



(Module Name) Course Catalogue

2023-2024

College	Erbil Technology college	
Department	Road Construction	
Module Name	Surveying II	
Module Code	SUR 303	
Semester	3	
Credit	8	
Module type	Core	
Weekly hours	200	
Weekly hours (Theory)	(2)hr Class	(6)hr Workload
Weekly hours (Practical)	(4)hr Class	(6)hr Workload
Lecturer (Theory)	Galawezh Mohammed Ahmed	
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Lecturer (Practical)	Hoshyar Bakr Wali	
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Course Book

- **Vision :**

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

- Surveying is the art and science of taking field measurement on or near the surface of the earth. Preparation of surveying and related mapping specification.
- Surveys are usually performed for one of two reasons. First, surveys are to collect data, which can then be drawn to scale on a plan or map; second field surveys are made to lay out dimensions taken from a design plan and thus define precisely the location of the proposed construction facility.
- Introduces you to traditional and state of the art techniques in data collection, lay out, and presentation of field data.
- Design and provision of horizontal and vertical control survey networks.

- **Course objective:**

Introducing the fundamentals, purposes, & the required calculations of the plane surveying to the student as well as qualifying him to use the different kinds of surveying instruments in designing & executing the project of civil engineering.

- **Student's obligation**

The roles of students and their obligations throughout the year are such as :- reports of all exercises- Prepare their self's of examination good.

- **Forms of teaching**

Are done by
-DATA SHOW
-WHITE BOARD
-AND SHEETS

- **Assessment scheme**

10% Home work (Theory)

2% Class activity (Theory)

14% (Report-Seminar-Paper-Essay-Project) (Theory)

14% Lap. Reports & Activities (Practice)

4% Quiz (Theory+Practice)

6% Midterm(Theory)

15% Final (Theory)

<p>10% Midterm (Practice) 25% Final (Practice)</p>		
<p>- Specific learning outcome: This course has been read and studied to provide a practice for a survey work. It covers the fundamentals of surveying and those basic surveying procedures that make up the Great bulk of surveying practices.</p>		
<p>- Course Reading List and References: <ul style="list-style-type: none"> ▪ ELEMENTARY SURVEYING (BREED AND HOSMER) . SURVEYING INSTRUMENTS AND METHODS (PHILIP KISSAM) .SURVEYING WITH CONSTRUCTION APPLICATIONS(six Edition) (Barry F. Kavanagh) Plane Surveying (ALAK DE). </p>		
- Course topics (Theory)	Week	Learning Outcome
1- General review Traversing Computation	2	
2- Trigonometry and tachometry	2	
3- Horizontal Alignment	1	
4- Vertical Alignment	1	
5- Total station	4	
6- Photogrammetry	1	
7- Tunnel	1	
.		
-		Learning Outcome

- Practical Topics (If there is any)	Week	Learning Outcome
The component of theodolite , setting out theodolite , The procedure to measure Horizontal angle, the closed formed of transvers , measure Horizontal angle and correction the angles	1A	
Determine the azimuth , departures and latitude , correction of ΔE and ΔN , Calculations of E and N	2A	
The procedure to measure vertical angles , Trigonometry	1B	
Tachometry , Stadia method , sub tenses bars method	2B	
Tachometry Tangential method , And(EDM)	3A	
Setting out Simple Curve by deflection angle	3B	
Setting out spiral curves by deflection angle	4A	
Setting out Vertical curves	4B	
Global Position System (GPS)	5A	
The component of Total station	5B	
The commons applications of Total station	6A	
Programme's Grated Job, Setting the Orientation by angles.	6B	
Programme's Grated Job, Setting the	7A	
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Orientation by Coordinates.		
Programme's Grated Job, Setting the Orientation by Resection (Free Station)	7B	
The commons applications of Total station(Surveying)	8A	
The commons applications of Total station(Area & Volume)	8B	
The commons applications of Total station(Tie Distance & Remote Height)	9A	
The commons applications of Total station(Stake Out)	9B	
The commons applications of Total station(Reference Line, Reference Arc)	10A	
Data Transfer	10B	
Photogrammetry	11A	
Project	11B	
Project	12A	
Project	12B	

19. Examinations:

Ministry of Higher Education & Scientific Research
Erbil Polytechnic University
Erbil Technology college
Dep. of Road construction

First term 2020-2021

Second Year
Sub: surveying
Time:3 Hours
Date:10 /2/2021

Q1/ multiple choice questions : [35 Marks, 5 marks for each branch]

1-The directions of bearing in quadrant III are.....

- a) NE, b) SE c) SW d) NW

2- There are two methods for adjusting latitudes & departures, that's ensuring that the sums of the latitudes & departures equal.....

- a) zero b) 90° c) 180° d) 270°

3-- In traverse, if the latitude and departure of a line are known the length of the line can be computed by using equations

- i) $L = \sqrt{(\Delta E)^2 + (\Delta N)^2}$ ii) $L = \Delta N / \cos \text{Azimuth}$
iii) $L = \Delta E / \sin \text{Azimuth}$ iv) $L = \sqrt{(\Delta E)^2 + (\Delta N)^2}$

which of above statements is/are correct?

- a) (iv) b) (ii)and(iv) c) (iii)and(iv) d) (ii) ,(iii)&(iv)

4- The sum of the external angles of a closed traverse of(N) sides is equal to.....

- i- $(N+4) * 90^\circ$ ii- $(2N+4) * 90^\circ$ iii- $(N+2) * 180^\circ$ iv- $(2N+2) * 180^\circ$

Which of above statements is/are correct?

- a) (ii)and(iii) b)(iii)only c) (i)and(iii) d) (ii)and(iv).

5- +2% grade line intersects a – 4%grade line. The elevation at station PVC 15+00 is 350m and the elevation at stationPVT25+00 is 340m.

The station and elevation of the PVI are

a) sta. 19+00 at 358m b) sta. 20+00 at 360m

c) sta. 20+50 at 351m d) sta. 21+00 at 362m

6- The distance between the points(18,38,15)and (10,30,) observed with G.P.S is.....a) 10m b)12m c)14m d) 16m

7-are stakes set at predetermined elevation to control a specific grade .
On a road project ,this could be finished sub base or base or the top of rock .

a)right of way, b)shallow filter, c) deep filter, d) blue top.

Q2/ (20M)

Compute latitude &departure the survey data shown in table

(1)	(2)(length	(3) Azimuth	(4) Δ N	(5) Δ E
AB	164.95	71 11		
BC	88.41	149 00		
CD	121.69	224 18		
DE	115.89	291 13		
EA	<u>68.42</u>	<u>352 39</u>		

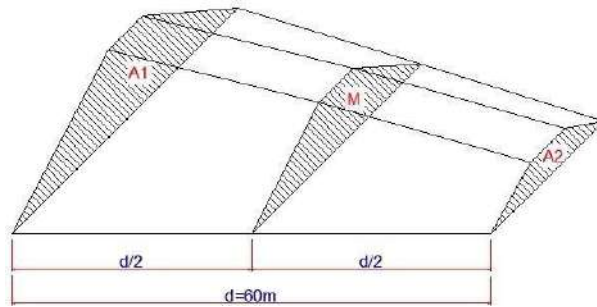
Q3/ (20M)

_The following vertical angles were read with theodolite at A&B respectively to O point. A&B being in the same plane 20 28 &13 14 . If the distance between A&B =10m and the reduced level of A was 64.6m. Determine the height of the bottom of the tank above ordinate datum.

Q4/ (25 M)

) see figure below for the problem parameters. Compute the volume using the Prismoidal formula.

Centre height $h_1 = 10\text{m}$, $h_2 = 20\text{m}$, widths roads $b_1 = b_2 = 20\text{m}$, horizontal distance between sections: $L = 60\text{m}$, side slopes: 1:2



Typical answering

Q1/1- C 2-A 3-D 4-A 5- B 6- B 7- D

Q2/ (1)	(2)(length	(3) Azimuth	(4) ΔN	(5) ΔE
AB	164.95	71 11	53.20	156.13
BC	88.41	149 00	- 75.78	45.53
CD	121.69	224 18	- 87.09	-84.99
DE	115.89	291 13	41.94	-108.03
EA	68.42	352 39	67.86	-8.75
	$\Sigma 559.36$		$\Sigma +0.13$	$\Sigma -0.11$

$$Q3/ \quad D = d \tan \alpha_2 / (\tan \alpha_1 - \tan \alpha_2) \text{-----}$$

$$D = 10 * \tan(13 \ 14) / \tan(20 \ 28) - \tan(13 \ 14) \Rightarrow 17.03\text{m}$$

$$h = D \tan \alpha_1 \Rightarrow 17.03 * \tan 20 \ 28 = 6.35\text{m}$$

$$\text{For check} \quad h_2 = (D+d) \tan \alpha_2 \Rightarrow (10+17.03) \tan 13 \ 14 = 6.35\text{m}$$

∴ the height of the bottom of the tank above ordinate datum = 64.6+6.35= 70.95m.

$$Q4/ \quad A1 = h(b+hs) \text{====} \rightarrow 10(20+10*2) = 400$$

$$A2 = 20(20+20*2) = 1200$$

$$A_m = 15(20+15*2) = 750$$

$$V = L/6(A1+A_m+A2) \text{====} \rightarrow 60/6(400+4*750+1200) \text{====} \rightarrow 46000\text{m}^2$$

20. Extra notes:

The subjects and titles of all topics are covered the objectives of each topic, and this also includes a brief description of each topic. And I suggest to use new technical or connected part theory with practices together.

21. Peer review

The course book of surveying subject of second year road department. Consists of detailed description of syllabus of the course for a academic year 2018- 2019.

The content of the syllabus is up to date which is suitable for the need of the modern local projects.

Mission :

- Equipment's and accessories of theodolite survey and necessary adjustment;
- How the theodolite is to be set up , levelled ,centred and oriented;
- The different bearings ascribed to the lines of a traverses for calculation purposes;
- The calculation of closed traverses and the method of adjusting the latter;
- The plotting of a traverse using rectangular coordinates;
- Circular geometry and the formulae for calculating the various elements of circular curves;
- The geometry, computations and methods of setting out horizontal simple circular curves;
- The geometry, computations and methods of setting out horizontal spiral circular curves;
- The geometry, computations and methods of setting out vertical curves;
- What is thecometry, measurements;
- Theory of stadia thecometry and its variations ;
- Theory of tangential method thecometry and its variations ;
- Theory of substances bar methods thecometry and its variations ;
- Theory of stadia thecometry and its variations ;

- **OPERATION IS DONE BY TOTAL STATION**

1. SURVEYING

2. FREE STATION (RESECTION)

3. STAKE OUT

4. AREA & VOLUME

5. REMOTE HIGHT

6. TIE DISTANCE

- **Photogrammetry, Ground control, Photo scale, Scale Expression, Determination of the height of Towers and pillars;**

Tunnel surveys,Types of tunnels,Transferring the surface levels to underground ;

- ;