

I. CATALOG DESCRIPTION:

A. Division: Science
Department: Geology
Course ID: GEOL 111
Course Title: Investigations in Physical Geology
Units: 1
Laboratory: 3 hours
Prerequisite: GEOL 101.
Departmental Advisory: English 015 or eligibility for English 101 as determined through the SBVC assessment process.

B. Course Description:
The Laboratory portion of GEOL 100. Students who have completed GEOL 101 may enroll in GEOL 111 to complete the requirement for a physical science with a laboratory.

Schedule Description:

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II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of the course, the student will be able to:

- A. identify common rock-forming minerals and major economic minerals,
- B. identify and understand the origin and significance of the three fundamental rock types,
- C. find specific locations on topographic maps and identify common landforms from contour patterns,
- D. interpret topographic maps and aerial photographs in order to recognize landscape features typical of major erosional and depositional processes,
- E. analyze evidence on geographic maps and cross-sections in order to restore the sequence of geologic events that led to the observable features
- F. identify the landforms typical of faults and folded structures.

ADVISORY ENTRANCE SKILLS:

Before attempting this class students should be able to:

- A. read actively, annotating and paraphrasing the text,
- B. summarize accurately,
- C. evaluate evidence for relevance to one's purpose,
- D. distinguish between facts, opinions, assumptions, and inferences,
- E. understand a common English vocabulary equivalent to a High School Education,
- F. be able to assimilate a new technical vocabulary appropriate to the subject matter,
- G. organize information around a central idea,
- H. select and present relevant evidence to support a proposition,
- I. create a focused thesis statement, and
- J. write sentences free of gross grammatical errors.

IV. CONTENT:

- A. The Materials of the Earth
 - 1. Minerals
 - 2. Igneous rocks
 - 3. Sedimentary and Metamorphic Rocks
- B. Topographic Maps and Aerial Photos
 - 1. Map Coordinate Systems
 - 2. Contours and Topographic Maps
 - 3. Aerial Photos and Remote Imagery

- C. Geologic Interpretation of Maps and Images
 - 1. Stream Erosion
 - 2. Desert Landforms
 - 3. Landforms created by Groundwater
 - 4. Glaciation
 - 5. Shorelines
- D. Structural Geology
 - 1. Geologic Maps and Cross Sections
 - 2. Folded Sedimentary rocks
 - 3. Faulted Structures
- E. Plate Tectonics
 - 1. A Brief review of the major Plates
 - 2. Geologic processes related to plate boundaries
 - 3. Topographic expressions related to plate boundaries

V. METHODS OF INSTRUCTION:

- A. Field trips in which students will be shown geologic features first hand, collect representative samples, perform field identifications, and assess the results of a variety of geologic processes.
- B. Laboratory work, including instructor-guided demonstrations of mineral and rock identification and classification processes, student-initiated identification and classification of rocks and minerals, interpretation of topographic maps, and analysis and interpretation of geologic maps and cross-sections.

VI. TYPICAL ASSIGNMENTS:

- A. Reading Assignments
 - 1. Selected assignments from the textbook and laboratory manual.
 - 2. Articles covering current events in geology (landslides, earthquakes, volcanic eruptions, floods) as well as long-term events (for example, natural resource depletion, environmental effects of mining and processing ores).
- B. Writing Assignments
 - 1. Selected chapter exercises from the textbook.
 - 2. Instructor-prepared exercises, especially those involving illustrations (maps, charts, diagrams, cross-sections) and their analysis.
 - 3. A journal to be kept when in the field.
 - 4. Laboratory reports including observations, drawings, conclusions, and answers to related questions.
 - 5. A written term project, either a research paper or a group project, showing synthesis of the concepts and processes covered in the course.
- C. Example
Choose one of the magazine or newspaper articles on the reading list and analyze the following:
 - 1. Scientific accuracy
 - 2. Topic of study in this course
 - 3. What was reinforced as learned in this course
 - 4. What was new information for you
 - 5. Prepare a written summary and 3-5 minute class presentation.

VII. EVALUATION:

- A. Methods of evaluation:
 - 1. Written quizzes and/or tests of a variety of types of questions from among true-false, multiple choice, fill-in, sentence completion, and short essay.
 - 2. Written exercises.
 - 3. Written summaries of magazine or newspaper articles.

B. Frequency of evaluation:

1. Quizzes are given in lab at the end of each major section.
2. Laboratory exercises are completed in the lab and turned each meeting.
3. A final Project involving independent thinking, observation and analysis and resulting in a written report is usually assigned for the last 2-3 weeks of the semester.

C. Typical exam questions

1. List the 3 major rock types and describe their mode of occurrence.
2. In the list below, identify the minerals that have a hardness greater than glass.
 - a. Plagioclase
 - b. Kaolinite
 - c. Chalcedony
 - d. Calcite
 - e. Hornblende
 - f. Corundum
 - g. Chlorite
 - h. Garnet
 - i. Gypsum
 - j. Fluorite
3. Which of the minerals listed above are included among the "Common Igneous Rock-forming Minerals"
4. Identify the minerals in the display set. Only a mineral name is required. Make certain that the mineral name is written in the space that has the same number as the mineral tray.
5. Given the indicated area on the geological map and accompanying cross-section at your table, reconstruct the sequence of geologic events representing the geologic history of the area.

VIII. TYPICAL TEXTS:

Zumberge, Rutherford and Carter, *Laboratory Manual for Physical Geology*, 10th ed., WCB McGraw-Hill, 1999.

Wiswall and Fletcher, *"Investigating Earth, a Geology Laboratory Text"*, 2nd ed., WCB Publishers, 1997.

Karen M. Woods, *"Physical Geology Laboratory Manual"* 2nd ed., Kendall-Hunt Publishing Co. 1997.

Jones, Norris, *Laboratory Manual for Physical Geology*, 3rd ed., WCB McGraw-Hill, 2001.

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:

- A. Scale ("ruler") graduate in tenths of an inch.
- B. Colored pencils (red, blue, and assorted other colors.)
- C. Felt tip pens (1/8" x 1/4" tip), three assorted colors.
- D. Several medium to medium-soft pencils (2H or No. 2).
- E. Pocket stereoscope.
- F. Small magnifying glass (optional) for map reading.
- G. Six sheets 8½" x 11" tracing paper.
- H. Eraser (art gum or equivalent).
- I. Inexpensive pencil sharpener.
- J. Inexpensive compass, for drawing circles.
- K. Dividers (optional), for measuring distances on maps.