

# Suggested Courses

## Courses in the Department of Geological Sciences:

### 1) GEO 391 Field Stratigraphy in the Guadalupe Mountains:

In several lectures before the field trip students prepare specific areas and teach other students about them so that everybody is prepared for the field trip. Great field trip that covers everything from carbonate shelf systems to canyons and to turbidite systems. Spectacular area and views. Course takes place only over several weeks because of field trip during semester.

### 2) GEO 380R Dynamics of Sedimentary Systems:

Very useful course with great field trip to Utah. Teaches sedimentary concepts and laws including for example interaction between river bed and river. Requires some math.

### 3) GEO 380G CONSTRUCTING/INTERPRETING 3-D STRATIGRAPHY 27480:

Taught by David Mohrig. Light on lecture, heavy on hands-on exercises in the computer lab. We interpret the synthetic stratigraphy created in the Jurassic Tank (Wonsuck Kim's work) in which sed rate, sea level, etc are controlled. We get to explore the consequence of varying one of these main parameters on the resulting stratigraphy. Great course overall... I would recommend taking this with, or after, a basic stratigraphy course if the student has not already had one.

### 4) GEO 391 CRUSTAL FLUIDS

Excellent course with lecture, lab and field trip. Substantial time commitment with labs and homework assignments. Recommend for any graduate level student.

Crustal Fluids- Absolutely necessary background for research in marine geoscience. In the top two for most beneficial (albeit painful) class in my grad school tool box.

### 5) Marine Geology and Geophysics Field Course:

The other top two class. No other university in the country offers a course of this nature. Invaluable experience in marine sample and data acquisition, processing, integration and interpretation.

## Courses outside the Department of Geological Sciences:

### 1) CE 394M Advanced Analysis of Geotechnical Engineering (in CEE):

Numerical modeling class using the software PLAXIS. Good way to learn an engineering software and geotechnical concepts. Pretty high pace of teaching material. Course encourages to work in teams with engineers which is an experience for itself. One will learn a lot from it though.

## 2) CE 387M Seepage and Earth Dams (in CEE):

Teaches concepts about pressure gradients and hydraulic conductivity or permeability as well as drawing flow nets. Really good way to get insight into how engineers use similar theories and concepts in a different field. The part about earth dams isn't quite applicable to what we do in geology but very interesting and broadens your horizon and makes you understand better the perspective of engineers.

## 3) CE 387L 1-STRENGTH/SHEAR PROPS OF SOIL:

Lecture and Lab, I took it with Roy Olson but is taught by others now. A good course but a lot of material covered very quickly and labs can be time consuming. Exams are difficult. Would only recommend for a student who has had previous experience and/or is going to rely heavily on soil mechanics for their graduate research. Expect substantial time commitment.

## 4) M427K- Advanced Calculus for Applications I (Differential Equations).

Excellent foundation for any type of geophysics, fluid flow, volumetrics, engineering, etc. Great class to have at the beginning of grad school for a math upgrade.

## 5) For Students with insufficient math skills:

PGE 381K ENGINEERING ANALYSIS (offered in Fall and Summer)

## 6) CE 357 Geotechnical Engineering

The objectives of CE 357 are: (1) to introduce the subject of soil mechanics and foundation engineering to civil engineering students; (2) to teach students how to solve certain fundamental problems related to consolidation, shear strength, and design of shallow foundations; (3) to familiarize students with relevant terms and soils tests so that they can work effectively with specialists in geotechnical engineering; and (4) to provide those students who will go on to take CE 360K (Foundation Engineering) and CE 375 (Earth Slopes and Retaining Structures) with the background needed for further study.

In this course, you will learn what soils are, how they are derived, and how they are identified and classified for engineering purposes. You will also learn the principles that govern flow of water in soils, settlement and heave of soils, and strength of soils. We will talk about consolidation problems and teach you how to calculate factors of safety for foundations and how to predict the settlement of the foundations under working loads. We will discuss actual field problems during the semester and show you how the concepts that are taught in class can be applied to understand and solve real engineering problems.

## 7) PGE 322K Transport Phenomena in GeoSystems

Provide basic fluid mechanics and heat transfer knowledge needed for application in courses on drilling, production engineering and reservoir engineering.

Provide understanding and tools to predict and analyze behavior of non-Newtonian fluids for drilling and well stimulation.

First introduction to unsteady-conduction equations also applied in reservoir engineering.