

Department of Earth and Environmental Sciences  
California State University, East Bay

ASSESSMENT REPORT 2015-16

GEOLOGY M.S.

28 June 2016

Department of Earth and Environmental Sciences  
California State University, East Bay

Assessment Results 2016-17  
Geology M.S.

Contents



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**Geology M.S. Program ILO Alignment Matrix**

The table below shows which Institutional Learning Outcomes (ILOs) are addressed by each of the Program Learning Outcomes (PLOs) listed above.

	MS PLO 1 Geologic Materials	MS PLO 2 Data Analysis	MS PLO 3 Communication	MS PLO 4 Research	MS PLO 5 Geologic Time
ILO 1: Thinking & Reasoning	X	X	X	X	X
ILO 2: Communication			X	X	
ILO 3: Diversity			X		X
ILO 4: Collaboration		X	X	X	
ILO 5: Sustainability			X		X

			Program Learning Outcomes				
Field	Course	Title	1. Geologic Materials	2. Data Analysis	3. Communication	4. Research	5. Geol. Time
GEOL	6020	Seismic Exploration	P	M			
GEOL	6040						

Quantitative Literacy (QL) is competency and comfort in working with numerical data. Individuals with strong QL skills possess the ability to reason and solve quantitative problems from a wide array of contexts and situations.

This rubric may be applied to student assignments that involve all or parts of any of the department's Program Learning Outcomes (PLOs).

	Capstone 3	Milestone 2	Milestone 1	Milestone 0
Interpretation <i>Ability to explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words)</i>	Provides accurate explanations of information presented in mathematical forms. Makes appropriate inferences based on that information.	Provides accurate explanations of information presented in mathematical forms.	Provides somewhat accurate explanations of information presented in mathematical forms, but occasionally makes minor errors related to computations or units.	Attempts to explain information presented in mathematical forms, but draws

**M.S. Geology Program**  
**Assessment Summaries, 2015-2016**  
**Overview**

## Dispersion in a Sediment Column, Laboratory Assignment:

This laboratory will use a groundwater tracer to make benchtop-scale estimates of mass transport in a saturated porous medium. We will use fluorescein, a fluorescent dye approved for application in drinking water settings, as a conservative tracer. Its movement through the column should be controlled by advection and dispersion only.

A known concentration of dye will be applied to the sediment column. The solution should be applied at a constant rate and with a constant hydraulic head maintained. Small volume fractions of effluent will be collected at the column outlet and their fluorescein concentrations measured using a UV-visible spectrophotometer. From the breakthrough curve, you can make estimates of dispersivity,  $\alpha$ , and the Dispersion Coefficient,  $D_L$ .

Results of this type of experiment are often reported in pore volumes of the fluid that are eluted.

One pore volume is equivalent to the cross sectional area,  $A$ , times the length,  $L$ , times the porosity of the medium,  $n$ . Since discharge over a time period is  $q \cdot t = v \cdot n \cdot A \cdot t$ , the number of pore volumes eluted is:  $v \cdot A \cdot n \cdot t / A \cdot L \cdot n = vt/L$ , a dimensionless number related to time.

### Procedure:

1) Calibrate the spectrophotometer using the standards and blank provided. Plot a calibration curve (may not be linear, use Excel to get the best fit)



Write out equations and calculations, and write an explanation of the steps you took to determine the dispersivity of the medium. Interpret the value of the dispersivity in the context of the type of material packed in the column, and relate it to grain size and sorting.

Write another paragraph that summarizes how this experiment allows determination of dispersive characteristics of porous media. Include sources of uncertainty and your assessment of how the results would translate to the field scale.

**California State University, East Bay**  
**Department of Earth and Environmental Sciences**

**SUGGESTIONS FOR THE PREPARATION OF A PROSPECTUS FOR A  
MASTER'S THESIS**

**GENERALITIES**

A thesis prospectus is a document which is required from all graduate students who plan to complete a Master's thesis in Geology. It is one of the requirements which must be fulfilled in order to be *advanced to candidacy*, a step necessary to begin work on a thesis project.

The prospectus must present convincing evidence that the student is able to complete independent research; specifically, there must be evidence that:

The student is familiar with the proposed thesis topic:

1. by his/her ability to state clearly the research objectives and to demonstrate mastery in the methods to be used in carrying out these objectives.
2. by his/her academic background.
3. by his/her knowledge of pertinent geologic literature.

The student will be able to carry out the proposed research within a realistic framework of:

1. reasonable project scope and size.
2. available time.
- 3.

A prospectus must include the following parts:

1. Title page
2. Abstract
3. Description of research proposed
4. Student qualification (optional)
5. Tentative work

- TITLE PAGE

Example of a Title Page

**Prospectus for a Thesis  
Master of Science Degree in Geology  
California State University, East Bay**

(title of the project)

e.g., **GEOLOGIC STUDY OF CONTACT METAMORPHIC ROCKS IN THE HAYWARD  
QUADRANGLE, ALAMEDA COUNTY, CALIFORNIA**

(name and address of the student)

e.g., **Joseph P. Dough  
11234 Grand Boulevard, Castro Valley, CA 94546  
(510) 555-1212**

(date of submission)

e.g., **May 10, 2011**

**Proposed Advisor: Dr. XXXXX**

**Signature** \_\_\_\_\_

**Other Committee Members:**

**Dr. xxxxxxxx**

**Signature:** \_\_\_\_\_

**xxxxxxx,  
U.S. Geological Survey  
345 Middlefield Road  
Menlo Park, CA 94025  
(650) 856**

**Signature** \_\_\_\_\_

## PART II - ABSTRACT

The abstract must highlight the salient features of the project in terms of situating the project within a context of geology, past research, significance, and feasibility.

Remember that an abstract is **not** a summary but rather a brief enumeration of the important points of the work. The abstract should be brief, not much more than a half page. **Under no circumstances should it exceed a page in length.**

You may use the attached literature as guidelines.

## **INTRODUCTION**

### **OVERVIEW**

Outline the proposed thesis topic in terms of geographic and geologic location, type of work projected, etc. Mention briefly what other studies have been done on the same topic and why there is a need for further work. Also mention what you hope to achieve with your research.

### **PREVIOUS WORK DONE WHICH RELATES TO YOUR TOPIC**

In this section describe in detail all you know about previous investigations which relate to your

#### PART IV - STUDENT'S QUALIFICATIONS

List the reasons which you feel qualify you to successfully carry out the proposed project. Include:

1. The course work you have taken which prepared you for the project.
2. Any knowledge you may have acquired on your own through reading, outside coursework.
3. Any non-academic experience which has prepared you for the project, such as work related workshops, training by non-academic specialists, etc.
4. Names of specialists who may provide you with some advice outside of the university and whom you have contacted or plan to contact.

#### PART V - TENTATIVE WORK SCHEDULE

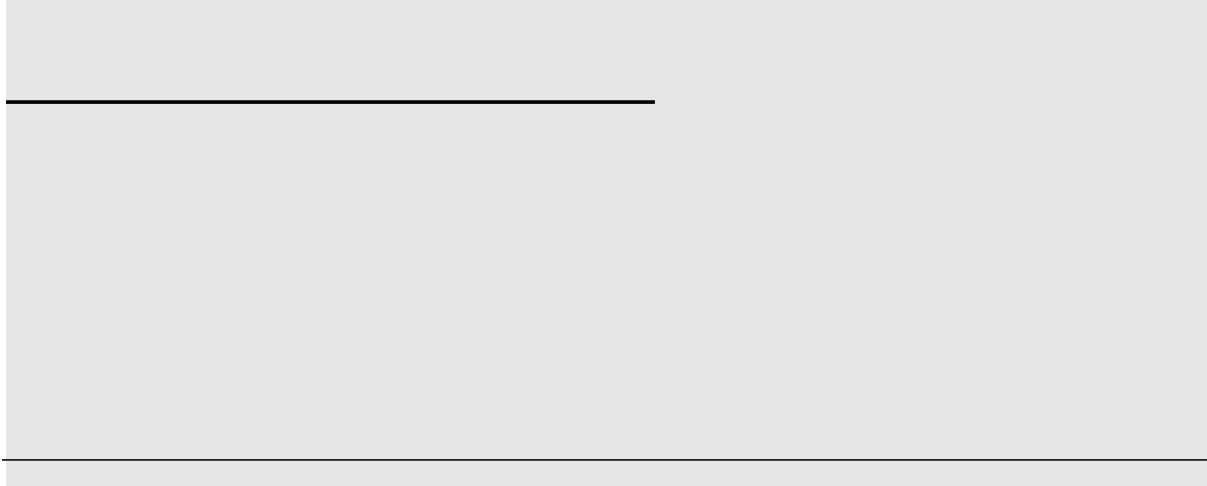
In this section give an estimate of the time you plan to spend to complete your project. Your prospectus will be evaluated for its realistic time framework. Past experience shows that students nearly always underestimate the time they need to prepare and write their theses once research is completed. Also keep in mind that in its final stages thesis writing involves frequent communication between the student and committee members to improve thesis quality, scheduling of thesis defense, etc. **These matters cannot be improvised and take a lot of time.**

Finally, remember that there is a five-year time limit for completing a Master's Degree at CSUEB. This time includes all course work and the thesis approved in its final form by the University Office of Academic Programs.

# Department of Earth and Environmental Sciences, CSCI



## ASSESSMENT PLAN: M.S. in





**Year 1: 2013-2014**

*1. Which PLO(s) to assess*

PLO 3 (*Communication*), PLO 4 (*Research*)

*2. Assessment indicators*

GEOL6320 Term Paper, GEOL6414 Precis & Oral Presentation,  
GEOL6910 P

