# Department of: GEOMATICS

# College of: Engineering

# University of: Salahaddin

# Subject: Digital Mapping

# Course Book – Grade 3 – semester 6 (spring)

# Lecturer's name: Asst.prof.Dr. Dleen Al-Shrafany

# Academic Year: 2023/2024

# Course Book

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|---|---|
| **1. Course name** | **Digital Mapping** |
| **2. Lecturer in charge** | **Dr. Dleen M. S. Al-Shrafany** |
| **3. Department/ College** | **Geomatics Engineering Department.** |
| **4. Contact** | **e-mail: dleen.alshrafany@su.edu.krd** |
| **5. Time (in hours) per week** | **Theory: 2 hrs per class , (4 hrs total)**<br>**Practical: 2 hrs per class , (4 hrs total)** |
| **6. Office hours** | **Sun:8:30-10:30, Mon: 8:30-10:30, Tue:10:30-1:00, Wed 8:30-1:00, Thur: 8:30-1:00** |
| **7. Course code** | **SE306** |
| **8. Teacher's academic profile** | **https://sites.google.com/a/su.edu.krd/dleen-alshrafany/home** |
| **9. Keywords** | **Maps, coordinate systems, Map projection, digital data, digitizing, raster and vector data, GIS** |

**10. Course overview:**

In this section the lecturer shall write an overview about the subject he/she is giving. The course overview must cover:

- The importance of studying the subject
- Understanding of the fundamental concepts of the course
- Principles and theories of the course
- A sound knowledge of the major areas of the subject
- Sufficient knowledge and understanding to secure employment

This should not be less than 200 words

**11. Course objective:**

**The course provides students**: an insight into digital mapping, both in theory (mathematical and physical background) and in practice (applications and training). After the course they will be able to understand the information content of digital data and how to retrieve the information.

**12. Student's obligation**

The students has to attend the lectures and labs, also they have to prepare all necessary homework that is assigned to them, in addition to that, the students are necessary to work for the quizzes which is held along the study course.

At the end of each term the student has to attend exams. Each student has to attend at least two exams and final exam in order to evaluate his knowledge. In addition to the oral exam the student has to test for a practical exam too.

## 13. Forms of teaching

The means that are used in the teaching, to deliver the subjects to the students, are Mainly lectures and few labs. Theory and practical samples will be covered in the lecture. In addition to that homeworkers are given to the students in order to motivate them to evolve thinking about the subject. Lecture notes will be available on the personal web site in order to download the required lessons.

## 14. Assessment scheme

Lab assignments and quizzes **10%**
First semester exam **15%**
Second semester exam **15%**
Final Practical Exam **10%**
Final Exam **50%**

**15. Student learning outcome:**

**Upon completion of the course, students will be able to....**

1. Understand the fundamental theory of Digital mapping and using Geographic Information Science behind Geographic Information Systems (GIS),
2. Understand the special nature of spatial data and how they are different from non-spatial data.
3. Learn about the key components of producing digital map, including users, databases, software, and networks
4. Learn basic visualization techniques and cartographic principles
5. Use GIS analyses to address applied problems and/or research questions

## 16. Course Reading List and References:

- Key references:

  - Jonathan Lliffe, (2005), Datums and Map Projections. For GIS and Surveying, University College of London, London, UK.

- Useful references:

William Cartwright, Georg Gartner, Liqiu Meng, Michael P. Peterson (2007), Digital Terrain Modelling, Springer-Verlag Berlin Heidelberg.

| 17. The Topics: | | | Lecturer's name |
|---|---|---|---|
| Week-1 | | Introduction and course structure | **Dr. Dleen Al-Shrafany** |
| Week-2 | | History overview of maps | |
| Week-3 | | Coordinate systems ad datums | **(2 hrs) = Theory** |
| Week-4 | | Spherical, spheroiadal and cartisian coord. system | |
| Week-5 | | Global and regional datums | |
| Week-6 | | Aspects of datum transformations | |
| Week-7 | | Fundamentals of map projections | |
| Week-8 | | Scale factor and computational aspects | |
| Week-9 | | Relationship of digital mapping to GIS and LIS | |
| Week-10 | | Data acquisition for digital mapping | |
| Week-11 | | Digitizing technology and procedures | |
| Week-12 | | Positional accuracy of digitizing procedure | |
| Week-13 | | Digital mapping data structure | |
| Week-14 | | Raster data structure | |
| Week-15 | | Vector data structure | |
| Week-16 | | Raster to vector conversion | |
| Week-17 | | Graphic representation of spatial data | |
| Week-18 | | Spatial data models in GIS | |
| Week-19 | | Date Input and data Quality | |
| Week-20 | | Data editing | |
| Week-21 | | Detecting and correcting errors | |
| Week-22 | | Data reduction and generalization | |
| Week-23 | | Edge matching and rubber sheeting | |
| Week-24 | | Data base management system | |
| Week-25 | | Building map model | |
| Week-26 | | Layer based model | |
| Week-27 | | Object oriented based model | |
| Week-28 | | Data Accuracy, precision and resolution | |
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| **18. Practical Topics (If there is any)** | | | |
| Week-1 | | Map Identification: diff. Between digital and cartographic map | **Dr. Dleen Al-Shrafany** |
| Week-2 | | Coordinate system transformation | **(2 hrs) = Practical** |
| Week-3 | | Forward transformation | |
| Week-4 | | Inverse transformation | |
| Week-5 | | Datum transformation | |
| Week-6 | | Map projection | |
| Week-7 | | UTM projection | |
| Week-8 | | Stereographic projection | |
| Week-9 | | Digitizing | |
| Week-10 | | Manual and automatic digitizer instrument | |

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| Week-11 | | Starting surfer software for 2D and 3D mapping | |
| Week-12 | | Viewing and creating data | |
| Week-13 | | Creating a grid file | |
| Week-14 | | Creating a contour map | |
| Week-15 | | Creating contour levels | |
| Week-16 | | Exporting 3D contours | |
| Week-17 | | Posting data points and working with layers | |
| Week-18 | | Creating a profile | |
| Week-19 | | Creating a 3D surface map | |
| Week-20 | | Creating maps for different coordinates system | |
| Week-21 | | Overlaying map layers | |
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## 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:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

## 21. Peer review پێداچوونەوەی هاوەڵ

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.
*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*

ئەم کۆرسبووکە دەبێت لەلایەن هاوەڵێکی ئەکادیمیەوە سەیر بکرێت و ناوەرۆکی بابەتەکانی کۆرسەکە پەسەند بکات و جەند ووشەیەک بنووسێت لەسەر شیاوی ناوەرۆکی کۆرسەکە و واژووی لەسەر بکات.
هاوەڵ ئەو کەسەیە کە زانیاری هەبێت لەسەر کۆرسەکە و دەبیت پلەی زانستی لە مامۆستا کەمتر نەبێت.