

Higher Institute of Earthquake studies and Research

COURSE : Seismology

CONTACT HOURS: 6 hours weekly

Description: Postgraduate level course.

The course is postgraduate level presenting in profound main concepts of seismology, including seismic waves, earthquakes, seismic hazard assessment, and the utilization of seismic waves for the study of Earth's interior. The practical part of the course introduces programs necessary for understanding earthquake phenomena in terms of seismic waves and phases, location, magnitude and other source parameters.

Aims & Objectives:

This course aims to provide advanced knowledge and technology concerning seismology, earthquakes, and seismic hazards. The course starts with the concept of earthquake loading development, next, basics of seismology will be presented including types of seismic waves and their propagation and attenuation characteristics in the medium ... etc., then seismic source characteristics will be studied, this will be followed by concepts used in the derivation of ground motion at specific sites and seismic hazard and seismic risk concepts. Finally seismicity (historical and instrumental) and seismotectonics of Syria will be presented.

Syllabus:

Chapter 1: Origin of tectonic earthquakes – Global seismicity – non-tectonic earthquakes - tsunamis.

Chapter 2: Seismogram components.

Chapter 3: Seismic wave types and propagation principles in the geological medium.

Chapter 4: Introduction to Seismic recording systems.

Chapter 5: Frequency-domain signal analysis.

Chapter 6: Seismic source, focal mechanism and seismic wave attenuation parameters estimation.

Chapter 7: Earthquake Magnitude and intensity.

Chapter 8: Seismic Microzonation.

Chapter 9: Ground motion estimation, Seismic hazard.

Chapter 10: Seismicity and seismotectonics of Syria.

Chapter 11: Seismological techniques for the study of Earth's interior.

Course Outline:

Week 1: Introduction to Plate tectonics and Geodynamics.

Weeks 2 - 3: Seismogram components.

Week 4: Seismic wave types and propagation principles in the geological medium.

Week 5: Introduction to Seismic recording systems.

Weeks 6 - 7: Frequency-domain signal analysis.

Week 8: Seismic source focal mechanism and seismic wave attenuation parameters estimation.

Week 9: Earthquake Magnitude and intensity.

Week 10: Seismic Microzonation.

Week 11: Ground motion estimation - seismic hazard - seismic risk.

Weeks 12 – 13: Seismicity and seismotectonics of Syria.

Week 14: Seismological techniques for the study of Earth's interior.

Instructional Methodology & Teaching Resources:

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

Resources:

- An introduction to seismology, earthquakes and Earth structure (by S. Stain and M. Wyssession, 2003).
- Modern Global Seismology (By L. Thorne and T. Wallace, 1995).
- Introduction to Seismology (By P. Shearer, 2009).
- Encyclopedia of Geology (Edited in 2005).
- Scientific papers on Syria geology, tectonics and seismotectonics.

Head of Department:

Date:

Vice dean:

Date:

Dean:

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