

GED596.01
SELECTED TOPICS IN GEODESY IV

Instructor *Name:* **Semih Ergintav**
 Office
 Hours: by appointment
 Office
 No.: G 07
 Phone
 No.: 216-516 3251
 e-mail: semih.ergintav@boun.edu.tr

Course *Hours:* TBA
Data:
 Room: Geodesy Department

Course Description (Catalog):

Study of selected topics in geodesy. Focus on the recent developments to solve the “Active tectonic” problems in modern geodesy.

(3+0+0)
(ECTS 7)

GED596.01

Course Content:

Modern geodetic observations (e.g. GPS and InSAR) constrain the crustal deformation models and solve the “Active tectonic” problems. They opened a new area to geodesists. In this course, we introduce the strong connection between active tectonic studies and modern geodesy.

Briefly, the course should help the student to develop her/his own geodetic approach to study problems in active tectonics by learning,

- Monitoring of the kinematic deformations with GPS&INSAR and seismology
- The Modeling strategies of kinematic deformations

Prerequisite: Familiarity with Matlab, Linux, GMT and c-shell programming. Basic knowledge about inverse theory, optimization approaches error estimations and the general concept of kinematic deformations.

Course Objectives (Learning Outcomes):

Students will learn the up to date modern geodetic tools to analyze results of displacement measurements in active tectonics.

Textbook: N/A

Reference Books:

- Burbank D., and Anderson, R., 2001, Tectonic Geomorphology, Blackwell Inc.
- Scholz, C.H., 2002, The mechanics of earthquakes and faulting, Cambridge University Press.
- Segall, P., 2010, Earthquake and Volcano Deformation, Princeton University Press
- Yeats, R.S., Sieh, K., Allen, C.R., 1997, The Geology of Earthquakes, Oxford University Press.
- Battaglia, Maurizio, Cervelli, P.F., and Murray, J.R., 2013, Modeling crustal deformation near active faults and volcanic centers—A catalog of deformation models: U.S. Geological Survey Techniques and Methods, book 13, chap. B1, 96 p., <http://pubs.usgs.gov/tm/13/b1>.

Details of Course Content:

- Overview of Modern Space Geodetic Techniques and their contribution to Active tectonics
- Monitoring of kinematic deformations
- 1-D (arctan) inversions for strike-slip fault slip rates / analytical expressions for dip-slip fault slip rates
- Okada's solutions
- Back-slip models
- Block models
- Slip Inversion
- Applications to real data,
 - for earthquake parameters
 - for fault slip rates