

nic 1972-1973

9:00 a.m.-3:00 p.m.

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and Sat., Dec. 9.

Nov. 23-26.
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9:00 a.m.-3:00 p.m.

and Sat., Feb. 24.

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9:00 a.m.-3:00 p.m.
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amer School.

UNIVERSITY OF CINCINNATI BULLETIN

Announcement

of



Division of Graduate Studies

1972-1973

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

15-041-810. Research Orientation. For Ph.D. students. Designed to facilitate research specialization. 4 gr. cr. Win. Qtr. Mr. Stafford.

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. For advanced graduate students especially Ph.D. students. Admission only by permission of instructor. 3 gr. cr. ea. Qtr. Messrs. Hinman, Miller, Ryan. (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. Staff.

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

Courses Omitted in 1972-1973: 532-3, Advanced Physical Geography; 675, Historical Geography of U.S.; 721, Modern Concepts in Regional Geography; 730, Australia and the Southwest Pacific; 771, Seminar in Graduate Research; 772, Seminar: Urban Blight; 773, Seminar in Cultural Geographic Theory; 783, Advanced Geography of the U.S.; 784, Seminar in Location Theory Research Cluster; 789, Research Seminar: Geography of Transportation; 791, Regional Concept and Area Analysis; 878, Seminar: Growth of Geographic Thought.

Geology

Head: Professor Lattman (105C); Professors Caster (104A), Jenks (232), Larsen (220), Potter (107), Pryor (101); Associate Professors Durrell (233), Huff (225), Sunderman (231); Assistant Professors Bullard (10B), DeJong (236), Fleming (223), Kilinc (220); Curator and Assistant Professor Davis (102). (All in Old Tech Building.)

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 2.5 Major and 3 referees to be admitted, and is expected to have satisfactorily passed one-year courses in physics and chemistry and an approved course in calculus or statistics. Biology is recommended as preparation for graduate work chiefly in paleontology. 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.

Laboratories for research in paleontology, mineralogy, petrology, geochemistry, geomorphology, remote sensing, and sedimentology afford modern facilities for study. The Geological Museum provides extensive research collections particularly with respect to Paleozoic biota.

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 is an alternate option for the M.S. thesis.

By agreement between the Secretary of the Smithsonian Institution and the President of the University of Cincinnati, graduate students in paleontology may apply for summer internships at the United States National Museum, to work with specialists there on subjects of mutual interest. Such work is commonly related to

the subject of the student's dissertation. Academic year fellowships at the Smithsonian are sometimes available to outstanding advanced students when the Language and Candidacy examinations at the University are satisfactorily completed. This affords the student opportunity to work under the joint supervision of University and Smithsonian paleontologists. Satisfactory research work under this program carries University graduate credit.

For Advanced Undergraduate and Graduate Students

15-040-037,038,039. *Geology Seminar.* Expected of all graduate students majoring in geology. No credit. W 4:00-5:00. Staff.

15-040-521,522,523. *Invertebrate Paleontology.* Paleobiology of common invertebrate fossils. 3 gr. cr. ea. Qtr. TTh 9:30; W 1:00-4:00. Staff. Prereq.: Geol. 321-2-3, or equivalent, or a full course in biology, zoology, or botany.

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 gr. cr. Spr. Qtr. TTh 8:00; Tu 2:00-5:00; S 9:00-12:00. Mr. 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. MW 11:00; M 1:00-4:00. Mr. 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. Mr. Fleming. 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 gr. cr. Win. Qtr. Mr. Fleming.

15-040-576. *Advanced Geology Field Trip.* A two weeks' field excursion during the Summer of 1972. Historical and regional geology. Conferences and report in Aut. Qtr. 3 gr. cr. Aut. Qtr. Mr. Pryor. Prereq.: Permission of instructor.

15-040-581. *Basic Photography for the Geological Sciences.* Systematic study of photographic theory and technique for geological research, with emphasis on documentation and illustration. 2 gr. cr. Win. Qtr. M 12:00. 3 laboratory hours. Mr. Bullard.

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. WF 1:00-4:00. Mr. Sunderman.

15-040-649. *Phase Equilibria I.* Introduction to phase equilibria. Construction and interpretation of phase diagrams with temperature and composition as variables. 2 gr. cr. Aut. Qtr. MW 10:00. Mr. Kilinc. Prereq.: Permission of instructor.

15-040-650. *Phase Equilibria II.* Measurement of P-T-X and determination of equilibrium diagrams for geologically significant unary, binary and ternary systems. 2 gr. cr. Win. Qtr. MW 10:00. Mr. Kilinc. Prereq.: Geol. 649.

15-040-651,652. *Geological Data Analysis.* Application of statistics and computing to diverse geological and paleontological problems. Many case histories. 3 gr. cr. Win., Spr. Qtrs. MWF 9:00. Messrs. Lattman, Potter. Prereq.: Permission of instructor.

15-040-661. *Igneous Petrology I.* Principles and methods: minerals, phase relations, analysis and calculations, lab methods. 4 gr. cr. Aut. Qtr. MW 8:00; M 1:00-4:00; F 9:00-12:00. Mr. Larsen. Prereq.: Geol. 401-2-3 or equivalent.

15-040-662. *Igneous Petrology II.* MW 8:00; M 1:00-4:00. Mr. Larsen. Prereq.: Geol. 401-2-3 or equivalent.

15-040-663. *Stratigraphy and Sedimentation.* Spr. Qtr. MW 11:00; M 1:00-4:00. Mr. Pryor.

15-040-674,675. *Geological Data Analysis.* 4:00. Mr. Jensen.

15-040-677. *Geological Data Analysis.* America. 3 gr. cr. ea. Qtr. Spr. Qtr. MW 11:00; M 1:00-4:00. Mr. Pryor.

15-040-678. *Geological Data Analysis.* netism, and its application. Mr. DeJong.

Primarily for

15-040-711. *Geological Data Analysis.* with emphasis on documentation and illustration. Th 2:00-5:00.

15-040-712. *Geological Data Analysis.* geologic occurrence of minerals. 2:00-5:00. Staff.

15-040-713. *Geological Data Analysis.* occurrence of minerals. Geol. 521-2-3.

15-040-731. *Geological Data Analysis.* involving hydrogeology. Spr. Qtr. MW 11:00; M 1:00-4:00.

15-040-751. *Geological Data Analysis.* Permission of instructor.

15-040-775. *Geological Data Analysis.* during Spring.

15-040-776. *Geological Data Analysis.* trip during S.

15-040-778. *Geological Data Analysis.* vacation or i.

15-040-779. *Geological Data Analysis.* Report. 2 gr. cr. ea. Qtr.

15-040-780. *Geological Data Analysis.* Staff.

15-040-811,812. *Geological Data Analysis.* mineral analysis. cr. ea. Qtr.

15-040-814,815. *Geological Data Analysis.* groups of se. 4 gr. cr. ea.

15-040-662. *Igneous Petrology II*. Occurrence, genesis, petrography. 4 gr. cr. Win. Qtr. MW 8:00; M 1:00-4:00; F 9:00-12:00. Mr. Larsen. Prereq.: Geol. 661 or permission of instructor.

15-040-663. *Seminar in Igneous Petrology*. Major problems, current literature. 3 gr. cr. Spr. Qtr. MWF 11:00. Messrs. Larsen, Kilinc. Prereq.: Geol. 662 or permission of instructor.

15-040-674,675,676. *Geology of Ore Deposits*. 3 gr. cr. ea. Qtr. TTh 8:00-9:30; M 1:00-4:00. Mr. Jenks. Prereq.: Permission of instructor.

15-040-677. *Regional Tectonics (North America)*. Orogenic belts in North and South America. 3 gr. cr. Aut. Qtr. TTh 11:00; Th 2:00-5:00. Mr. DeJong. Prereq.: Permission of instructor.

15-040-678. *Regional Tectonics (World)*. Orogenic belts outside America; paleomagnetism, and its application to tectonics. 3 gr. cr. Win. Qtr. TTh 1:00; Th 2:00-5:00. Mr. DeJong. Prereq.: Permission of instructor.

Primarily for Graduate Students

15-040-711. *Palynology*. An introduction to the study of organic-walled microfossils, with emphasis on spores, pollen, and dinoflagellates. 3 gr. cr. Aut. Qtr. MW 10:00; Th 2:00-5:00. Staff. Prereq.: Geol. 521-2-3 (or equivalent).

15-040-712. *Micropaleontology I*. Conodonts and Ostracods. Morphology, biology, and geologic occurrence of conodonts and ostracods. 3 gr. cr. Win. Qtr. MW 10:00; Th 2:00-5:00. Staff. Prereq.: Geol. 521-2-3 (or equivalent).

15-040-713. *Micropaleontology II*. Foraminifera. Morphology, biology, and geologic occurrence of foraminifera. 3 gr. cr. Spr. Qtr. MW 10:00; Th 2:00-5:00. Staff. Prereq.: Geol. 521-2-3 (or equivalent).

15-040-731. *Geochemistry of Hydrothermal Processes*. Geochemistry of processes involving hydrothermal fluids under metamorphic and igneous conditions. 3 gr. cr. Spr. Qtr. MWF 9:00. Mr. Kilinc. Prereq.: Permission of instructor.

15-040-751. *Seminar in Physical Geology*. 3 gr. cr. Spr. Qtr. Mr. Fleming. Prereq.: Permission of instructor.

15-040-775. *Field Studies in Stratigraphy and Sedimentation*. 10- to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. Mr. Pryor.

15-040-776. *Field Studies in Igneous and Metamorphic Petrology*. 10- to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. Mr. Larsen.

15-040-778. *Field Studies in Structural Geology*. 10- to 14-day field trip during Spring vacation or in June. Report. 2 gr. cr. Mr. DeJong.

15-040-779. *Field Studies in Volcanology*. 2-week field trip in September or December. Report. 2 gr. cr. Mr. Larsen.

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

15-040-811,812,813. *Geochemistry*. Advanced theory and techniques in rock and mineral analysis: X-ray fluorescence, flame photometry, electron microscopy, etc. 3 gr. cr. ea. Qtr. TTh 9:30-11:00; M 1:00-4:00. Staff.

15-040-814,815,816. *Advanced Sedimentary Petrology*. Advanced study of the major groups of sedimentary rocks, their composition, origins and geological interpretations. 4 gr. cr. ea. Qtr. TTh 8:00-9:30; Tu 1:00-4:00. Messrs. Potter, Pryor.

178 *Division of Graduate Studies*

- 15-040-821. *Seminar in Paleontologic Principles*. 3 gr. cr. Aut. Qtr. MWF 9:00. Messrs. Caster, Davis. Permission of instructors required.
- 15-040-822,823. *Seminar in Megascopic Paleontology*. Reading knowledge of German and French desirable. 3 gr. cr. Win., Spr. Qtrs. MWF 9:00. Mr. Caster. Permission of instructor required.
- 15-040-844. *Seminar in Geomorphology*. 3 gr. cr. Spr. Qtr. MWF 8:00. Mr. Lattman.
- 15-040-874,875,876. *Universal Stage Microscope Studies*. 2 gr. cr. ea. Qtr. 6 lab hours to be arranged. Mr. Sunderman.
- 15-040-881. *Research—Special Problems—Paleontology*. Credit to be arranged. Offered ea. Qtr. Messrs. Caster, Davis.
- 15-040-882. *Research—Mineralogy, Geochemistry*. Credit to be arranged. Offered ea. Qtr. Messrs. Bullard, Huff, Kilinc, Sunderman.
- 15-040-883. *Research—Structural Geology*. Credit to be arranged. Offered ea. Qtr. Messrs. DeJong, Jenks.
- 15-040-884. *Research—Petrology*. Credit to be arranged. Offered ea. Qtr. Messrs. Kilinc, Larsen.
- 15-040-885. *Research—Economic Geology*. Credit to be arranged. Offered ea. Qtr. Mr. Jenks.
- 15-040-886. *Research—Geomorphology*. Credit to be arranged. Offered ea. Qtr. Messrs. Durrell, Lattman.
- 15-040-887. *Research—Sedimentary Petrology*. Credit to be arranged. Offered ea. Qtr. Messrs. Potter, Pryor.
- 15-040-888. *Research—Stratigraphy—Sedimentology*. Credit to be arranged. Offered ea. Qtr. Messrs. Caster, Pryor, Potter.
- 15-040-889. *Research—Clay Mineralogy*. Credit to be arranged. Offered ea. Qtr.
- 15-040-890. *Research—Geophysics (Paleomagnetism)*. Credit to be arranged. Offered ea. Qtr. Mr. DeJong.
- 15-040-891. *Master's Thesis Research—Paleontology*. Credit to be arranged. Offered ea. Qtr. Mr. Caster.
- 15-040-892. *Master's Thesis Research—Mineralogy—Geochemistry*. Credit to be arranged. Offered ea. Qtr. Messrs. Bullard, Kilinc.
- 15-040-893. *Master's Thesis Research—Structural Geology*. Credit to be arranged. Offered ea. Qtr. Messrs. DeJong, Jenks.
- 15-040-894. *Master's Thesis Research—Petrology*. Credit to be arranged. Offered ea. Qtr. Messrs. Kilinc, Larsen.
- 15-040-895. *Master's Thesis Research—Economic Geology*. Credit to be arranged. Offered ea. Qtr. Mr. Jenks.
- 15-040-896. *Master's Thesis Research—Geomorphology*. Credit to be arranged. Offered ea. Qtr. Messrs. Durrell, Lattman.
- 15-040-897. *Master's Thesis Research—Sedimentary Petrology*. Credit to be arranged. Offered ea. Qtr. Messrs. Potter, Pryor.

15-040-898. arranged. Offered ea. Qtr.

15-040-971. Offered ea. Qtr.

15-040-972. arranged. Offered ea. Qtr.

15-040-973. arranged. Offered ea. Qtr.

15-040-974. Offered ea. Qtr.

15-040-975. Offered ea. Qtr.

15-040-976. Offered ea. Qtr.

15-040-977. arranged. Offered ea. Qtr.

15-040-978. be arranged.

Courses Offered
Physiography
 575-577, Altitude
 631, Clay Mineralogy
 Structural Geology
 732, Geology-Ore
 Geology.

Head: Professor
 Director of
 Friedrichsmeyer
 ciate Professor
 Cobbs (32), Geology
 McMicken Hall
 This Department
 Arts in Teaching
 Student
 graduate major
 are required
 Methods of
 mended for a
 in the literature
 seminar; they
 receive up to
 comprehensi
 History of Ge
 and Middle Ages
 of a reading
 ment. Swedish
 requirements

15-040-898. *Master's Thesis Research—Stratigraphy—Sedimentology*. Credit to be arranged. Offered ea. Qtr. Messrs. Caster, Pryor, Potter.

15-040-971. *Doctoral Dissertation Research—Paleontology*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Mr. Caster.

15-040-972. *Doctoral Dissertation Research—Mineralogy—Geochemistry*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Mr. Kilinc.

15-040-973. *Doctoral Dissertation Research—Structural Geology*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Messrs. DeJong, Jenks.

15-040-974. *Doctoral Dissertation Research—Petrology*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Messrs. Kilinc, Larsen.

15-040-975. *Doctoral Dissertation Research—Economic Geology*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Mr. Jenks.

15-040-976. *Doctoral Dissertation Research—Geomorphology*. Credits to be arranged. Offered ea. Qtr. Permission of adviser required. Mr. Lattman.

15-040-977. *Doctoral Dissertation Research—Sedimentary Petrology*. Credit to be arranged. Offered ea. Qtr. Permission of adviser required. Messrs. Potter, Pryor.

15-040-978. *Doctoral Dissertation Research—Stratigraphy—Sedimentology*. Credits to be arranged. Offered ea. Qtr. Messrs. Caster, Pryor, Potter.

Courses Omitted in 1972-1973: 561-2, Interpretation of Aerial Photographs; 572, Physiography of Western U.S.; 573, Physiography of Eastern U.S.; 574, Glacial Geology; 575-577, Alternate Advanced Geology Field Trips; 580, Advanced Geomorphology; 631, Clay Mineralogy; 658, Thermodynamics in Geological Processes; 672, Elements of Structural Analysis; 673, Advanced Structural Geology; 701-2-3, Advanced Sedimentation; 732, Geochemistry of Hydrothermal Ore Deposits; 777, Field Studies in Mining Geology-Ore Deposits; 801-2-3, Advanced Mineralogy I; 873, Seminar in Economic Geology.

Germanic Languages and Literatures

Head: Professor Stern (225); Director of Graduate Programs: Professor Slessarev (225); Director of Graduate Advising: Associate Professor Glenn (214 BSc); Professors Friedrichsmeyer (367), Merkel (225); Associate Professor Richert (225); Adjunct Associate Professor Schlawe; Assistant Professor Harris (367), Motsch (214 BSc); Instructors Cobbs (32), Obrath (32), Remys (32), Voss (32); Visiting Professor Angress. (All in McMicken Hall except as noted.)

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.

Students electing work in this Department should have completed an undergraduate major in German or its equivalent. All candidates for any graduate degree are required to take Methods and Bibliography 771 and Advanced Stylistics 772. Methods of Foreign Language Teaching and Applied Linguistics 573 is recommended for all students planning to teach. All candidates must earn at least 6 gr. cr. in the literature and language before 1600. M.A. candidates must complete a pro-seminar; they may write a thesis in partial fulfillment of the M.A. requirement (and receive up to 9 cr. in Research 971 for doing so) or submit themselves to a written comprehensive examination. Candidates for the Ph.D. degree are required to take History of German Philology and Language 901-2-3, a course in Old High German and Middle High German (1 Qtr. ea.) and two seminars. The successful completion of a reading course in a second Germanic language is strongly urged by the Department. Swedish, for example, will satisfy one of the two foreign language proficiency requirements, demanded for the doctorate by the department in addition to German.

p. 65 - 68

UNIVERSITY OF CINCINNATI BULLETIN

Announcement

of



McMicken College of Arts and Sciences

1972-1973

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

Honors Courses

- 15-041-194,195,196. Honors Independent Study and Guided Research.** Consent of instructor required. Credits to be arranged. Staff.
- 15-041-198. Geography Honors Colloquium I: Field Studies in Landscape Change.** An introduction to geography through field work. Three overnight weekend excursions into Kentucky and West Virginia. Limited to McMicken scholars. 3 ug. cr. Aut. Qtr. Mr. Ryan.
- 15-041-199. Geography Honors Colloquium II: Appalachia and the Future Environment of North America.** The Appalachian experiment in regional planning and resource deployment: new urban and rural communities; dynamics and directions of environmental change. Limited to McMicken scholars. 3 ug. cr. Spr. Qtr. Mr. Ryan.
- 15-041-397. Economic Geography of Appalachia.** An interdisciplinary approach to the economic and social issues in Appalachia. Field work anticipated. 3 ug. cr. Aut. Qtr. Messrs. Curtiss and Symanski. (Crosslisted with Economics 15-080-397.)
- 15-041-481. Research Seminar.** An opportunity to design, execute, and present independent research papers. For undergraduate majors. 3 ug. cr. Win. Qtr. Mr. Symanski. Prereq.: Permission of instructor.
- 15-041-501,502,503. Problems in Geography.** Individual research problems. Credit depends on amount of work completed. Staff.
- 15-041-601,602,603. Field Projects.** Execution of individual field projects under regular faculty supervision. Credit varies with work completed. Staff.
- Courses Omitted in 1972-1973.** 181-2-3, Honors, Intro. to Cultural Geography; 386, Soviet Union; 388, Middle East; 532-3, Advanced Physical; 680, Geographic Methods; 675, Historical Geography of U.S.

Geology

Head: Professor Lattman (105C); Professors Caster (104A), Jenks (232), Larsen (220), Potter (107), Pryor (101); Associate Professors Durrell (233), Huff (225), Sunderman (231); Assistant Professors Bullard (B-10), DeJong (236), Fleming (223), Grover (235), Kilinc (220); Curator and Assistant Professor Davis (102). (Offices are in Old Tech Building.)

Entering Freshmen intending to major in Geology may apply for the W. H. Bucher Scholarship (see page 20).

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

To qualify for the B.S. degree in geology a student shall include in his program Geol. 271 (or 272 or 273), 301-2-3, 321-2, 331, 401-2-3, 405-6, 525; Chem. 101-2-3, 111-2-3, 9 to 14 credits of Calculus or other approved Mathematics courses and 9 to 15 credits of physics or biology. In addition to the basic core of geology courses listed above, at least 18 credits in advanced courses in geology must be elected and should include 521-2-3 or 531-2-3 and 677 where feasible. The language requirement must be fulfilled by German, French, or Russian prior to the senior year.

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

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

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

15-040-101,102,103. *Introduction to Geology.* A survey of physical and historical geology. Lect. and Lab. 5 ug. cr. ea. Qtr. Staff.

101. Weathering; Mass wasting; Streams; Ground Water; Glaciers; Oceanography.

102. Volcanoes; Minerals; Rocks; Geologic time; Metamorphism; Sedimentation; Seismology; Mountain building; Ore deposits; Sea-floor spreading.

103. Stratigraphy; Paleontology; History of North America.

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

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

15-040-271. *Geologic Demonstration Trip.* A two-weeks' field trip. September 1972. One-hour conference weekly. 3 ug. cr. Aut. Qtr. Staff.

15-040-301,302,303. *Mineralogy.* Crystallography, crystal chemistry, atomic structures, geochemistry, and systematics of the common minerals. 3 ug. cr. ea. Qtr. Staff. Prereq.: College chemistry or permission of instructor.

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

15-040-331. *Elementary Structural Geology.* Description and interpretation of tectonic structures. Geometrical and geological field work techniques. 3 ug. cr. Aut. Qtr. Mr. DeJong.

15-040-401,402,403. *Elementary Petrology.* Aut. Qtr.: The polarizing microscope; Win., Spr. Qtrs.: The rock cycle, hand lens petrography, thin section studies of rocks. 3 ug. cr. ea. Qtr. Messrs. Bullard, Larsen, Pryor. Prereq.: Geol. 303.

15-040-405. *Principles of Geomorphology.* Fundamental concepts of land forms in terms of lithology, structure and geologic history. 3 ug. cr. Win. Qtr. Mr. Lattman. 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. Staff.

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

15-040-521,522,523. *Invertebrate Paleontology.* Paleobiology of common invertebrate fossils. 3 ug. cr. ea. Qtr. Staff. Prereq.: Geol. 322 or equivalent, or a full course in biology, zoology, or botany.

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. Mr. Caster.

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. Mr. Pryor.

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

15-040-576. Advanced Geology Field Trip. A two weeks' field excursion during September 1972. Conferences and report in Autumn Quarter. 3 ug. cr. Aut. Qtr. Prereq.: Permission of instructor. Mr. Pryor.

15-040-581. Basic Photography for the Geological Sciences. Systematic study of photographic theory and technique for geologic research, with emphasis on documentation and illustration. 2 ug. cr. Win. Qtr. 3 laboratory hours. Mr. Bullard.

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. Aut. Qtr. Mr. Sunderman.

15-040-649. Phase Equilibria I. Introduction to Phase Equilibria. Construction and interpretation of phase diagrams with temperature and composition as variables. 2 ug. cr. Aut. Qtr. Mr. Kilinc. Prereq.: Permission of instructor.

15-040-650. Phase Equilibria II. Measurement of P-T-X and determination of equilibrium diagrams for geologically significant unary, binary and ternary systems. 2 ug. cr. Win. Qtr. Mr. Kilinc. Prereq.: Geol. 649.

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. Win., Spr. Qtrs. Messrs. Lattman, Potter. Prereq.: Permission of instructor.

15-040-661. Igneous Petrology I. Principles and methods: minerals, phase relations, analysis and calculations, lab methods. 4 ug. cr. Aut. Qtr. Mr. Larsen. Prereq.: Geol. 401-2-3 or equivalent.

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

15-040-663. Seminar in Igneous Petrology. Major problems, current literature. 3 ug. cr. Spr. Qtr. Messrs. Larsen, Kilinc. Prereq.: Geol. 662 or permission of instructor.

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

15-040-677. Regional Tectonics (North America). Orogenic belts in North and South America. 3 ug. cr. Spr. Qtr. Messrs. DeJong, Jenks. Prereq.: Permission of instructor.

15-040-678. Regional Tectonics (World). Orogenic belts outside America; paleomagnetism, and its application to tectonics. 3 ug. cr. Win. Qtr. Messrs. DeJong, Jenks. Prereq.: Permission of instructor.

Honors Courses

15-040-182,183. Introduction to Geology. (Honors.) Departmental approval required. 5 ug. cr. Win., Spr. Qtrs. Lect., Lab. Staff.

15-040-194,195,196. Honors Independent Study and Guided Research. Consent of instructor required. Credits and hours to be arranged. Staff.

15-040-199. Geology Honors Colloquium. Geological Studies in Field Archaeology. The materials, processes, and depositional history of the archaeological site and its environment. 3 ug. cr. Spr. Qtr. Lab. hours arranged. Mr. Bullard.

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

Courses Omitted in 1972-1973: 272-3, Alternate Routes Geologic Demonstration Field Trip; 561-2, Interpretation of Aerial Photographs; 572, Physiography of Western United States; 573, Physiography of Eastern United States; 574, Glacial Geology; 575-7, Alternate Advanced Geology Field Trips; 578, World Physiography; 580, Advanced Geomorphology; 631, Clay Mineralogy; 648, Thermodynamics in Geological Processes; 672, Elements of Structural Analysis; 673, Advanced Structural Geology.

Germanic Languages and Literatures

Professors Stern (Head, 225), Friedrichsmeyer (367), Merkel (225), Slessarev (225); Visiting Professor Angress (225); Associate Professors Glenn (214BSc), Richert (225), Schlawe (225); Assistant Professors Harris (367), Motsch (214BSc); Instructors Cobbs (32), Obrath (32), Remys (32), Voss (225). (All offices are in McMicken Hall except as noted.)

German 101-2-3, 104-5-6, 201-2-3, 204-5-6, and 207-8-9 will not count toward a major in German. German 231-2-3, 401-2-3 or equivalents, 437-8-9, shall be offered as a part of the requirement toward a major in German. In addition, German majors are expected to select German 171-2-3 as one of their elective courses in preparation for Part I (German Culture) of their Comprehensive Examinations.

All advanced courses in German, except Senior Readings (437-8-9), may be entered at the beginning of the Winter or Spring Quarter, with the instructor's permission. To enter 100- and 200-level courses after the Autumn Quarter, students must obtain permission of the Department Head.

Related courses in the Department of English recommended for majors:

15-001-221,222,223. World Literature. For description, see page 56.

15-003-301,302,303. Foreign Backgrounds of English Literature.

15-003-314,315,316. Development of the Drama.

15-003-371. Modern Fiction I. Late Nineteenth Century.

15-003-372. Modern Fiction II. Early Twentieth Century.

15-003-373. Modern Fiction III. Mid-Twentieth Century.

15-003-429. Studies in Modern Literature: Jewish Fiction.

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 207-8-9, 15 credits. (3) 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