

## CC312 - GIS for Climate Change and Adaptation Course

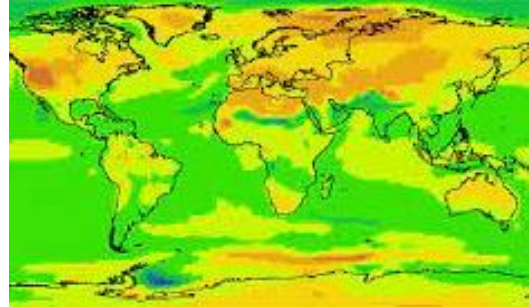
Course Duration: 10 Days

Training Fee: KSH 80,000 | USD 800

Course Registration: [Register Here>>](#)

### 1.0. Introduction

The planet earth is experiencing a profound climate change which influences the land surface processes. The climate change requires a more thorough understanding of the scientific basis of both natural and anthropogenic causes. This module focuses on the basic concepts of climate change and adaptation. The causes and impacts of climate change will be tackled in the module based on the principles of energy balance and moisture circulation. Through course material, lectures, discussions and field exercises, participants can use modelling tools to generate climate change scenarios. The application of Geospatial techniques helps students to obtain skills for measuring spatiotemporal patterns of climate change and evaluating their impacts on the ecosystem and human life.



### 1.1. Course Overview

The main objective of this course will be to provide students with a knowledge-base and skills to critically evaluate information concerning climate change and its related issues. Geo-related field exercises include: (1) Functions and role of GIS in climate change studies; (2) GIS-assisted spatial interpolation and presentation of climatic data; (3) GIS-assisted assessment of climate change impacts; (4) Climate Models and Modelling Climate Changes. Additionally, both the mitigation measures and potential strategies for adaption and mitigation for global warming will also be introduced and discussed in this module.

### 1.2. Course Objectives

This course will enable the participants:

- i. To gain knowledge and hands-on experience about effects of carbon in atmosphere; climate change and its causes.
- ii. To be able to measure the elements of climate change and their spatial distribution.
- iii. To obtain skills to use Geospatial techniques for evaluating the impacts of climate change.
- iv. To make use of climate generator and/or downscaling technique to generate climate change scenarios.
- v. To assess various strategies for adaption to climate change.

### 1.3. Learning System

The learning and teaching strategies will follow student centered mode. Through the lectures, in-depth reading and group discussions, the students will acquire advanced knowledge about

climate change and related issues. The students develop skills on how to use Geospatial techniques for data acquisition, processing and analyses of ground based as well as satellite sensed climate data. Further, the students will learn the principles of dynamic modelling using climate generator and downscaling technique for generating climate change scenarios as well as to assess the feasibilities of different adaptation strategies.

#### 1.4. Course Content/Outline

- i. **Introduction to Climate Change:**
  - Gain knowledge and geo-skills about the phenomenon of weather and climate;
  - Understand the concept of climate change at a global perspective;
  - Learn the approaches to climate change studies using Geo- techniques.
- ii. **Application of GIS in Climate Change Studies:**
  - Get acquainted with applications of Geo-techniques in climate change studies;
  - Create and present climatic dataset using GIS and remote sensing software.
- iii. **Evidence and Impact of Climate Change:**
  - Identify the main evidences of climate change;
  - Analyze the trends of climate change;
  - Recognize the consequences of climate change.
- iv. **Geospatial interpolation of Climate Parameters:**
  - Learn about different interpolation methods;
  - Perform GIS-assisted spatial interpolation of climate data.
- v. **Energy Balance and Temperature:**
  - Familiarize with the concepts of earth's radiation;
  - Understand the energy balance on the earth;
  - Learn how latitude, elevation, ocean, land use & land cover affect distribution of temp.
- vi. **Climate GIS Models and Modelling Climate Changes:**
  - Learn the concepts and types of climate models;
  - Assess the performance of climate models;
  - Learn the downscaling techniques in climate change;
  - Learn climate generator and compare various models.
- vii. **Future Climate Change and Projected Impacts:**
  - Generate future climate change scenarios;
  - Downscale of future climate change data;
  - Evaluate the trend of future climate change.
- viii. **Climate Change Adaptation strategies:**
  - Understand climate change mitigation measures;
  - Propose the potential strategies for adaptation and mitigation for global warming.

### 1.5. Expected Learning Outcomes

On completion of this course, the participants are expected to:

- i. Obtain solid skills and experience in application of geo-information and earth observation techniques in climate change and adaptation.
- ii. Acquire knowledge and skills needed for the collection, interpretation, and management of spatial information, using remote sensing and geographic information systems, to support climate change mitigations.
- iii. Gain skills using Geospatial tools that help in creating a disaster risk map.
- iv. Obtain the insights on use of modern-day geo-technologies to create GIS models for climate change and generate future climate change scenarios.
- v. Get acquainted with relevant GIS and other geo-techniques to provide project specific solutions in the field of climate change, adaptation and mitigation.

### 1.6. Training Tools (Hardware and Software)

1. Android Smartphone;
2. A Laptop or PC;
3. Satellite images;
4. ENVI Software;
5. Python, R and Excel;
6. ArcGIS & Q-GIS;

### 1.7. Training Style and Approach

1. On-site instructor-led training;
2. On-line training (optional);
3. Use of PowerPoint Slides;
4. Fieldwork Exercises;
5. Use of Case Studies.

