****

**Department of Geomatics (Surveying)**

**College of Engineering**

**University of Salahaddin**

**Subject: Application of GIS**

**Course Book Fall Semester**

**Lecturer's name MSc Assistant Lecturer Mrs. Hadeel Jamal Ali**

**Academic Year: *2022- 2023***

**Course Book**

|  |  |  |
| --- | --- | --- |
| **1. Course name** | **Application of GIS** | |
| **2. Lecturer in charge** | **Assistant Lecturer Mrs. Hadeel Jamal Ali** | |
| **3. Department/ College** | **Geomatics / Engineering** | |
| **4. Contact** | **e-mail:** [**hadeel.ali@su.edu.krd**](mailto:hadeel.ali@su.edu.krd) | |
| **5. Time (in hours) per week** | **Theory: 2**  **Practical: 3** | |
| **6. Office hours** |  | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | [**https://drive.google.com/drive/u/0/folders/1XBtJ8Tkr2zWp627Gpl2aWUmUnSHVgK9K**](https://drive.google.com/drive/u/0/folders/1XBtJ8Tkr2zWp627Gpl2aWUmUnSHVgK9K)  **I am Hadeel Jamal Ali. I was born in Baghdad / Iraq. I completed my studying for M.Sc. in University of Technology/Baghdad, College of Building and Construction Engineering (2009-2012), Specialization: Geomatic Engineering. Now, I am working in Salahaddin University-Hawler as Assistant Lecturer in Engineering college/Surveying Department. I am teaching for Second (Data Processing), Third (Highway Engineering), Fourth (GIS) Stage.** | |
| **9. Keywords** |  | |
| **10. Course overview:**  Geographic Information Science (GIS) is the science of linking data to locations to explore spatial relationships. GIS is way more than just maps! By evaluating the relationship between different spatial information you can identify the best location for new development, locate pollution point sources, find the easiest way to get from point A to point B, and develop a better understanding of the way the world interacts. Geographic Information Systems (GIS) are used in a wide variety of planning, facilities management, resource management, business, and applied research applications. The common thread in this diverse range of applications is the need to store, manipulate and analyze spatial data. Since spatial factors are central to almost all issues related to planning and geographic inquiry, it is important to develop a sound understanding of GIS principles and the fundamental skills required to apply it in practice.  The course is made of two components: lectures and labs. In the lectures, the conceptual elements of the geographic data input, data manipulation and data storage, spatial analytic and modeling techniques. The labs are designed in such a way that students will gain first-hand experience in data input, data management, data analyses, and result presentation in a geographical information system. | | |
| **11. Course Objective:**  The overall goals of GIS course for students are listed below.   * Students will learn how to store, retrieve, manipulate, analyze, and display spatial data derived from various sources. This course will use the most popular programs, including ArcGIS. * To understand the basic structures, concepts, and theories of GIS. GIS knowledge relevant real-world situations and problems. Critical analysis and effective communication using maps. * To gain a hand-on experience with a variety of GIS operations. * Promote understanding of the geographic information science and technology enterprise. * Allow students to choose and apply of appropriate methods for the GIS spatial data. * Allow students to formulate a research problem in a SPECIFIC topic area, to gather and organize appropriate available datasets, and to understand how a variety of GIS-methods among those covered in the course can be applied in combination to thoroughly explore real questions. GIS as a tool for a variety of applications and disciplines.   As an important component of this course, labs are designed closely related to lectures and provide hands-on experiences of using GIS software ArcGIS 10. | | |
| **12. Course Objective:**  The overall goals of GIS course for students are listed below.   * Students will learn how to store, retrieve, manipulate, analyze, and display spatial data derived from various sources. This course will use the most popular programs, including ArcGIS. * To understand the basic structures, concepts, and theories of GIS. GIS knowledge relevant real-world situations and problems. Critical analysis and effective communication using maps. * To gain a hand-on experience with a variety of GIS operations. * Promote understanding of the geographic information science and technology enterprise. * Allow students to choose and apply of appropriate methods for the GIS spatial data. * Allow students to formulate a research problem in a SPECIFIC topic area, to gather and organize appropriate available datasets, and to understand how a variety of GIS-methods among those covered in the course can be applied in combination to thoroughly explore real questions. GIS as a tool for a variety of applications and disciplines.   As an important component of this course, labs are designed closely related to lectures and provide hands-on experiences of using GIS software ArcGIS 10. | | |
| **13. Forms of Teaching**  No two teachers are alike, and any teacher with classroom teaching experience will agree that style of teaching is uniquely own. An effective teaching style engages students in the learning process and helps them develop critical thinking skills. Traditional teaching styles have evolved with the advent of differentiated instruction; prompting teachers to adjust their styles toward students’ learning needs. There are many different types of teaching and learning materials that can be used by lecturer. Like traditional methods: pens, whiteboard, Eraser and Methods illustrative: Maps, Charts, diagrams, Books, Videos and Overhead projectors, Slide PowerPoint  Although it is not the teacher’s job to entertain students, it is vital to engage them in the learning process. Selecting a style that addresses the needs of diverse students at different learning levels begins with a personal inventory — a self-evaluation — of the teacher’s strengths and weaknesses. | | |
| **14. Assessment scheme**  The grade distribution is as follows:   |  |  |  | | --- | --- | --- | | ***Examination*** | ***Approximate Date*** | ***Mark (%)*** | | ***First semester*** | ***January*** | ***15*** | | ***Practical First semester*** |  | ***5*** | | ***Second semester*** | ***April*** | ***15*** | | ***Practical Second semester*** |  | ***5*** | | ***Activities & quizzes*** |  | ***10*** | | ***Practical Exam*** | ***May*** | ***10*** | | ***Final Examination*** | ***June*** | ***40*** | | ***Total Mark*** |  | ***100*** |   ‌ | | |
| **15. Student learning outcome:**  **References Theoritical**   * Longley, P., and et al, (2005). Geographic Information Systems and Science, 2nd Edition. John Wiley and Sons, Toronto. * Rolf, A., and et al, (2001), "Principles of Geographic Information Systems", ITC, Enschede, Netherlands. * Johnson L. E., (2009), “Geographic Information Systems in Water Resources Engineering”, Taylor & Francis Group, LLC, USA. * ESRI, (2012), “What is the GIS?”, Redlands, USA.   **References Practical**   * Getting Started With ArcGIS. – Redlands, USA: ESRI. * ArcGIS ArcCatalog. – Redlands, USA: ESRI. * Building a Geodatabase. – Redlands, USA: ESRI. * ArcGIS ArcMap. – Redlands, USA: ESRI. * Editing in ArcMap. – Redlands, USA: ESRI. * ArcGIS Spatial Analyst. – Redlands, USA: ESRI. * ArcGIS 3D Analyst. – Redlands, USA: ESRI. * ArcScan for ArcGIS. – Redlands, USA: ESRI. * ArcGIS Survey Analyst. – Redlands, USA: ESRI.   ArcGIS Tracking Analyst. – Redlands, USA: ESRI. | | |
| **16. Course Reading List and References‌:**  ▪ Key references:  ▪ Useful references:  ▪ Magazines and review (internet): | | |
| **17. The Topics:** | | **Lecturer's name** |
| |  |  |  |  | | --- | --- | --- | --- | | **Month** | **Week No.** | **Name of the Chapter** | **Names of the Topics** | | **Sep** | **1st Week**  **2nd Week** | **Spatial Analysis** | * **Introduction to spatial analysis** * **Spatial Analysis and GIS** * **aim of Spatial Analysis** * **Types of Spatial Analysis**   **Spatial Analysis Functions** | | **Oct** | **3rd Week**  **4th Week**  **5th Week**  **6th Week** | **Network Analysis** | * **Introduction to Networks** * **Introduction to Network Analyses** * **Classic networking problems** * **Three common types of network analyses** * **Requirement of Network Analysis** | | **Nov** | **7th Week**  **8th Week**  **9th Week**  **10th Week** | **Three-dimensional data analysis** |  | | **Dec** | **11th Week 12th Week** | **Maplex for ArcGIS** |  | | | |
| **18. Practical Topics (If there is any)** | |  |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | **Month** | **Week No.** | **Name of the Chapter** | **Names of the Topics** | | **Sep** | **1st Week**  **2nd Week** | **Spatial Analysis** | * **ArcGIS Spatial Analyst** | | **Oct** | **3rd Week**  **4th Week**  **5th Week**  **6th Week** | **Network Analysis** | * **ArcGIS Network Analyst** | | **Nov** | **7th Week**  **8th Week**  **9th Week**  **10th Week** | **Three-dimensional data analysis** | * **ArcGIS 3D Analyst** | | **Dec** | **11th Week 12th Week** | **Maplex for ArcGIS** |  | | | | |
| **19. Examinations:**  ***1. Compositional:*** In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?  With their typical answers  Examples should be provided  ***2.******True or false type of exams:***  In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided  ***3. Multiple choices:***  In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided. | | |
| **20. Extra notes:** | | |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** | | |