

**Jerash University**

**Faculty of Computer Science and Information Technology**

**Computer Sciences Department**

**Semester**: Fall Semester 2018/2019

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| **Course symbol and number:** 1002440 | **Course Name: نظم المعلومات الجغرافية**  **Geographical Information Systems** |
| **Teaching Language:** English | **Prerequisites:** 1002140+ 1003250 |
| **Credits:** 3 hours**.** | **Course Level:** 400 |

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| **Course Description** |
| GIS (Geographic Information Systems) is a computer-based tool that uses spatial (geographic) data to analyze and solve real-world problems. This course is designed to introduce the student to the basic principles and techniques of GIS. The lab material will emphasize GIS data collection, entry, storage, analysis, and output using ArcGIS. |

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| **Course Objectives** |
| Students will learn how to compile, analyze, and present geospatial data while emphasizing the value of visual communication. Students will learn these basic geospatial concepts while working with ESRI’s ArcGIS software. |

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| **Learning Outcomes** |
| students should be able to:   * Will be able to describe what geography and GIS are; * Will understand the importance of scale, projection, and coordinate systems in GIS; * Will understand vector and raster data structures and the appropriate use of each of these data structures; * Will understand the basics of data capture, storage, analysis, and output in a GIS; and * Will understand typical uses of GIS in business, government, and resource management. |

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|  | **Text Book(s)** |
| **Title** | Getting to Know ArcGIS |
| **Author(s)** | [Tim Ormsby](https://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Tim+Ormsby&search-alias=books&field-author=Tim+Ormsby&sort=relevancerank) |
| **Publisher** |  |
| **Year** | 2008 |
| **Edition** | Second  Edition |

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|  | **References** |
| **Books** |  |
| **Internet links** | http://www.jpu.edu.jo/lms |
| **Course link** | [Click here](http://www.jpu.edu.jo/lms) |

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|  | **Instructors** |
| **Instructor** | Dr..Bassam Mohammed El-zaghmouri |
| **Office Location** | الطابق السابع - 709 |
| **Office Phone** | 189 |
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| **Topics Covered** | | | |
| **Topics** | **Chapters in Text** | **Week number** | **Teaching hours** |
| **Introduction to GIS:**   * Review Syllabus, Course Rationale, and Objectives; * Introduce GIS; * Become familiar with ArcGIS software * Become familiar with ArcMap menus, toolbars, and map elements; and * Learn how to explore data using ArcMap and ArcCatalog. |  | 1-2 | 6 |
| **Envisioning Information:**   * Introduce the concept of envisioning information; * Understand the value of maps; * Learn how to symbolize features and rasters in ArcGIS; and * Learn how to classify features and rasters in ArcGIS. |  | 3 | 6 |
| **Features and Attributes:**   * Understand what features are and how they model (i.e. represent) geospatial features; * Understand what attributes are and how the describe geospatial features; and * Explore how features and attributes are linked and displayed in a GIS. |  | 4 | 6 |
| **Attribute Queries:**   * Use ArcGIS to find and query attributes; * Introduce selection methodologies available in ArcGIS; * Use Structured Query Language (SQL) to execute standard database queries; and * Create summary reports based on attribute queries. |  | 5 | 6 |
| **Tables:**   * Identify basic structure and data types for tables stored in a GIS; * Identify common tabular formats imported into a GIS; and * Learn how to perform a join and relate between two tables and a feature class and a table. |  | 6 | 6 |
| **Spatial Queries:**   * Which businesses are within 1000-feet of a new school? * How many wells are registered within an aquifer? * Which roads are crossed by a proposed rail line? |  | 7 | 6 |
| **Geoprocessing:**   * Consolidating contiguous habitat zones; * Creating new market service areas based on ZIP code boundaries; and * Performing a suitability analysis for a specific project area |  | 7 | 3 |
| **Spatial Analysis:**   * Introduce vector, raster, and three dimensional spatial analysis; * Understand the application of spatial analysis; and * Perform spatial analyses using vector and tabular data. |  | 8 | 3 |
| **Map Projections and Scale:**   * Introduce map projections, coordinate systems, and scale; and * Understand how to identify the appropriate map projections, coordinate systems, and scale for your GIS application. |  | 9 |  |
| **Data Types, Structures, and Formats:**   * Recognize the different data types and structure available to represent geospatial and tabular data; * Learn how to select the most appropriate data type and structure to support your objective; * Discuss the value of smart feature in planning applications; * Understand the role of subtypes, relationships, domains, validation rules, and topology; * Recognize the most common GIS data formats; * Explore different data types, structures, and formats using ArcGIS; and * Learn how to develop a geospatial inventory. |  | 10 |  |
| **Data Creation, Collection, and Quality:**   * Be able to identify the geospatial data required to support a process; * Understand the differences between utilizing existing data and creating your own; * Learn where to find data; * Understand when you need to create data; * Recognize when it is appropriate to use a pilot project; * Learn how to create vector data; * Learn how to create attribute data; * Back up your data early and often; * Understand the relationship between error, accuracy, and precision; * Discuss opportunities to introduce error and how to mitigate them; * Be able to distinguish between quality control and quality assurance; * Learn how to establish and audit trail; and * Discuss the importance of good data management. |  | 11 |  |
| **Geocoding:**   * Understand geocoding and its application; * Create an address locator; * Geocode addresses from a table; * Find individual addresses; * Standardize address and reference data; * Interpret geocoding results; and * Rematch addresses automatically and interactively. |  | 12 |  |
| **Cartography:**   * Understand the value of maps; * Understand basic cartographic techniques and why they are important; * Become familiar with map elements and the visual hierarchy; and * Generate a cartographic product using ArcGIS. |  | 13 | 6 |
| **Presentation Mediums:**   * Recognize the importance of visual communication; * Discuss the different types of presentation medium and their appropriate use; and * Learn how to generate different presentation medium. |  | 14 |  |
| **Models, Metadata, and Mapping Law:**   * Introduce and build a simple model in ArcGIS ModelBuilder; * Introduce metadata and metadata standards; * Learn how to use the Metadata tool in ArcCatalog; and * Discuss various GIS legal issues. |  | 15 |  |
| **Final Test and Project:**   * Apply your GIS knowledge and skills on a real-world project; * Present the results of your analysis in an aesthetic and informative medium; and * Measure comprehension of lecture and lab materials. |  | 16 |  |

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|  | **Evaluation** |  |
| **Assessment Tool** | **Expected Due Date** | **Weight** |
| Programming assignments and LMS |  | 20 % |
| First Exam |  | 20 % |
| Second Exam |  | 20 % |
| Final Exam | According to the University final examination schedule | 40 % |

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|  | **Policy** |
| **Attendance** | Attendance is very important for the course. In accordance with university policy, students missing more than the allowed absence rate of total classes are subject to failure. Penalties may be assessed without regard to the student's performance. Attendance will be recorded at the beginning or end of each class. |
| **Exams** | All exams will be CLOSE-BOOK; necessary algorithms/equations/relations will be supplied as convenient. |

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| **Class Schedule & Room** |

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| **Office Hours** |
| Sun: 8 – 9:30  Mon: 9:30-11  Tues: 11- 12:30  Wed: 11 – 12:30 |

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|  | **Teaching Assistant** |
| To announced later on. |  |

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|  | **Prerequisites** |
| **Prerequisites by course** | 1002140+ 1003250 |