6001 Topics in Earth Sciences for Teachers (3) Su May be taken for a max. of 9 sem. hrs. when topics vary. Consent of instructor is required for the second and third times. Various aspects of the earth sciences for elementary, middle, and high school teachers of science.

7031 Deep-water Depositional Environments (3) Prereq.: introductory course in sedimentology; e.g., GEOL 4031. Different types of sediment in deep water and on various transport processes; emphasis on submarine fan systems, their lithologic and seismic response, geological factors responsible for variation in end products.

7032 Fluvial Processes and Systems (3) Prereq.: consent of instructor. Fluid flow, sediment transport, and fluvial depositional processes; river systems as conveyor belts for sediment delivery to sedimentary basins; fluvial depositional processes in the stratigraphic record.

7043 Advanced Igneous Petrology (3) Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Phase diagrams, magmatic origin of igneous rocks, and evolution of igneous provinces.

7044 Advanced Metamorphic Petrology (3) Prereq.: GEOL 3041 or equivalent. 2 hrs. lecture; 3 hrs. lab. Facies concept, theoretical and field relations, textures, and their significance.

7061 Sequence Stratigraphy (3) Prereq.: GEOL 4031 or equivalent. One-week field trip to the southern Rocky Mountains is required. Principles of physical stratigraphy with emphasis on contemporary concepts about the interaction of tectonics, sea level, and sediment supply in generating a predictable architecture of sedimentary basin fills.

7062 Seismic Stratigraphy (3) Prereq.: GEOL 3071 or equivalent. Interpretation of seismic reflection data in terms of sedimentary facies, stratigraphic sequences, and implications for local and eustatic sea-level fluctuations.


7065 Geodynamics (3) Prereq.: MATH 2057 and 2090 or equivalent; and GEOL 4064 or equivalent. Fundamental physical processes involved in plate tectonics and other geological phenomena; concepts in mantle convection, rock rheology, faulting, flexure, and heat transfer.

7081 Isotope Geochemistry (3) Prereq.: consent of instructor. 2 hrs. lecture; 2 hrs. lab/demonstration. Stable isotope fractionation in natural systems; emphasis on oxygen, hydrogen, and carbon isotope-ratio variation in natural waters, carbonates, and silicates with application to the solution of petrologic problems.

7083 Mass Spectrometry for Isotope Geology (3) Prereq.: GEOL 4083 or consent of instructor. 2 hrs. lecture; 3 hrs. lab. Principles of thermal ionization mass spectrometry; chemical preparation of geological samples for isotope ratio measurements; use of multicollector solid source mass spectrometer; applications to geological studies.

7085 Paleoceanography (3) Prereq.: GEOL 4081 or consent of instructor. Physical conditions, circulation, bio-ecology, and chemistry of oceans in the past as inferred from sediment records; ocean’s role in the climate system and its response to climatic and tectonic changes.

7111 Advanced Micropaleontology (3) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Advanced training in micropaleontology.

7115 Paleontology (3) Prereq.: GEOL 2061 and 4031. 2 hrs. lecture; 2 hrs. lab field trip. Diversity, structure, taphonomy, and evolution of fossil and modern marine assemblages; adaptations and functional morphology; organism-sediment relationships.

7117 Biostratigraphy (3) Prereq.: GEOL 2061 or equivalent. 2 hrs. lecture; 2 hrs. lab. Stratigraphic concepts; modern rules and procedures in interval and assemblage zones; distribution of stratigraphically important fossil groups; event stratigraphy and chronostratigraphic modeling using computer techniques; applications to global and regional problems.

7120 Palaeobiology (3) Prereq.: GEOL 3071 or equivalent. Patterns and processes of evolution as discerned from the fossil record; tempo and mode of evolution, hierarchy and macroevolution, mass extinctions, patterns of diversification; emphasis on development of theories and case studies.

7131 Petrology of Sandstones (3) 2 hrs. lecture; 3 hrs. lab. Petrology and petrography of terrigenous sandstones; applications of sediment mineralogy and texture to the analysis of provenance, deposition, and diagenesis; emphasis on the interrelationship of tectonics and sedimentation.

7132 Dynamics of Sedimentation (3) 2 hrs. lecture; 3 hrs. lab. Fluid mechanics as applied to sedimentation, fluid-particle interactions, erosion, mechanics of sediment transport including fluid and sediment flows, deposition and the origin of primary structures, and hydrodynamic instability and sediment deformation.

7133 Sedimentary Petrography of Carbonates (3) 2 hrs. lecture; 3 hrs. lab. Principles governing formation, deposition, and diagenesis of carbonate sediments and sedimentary rocks; lab stresses textural, fabric, and mineral relationships and interpretation of depositional environments and mineral paragenesis of ancient carbonate sequences.

7134 Clay Mineralogy (3) 2 hrs. lecture; 3 hrs. lab/discussion. Mineralogy; geochemistry, and geology of clay minerals; argillaceous sediments and rocks.

7183 Physical Geochemistry of Burial Diagenesis (3) Prereq.: GEOL 4083 or equivalent. Quantitative techniques in thermodynamics, kinetics, and mass transport applied to problems of burial diagenesis of sedimentary minerals and fluids.

7195 Reservoir Characterization (3) Prereq.: GEOL 4182 or PETE 4051 or consent of instructor. 2 hrs. lecture; 2 hrs. lab. Also offered as PETE 7195. Origin, description, exploration, and development of oil and gas reservoirs; topics include accommodation space, reservoir occurrence, origin of petroleum, oil and gas properties, rock properties, drilling, exploration, and appraisal.

7200 Scientific Communication and Visualization (3) Methods for written, oral, and visual communication with an emphasis on scientific approaches, analysis and presentation of scientific quantitative information.

7900 Special Topics in Geology and Geophysics (3) V May be taken for a max. of 12 sem. hrs. of credit when topics vary. Advanced and/or emerging topics in geology and geophysics.

7909 Directed Research in Geology and Geophysics (1-6) May be taken for a max. of 10 sem. hrs. of credit when topics vary. General student-selected research topics and focused group research, including all topics in geology and geophysics.

7911 Seminar in Geology: Paleontology (2) May be repeated for credit.

7931 Seminar in Geology: Sedimentology (2) May be repeated for credit. Fall semester: carbonate sedimentology; spring semester: clastic sedimentology and sedimentary environments.

7941 Seminar in Geology: Igneous and Metamorphic Petrology (2) May be repeated for credit.

7961 Seminar in Geology: Structural Geology (2) May be repeated for credit.

7966 Field Work (1-9)

7971 Seminar in Tectonics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Plate tectonics, diapirism, isostasy, and the tectonics of specific areas.

7972 Seminar in Geophysics (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Structure and composition of the mantle; physical processes at ridges, trenches, and transform faults; dynamics of plate interiors; intraplate stress; and thermal histories of the earth and other terrestrial planets; physics of rock magnetism; and hydrodynamics of sedimentary basins.

7981 Seminar in Geochemistry (2) Prereq.: consent of instructor. May be taken for a max. of 6 hrs. of credit. Mineralogy, paragenesis, geochemistry, and natural occurrence of authigenic silica in sediments; other topics such as hydrogeochemistry, isotopic geochemistry, and the geochemistry of carbonates.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.

9000 Dissertation Research (1-12 per sem.) “S”/“U” grading.