

Module (Course Book)

2022-2023

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"/> Bachler <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)	7.0x 27
Module type	Prerequisite <input type="checkbox"/> Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	5
Weekly hours (Theory)	(2)hr Class
Weekly hours (Practical)	(3)hr Class
Number of Weeks	20
Lecturer (Theory)	Salar K Hussein; Kamal Yaseen Abdulla
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Lecturer (Practical)	Salar K Hussein; Kamal Yaseen Abdulla;
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Course Book

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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.</p> <p>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.</p> <p>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</p>

	exams in order to able to collect required mark to success				
Required Learning Materials	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.				
Evaluation		Task	Weight (Marks)	Due Week	Relevant Learning Outcome
		Paper Review	N/A		
	Assign	Homework	5%	12	1,2,3
		Class Activity	2%	2	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:

- 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. Kavanogh "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

Practical Topics	Week	Learning Outcome
1. Temporary and Permanent adjustment in Theodolite Instrument. Theodolite construction, 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) Define digital Total station. Enumerate the Sources of Error in Total station instrument?

Solution:

Total Station (TS) is a precision surveying instrument used in the survey process works for all types of surveying works such as location, setting out of road works, airports, railways, building, waterways, canals, sewerage, and other engineering projects.

Sources of Error in the Total station

1. Instrumental Errors:

- line-of-sight error
- The tilting axis error
- automatic target recognition

2. Natural Errors:

- Effect of Wind • Effect of Temperature • Refraction:
- Tripod settlement

3. Personal Errors:

- Setting up the instrument over a point
- Centring the Bubbles
- Use of clamps and tangent screws
- Focusing

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**