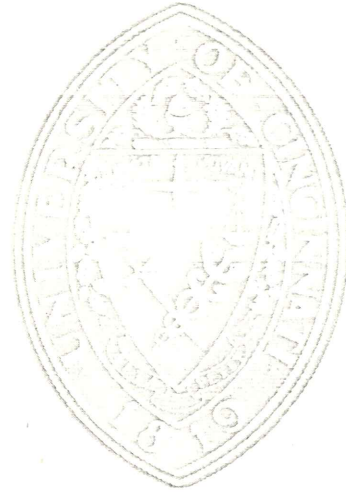


Year 1976-1977

UNIVERSITY OF CINCINNATI BULLETIN



1976-1977

**DIVISION OF
GRADUATE EDUCATION
AND RESEARCH**

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

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.

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.

15-041-797. **Seminar in Graduate Research II.** Research design; preparation of thesis or dissertation proposal. 4 gr. cr. Spr. Qtr.

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. (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.

15-041-878. **Seminar: Growth of Geographic Thought.** An examination of the history, philosophy, and sociology of the discipline for advanced graduate students. 4 gr. cr. Win. Qtr.

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

Geology

Head: Killinc; Teaching Staff: Brisikin, Caster, De Jong, Durrell, Grover, Huff, Jenks, Larsen, Maynard, Meyer, 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 651-652.

All graduate students are required to participate in the annual four-day departmental field trip and should anticipate living 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.

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

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.

Topics in Advanced Structural Geology

136 Division of Graduate Education and Research

- 15-040-561. Interpretation of Aerial Photos. 3 gr. cr. Aut. Qtr. Durrell
- 15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during the Summer of 1976. 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.
- 15-040-627, 628. Solution Geochemistry. Principles of solution chemistry as applied to geologic problems in sedimentary, hydrothermal, and solid state processes. 3 gr. cr. Win., Spr. Qtrs. Prereq.: Geol. 648 or equivalent or permission of instructor. Grover, Kilinc, 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.
- 15-040-651, 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. 3 gr. cr. Aut. Qtr. Prereq.: Geol. 303, 501, 502 or equivalent. Larsen.
- 15-040-662. Igneous Petrology II. Occurrence, genesis, petrography of suites. 3 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. Grover, Kilinc, Larsen.
- 15-040-673. Structural Geology II. 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.
- 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. Paleocology. 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. Micropaleontology of the Paleozoic Era. Survey of selected Paleozoic microfossils. Evolution, biostratigraphic distribution, paleoecological significance and geologic implications. 4 gr. cr. Aut. Qtr. Briskin.
- 15-040-698. Micropaleontology of the Mesozoic and Cenozoic Eras. Survey of selected Mesozoic and Cenozoic microfossils. Evolution, biostratigraphic distribution, paleoecological significance and geologic implications. 4 gr. cr. Win. Qtr. Briskin.
- Primarily for Graduate Students*
- 15-040-731. Geochemistry of Hydrothermal Processes. Geochemistry of processes involving hydrothermal fluids under metamorphic and igneous conditions. 3 gr. cr. Win. Qtr. Kilinc.
- 15-040-741. 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.

15-040-778. Field Studies in S
Report. 2 gr. cr. DeJong.

15-040-780. Methods of Geolo

15-040-814, 815, 816. Advance
rocks, composition, origins, ge

15-040-821. Seminar in Paleo

15-040-822, 823. Seminar in
desirable. 3 gr. cr. Win., Spr.

15-040-844. Seminar in Geom

15-040-874, 875, 876. Univers

15-040-881. Research — Spec

15-040-882. Research — Mine

15-040-883. Research — Struc

15-040-884. Research — Petro

15-040-885. Research — Econ

15-040-886. Research — Geon

15-040-887. Research — Sedim

15-040-888. Research — Strat

15-040-889. Research — Clay

15-040-890. Research — Geop

15-040-891. Research — Geol

15-040-892. Research — Geoc

15-040-893. Master's Thesis R

15-040-971. Doctoral Disserta

required.

Head: Slessarev; Director, Gra
Jeziorkov ski, Lewis, Obrath, I
730-742 Old Chem.

Students electing work in this
or its equivalent. For precise
offers work leading to the deg
in Germanic Languages and Li
and junior college teachers. It
earn their teaching certificate t
contact the Department.

For Advanced Undergraduate
15-010-531, 532, 533. Advan
wishing greater perfection in
gr. cr. ea. Qtr. Aut., Win., Spr

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

Structural
Geology
search

all
 excursion during the Summer of 1976.
 3 gr. cr. Aut. Qtr. Pryor.
 of processes of erosion; equilibrium
 ministry as applied to geologic problems
 Win., Spr. Qtrs. Prereq.: Geol. 643 or
 on exchange properties and dehydra-
 soils, continental and marine environ-
 ps, computing to diverse geological,
 Potter.
 hy, minerals, phase relations, calcula-
 or equivalent. Larsen.
 y of suites. 3 gr. cr. Win. Qtr. Prereq.:
 rent literature. Group selects materials
 res. 3 gr. cr. Win. Qtr. DeJong.
 : Geol. 475, 501, 502 or equivalent.
 3 gr. Aut. Qtr. DeJong.
 (rica.) 3 gr. cr. Spr. Qtr. DeJong.
 the earth's upper mantle and crust.
 e equilibria to the solution of petrologi-
 iline
 surface and thermohaline circulation,
 sea sediments and geological implica-
 . Physical and chemical parameters.
 t. Win. Qtrs. Prereq.: Geol. 521, 522.
 sted Paleozoic microfossils. Evolution,
 implications. 4 gr. cr. Aut. Qtr. Briskin.
 as. Survey of selected Mesozoic and
 eological significance and geologic
 ry of processes involving hydrothermal
 . Kilinc.
 cope for recognition of transparent
 onments. 10 to 14 day field trip during

- 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. Maynard, Potter, Pryor.
- 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 — 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: Richert; Teaching Staff: Friedrichsmeyer, Galt, Glenn, Harris, Jeziorkov ski, Lewis, Obrath, Richert, Schade, Smith, Strodach, Torbruegge, and addl. staff. All located 730-742 Old Chem.

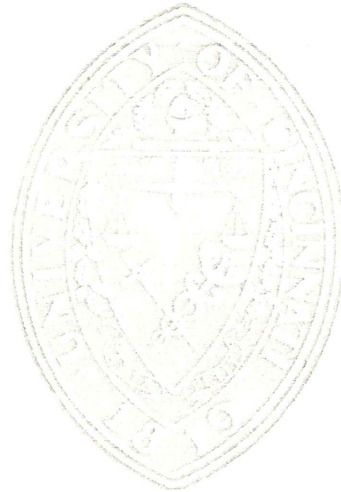
Students electing work in this department should have completed an undergraduate major in German or its equivalent. For precise requirements consult our *Guidelines to Graduate Studies*. This department offers work leading to the degrees of Master of Arts, Master of Arts in Teaching and Doctor of Philosophy 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 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., Spr. Qtrs. TTH 9:30-11:00. Staff.

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. Lewis.

UNIVERSITY OF CINCINNATI BULLETIN



1976-1977

McMICKEN COLLEGE OF ARTS AND SCIENCES

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

SUMMER SESSION (1977)
Day (Terms — 3½ weeks each)
First June 20 — July 12
Second July 13 — Aug. 3
Third Aug. 4 — Aug. 25
Quarter June 20 — Aug. 25

Evening (Five weeks each)
First June 20 — July 21
Second July 25 — Aug. 25
Quarter June 20 — Aug. 25
Commencement Aug. 26

*Additional calendar items relating to a specific college schedule will be found in Part 2 of the Bulletin of that college.
Calendars of the Evening College and the Summer Session will be found in those Bulletins.

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, Grover, Huff, Jenks, Larsen, Maynard, Meyer, 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, 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.

15-040-271. **Geologic Demonstration Trip.** A two-weeks' field trip. September 1976. 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. **Mineral Systematics.** Systematics of the common minerals. 3 ug. cr. ea. Qtr. of instructor.

15-040-303. **Introduction to Mineralogy.** Introduction to transparent minerals in thin section. 3 ug. cr. Spr. Qtr.

15-040-321, 322. **Historical Geology.** History of geology with emphasis on North America. 3 ug. cr. ea. Qtr.

15-040-331. **Elementary Structural Geology.** Field and laboratory work. 3 ug. cr. Spr. Qtr.

15-040-405. **Principles of Structural Geology.** Structure and geologic history. 3 ug. cr. Spr. Qtr.

15-040-406. **Major Problems in Geology.** Major problems of the origin of the earth. 3 ug. cr. Spr. Qtr.

15-040-421, 422. **Introduction to Geology.** Introduction to various geologic problems. 3 ug. cr. ea. Qtr.

15-040-445. **Quantitative Methods in Geology.** Quantitative methods in the solution of geologic problems. 3 ug. cr. Spr. Qtr.

15-040-474, 475. **Geology of the Earth's Crust.** Geology of the earth's crust. 3 ug. cr. ea. Qtr.

15-040-476. **Geology of the Earth's Crust.** Geology of the earth's crust. 3 ug. cr. ea. Qtr.

15-040-477. **Introduction to Mineralogy.** Introduction to mineralogy and geologic sampling. 3 ug. cr. Spr. Qtr.

15-040-487, 488, 489. **Introduction to Mineralogy.** Introduction to mineralogy. 3 ug. cr. ea. quarter. Staff.

15-040-501, 502. **Elementary Mineralogy.** Elementary mineralogy. 3 ug. cr. Aut., Win. Qtrs.

15-040-521, 522. **Paleontology.** Paleontology: significance of fossil organisms. 3 ug. cr. ea. Qtr.

15-040-525. **Advanced Paleontology.** Advanced paleontology: significance in the interpretation of the geologic record. 3 ug. cr. Spr. Qtr.

15-040-531, 532, 533. **Stratigraphy.** Stratigraphy: interpretation, facies analysis. 3 ug. cr. ea. Qtr.

15-040-551. **Engineering Geology.** Engineering geology: stresses. Field trips. 3 ug. cr. Spr. Qtr.

15-040-561. **Interpretation of Geologic Maps.** Interpretation of geologic maps. 3 ug. cr. Spr. Qtr.

15-040-576. **Advanced Geology.** Advanced geology: essays and report in Aut. Qtr.

15-040-580. **Advanced Geology.** Advanced geology: theories of landscape evolution. 3 ug. cr. Spr. Qtr.

15-040-627, 628. **Sedimentation.** Sedimentation: in sedimentary, hydrothermal, and metamorphic equivalent or permission. 3 ug. cr. ea. Qtr.

15-040-631. **Clay Mineralogy.** Clay mineralogy: rehydration reactions in clays. 3 ug. cr. Spr. Qtr.

15-040-632. **Clay Mineralogy.** Clay mineralogy: problems in diagenesis. 3 ug. cr. Spr. Qtr.

Geology

bought from Greco-Roman to
n con prary problems. 3

ds and techniques, including
areas. 3 ug. cr. Spr. Qtr.

e; recent major conceptual
well as relationships to other

to areal statistics, computer

er regular faculty supervision.

Durrell, Grover, Huff, Jenks,

ucher Scholarship (see page

who have completed 104-5-6

ram Geol. 271, 301-2-3, 331,
s and 15 credits of physics.
credits in advanced courses
77 where feasible. Students
foreign language, preferably

essential for a professional
r of Graduate Studies.

or i uivalent. Alternative
olog station or with one
l company, with the approval

day field trip providing space

historical geology. Lect. and
ter; Glaciers; Oceanography.
ation; Seismology; Mountain
History of North America.

urse for those not expecting
with an elementary course in

r 1976. One-hour conference

nvironmental, economic and
minerals. 3 ug. cr. Aut. Qtr.

energy problems: geology,
Spr. Qtr. No prereq.

oceanic circulation, oceanic
r. Spr. Qtr. For non-science

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. 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.

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

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

15-040-474, 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 measurement 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 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. 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.

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

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during September 1976. 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.

15-040-627, 628. Solution Geochemistry. Principles of solution chemistry as applied to geologic problems in sedimentary, hydrothermal 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 environments. 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, calculations, lab methods. 3 ug. cr. Aut. Qtr. Prereq.: Geol. 303, 501, 502 or equivalent.

15-040-662. **Igneous Petrology II.** Occurrence, genesis, petrography of suites. 3 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. **Structural Geology II.** 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. **Micropaleontology of the Paleozoic Era.** Survey of selected Paleozoic microfossils. Evolution, biostratigraphic distribution, paleoecological significance and geologic implications. 4 ug. cr. Aut. Qtr.

15-040-698. **Micropaleontology of the Mesozoic and Cenozoic Eras.** Survey of selected Mesozoic and Cenozoic microfossils. Evolution, biostratigraphic distribution, paleoecological significance and geologic implications. 4 ug. cr. Win. Qtr.

Germanic Languages and Literatures

Head: Professor Slessarev; Undergraduate Director: Obrath; Teaching Staff: Friedrichsmeyer, Galt, Glenn, Harris, Jeziorowski, Lewis, Obrath, Richert, Schade, Slessarev, Smith, Strodach, Torbruegge, 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 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 Linguistics

The International Business Administration Program. For details on the joint program see the International Business Option: Mr. Galt.

The A&S Coop Program. 15-000-271 must be taken

Note: The language requirement (one elementary course per week), followed by two intermediate courses (one per week) of the requirement in the area of *reading skill* in German and one of the requirement in the area of *conversational skill* in German.

A Placement test will be given to determine language and desire to study in this college. Such scores are satisfactory if such scores are satisfactory.

15-010-101, 102, 103. Elementary language requirement. See

15-010-104, 105, 106. Elementary language requirement. Some assistance

15-010-107. Individualized instruction. 1-15 ug. cr. Prereq.: Permission of instructor.

15-010-111, 112. Accelerated instruction in its beginning

15-010-121, 122, 123. Elementary language requirement of students in CCM. 3 ug. cr.

15-010-151, 152, 153. Elementary language requirement. Some assistance

15-010-201, 202, 203. Elementary language and culture, with 101-2-3 or equivalent. 3 ug. cr. ea. Qtr. Not open to students

15-010-204, 205, 206. Intermediate language and culture, with exposure to guest lecturers

15-010-251, 252, 253. Intermediate language and culture, with 101-2-3 or equivalent. 3 ug. cr. ea. Qtr.

15-010-231, 232, 233. Elementary German at the beginning of the practical correspondence

15-010-171. Survey of German language, structure, philosophical

15-010-172. Survey of German language from the Age of Enlightenment

15-010-173. Survey of German language dismantling between 1900

15-000-271. Professional language performance, realities of