Higher Institute of Earthquake studies and Research

COURSE : seismotectonics
CONTACT HOURS: 6 hours weekly

Description: postgraduate level course.

The course is postgraduate level course main concepts of seismotectonics, including seismogenic structure studies, seismic source characteristics, stress field and seismic cycle, seismic moment, and techniques used for crustal deformation analysis and seismic source kinematic analysis(GPS- Microseismicity analysis- Centroid moment tensor…).The practical part of the course introduces programs necessary for understanding seismic source characteristics in relation with seismic wave field (fault plane solution- spectral analysis- moment tensor analysis..).

Aims & Objectives:

This course aims to provide advanced knowledge concerning seismotectonics.the course deals with the main concepts regarding seismogenic structures and their dynamic and kinematic characteristics in the framework of the regional stress field and the rheological properties of the crust. The concepts of earthquake loading development and seismic cycle are also discussed in detail. Finally main seismic source in Syria and their seismotectonic characteristics are presented.

Syllabus:

Chapter 1: Faulting mechanism and crustal deformation.
Chapter 2:Stress field components.
Chapter 3: Seismic cycle.
Chapter 4: Tectonic and rheological factors affecting seismic activity.
Chapter 5: Seismic source in the frequency domain (source spectra).
Chapter 6: Seismic moment and stress drop.
Chapter 7: GPS analysis and applications in seismotectonics .
Chapter 8: Aftershockes and its seismotectonic implications.
. Chapter 9: Seismotectonics and seismic hazard assessment.
Chapter 10:Main seismic source in Syria.

Course Outline:

Week 1: Crustal deformation and faulting process.
Week 2: Fault types and fault plane solution..
Week 3: Stress field components and faulting process.
Week 4 : Earthquake loading process and seismic cycle.
Week 5: Tectonic and seismic activity.
Week 6: rheology and seismic activity.
Week 7: Frequency-domain signal analysis (extracting seismic source parametres from source spectra) .
Week 8: Seismic moment and stress drop.
Week9: GPS analysis.
Week 10: Aftershocks analysis.
Week 11: Seismotectonics and seismic hazard assessment.
Week 12: Seismotectonics and seismic source in Syria.

Instructional Methodology & Teaching Resources:

Lectures, examples, applications, seminars prepared by students, working on seismic analyzing software.

Resources:

1-An introduction to seismology, earthquakes and Earth structure (By S. Stain and M.Wysession,2003).

2-Modern Global seismology (By L. Thorne and T. Wallace, 1995).

3-Introduction to seismology (By P. Shearer, 2009).

4-Encyclopedia of Geology (Edited in 2005).

5- Scientific papers on Syria geology ,tectonics and seismotectonics.

Head of Department	Date:
Vice dean:	Date:
Dean:	Date: