Module (Course Syllabus) Catalogue

2023-2022

College/ Institute	ERBIL TECHNOLOGY	
Department	SURVYEING	
Module Name	Land Surveying	
Module Code	LAS301	
Semester	3rd	
Credits		
Module type	Prerequisite ☐ Core ☐ Assist. ☐	
Weekly hours		
Weekly hours (Theory)	(2)hr Class	(24)hr Workload
Weekly hours (Practical)	(6)hr Class	(72)hr Workload
Lecturer (Theory)	DALSHAD AHMED KAREEM	
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Course Book

Course Description	The Surveying Department is one of the effective departments of the technology institute; It prepares and sends hundreds of graduates to governmental and non-governmental institutions and private sector agencies. Surveying is the art and science of taking field measurements on or near the surface of the Earth. Survey field measurements include horizontal and slope distances, vertical distances, and horizontal and vertical angles. In addition to measuring distances and angles, surveyors can measure position as given by the northing, easting, and elevation of a survey station by using satellite-positioning and remote- sensing techniques. In addition to taking measurements in the field, the surveyor can derive related distances and directions through geometric and trigonometric analysis. Each Surveying II subject lessons contains the concepts and principles of each surveying works features field techniques and instruments to provide you with the background and foundation of knowledge that you need to complete the surveying field techniques lessons. You then work through real world exercises data to reinforce your understanding and provide you with practice on common tasks that other professionals are performing with Surveying II subject in the workplace every day. When you complete all surveying II courses, you will be armed with the background and knowledge to apply Surveying instruments and field techniques to your job tasks, and become more effective and productive in your job. The subject Contents are: 1. Stadia Surveying: Inclined Stadia Measurements, Stadia Field Practice, Topographic Surveys, Field procedure to calculate (Distances, Difference elevations, Elevations &

	Coordinates of points), prepare topographic maps. 2. Introduction to Total Station: Introduction to Total Station and Operations, Parts of a Total Station Instrument, Handling and Setting Up a Total Station Instrument & Angle Observations. 3. Total Station Operations: Total Station Field Techniques (EDM, Point Location, Missing Line Measurement, Resection, Azimuth, Remote Object Elevation, Distance Offset Measurements, Angle Offset Measurements, Layout or Setting-Out Positions and Area Computation), Field Procedures for Total Stations in Topographic Surveys, Construction Layout, Adjustment of Total Station Instruments and their Accessories, Source of Error in Total Station Work, Mistakes in Angle observation, Traverse Surveys and Computations: Definitions, Type of Traverse, Open Traverse, Closed Traverse, Fieldworks, Traverse Computations, Traverse Precision and Accuracy, Compass (Bowditch) Rule Adjustment, Area of a Closed Traverse by the Coordinate Method, Traverse Computations Using Computers, Mistakes in Traversing, Sources of Error in Traversing, Mistakes in Traverse Computations, Global Navigation Satellite Systems 4. Global Navigation Satellite Systems (GNSS): Principles of Operation, The GPS Signal, Reference Coordinate Systems, Errors in Observations, Differential Positioning, Kinematic Methods, Relative Positioning, Static Surveys, Field Procedures in Satellite Surveys, Data Processing and Analysis, Sources of Errors and Mistakes in Satellite Surveys, GNSS Kinematic Surveys, Planning of Kinematic Surveys, Methods Used in Kinematic Surveys, Performing Post-Processed, Real- Time Networks, Errors

	and Mistakes in Kinematic Surveys, GPS Applications, Topographic Surveys and Layout Surveys.
Course objectives	Each Land Surveying subject lessons contains the concepts and principles of each surveying works features field techniques and instruments to provide you with the background and foundation of knowledge that you need to complete the surveying field techniques lessons. You then work through real world exercises data to reinforce your understanding and provide you with practice on common tasks that other professionals are performing with Surveying II subject in the workplace every day. When you complete all Land Surveying courses, you will be armed with the background and knowledge to apply Surveying instruments and field techniques to your job tasks, and become more effective and productive in your job. After completing Land Surveying courses, you will be able to: 1. Topographic Survey by different techniques. 2. Construction Layout Using Total Stations and GNSS 3. Preparation of surveying and related mapping specifications. 4. Calculation, reduction, and plotting (manual and computer-aided) of survey data for use in engineering design. 5. Design and provision of horizontal and vertical control survey networks. 6. Execution of as-built surveys and preparation of related

	maps, plans, and profiles upon completion of the project. 7. The determination of the position of the boundaries of public or private land, including national and international boundaries, and the registration of those lands with the appropriate authorities. 8. Testing and calibration of instruments and systems for the above-mentioned purposes and for other surveying purposes. 9. The general requirements of handwritten field notes with type and kind of field books.
Assessment scheme	25% Mid Term (Theory and practical) 35% Assignment (report, paper, Quiz, homework, seminar..) 20% final practical 20% final theory
Specific learning outcome:	After completing Surveying II courses, you will be able to: 1- Topographic Survey by Stadia method. 2- Topographic Survey by Total Station techniques. 3- Topographic Survey by GNSS techniques. 4- Construction Layout Using Total Stations. 5- Construction Layout Using GNSS. 6- Preparation of surveying and related mapping specifications. 7. Calculation, reduction, and plotting (manual and computer-aided) of survey data for use in engineering design. 8. Design and provision of horizontal and vertical control survey networks. 9. Execution of as-built surveys and preparation of related maps, plans, and profiles upon completion of the project. 10. The determination of the position of the boundaries of public or private land, including national and international boundaries, and the registration of those lands with the appropriate authorities. 11. Testing and calibration of instruments and systems for the

	above- mentioned purposes and for other surveying purposes. 12. The general requirements of handwritten field notes with type and kind of field books.
Course References:	1. Chandra, Surveying Problem Solving with Theory Objective Type Questions, 2005 Ed. 2. David A. Madsen, Civil Drafting Technology, 6th Ed. 3. Kavanagh, Barry F. Surveying with construction applications _7th Ed. 4. Mathias Lemmens, Geo-information, 2011. 5. Paul R. Wolf, Charles D. Ghilani, Elementary surveying: an introduction to geomatics _ 13th Ed. 6. R. Sathikumar & N. Madhu, Advanced Surveying: Total Station, GIS and Remote Sensing, 2010. 7. Schofield, W. (Wilfred) Engineering surveying _6th Ed.

Course topics (Theory+ Practical)	**Week**	**Learning Outcome**
Principles	4	
Stadia Field Practice & Topographic Surveys		
Introduction to Total Station and Operations		
Reference Directions for Horizontal and Vertical Angles	3	
Total Station General Background		
Parts of a Total Station Instrument		

Total Station Capabilities		
Handling and Setting Up a Total Station Instrument		
Angle Observations (Total Station)		
Total Station Field Techniques		
EDM		
Point Location		
Missing Line Measurement	2	
Resection		
Azimuth		
Remote Object Elevation		
Distance & Angle Offset Measurements	3	
Layout or Setting-Out Positions		
Area Computation		
Summary of Modern Total Station Characteristics and Capabilities		
Field Procedures for Total Stations in Topographic Surveys		
Field-Generated Graphics		
Construction Layout Using Total Stations		
Motorized Total Stations		
Adjustment of Total Station Instruments and their Accessories		
Sourse of Error in Total Station Work	4	
Mistakes in Angle observation		
Traverse Surveys and Computations		

General Background		
Open & Closed Traverse		
Fieldworks		
Balancing Field Angles		
Azimuth Computations		
Latitudes and Departures		
Summary of Initial Traverse Computations		
Traverse Precision and Accuracy		
Compass (Bowditch) Rule Adjustment		
Effects of Traverse Adjustments on Measured		
Rectangular Coordinates of Traverse Stations		
Area of a Closed Traverse by the Coordinate Method		
Traverse Computations Using Computers		
Mistakes in Traversing		

Questions Example Design

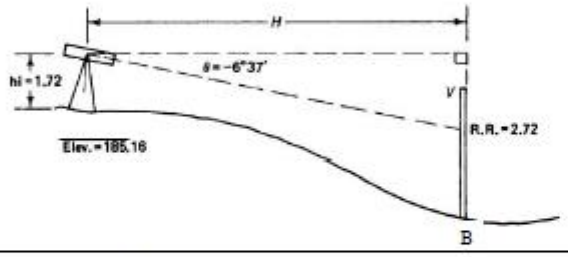
Ministry of Higher Education
& Scientific Research
Erbil Polytechnic University
Erbil Technology College
Dept. of Surveying

Midterm Exam
2021-2022

Class: second
Subject: Land Surveying
Time: 75 Min.
Date: 25/ 11 /2021

Q1/ From (figure below) and data's in the table, find the horizontal distance between the instrument & the staff reading then calculate Elevation of point (B). 30 marks

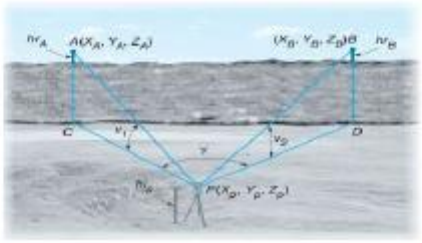
St	staff reading			V	H	elevation
	U	M	L			
A	2.89	2.72	2.65			185.16
B						



Q2/ Determine the 3D position of a total station instrument at point (P) , if E, N&Z of point (A) 7034.982, 5413.896 and 432.173 respectively, and those of point (B) are 7843.745, 5807.242, and 428.795 respectively , use the following observations. 30 marks

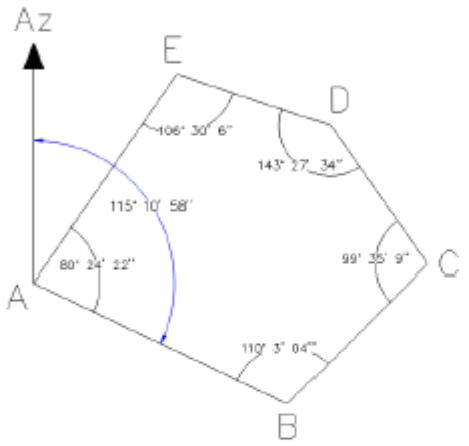
V1= 24° 33 ´ 42" PA= 667.413m hr_A = 1.743 m γ =77° 48 ´ 08"

V2= 26° 35 ´ 08" PB= 612.354m hr_B = 1.743 m hi_P =1.685m



Q3/ Balance the internal angles as shown in the figure below, then determines the directions (Azimuth) for all sides of the closed traverse

40 marks



Lecturer
Dilshad Ahmed Kareem

Head of Department
Sadiq ramazan

Extra notes:

External Evaluator