

Higher Institute of Earthquake studies and Research

COURSE : Networks and Instrumentations for Earthquakes Observation

CONTACT HOURS: 6 hours weekly

Description: Postgraduate level course.

The course is postgraduate level presenting main concepts of earthquake instrumentation used for observation, recording, data transmission and storage for both analogue and digital network.

Aims & Objectives:

This course aims to provide advanced knowledge and technology concerning the development and up to date instrumentations used in Earthquake seismology and basic principles of Seismometers technical specification, and its way of working, Calibration. Moreover, the analysis of natural and artificial seismic noise and its effect on seismological station site and earthquake seismogram.

Also, the course deals with seismological networks, their types and communication protocols in both physical and virtual, as well as the converting tools between analogue and digital form of earthquake data.

Syllabus:

Chapter 1: Introduction

Chapter 2: Seismological sensors

Chapter 3: Seismic noise

Chapter 4: Analog to digital converter.

Chapter 5: Seismological recorders.

Chapter 6: Correction for instrument response.

Chapter 7: Seismological stations

Chapter 8: Seismological networks.

Chapter 9: Seismological arrays.

Chapter 10: Calibration and testing.

Course Outline:

Week 1: Introduction to seismological instrumentations.

Week 2: Seismological sensors (Types, Constructions, Examples).

Week 3- 4: Seismological sensors (Response, Calibration Coil, Velocity and Acceleration).

Week 5- 6: Seismic noise (Observation, Types, Spectra), A/D Converter Technology.

Weeks 7- 8: Seismological recording systems (Analog Recording, Amplifiers and filters, Digital Recording).

Week 9: Correction for instrument response (Spectral analysis, Time and Frequency domain).

Week 10: Seismological stations (Site selection, Noise survey, Site preparation, Installation and operation).

Weeks 11- 12: Seismological networks (Type and Usage, Geometry and Configuration, Physical and Virtual Networks Communication and Data Transmission Technology, Examples).

Week 13: Seismological arrays (Size, geometry, characteristics and Example).

Weeks 14: Calibration and testing (free period, damping, Generator constant, Response Curve Plotting).

Instructional Methodology & Teaching Resources:

Lectures, seminars prepared by students, Software.

Resources:

- Instrumentation in Earthquake Seismology (Havskov and Alguacil,2010)
- Introduction to Seismology (Shearer, 2009) - An Introduction to Seismology, Earthquakes and Earth Structure (By Stain and M. Wyssession,2003)
- New manual of seismological observatory practice (NMSOP), (Bormann, P., 2002, Potsdam)
- Of poles and zeros, fundamentals of digital seismology (Scherbaum,1996)
- Scientific papers and reports on Seismological networks in Syria and other countries.

Head of Department:

Date:

Vice dean:

Date:

Dean:

Date: