

Course Name	Code\No.	Number of Credits			
		Theo.	Lab.	Train.	Credit
GIS Applications in nvironmental Sciences	HWR 317	2	1	-	3
Pre-Requests	HWR 221 - CPIT 110				

**Course Objectives:**

This course aims to provide knowledge to the students about Geographic information systems and their applications in natural and environmental resources management field and to give intensive training to students in using GIS software and applying it in analysis of spatial data.

**Course Contents:**

1. Introduction about GIS: spatial data, GIS software, advantages of using GIS, Methods of spatial data entry, GPS.
2. Coordinates and projection systems: coordinate systems, latitudes and longitudes, geographic projections, orientation of map projection, properties of map projection, UTM.
3. Applications of GIS: GIS applications in various fields, questions GIS help to answer, GIS analysis, Query tools, Algebraic operations, distance operators, context operators and Surface interpolation.
4. Applications in environmental sciences: Direct applications of GIS in environmental sciences, Geographic information systems applications in the field of pollution, merging geographic information systems with digital heights, conducting queries from spreadsheets or maps, performing map overlay analysis, producing geochemical maps and geographic information systems applications in the field of renewable energy such as selecting the most appropriate sites.
5. Introduction of remote sensing and its relation with GIS.
6. Presentation of students term projects.
7. GIS practical exercises: fifteen practical exercise in GIS lab and term project chosen by the student and provide report and presentation at the end of the term.

**Course outcomes:**

It is expected that the student will get the following knowledge and experience:

1. Recognize GIS and benefits of using it.
2. Define spatial data.
3. Recognize DEM and their applications.
4. Recognize how to produce digital maps.
5. Recognize to extract watershed boundary and channel network from digital amps.
6. Recognize how GIs are used for spatial analysis.
7. Recognize how GIS can be used as tool for decision-making.
8. Explain how to use GIS as a tool of decision-making.
9. prepare lab reports and term project report and presentation
10. Choose a topic of term project.
11. Collect data and present results in report.
12. Provide oral presentation.
13. Demonstrate ability to use GIS software
14. Demonstrate ability to work with digitizer and scanner as source of spatial data.
15. Demonstrate ability to use GPS to collect spatial data.

**Evaluation Method:**

The evaluation is performed by periodic tests, presentation of term project and reports of term project and lab exercises.

**References:**

• الخزامي، محمد (١٩٩٨) نظم المعلومات الجغرافية

- Gurnell, A. M. (2000) Hydrological application of GIS, published by J. Wiley
- Fetter, C.W. (1998) Contaminant hydrogeology, Prentice Hall, 2nd edition.
- [www.gisclub.net/inf/](http://www.gisclub.net/inf/)
- <http://www.ce.utexas.edu/prof/maidment/gishydro/home.html>
- ARCGIS Software

