



Department of Basic Scientific

College of Agricultural Engineering Sciences

Salahaddin University- Erbil

Subject: Principles of Surveying

Course Book – 1st Stage / Spring Semester

Lecturer's Theoretical name: Dr. Kamyar M. Mohammed

Lecturer's Practical name: Mr. Sherwan Y. Hammad, Mr. Ragheb

Mohammad

Academic Year: 2022-2023

Course Book

| 1. Course name | Principles of Surveying |
|-----------------------------|--|
| 2. Lecturer in charge | Kamyar M. Mohammed |
| | M.Sc. Mr. Sherwan Y. Hammad, Mr. Haval Haji and Ragheb |
| | Mohammad |
| 3. Department/ College | Soil and Water Dept and Forestry Dept. Agricultural |
| | Engineering Sciences |
| 4. Contact | E-mail: Kamyar.mohammed@su.edu.krd |
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| | Mr. Sherwan Yassin Hammad |
| | E-mail: Sherwan.hammad@su.edu.krd |
| | Tel: 07504762389 |
| | Mr. Daahad Mahammad |
| | Mr. Raghed Mohammad |
| | Email: ragheb.mohammad@su.edu.krd |
| | Tel: 0751 1283241 |
| | 161.0731 1263241 |
| 5. Time (in hours) per week | Theory: 6 and Practical: 15 |
| 6. Office hours | 5 days a week |
| 7. Course code | |
| 8. Teacher's | Dr. Kamyar Mutalib Mohammed |
| academic profile | |
| - | - My name is Kamyar M. Mohammed. I have B.Sc. in |
| | Soil and Water Science at Salahaddin University in |
| | 2006 and getting Master degree in Soil Physics at |
| | Salahaddin University in 2012. I am Ph. D. in |
| | Soil and Water Conservation branch. |
| | - |
| | Mr. Sherwan Yassin Hammad |
| | Bachelor's degree in Forestry and Horticultural Science in the |
| | year of 2011-2012 in College of Agricultural/ Salahaddin |
| | University. However, I've got my Master Degree in Organic |
| | Agriculture in the year of 2015 in Italy. Now, I am working as |
| | Assistant Lecturer in the Forestry Department, College of |
| | Agricultural Engineering Sciences, Salahaddin University- |
| | Erbil. |
| | Mr. Paghad Mahammad |
| | Mr. Raghed Mohammad |
| | I completed my B.Sc. in Salahaddin University – Forestry |
| | Department (2010 - 2011). I got my Master degree at Czech |
| | University of Life Sciences - Prague, Czech Republic; Master's |

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title (Farmers' use and preferences of trees in Kurdistan region of Iraq). Currently, I am working as Assistant Lecturer in Forestry Department - College of Agricultural Engineering Sciences, Salahaddin University - Erbil and my specific specialize is Forestry Engineering.

9. Keywords

Surveying, Taping, Pacing, Levelling, contouring, land survey, Theodolite, Global positioning system (GPS), Detail Survey.

10. Course Overview:

Surveying is the art of determining the relative positions of different objects on the surface of the earth by measuring the horizontal distances between them, and by preparing a map to any suitable scale. Thus, in this discipline, the measurements are taken only in the horizontal plane.

Levelling is the art of determining the relative vertical distances of different points on the surface of the earth. Therefore, in levelling, the measurements are taken only in the vertical plane.

Surveying may be used for the following various applications:

- 1- To prepare a topographical map which shows the hills, valleys, rivers, villages towns, forest, landscaping, etc. of a country.
- 2- To prepare a cadastral map showing the boundaries of fields, houses and other properties.
- 3- To prepare an engineering map which shows the details of engineering works such as roads, railways, reservoirs, irrigation canals, etc.
- 4- To prepare a contour map to determine the capacity of a reservoir and to find the best possible routes for roads, railways, etc.

To learn the student about the importance of Surveying tools and material for life; today creating more buildings, bridges, landscape design and parks which build by this process and application. Based on this course student will be able to learn the principles of surveying and how to measure the field areas and design the field regarding their plan. In the future students will be able to get a surveyor's job as an agricultural engineer in their field. However, surveying is very important in the public and the private sectors as well.

11. Course Objective:

UNDERGRADUATE LEARNING OBJECTIVES

These statements are made operational by skills and abilities common to the theory and practice of surveying and levelling that our undergraduate students are expected to acquire:

- Have the ability to apply knowledge of mathematics, science and engineering to understand the measurement techniques and equipment used in land surveying.
- To apply surveying principles in a range of sites and scales.
- To enable students to understand theory and practice of land surveying.
- To enable students in reading and preparing surveying maps.
- To develop skills to use modern survey instruments.

Additionally, it is our philosophy that our students be compelled to bring their creative talent to the public landscape. Further, we hope our students will self-actualize through their educational process while being grounded in theory, methods (including field), construction craft, and studio design.

The aim of surveying is to prepare a map to show the relative positions of the objects on the surface of the earth. The map is drawn to some suitable scale. It shows the natural features of a country, such as towns, villages, roads, railways, rivers, etc. Maps may also include details of different engineering works, such as roads, railways, irrigation canals, landscape architecture, etc.

12. Student's Obligation

The obligation of the students in this academic course includes attendance in the lectures on time and listening to teachers carefully, try as much as possible to read the material and teachers' notes daily participate in-class activities and prepare the assignments to gain the benefits from the course.

Students are required to be attended in all the practical lectures during this course, prepare themselves to go to the field each lecture, data collecting during the practical lectures and prepare the report for each practical lecture and the report should be submitted for the next week.

However, preparation every week they will do quizzes, homework and also encourage all students to participate by giving then questions and giving an opportunity to all of them, attendance the exam by studying the materials.

13. Forms of Teaching

The form of teaching is including the use of whiteboard mostly, However, Projector will be used to display my objectives by PowerPoint to present the lecture, and sometimes, give the lecture to the students by Microsoft word for each lecture. Moreover, the other primary materials surveying and the practical part there will be investigation presentations and also discussions that will encourage teamwork between the students. However, In each lecture, we will be presented a short presentation to explain the lectures today and show the required picture, tools, or video, and the practical procedure that will be implemented in the field in this lecture.

14. Assessment scheme

First exam after five lectures

Second exam after ten lectures

Mark distribution:

Monthly Exam 50% (Theoretical 15% + Practical 35%).

Final Exam 50%

Final Mark 100%

15. Student learning outcome:

Demonstrate a fundamental understanding of the fundamental surveying methodologies in principles of surveying and levelling at appropriate scales: context, strategy, and detail. After finishing this course student will be introduced to the importance of surveying and levelling. They will be got information about surveying and levelling, Taping, Pacing, contouring, land survey as well as Theodolite, Global positioning system(GPS), Detail Survey and scales. Understanding, interesting and enjoyable in the term of surveying.

Apply fundamental surveying concepts such as datum's, horizontal and vertical coordinate systems, horizontal and vertical angles, and the graphical representation of the three-dimensional information in a plane surveying environment. Implement the concepts and practicalities of differential levelling in a plane surveying environment. Apply the knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined surveying problems appropriate to the discipline.

During this course, the students will be able to learn and get sufficient information about land surveying. They will be able to work as a surveyor in the agricultural directorates as an agricultural engineer.

16. Course Reading List and References:

Basak, N. (2014). Surveying and Levelling. Second edition. McGraw hill education (India) private limited.

McCormac, Jack C. (2012). Surveying. 6th edition. Publisher: John Wiley & Sons, Inc.

Michael, M. (2003). Introduction of Surveying. Second Edition. Government of Western Australia.

ÖZENER, H. (2011). Surveying. Bogazici University.

Punmia, B.C. Jain, A. and Jain, A. K. (2005). Surveying. Volume one. 6^{th} edition. Laxmi publications LTD.

Rlyadh S. Al Khaffaf. (1986) Principles of plane and topographic

Surveying. SAYILI, İ. (2005). Elementary Surveying.

| 17. The Topics: Theoretical Part | Lecturer's name Dr. Kamyar M. Mohammed |
|-----------------------------------|--|
| Definition Surveying | 2 hours |
| Units of measurements | |
| Types of Surveying | |
| Accuracy in Surveying | |
| Scales | |
| Basic Principles of Surveying | |
| Distance measurement | 2 hours |
| pacing | |
| Taping | |
| Taping on level ground | |
| Linear surveying | |
| Levelling | 2 hours |
| Contouring | 2 hours |
| First Examination | 2 hours |
| Vertical Section | 2 hours |
| Longitudinal sections | |
| Cross Sections | |
| Computer generated sections | |

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| Theodolite and total stations | 2 hours |
| Traverse Surveying | 2 hours |
| Types of traversing | |
| Global positioning | 2 hours |
| system(GPS) Principles of GPS | 2 nours |
| Errors in GPS | |
| GPS procedures | |
| Second Examination | 2 hours |
| Second Examination | 2 nours |
| Detail Survey | 2 hours |
| | |
| Curve ranging | 2 hours |
| Cui ve ranging | |
| Catting out construction works | 2 hours |
| Setting out construction works | 2 nours |
| Mensuration – areas | 2 hours |
| Mensuration – volumes. | |
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| 1X Practical Tonics | Lecturer's name |
| 18. Practical Topics | Lecturer's name Mr. Sherwan |
| 18. Practical Topics | Mr. Sherwan |
| 18. Practical Topics | |
| Pacing, Setting out the straight line and Distance Measurements | Mr. Sherwan Yassin, Mr. Ragheb |
| _ | Mr. Sherwan Yassin, Mr. Ragheb Mohammad |
| Pacing, Setting out the straight line and Distance Measurements | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours |
| Pacing, Setting out the straight line and Distance Measurements | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level First Examination | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours 3 hours 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level First Examination | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours 3 hours 3 hours 3 hours 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level First Examination Leveling (Elevations), Open level Traverse Differential Leveling | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours |
| Pacing, Setting out the straight line and Distance Measurements Setting out Right Angles Calculating Surface Areas of Irregular Shaped Field Taping Around Obstacles Setting up an Optical Level First Examination Leveling (Elevations), Open level Traverse Differential Leveling Leveling (Elevations), Closed loop level traverse | Mr. Sherwan Yassin, Mr. Ragheb Mohammad 3 hours

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| Topographic Survey (contouring) | 3 hours |
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| Topographic Survey (contouring) | 3 hours |
| Second Examination | 3 hours |

19. Examinations:

1. Compositional: In this type of exam the questions usually start with Explain how, what are the reasons for...? Why...?

Example:

Answer the following.

- 1. Source of taping errors.
- 2. Classification of surveying.
- 2. Define the following terms:
 - 1- Surveying. 2-Fore sight. 3- Turning Point.
- 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:

- **1.** Contour lines are:
 - A. Actual lines.
 - B. Imaginary lines
 - C. Opened lines.
 - D. Parallel lines.

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:

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).