



Module (Course Book)

2023-2024

| | | |
|--------------------------|--|--|
| College/ Institute | Erbil Technical College | |
| Department | Civil Engineering Department | |
| Module Name | Plane and Applied Surveying - 2 | |
| Module Code | PAS; 404 | |
| Degree | Technical Diploma <input type="checkbox"/> | Bachelor <input checked="" type="checkbox"/> High Diploma <input type="checkbox"/> |
| | Master <input type="checkbox"/> | PhD <input type="checkbox"/> |
| Semester | Second Stage – Fourth Semester | |
| Qualification | B.Sc. | |
| Scientific Title | Engineer | |
| ECTS (Credits) | 7.0 x 27 | |
| Module type | Prerequisite <input type="checkbox"/> | Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/> |
| Weekly hours | 5 | (189) Total hrs Workload |
| Weekly hours (Theory) | (2)hr Class | |
| Weekly hours (Practical) | (3)hr Class | |
| Number of Weeks | 12 | |
| Lecturer (Theory) | Kamal Yaseen Abdulla; Dilveen Hassan Omar | |
| E-Mail & Mobile NO. | kamal.yaseen@epu.edu.iq ; (+9647504521060) dilveen.omar@epu.edu.iq ; | |
| Lecturer (Practical) | Kamal Yaseen Abdulla; Dilveen Hassan Omar | |
| E-Mail & Mobile NO. | kamal.yaseen@epu.edu.iq , Tel:(+9647504521060) dilveen.omar@epu.edu.iq ; | |
| Websites | epu.edu.iq | |

Course Book

| | | | | | |
|-----------------------------|---|----------------|----------------|----------|---------------------------|
| Course Description | <p>For the Fourth semester the Surveying lectures have also divided into two main parts, theoretical and practical parts. Theoretical Surveying lectures will help students to learn and easily recognize of the surveying subject contents such as using theodolite for construction purposes, setting up the theodolite instrument centering and levelling, tests, temporary adjustment and permanent adjustment. Horizontal and vertical Angle measurement. Perform the traverse and theodolite traversing. Distance and elevation measurement using tachometric surveying.</p> <p>Conducting measurement to locate and find remote high points using trigonometric leveling. Introduction to total station and GPS, then using the instrument for the purpose of different Civil Engineering Projects.</p> <p>Setting out of works using different methods such as tape, theodolite and total station. Locating Horizontal Curves and Vertical Curves using tape, theodolite and total station.</p> | | | | |
| Course objectives | <p>The main aim and purpose behind the study of engineering surveying is to</p> <ul style="list-style-type: none"> ▪ The surveyor can possess a thorough understanding of surveying techniques and can determine most efficient methods required to obtain optical results over a wide variety of surveying problems. ▪ Rigorous mathematical techniques are used to analyze and adjust the field survey data. The accuracy and thus the reliability of the survey depend not only on field expertise but also on the understanding the principles. | | | | |
| Student's Obligation | <p>The students should be available during lecture time table when the student absence more than the allowed hours the student will be dismissed. Students should be doing quizzes, practical reports, seasonal tests and final exams in order to able to collect required mark to success.</p> | | | | |
| Required Learning Materials | <p>During lecturing the data show is used for showing lecture notes using power point program while the white board is used for explanation and solving problems and using surveying instruments in laboratory.</p> | | | | |
| Evaluation | Task | | Weight (Marks) | Due Week | Relevant Learning Outcome |
| | Paper Review | | N/A | | |
| | Assign | Homework | 5% | 12 | 1,2,3 |
| | | Class Activity | 2% | 12 | 1,2,3 |
| | | Report | 5% | 2 | 1,2,3 |
| | | Seminar | N/A | - | - |
| | | Essay | N/A | - | - |
| | | Project | 5% | 10 | 1,2,3 |
| | Quiz | | 8% | 2 | 1,2 |
| | Lab. Reports and Activity | | 10% | 12 | 4 |
| | Midterm Exam/Theory | | 10% | 1 | 1,2 |
| | Final Exam/ Theory | | 20% | 1 | 1;2 |
| | Midterm Exam/Practical | | 15% | 1 | 4 |
| | Final Exam/ Practical | | 20% | 1 | 4 |
| Total | | 100% | | | |
| Specific Learning Outcome: | <p>Basic and very important objective of studying Surveying is;</p> <ol style="list-style-type: none"> 1. Learn and easily recognize the main aspects of surveying, which is relates to all of the civil engineering and highway engineering works. 2. Familiarize with the fundamental instruments used in surveying. 3. Using most recent software used in surveying | | | | |

| | |
|--------------------|--|
| | 4. Practicing all the basic daily required working procedure in the real civil engineering life on ground. |
| Course References: | <ul style="list-style-type: none"> ▪ Ghilani, C. D. & Wolf, P. R. (2011). "Elementary Surveying: An Introduction to Geometrics". ISBN-10, 132554348, Thirteenth Edition, Manufactured in the United States of America. ▪ Barry F. Kavanagh "Surveying Principles and application", 7th edition, Parson Principle hall, parson edition. Inc, upper Saddle River, New Jersey, Columbus, Ohio, 2006 ▪ Late David Clarck "Plan and Geodetic surveying" sixth edition constable and company ltd, London WC2 2001 ▪ S. K. Hussain, "Text book of Surveying", India 2000. |

| Course Topics (Theory) | Week | Learning Outcome |
|--|------|------------------|
| 1. Theodolite construction, tests and adjustment. Angle measurement. | 1 | 1 |
| 2. Traverse and theodolite traversing. | 2 | 1,2 |
| 3. Tachometric surveying. | 3 | 1,2 |
| 4. Trigonometric leveling. | 4 | 1,2 |
| 5. Total station and GPS | 5-9 | 1,2,3 |
| 6. Setting out of works. | 10 | 1,2 |
| 7. Horizontal Curves. | 11 | 1,2,3 |
| 8. Vertical Curves. | 12 | 1,2,3 |

| Course Topics (Practical) | Week | Learning Outcome |
|--|------|------------------|
| 1. Temporary and Permanent adjustment in Theodolite Instrument. Theodolite construction, and measurement reputation and reiteration. | 1 | 4 |
| 2. Theodolite traversing. | 2 | 4 |
| 3. Trigonometric levelling. | 3 | 4 |
| 4. Tachometric levelling. | 4 | 4 |
| 5. Total station and Centering, Leveling and Tilting. | 5 | 4 |
| 6. Applications of Total Station. | 6-8 | 4 |
| 7. Global Positioning System (G P S). | 9 | 4 |
| 8. Setting out of works | 10 | 4 |
| 9. Setting out of Horizontal. | 11 | 4 |
| 10. Setting out of Vertical Curves. | 12 | 4 |

Examinations:

Q1- List Eight advantages of Total Station

Solution Q1:

Advantages of Total Station

1. Most accurate and user friendly.
2. Gives position of a point (x, y and z) with respect to known point (base point).
3. EDM is fitted inside the telescope.
4. It has digital display and on board memory to store data and compatibility with computers.
5. Measures distance and angles and displays coordinates,
6. Auto level compensator is available.
7. Can work in lesser visibility also.
8. Can measure distances even without prismatic target for lesser distances.

On board software are available

Q2/ A horizontal curve is designed with a 600m radius and has a tangent Length of 52m., the PI is at station (200+00).

Determine the station of PT?

SolutionQ2:

$$T = R \tan (\Delta) \quad 52 = 600 \tan(\Delta)$$

$$\Delta = 9.9 \text{ deg}$$

$$L = R \pi \Delta / 180 = 600 \pi 9.9 / 180 = 104 \text{ m}$$

$$PC = PI - T = (200+00) - (0+52) = (199+48)$$

$$PT = PC + L = (199+48) + (1+04) = (200+52)$$

$$Lc = 2R \sin \Delta / 2 = 2 * (600) \sin 9.9 / 2 = 103.5 \text{ m}$$

Extra notes:

External Evaluator

As Professor I have reviewed the Course Book related to the subject of surveying for second year, Department of Civil Engineering, College of Technology, I found that the course Book is very good describing the aim and objectives of the subject. Moreover it is covering all the required syllabus and contents of the course and describes satisfactorily the aspects related to the course, which is approved by the department.



Professor Dr.
Meren Hassan Fahmi