

ESR-399 Training in the Specialization

A. Field Training (1 week):

- Field studies of geologic structures using Brunton Compass, aerial photographs and satellite imagery.
- Classification of structural fabric elements.
- Timing of successive generations of structural elements.
- Geometric analyses of various kinds of structural fabrics.
- Drawing structural maps of some selected areas.
- Use of stereographic projection in structural analyses.
- Submission of a structural map and a report on the selected study areas.

B. Laboratory Training (over 4 weeks the student has to carry out training in both the Department and Saudi Geological Survey in the application of Image Processing and GIS techniques in the construction of geologic maps) :

*** Image Processing: (ERDAS Imagine 8.3 image processing software is used)**

- Image display.
- Layer stack.
- Image to image registration.
- Visualize a multi-band image by different color composites.
- Create map composition.
- Subset image.
- Radiometric enhancement.
- Mosaic Images.
- Spatial Enhancement (Convolution).
- Unsupervised Classification.
- Supervised Classification.
- Accuracy Assessment.

*** GIS:**

- Introduction to ArcView 3.2, and ARCGIS 9.0.
- Digitizing map features.
- Create and modify tabular data.
- Link and join tables.
- Perform basic queries.
- Creating Contour Map and 3D Scene.
- Save selected features.
- Spatial query based on spatial relationships
- Buffer operation.
- Spatial overlay operations.

ESR-499 (B.Sc. Project)

The main aim of the B.Sc. Graduation Project in the "Department of Structural Geology and Remote Sensing" is to construct detailed geologic and structural maps on an interesting area in the Arabian Shield. In order to implement this goal, the student has to carry out detailed field work throughout a couple of weeks, together with intensive laboratory work for at least three months. Detailed description of both field and laboratory program is given below:

A. Field Work: (at least 1 week)

- Collection of representative samples from the different rock units exposed in the study area.
- Careful investigation of the geologic contacts between these rock units.

- Identification and discrimination of the different structural fabrics recorded in the area (primary and secondary structures).
- Using of primary structures in the determination of facing or younging direction in case of sedimentary and metasedimentary successions.
- Measuring the attitudes of both planar and linear structures encountered in the area by means of magnetic compass.
- Tracing the major structural elements and studying their relations to the minor structures.
- In areas exhibiting strain markers, the student has to study and describe these markers with the aim of the determination of the strain ratios (Rs) in the rocks.
- Studying the relation of folding to fracturing in the area.

B. Laboratory Work:

- Projection of the collected structural measurements on stereographic projection, with the aid of recent programs such as Stereonet, Dips, Georient and Spheristat.
- Petrographic description of the collected rock samples.
- Study of the relation of structures to metamorphism in case of metamorphic rocks.
- The student has to carry out detailed geometric analyses of the projected structural data.
- Application of GIS and Remote Sensing techniques in the preparation and construction of both geologic and structural maps.
- Submission of a detailed structural report of the study area.
- Presenting and discussing of the obtained results in a seminar.