reading knowledge of one foreign language, preferably French, German or Russian, is required for the Ph.D.

All graduate students are required to take Geology 651.

All graduate students are required to participate in the annual four-day departmental field trip and should anticipate expenses of about $50.

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. Prereq.: 301-2-3.

15-040-521, 522. Paleontology. Fundamental concepts; paleobiology and the geological occurrence and significance of fossil organisms. 3 gr. cr. Aut., Win. Qtrs. Meyer.

15-040-525. Advanced Historical Geology. Evolution of higher forms of plant and animal life and their significance in interpretation of earth hisory. 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.

15-040-561. Interpretation of Aerial Photos. 3 gr. cr. Win. Qtr. Durrell

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during the Summer of 1978. Historical and regional geology. Conferences and report in Aut. Qtr. 3 gr. cr. Pryor.

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

15-040-581. Field Studies in Structural Geology. Reading in Win. Qtr., and 10-day field trip in Spring break. 3 gr. cr. Win. Qtr. Prereq.: Perm. of instr. De Jong.

15-040-627, 628. Solution Geochemistry. Principles of solution chemistry as applied to sedimentary, hydrothermal and solid state processes. 3 gr. cr. Win., Spr. Qtrs. Prereq.: Geol. 548 or equivalent or permission of instructor. Grover, Kilinc, Maynard.

15-040-631. Clay Miner
dehydration-rehydration

15-040-632. Clay Mineral
ments. Problems in diage

15-040-651, 652. Geologi
paleontological problems

15-040-661. Igneous Petr
tions, lab methods. 4 gr.

15-040-662. Igneous Petr
Geol. 661 or permission

15-040-663. Seminar in Ig
rials to read and discuss.

15-040-673. Advanced Str

15-040-675. Problems of G
Annis.

15-040-677. Regional Geo

15-040-678. Regional Geo

15-040-691. The Solid Ear
equilibria of rock systems

15-040-692. Petrogenesis
rological problems. 3 gr.

15-040-693. Modern Conc
oceanic-atmospheric inte
cations. 3 gr. cr. Spr. Qtr.

15-040-695, 696. Paleoec
Recent marine ecological
Briskin, Meyer.

15-040-697, 698. Micropal
record; functional morpho
Briskin.

Primarily for Graduate St

15-040-741. Optical Cryst
substances in immersion

15-040-775. Field Studies
Spring vacation or in Jun

15-040-780. Methods of G

15-040-814, 815. Advanc
rocks, composition, origin

15-040-816. Sedimentary
posits. 3 gr. cr. Spr. Qtr. M

15-040-821, 822, 823. Sem

15-040-844. Seminar in G
15-040-874, 875, 876. Univ
15-040-881. Research —
15-040-882. Research —
15-040-883. Research —
15-040-884. Research —
15-040-885. Research —
15-040-886. Research —

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.

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

15-040-661. Igneous Petrology I. Principles and methods: petrography, minerals, phase relations, calculations, lab methods. 4 gr. cr. Aut. Qtr. Prereq.: Geol. 303, 501, 502 or equivalent. Larsen.

15-040-662. Igneous Petrology II. Occurrence, genesis, petrography of suites. 4 gr. cr. Win. Qtr. Prereq.: Geol. 661 or permission of instructor. Larsen.

15-040-663. Seminar in Igneous Petrology. Major problems from current literature. Group selects materials to read and discuss. 3 gr. cr. Spr. Qtr. Larsen.

15-040-673. Advanced Structural Geology. Interpretation of tectonic structures. 3 gr. cr. Win. Qtr. DeJong.

15-040-675. Problems of Ore Formation. 3 gr. cr. Win. Qtr. Prereq.: Geol. 475, 501, 502 or equivalent. Jenks, Annis.

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. The Solid Earth. Physical and chemical processes of the earth's upper mantle and crust. Phase equilibria of rock systems. 3 gr. cr. Aut. Qtr. Kilinc.

15-040-692. Petrogenesis. Applications of thermodynamics and phase equilibria to the solution of petrological problems. 3 gr. cr. Win. Qtr. Prereq.: Geol. 648 or equivalent. Kilinc.

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 gr. cr. Spr. Qtr. Briskin.

15-040-695, 696. Paleoecology. Fundamental ecological processes. Physical and chemical parameters. Recent marine ecological models and ancient analogs. 3 gr. cr. Aut., Win. Qtrs. Prereq.: Geol. 521, 522. Briskin, Meyer.

15-040-697, 698. Micropaleontology. Lecture and seminar approach. Selected key species of the geologic record; functional morphology, distribution, paleoecology, geologic implications. 4 gr. cr. Aut., Win. Qtrs. Briskin.

Primarily for Graduate Students

15-040-741. Optical Crystallography. Use of the polarizing microscope for recognition of transparent substances in immersion media. 4 gr. cr. Spr. Qtr. Sunderman.

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.

15-040-780. Methods of Geological Instruction. Credits to be arranged. Offered ea. Qtr.

15-040-814, 815. Advanced Sedimentary Petrology. Advanced study of major groups of sedimentary rocks, composition, origins, geological interpretations. 4 gr. cr. Aut., Win. Qtrs. Potter, Pryor.

15-040-816. Sedimentary Ore Deposits. Petrology, geochemistry and origin of low-temperature ore deposits. 3 gr. cr. Spr. Qtr. Maynard.

15-040-821, 822, 823. Seminar in Megascopic Paleontology. 3 gr. cr. ea. Qtr.

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 — Sedimentation. 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.

Germanic Languages and Literatures

Head: Slessarev; Director, Graduate Studies: Friedrichsmeyer; Teaching Staff: Friedrichsmeyer, Galt, Glenn, Harris, Lewis, Obrath, Richert, Schade, Strodach, Torbruegge, Barner, and addl. 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-year sequence. For full program descriptions contact the Department.

For Advanced Undergraduate and Graduate Students

15-010-531, 532, 533. Advanced Stylistics. Topical conversations for students wishing greater perfection in spoken and written German with emphasis on stylistics. 3 ug., 4 gr. cr. ea. Qtr. TTh 9:30-11:00. Friedrichsmeyer, Richert, Slessarev.

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 of Teaching the German Language. Critical analysis and the application of current theories of language teaching on high-school and college levels. Equiv. to Ed. 303. 3 ug., 4 gr. cr. Aut. Qtr. W 4:00-6:00. Obrath.

15-010-752. German Phonetics. Taught in English. Articulatory treatment of contrasts between English and German. 4 gr. cr. Win. Qtr. TTh 11:00-12:30. Strodach.

15-010-753. Structure of Modern German. Descriptive analysis of modern German grammar. Taught in English. 4 gr. cr. Spr. Qtr. TTh 11:00-12:30. Strodach.

For Graduate Students only:

15-010-690. Methods of Research and Bibliography. (Eve.) A general introduction into the techniques of literary scholarship. 4 gr. cr. Win. Qtr. Th 6:40-9:10. Harris.

15-010-659. Advanced Area Studies: "Jugendstil" in German Art and Literature. Philosophical background and artistic expression of a movement. 4 gr. cr. Spr. Qtr. TTh 2:00-3:30. Harris.

15-010-705. Topics: The Baroque in Germany. An examination of the major works of Andreas Gryphius. 4 gr. cr. Aut. Qtr. W 1:00-3:00. Schade.

15-010-728. Topics in Classical German Literature. Specific subject to be announced. 4 gr. cr. Aut. Qtr. TTh 2:00-3:30. Barner.

15-010-749. Topics: Modern Poetry. Analysis of major contemporary poets and criticism devoted to their works. 4 gr. cr. Spr. Qtr. W 1:00-3:00. Glenn.

15-010-786. German Film and German Literature. Discussion of two genres as art forms. 4 gr. cr. Aut. Qtr. TBA. Torbruegge.

15-010-787. Group 47. Discussions of writers of Group 47. 4 gr. cr. Win. Qtr. M 2:00-4:00. Barner.

15-010-788. Kafka. Discu

15-010-765. History of th
an introduction to the h

15-010-766. History of th
Win. Qtr. Tu 4:00-6:00. F

15-010-767. Topics in Pl
German *maere, schwank*

15-010-858. Pro-Semina
Qtr. Th 4:00-6:00. Siessa

15-010-859. Thomas Ma
discussed. In the nature

Seminars:
15-010-917, 918. Stifter.
4 gr. cr. ea. Qtr. Aut., Wi

15-010-919, 920. Death a
sion of a theme. In the r

Research
15-010-771. Masters' Th
Graduate Director.

15-010-971. Doctoral Res
Graduate Director.

15-010-988. Directed Re
Spr. Permission of Grad

15-010-997. Special Prob
Graduate Director.

Scandinavian Studies:
15-010-601, 602, 603. Ele

15-010-604, 605, 606. In
literature and culture, wi
for work beyond the lan

Language Training Cou
15-010-001, 002, 003. Ge
knowledge of German. N

15-010-011-012, 013. Ge
more years of College G
ment. No credit. Fee at t

Head: Daniels; Teaching
Engberg, Kafker, Laux,
Schrier, Henry Shapiro,

This department offers
Doctor of Philosophy.

A candidate for the degr
completed in one acade
requires acceptance into
work beyond the baccal

The degree of Doctor of
tion of proficiency in for
tion precedes work on th

UNIVERSITY OF CINCINNATI BULLETIN

1978-1979

McMICKEN COLLEGE OF ARTS AND SCIENCES

Published by the University of Cincinnati
Office of the University Bulletin
118 French Hall
Cincinnati, Ohio 45221

15-041-251. Geography for Travelers. Designed for people who might be traveling in the U.S. or in foreign countries. In addition to general travel-related material, several geographic tools, techniques, and concepts will be discussed that might be of use to the traveler. 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. Qtr.

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.: Geo. 321 or 322 or permission of instructor.

15-041-573. The Urban Habitat. Modern North American cities as physical and social environments at various scales. Ecological problems of the city as a spatial system. 3 ug. cr. Aut. Qtr.

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. 5 studio hours per week. 3 ug. cr. Win., Spr. Qtrs.

15-041-577. Historical and Cultural Geography. Modern concepts of cultural geography: origins, dispersals, cultural regions. 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. Spr. 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. Win. 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: Annis, Briskin, DeJong, Durrell, Grover, Huff, Jenks, Johnson, Larsen, Maynard, Meyer, Nash, Potter, Pryor, Sunderman.

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

The department also has two Amoco Scholarships, covering the academic period of 1976-77 through 1980-81.

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/her program Geol. 271, 301-2-3, 331, 405-6, 501-2, 521-2, Chem. 101-2-3, 111-2-3, 9 to 14 credits of calculus and 15 credits of physics. 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 or 531-2, 525 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. Information on graduate programs may be obtained from the Director of Graduate Studies.

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 may be included in a four-day field trip providing space is available, and should anticipate living expenses of about $50.

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.

15-040-107. Geology from Space. Major geologic concepts are explained with the aid of the LANDSAT photographs. 3 ug. cr. Aut. Qtr.

15-040-108. Geology of Greater Cincinnati. A survey of the earth history of the Cincinnati region for the past 450 million years. 3 ug. cr. Win. Qtr.

15-040-109. Geology of National Parks. A survey based on illustrated lectures and map-reading of selected national parks whose main features include geologic phenomena, e.g., Grand Canyon, Yellowstone and Yosemite National Parks. 3 ug. cr. Spr. Qtr.

15-040-111. Geology Laboratory for Pre-service Elementary and Secondary Science Teachers. Laboratory on methods of earth science instruction. Must be taken concurrently with Geol. 104 or 106. 1 ug. cr. Aut. & Spr. Qtrs.

15-040-261. Topics in Geology — Oceanography. The history of ocean basins, oceanic circulation, oceanic sediments, oceanic pollution and the atmospheric oceanic system. 3 ug. cr. Aut. Qtr. For non-science majors.

15-040-262. Topics in Geology — Plate Tectonics. The revolutionary concept of Plate Tectonics and its implications as to distribution of earthquakes, volcanoes, hydrocarbons and metallic mineral deposits. 3 ug. cr. Win. Qtr.

15-040-263. Topics in Geology — Energy. A survey of energy problems: geology, distribution, consumption, conservation; alternate future sources. 3 ug. cr. Spr. Qtr. No Prereq.

15-040-271. Geologic Demonstration Trip. A two-weeks field trip. September 1978. One-hour conference weekly and final report. 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.

15-040-301, 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. 4 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.

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

15-040-374. Geology for Engineers. Physical geology pertinent to engineers. 4 ug. cr. Win. & Spr. Qtr

15-040-405. Principles of Geomorphology. Fundamental concepts of land forms in terms of litholo 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 the origin of the earth's crust. 3 ug. cr. Spr. Qtr.

15-040-421, 422. Introduction to Geochemistry. Introduction to the application of chemical principles various geologic problems. 3 ug. cr. Aut., Win. Qtrs. Prereq.: Chem. 106.

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

15-040-474, 475. Geology of Ore Deposits. 3 ug. cr. Aut., Win. Qtrs. Prereq.: Geol. 301, 302, 331.
15-040-476. Geology of Industrial Mineral Deposits. 3 ug. cr. Spr. Qtr.

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

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

15-040-501, 502. Elementary Petrology. Hand lens petrography, thin section studies of common rocks. ug. cr. Aut., Win. Qtrs. Prereq.: Geol. 301-2-3.

15-040-521, 522. Paleontology. Fundamental concepts; paleobiology and the geological occurrence an significance of fossil organisms. 3 ug. cr. Aut. Qtr.

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

15-040-531, 532, 533. Stratigraphy and Sedimentation. Physical and biological processes, environmenta 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.

15-040-561. Interpretation of Aerial Photos. 3 ug. cr. Win. Qtr.

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during September 1978. Confer ences 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 equilib rium theories of landscape evolution. 3 ug. cr. Win. Qtr. Prereq.: Geol. 405 or permission of instructor.

15-040-581. Field Studies in Structural Geology. Reading in Win. Qtr., and 10-day field trip in Spring break. 3 ug. cr. Win. Qtr. Prereq.: Permission of instructor.

15-040-627, 628. Solution Geochemistry. Principles of solution chemistry as applied to sedimentary, hyd rothermal and solid state processes. 3 ug. cr. Win., Spr. Qtrs. Prereq.: Geol. 648 or equivalent or permission of instructor.

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 environ ments. Problems in diagenesis. 3 ug. cr. Win. 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.

15-040-661. Igneous Petrology I. Principles and methods: petrography, minerals, phase relations, calcula tions, lab methods. 4 ug. cr. Aut. Qtr. Prereq.: Geol. 303, 501, 502 or equivalent.

15-040-662. Igneous Petrology II. Occurrence, genesis, petrography of suites. 4 ug. cr. Win. Qtr. Prereq.: Geol. 661 or permission of instructor.

15-040-663. Seminar in Igneous Petrology. Major problems from current literature. Group selects materials to read and discuss. 3 ug. cr. Spr. Qtr.

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

15-040-675. Problems of Ore Formation. 3 ug. cr. Win. Qtr. Prereq.: Geol. 475, 501, 502 or equivalent.

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.

15-040-691. The Solid Earth. Physical and chemical processes of the earth's upper mantle and crust. Phase equilibria of rock systems. 3 ug. cr. Aut. Qtr.

15-040-692. Petrogenesis. Applications of thermodynamics and phase equilibria to the solution of petrological problems. 3 ug. cr. Win. Qtr. Prereq.: Geol. 648 or equivalent.

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.

15-040-695, 696. Paleoecology. Fundamental ecological processes. Physical and chemical parameters. Recent marine ecological models and ancient analogs. 3 ug. cr. Aut., Win. Qtrs. Prereq.: Geol. 521, 522.

15-040-697, 698. Micropaleonotology. Lecture and seminar approach. Selected key species of the geologic record: functional morphology, distribution, paleoecology, geologic implications. 4 ug. cr. Aut., Win. Qtr.

Germanic Languages and Literatures

Head: Professor Slessarev; Undergraduate Director: Obrath; Teaching Staff: Friedrichsmeyer, Galt, Glenn, Harris, Lewis, Obrath, Richert, Schade, Slessarev, Strodach, Torbruegge, Zeman, and additional staff.

Two majors are available: a major in ***German,*** which emphasizes language and literature (54 credit hours) and which culminates in a Senior Comprehensive Examination; a major in ***German Studies,*** emphasizing contemporary aspects of the German-speaking world and requiring a senior paper.

Students majoring in German Studies must complete at least the following courses within the department: German 231-2-3, 234-5-6, 237-8-9, and 331-2-3. The balance of the major credits may include up to 18 credits in approved courses from no more than two of the following fields: Anthropology, Art History, Economics, Geography, History, Linguistics, Music History, Philosophy, Political Science. These courses must pertain to the German-speaking world, and should provide background for the senior paper. (Literature courses are strongly recommended.) Acceptance into this Program must be approved by the adviser.

German 101-2-3, 104-5-6, 107, 111-2, 121-2-3, 181-2-3, 201-2-3, 204-5-6, 207-8-9, 221-2-3, 281-2-3 do not count toward either major.

Students of the German Department can participate in various Interdepartmental Programs: The ***Comparative Literature Program,*** the ***Linguistics Program,*** and the ***Arts and Sciences 4A Program.*** For the requirements of these programs see Professor Obrath, 740 Old Chemistry Building.

The International Business Option is another interdisciplinary program, available to students in German. For details on the joint program see the description under Special Programs in this *Bulletin.* Adviser for this International Business Option: Professor Galt, 740 Old Chemistry Building.

Professional Practice (Co-op) Program for German Majors.
German majors who select a program of study with business option may be eligible for participation in the Professional Practice Program. Students registering for the program participate in the National Work-Study Program in Germany after the sophomore year, followed by alternating study and work quarters with business firms in Germany and the U.S.

Students who successfully complete the five-year program receive a B.A. in German, a Certificate in International Business, and a Certificate of Professional Practice. Professional Practice I, 15-000-271, must be taken prior to enrollment. For requirements, see Mrs. Daley, Career Dynamics Center.