Seismotectonics - Course Syllabus

Course Number: ErSE 217

Course Title: Seismotectonics

Academic Semester:	Spring	**Academic Year:**	2015/ 2016
Semester Start Date:	Jan, 24, 2016	**Semester End Date:**	May, 19, 2016

Class Schedule: Sun/Wed, 14:30-16:00

Classroom Number:

Instructor(s) Name(s): Sigurjon Jonsson
Email: sigurjon.jonsson@kaust.edu.sa

Teaching Assistant name:
Email:

Office Location: 3136, B1
Office Hours: Tue, 14:00-16:00

COURSE DESCRIPTION FROM PROGRAM GUIDE

Stress and strain, tensor analysis, rheology, brittle vs. ductile deformation, fracture, fault mechanics, friction, stable and unstable sliding, double-couple representation of earthquake sources, moment tensors, coulomb failure stress changes, earthquake triggering, stress drop, Kostrov's summation, comparative seismotectonics.

COMPREHENSIVE COURSE DESCRIPTION

Stress and strain, tensor analysis, rheology, brittle vs. ductile deformation, fracture, fault mechanics, friction, stable and unstable sliding, double-couple representation of earthquake sources, moment tensors, coulomb failure stress changes, earthquake triggering, stress drop, Kostrov's summation, probabilistic seismic hazard assessments, slip-rate determinations, paleoseismology, comparative seismotectonics

GOALS AND OBJECTIVES

Students completing the course should:

- understand stresses and strain in the crust and be able to resolve stresses on faults, apply coordinate transformations and assess failure criteria

- know the behavior of materials and faults in the crust under different conditions

- know how to interpret focal mechanisms and moment tensors in seismotectonics

- be able to derive information for seismic hazard assessment of an area, when provided with basic geological and geophysical data

REQUIRED KNOWLEDGE

Some knowledge of continuum mechanics, general geology and geophysics is expected.

REFERENCE TEXTS

S. Stein and M. Wyssession, An introduction to seismology, earthquakes and earth structure, Blackwell Publishing, Malden, USA, 2003.

Also:

T. Lay and T.C. Wallace, Modern Global Seismology, 1995.

C.H. Scholz, The mechanics of Earthquakes and Faulting, 2nd edition, 2002

D.L. Turcotte & G. Schubert, Geodynamics, 2nd edition, 2002.

B.A. Bolt, Earthquakes (5th edition), 2003.

G. Ranalli, Rheology of the Earth (2nd edition), Chapman & Hall, 1995.

K. Aki and P.G. Richards, Quantitative Seismology, 2nd edtion, 2002.

D. Gubbins, Seismology and Plate Tectonics, 1992.

METHOD OF EVALUATION

Percentages %	**Graded content**
(30%) **(40%)** **(20%)** **(10%)**	**The grading in this class is based on** • **problem sets** • **the midterm exam** • **student presentations** • **and participation and attendance**

COURSE REQUIREMENTS

Assignments

There will be about 4 problem sets during the semester and 1-2 student presentations.

Course Policies

More than 80% attendance is expected. 5% are taken off homework assignments for each day of a late submission.

NOTE
The instructor reserves the right to make changes to this syllabus as necessary.