**Course Outline
Geographic Information Systems (GIS)
2022-2023**

**Time:** 8:30-9:30pm (theory) and 11:30-1:30pm (practical), Monday
**Location:** college of science, department of Earth sciences and Petroleum, Salahaddin University
**Lecturer:** Dr. Rebar Tahseen Mzuri, Department of Earth sciences and Petroleum
**Full title:** Introduction to Geographic Information Systems and Techniques
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**Course Objectives**
This is an introductory course covering the theory and application of geographic information systems (GIS). The course includes an overview of the general principles of GIS and practical experience in its use. The lectures follow the organization of the textbook. The practical component involves the hands-on use of desktop GIS software packages.

Upon successful completion of this course, the student should be able to:

* Define Geographic Information Systems (GIS)
* Identify and evaluate GIS data sources and the importance of metadata
* Demonstrate the process of converting analogue data to digital data for use in a GIS
* Identify, compare and contrast vector and raster GIS
* Evaluate the capabilities of various GIS software programs
* Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature
* Apply spatial analysis functions on a GIS to solve a Geospatial problem
* Describe data storage, editing and retrieval techniques used in a GIS

**Text and Readings**
Huisman, Otto, and R. A. De By. "Principles of geographic information systems." ITC Educational Textbook Series 1 (2009): 17.

Chrisman, Nicholas. "Fundamental principles of geographic information systems." In Proceedings of auto-carto, vol. 8, pp. 32-41. 1987.

**Practical Component**
Class will consist of lecture, discussion, and labs. You will be given time in class to work on the labs. The practical exercises provide a way to acquire skills using ArcGIS and other software packages and to apply the course concepts to real data.Lab assignments should be submitted on the date specified on the lab, at the beginning of the lab period (you will normally have at least one week to complete each lab).

**Project Assignment**
The project is intended to provide a deeper understanding of a GIS application through hands-on experience. The project should investigate a particular research problem using GIS software from class. You should acquire (and, if necessary, create) the spatial and attribute data required to complete the project.  The project should involve some type of spatial analysis. Projects can be done in teams of up to two members. The quality and timeliness of these intermediate products will be incorporated into the final project grade.  More information on the projects will be distributed during the semester.

**Participation and Attendance**
Because of the lab-based structure of this class, attendance is extremely important.  The participation/attendance aspect of the course also includes active participation in class and the completion of short exercises used to monitor the mastery of GIS concepts and skills.

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|  **GRADING SCHEME** |   |
| Lab Assignments | 25% |
| Exam  | 30% |
| Participation and Attendance | 15% |
| Final Project | 30% |
| Total | 100% |

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| **Outline of Lecture Topics****and Readings** |
| **Topic** | **Readings** |
| Overview of the course; Overview of GIS: Definitions, components, applications | Lec. 1 |
| GIS Data Models  | Lec. 2 |
| Projections and Coordinate Systems | Lec. 3 |
| Data Sources and Data Entry, Digitizing, GPS, Remote Sensing | Lec 4-7 |
| Attribute Data: Queries and Analysis; Spatial Data: Spatial Queries and Basic Spatial Analysis | Lec. 8-9 |
| Visualization of Spatial Data (Geo-information) | Lec. 10-12 |
| Database Management Systems | Lec. 13 |
| Implementation Issues and the Future of GIS | Lec. 14 |

**Key Dates to Remember**September 27: Project teams must be formed. Inform the instructor in writing of team members and possible project topics.
November 17: Exam.
December 6 and 8: Project presentations. Each group member must participate.
December 14: Project reports due at 1:00pm.