تنظـــم

الجمعية الجغرافية السعودية

والهيئة القومية للاستشعار من البعد و علوم الفضاء

برامج تدريبية في الاستشعار عن بعد ونظم المعلومات الجغرافية

Training Courses Syllabus

Course No.1: Basics of Geographic Information System (GIS)

Course Contents:

1 - Introduction

- Basic Definitions, Components and Functions.
- Different Methods for Data Capture and Preparation.
- GIS Data Formats and Conversions among them.
- Advantages of GIS Principle.
- Capabilities of Used GIS Software.

2- GIS Data Modeling and Management

- Different Types for GIS Data Modeling.
- Entity Relationships Model.
- Concept of Data Topology.
- The Ways for Data Presentation.

Course No. 2: Advanced Course in Geographic Information System (GIS)

Course Contents:

1- Physical GIS Data Management

- Basic Definitions and Components of Geodatabase.
- Advantages of Geodatabase.
- Different Types of Spatial Data Management.
- Relational Operations of GIS Data within the Geodatabase.

2 - GIS Data Analysis

- Basic Precautions Prior to GIS Data Analysis.
- Different Methods of GIS Data Analysis.
- Multi Criteria Data Analysis.

Course No. 3: Basics of Remote Sensing (RS)

Course Contents:

1. Introduction and concept of Remote Sensing.
2. Process of Remote Sensing and remote sensing systems.
3. EMR-Atmosphere-Target interaction.
4. Types of satellites sand Sensor characteristics.

5. Advantages and limitations of remote sensing.
6. Basics of Digital Image Processing and Quick start to ENVI software.
7. Image preprocessing techniques.
8. Applications of Remote Sensing.

Course No. 4: Advanced Remote Sensing (RS)

Course Contents:

1. Mosaicking Multiple Satellite images into one dataset.
2. Removing noise from data (MNF).
3. Removing stripping and missing pixels from satellite imagery.
4. Spatial resolution enhancement (Data Fusion)
5. Advanced mapping methods
6. Geological Application (and/or) Environmental Application.

Course No. 5: Integration between Remote Sensing (RS) and GIS

Course Contents:

1. Introduction to Remote Sensing and GIS.
2. Advantages of remote sensing and GIS.
3. Getting familiar with ENVI and Arc GIS software's.
4. Opening, preprocessing and processing satellite image data in ENVI.
5. Exporting data from ENVI for Arc GIS formats.
6. Georeferencing and rectification of scanned maps.
7. Creating shapefiles, digitizing and Editing.
8. Coding, symbology, and map production.
9. Automatic digitizing using Arc Scan.

Course No. 6: Advanced Geotechnologies

Course Contents:

1- Meaning and Definitions of Geotechnologies.
2- Integration of Geotechnologies.
3- Modeling of Geotechnologies.
4- Thermal & Microwave Remote Sensing.
5- Laser data and Analysis.
6- Hyperspectral Remote Sensing.
7- Radar Theory and Applications and data analys
8- Numerical Weather & Climate Modelling.

Course No. 7: Applications of Remote Sensing and Geographic Information System

Course Contents:

1- Application in land use and land cover mapping at different levels.
2- Application in Geology, Geomorphology, and Mineral resources.
3- Application in Environment, and Natural Hazards.
4- Application in Water Resources.

Course No.8: Geostatistical/ Spatial Analysis

Course Contents:

1. Principles of geo-statistical analyses & applications.
2. Assessing geospatial techniques (e.g. IDW, kriging).
3. Data preparation, exploration.
4. Generating surface and assessing outputs.
5. Threshold limits identification and assessment.
6. Practical application 1 (Water Quality).
7. Practical application 2 (Air Quality).

Course No. 9: GIS Modelling

Course Contents:

1- Basics and Definitions of Modelling
2- Types of GIS Modelling
3- Creating a GIS Model and designing a criteria tree.
4- Model criteria and Conditions.
5- Binary Overlay models.
6- Arithmetic Overlay Modelling.
7- Weighted Linear Combination Overlay Modelling.
8- Applications of GIS Modelling (suitability mapping).
9- Application of GIS modeling in site ranking and selection.
10- Sensitivity Analysis.

Course No. 10: Aerial and Space Digital Photogrammetry

Course Contents:

1- Definition of Photogrammetry.
2- Basics of Aerial & Space Digital Photogrammetry.

3- Stereoscopic Viewing.
4- Interpretation and Analysis.
5- Digital Elevation Models (DEM).
6- Air & Space photo mosaics and orthophotos.
7- Applications of Aerial & Space Digital Photogrammetry.
8- Accuracy Standards for Map Production.

Course No. 11: Survey and GPS

Course Contents:

1- Main concept of Geodesy.
2- Reference coordinate systems used in Geodesy.
3- Transformation between Different Coordinate Systems on the same Ellipsoid.
4- Mathematical Geodesy.
5- Transformation parameters among different models on different ellipsoids.
6- Satellite Geodesy and its applications (GPS).
7- Map Projection.
8- Map classification.
9- Geodetic Nets, its Applications and Calculations.
10- Geoid determination and its applications.

Course No. 12: GIS Programming

Course Contents:

1. Introduction to GIS modeling and Python.
2. Python and programming basics.
3. GIS data access and manipulation with Python.
4. Practical Python for the GIS analyst.

Course No. 13: Advanced GIS Programming

Course Contents:

1. Advanced Python.
2. Building GIS Add-ins.
3. Introduction to Standalone GIS Interfaces.
4. Spatial SQL.
5. Object-oriented programming.

Course No.14: Web GIS

Course Contents:

1- Web Page Basics.
2- Web Mapping Basics.
3- Getting Started with Google Maps API.
4- Info windows – Just one please.
5- Evaluating an API for use in a Map room.
6- Geospatial web services basics.
7- Real-Time map service. Web services optimization, OGC web services standards.
8- Mobile GIS.
9- Geospatial Mashups Virtual Reality and 3D Cartography.
10- The future of Internet GIS(Geospatial Semantic Web, Cloud Computing, etc).

Course No.15: Basics of Geographic Information System (ArcGIS pro Software)

Course Contents:

1- GIS Information.
2- Exploration.
3- Database.
4- Type of Feature.
5- Attributes
6- Domain & Subtype
7- Georeference.
8- Digitizing.
9- Symbology.
10- Cartography & Style.
11- Layout.

Course No.16: Advanced of Geographic Information System (ArcGIS pro Software)

Course Contents:

1- Geoprocessing Tools.
2- Model Builder
3- 3D Analysis.

4- Hydrology Analysis.
5- Data Management Tools.
6- Relationship Class.
7- Topology.

Course No.17: Advanced2 of Geographic Information System (ArcGIS pro Software)

Course Contents:

1- Network Analysis.
2- Geostatistical Analysis.
3- Raster Analysis.
4- Supervised Classification.
5- UnSupervised Classification.

Course No.18: ArcGIS Online

Course Contents:

1- Intro to ArcGIS Online.
2- Sharing contents
3- Dashboards.
4- Story Map.
5- Web app builder
6- Survey 123
7- Business Analysis.