College of San Mateo
Official Course Outline

1. **COURSE ID:** GEOL 101 **TITLE:** Geology Laboratory **C-ID:** GEOL 100L
   Units: 1.0 units **Hours/Semester:** 48.0-54.0 Lab hours; 48.0-54.0 Total Student Learning hours
   Method of Grading: Letter Grade Only
   Prerequisite: completion or concurrent enrollment in GEOL 100

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC
   AA/AS Degree Requirements:
   CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science
   CSU GE:
   CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B3 - Laboratory Activity
   IGETC:
   IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: C: Science Laboratory

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   Introductory laboratory exercises in geology. Emphasis on gathering, analyzing, evaluating, and interpreting geologic data, especially those related to California and the San Francisco Bay Area. Topics include mineral and rock identification and interpretation; interpretation of topographic and geologic maps and cross-sections; landform evaluation; and geologic dating. Field trips required.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   1. Investigate geological phenomena through a variety of scientific inquiry techniques.
   2. Analyze and evaluate geologic data.
   3. Apply scientific principles, theories, or models to predict and explain the behavior of geologic phenomena.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   1. Solve quantitative problems associated with geologic processes, dating of rocks, and maps
   2. Read and interpret topographic and geologic maps and cross-sections
   3. Apply principles of plate tectonics, crustal deformation, and dating methods to interpret the geologic history and formation of landscapes and landforms, such as mountains, cliffs, and canyons.
   4. Classify minerals and rocks and evaluate their formation histories
   5. Use a variety of instruments to make observations and gather data on geologic materials and landscapes (in the field and in the lab), and communicate results with precision.

6. **COURSE CONTENT:**
   Lab Content:
   A minimum of 10 of the following activity topics:
   1. Measurements and methods of scientific inquiry
      A. Instrument precision
      B. Scientific notation
      C. Measuring angles
      D. Uncertainty
   2. Plate tectonics
      A. Tectonic plates
      B. Mapping plate boundaries
      C. Determining plate rates
   3. Earthquakes & seismology
      A. Types of seismographs
      B. Seismic waves & their propagation
      C. Triangulation
      D. Determination of earthquake magnitude

E. First motion applications
4. Topographic maps
   A. Reading maps
   B. Location/coordinate systems
   C. Interpretation of topographic contours
   D. Construction of topographic profiles
5. Geologic structures
   A. Faults
   B. Folds
   C. Building 3-D block diagrams
6. Geologic maps & cross sections
   A. Interpretation of geologic maps
   B. Creating and interpreting geologic cross-sections
7. Minerals
   A. Physical properties
   B. Identification and evaluation of minerals
8. Igneous processes & rocks
   A. Igneous compositions
   B. Igneous textures
   C. Identification and evaluation of igneous rocks
9. Volcanoes
   A. Hazards
   B. Eruptive materials
   C. Locations globally
10. Sedimentary rocks
   A. Interpreting sedimentary features
   B. Identification and evaluation of sedimentary rocks
11. Metamorphic processes and rocks
   A. Agents and types of metamorphism
   B. Parent rock interpretation
   C. Identification and evaluation of metamorphic rocks
12. Erosional and depositional processes
   A. Groundwater
   B. Waves and gravity (coastlines)
   C. Running water (rivers)
   D. Glaciers
   E. Wind and dunes
13. Geologic time
   A. Relative dating
   B. Radiometric dating
   C. Fossil succession
   D. The geologic time scale
14. Field trip
   A. Interpretatin of local geology
   B. Making observations and gathering data in the field

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
Typical methods of instruction may include:
   A. Lecture
   B. Lab
   C. Activity
   D. Experiments
   E. Field Experience
   F. Field Trips
   G. Observation and Demonstration
   H. Other (Specify): The following methodologies are appropriate. Individual faculty will use whatever mix of these they find most effective in the presentation of each topic. Review of geologic principles pre-lab lecture with visual aids (photos, diagrams, samples, maps), laboratory exercises, hands-on experience with minerals and rocks, required reading of lab materials, required application of key terms, concepts and techniques and field trips.

8. **REPRESENTATIVE ASSIGNMENTS**

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

Written pre-lab preparatory assignments and post-lab reports, summaries, or assessments.

Reading Assignments:

Required reading of background materials prior to completing labs.
Required reading of lab instructions and materials during labs.

Other Outside Assignments:

Practical review and practice for exams of topics covered in lab, such as mineral identification and map interpretation.

9. **REPRESENTATIVE METHODS OF EVALUATION**

Representative methods of evaluation may include:

A. Class Work
B. Exams/Tests
C. Field Trips
D. Group Projects
E. Homework
F. Lab Activities
G. Projects
H. Quizzes
I. Research Projects
J. Written examination
K. Instructors have considerable discretion in determining course grades, as long as final grades reflect the student's mastery of the course's student learning outcomes. Methods of evaluation include a combination of lab preparation homework; post-lab reports, summaries, or quizzes; practical demonstrations of lab skills (including classifying rocks and minerals and measuring strike and dips of rock layers); and cumulative exams that required the demonstration of lab skills such as drawing geologic cross-sections and interpretation geologic maps.

10. **REPRESENTATIVE TEXT(S):**

Possible textbooks include:

A. AGI/NAGT. *Laboratory Manual in Physical Geology*, 11th ed. Pearson, 2018

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Course Originator: Katryn Wiese