

Lesson Plan - CE1101 - Geomatics Surveying
Academic year 2015-16
(Semester commencing in February 2016)

Instructional objectives

Instructional Objective No.	Instructional objectives (IO)
1	To know the basics, importance, and methods of Triangulation and Trilateration.
2	To study the various Hydrographic Surveying Techniques.
3	To study the Advance Surveying Instruments like EDM Total Station and GPS
4	To Study the Concept of Aerial Photo Interpretation
5	To learn the importance and different aspects of remote sensing.

Student outcomes

Student Outcome No.	Student outcome (SO)
a	an ability to apply knowledge of mathematics, science, and engineering
b	an ability to design and conduct experiments, as well as to analyze and interpret data.
e	an ability to identify, formulate, and solve engineering problems.
k	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Mapping of Instructional Objectives (IOs) with Student Outcomes (SOs)
CE1101 - Geomatics Surveying

Instructional objectives	Student Outcomes			
	a	b	e	k
1. To know the basics, importance, and methods of Triangulation and Trilateration.	X			
2. To study the various Hydrographic Surveying Techniques.	X	X	X	X
3. To study the Advance Surveying Instruments like EDM Total Station and GPS	X	X	X	X
4. To Study the Concept of Aerial Photo Interpretation	X	X	X	X
5. To learn the importance and different aspects of remote sensing.	X		X	X

CE1101	Geomatics Surveying	Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)	Credits (C)
		3	0	0	3
	Prerequisites Nil				

Lesson Plan – 2015-16

Revision: 0 dated 01/02/2016

Lecture No.	Topic	No. of hours	IOs	SO	Reference
UNIT - I TRIANGULATION AND TRILATERATION					
1.	Introduction-Horizontal and vertical control - methods – network/classification triangulation - Layouts	1	1	a,b,e,k	1,2,3,4,10
2.	Base line – selection of site for base line, instruments – Colby Apparatus, Steel, Invar, Wheelers base line apparatus	1	1	a,b,e,k	1,2,3,4,10
3.	Jaderins method, Hunters short base	1	1	a,b,e,k	1,2,3,4,10
4.	Extension of base lines – corrections	1	1	a,b,e,k	1,2,3,4,10
5.	Satellite station - Reduction to centre	1	1	a,b,e,k	1,2,3,4,10
6.	Signals	1	1	a,b,e,k	1,2,3,4,10
7.	Axis signal corrections	1	1	a,b,e,k	1,2,3,4,10
UNIT - II – HYDROGRAPHIC SURVEYING					
8.	Shore line survey, Tides – Gauges	1	2	a,b,e,k	1,2,3,4,10
9.	Sounding , Equipments- shore signals and Buoys - Sounding boat, sounding Rod , Lead Lines, Sounding Machine, Fathometers, Sextants	1	2	a,b,e,k	1,2,3,4,10
10.		1	2	a,b,e,k	1,2,3,4,10
11.	Locating the sounding: observations from shore – transit and stadia, Range and one angle from shore Two angle from Shore	1	2	a,b,e,k	1,2,3,4,10
12.	Observations from boat - Range and one angle from Boat, Two angle from Boat	1	2	a,b,e,k	1,2,3,4,10
13.	Cycle Test I		1		
14.	Observations from shore and boat – range and time interval, Intersecting Ranges, Cross rope,	1	2	a,b,e,k	1,2,3,4,10
15.	Plotting sounding – Mechanical , Graphical, Analytical Solutions	1	2	a,b,e,k	1,2,3,4,10
16.	River/Stream Surveying– area velocity, weir method and chemical method	1	2	a,b,e,k	1,2,3,4,10

Lecture No.	Topic	No. of hours	IOs	SO	Reference
UNIT – III - EDM, TOTAL STATION, GPS SURVEYING					
17.	Introduction to EDM – Introduction to EDM – Components	1	3	a,b,e,k	1,2,3,7,10
18.	Electro – Optical system – Working Principles and Errors	1	3	a,b,e,k	1,2,3,7,10
19.	Microwave EDM- Working Principles and Errors	1	3	a,b,e,k	1,2,3,7,10
20.	Total Station – Working Principles and Errors	1	3	a,b,e,k	1,2,3,7,10
21.	Coordinate system-Cartesian-rectangular and Geographic	1	3	a,b,e,k	1,2,3,7,10
22.	Introduction to GPS, Working Principle Segments of GPS – Space, Control, User	1	3	a,b,e,k	1,2,3,7,10
23.	Errors in GPS Surveying	1	3	a,b,e,k	1,2,3,7,10
24.	GPS Survey – Kinematics and static	1	3	a,b,e,k	1,2,3,7,10
UNIT – IV PHOTGRAMMETRY SURVEYING					
25.	Introduction to photogrammetry-Metric and interpretative photogrammetry-History of Photogrammetry	1	4	a,b,e,k	5,6,8,9
26.	Types of photographs : Photo theodolite- Ballistic camera, terrestrial photographs ,	1	4	a,b,e,k	5,6,8,9
27.	Aerial photographs - vertical, Oblique photographs	1	4	a,b,e,k	5,6,8,9
28.	Marginal Information on Aerial Photo Graph, Flight Planning	1	4	a,b,e,k	5,6,8,9
29.	Scale-Types and its measurement-LSM, SSM, MSM, Relief displacement, Orthophoto,	1	4	a,b,e,k	5,6,8,9
30.	Elements of Photographic Interpretation- With Examples	1	4	a,b,e,k	5,6,8,9
31.	Cycle Test – II		1		
32.	Stereoscopy – Principles and uses	1	4	a,b,e,k	5,6,8,9
33.	Parallax types – height determination	1	4	a,b,e,k	5,6,8,9
34.	Applications of aerial photographs in Civil Engineering	1	4	a,b,e,k	5,6,8,9
UNIT – V REMOTE SENSING					
35.	Introduction to Remote Sensing, Historical background - Indian Remote Sensing Satellites	1	5	a,b,e,k	5,8
36.	Components of Remote Sensing - Ideal Remote Sensing System	1	5	a,b,e,k	5,8
37.	EMR Wavelength and wave frequency – Characteristics and specific applications	1	5	a,b,e,k	5,8
38.	EMR Interaction with Atmosphere, Earth surface feature-Scattering, Emissions and Absorption	1	5	a,b,e,k	5,8
39.	Platforms – Ground, Airborne and Space borne Sensors – Illumination - Orbit and Wavelength.	1	5	a,b,e,k	5,8
40.	Resolutions- Spatial, Spectral, Temporal, Radiometric	1	5	a,b,e,k	5,8
41.	Optical Remote Sensing – sensors -Characteristics	1	5	a,b,e,k	5,8
42.	Microwave Remote Sensing-bands divisions – Scatterometer, Radiometer and Radar- Characteristics	1	5	a,b,e,k	5,8
43.	Model Examination		3		
Total hours		45			

The faculty members handling the course may conduct surprise test according to their convenience. However a question paper in hard copy as well as key shall be made available for the surprise test. The process shall be same as that of cycle tests.

TEXT BOOKS

1. Kanetkar .T.P, “Surveying and Leveling” Vols. I and II, United Bok Corporation, Pune, 1994.
2. Kanetkar T P and Kulkarni S V., Pona Vidyagriha Prakashan, “Surveying and leveling Part I”II.
3. Punmia B.C, “Surveying, Vols”. I and II, Laxmi Publications,1999.

REFERENCE BOOKS

4. Chandra .A.M “Plane Surveying and Higher Surveying”, New Age International (P) Limited, Publishers, Chennai, 2002.
5. Agarwal .C.S, Garg P.K, “Remote Sensing”, Whekrs Publishing Co., 2000.
6. Wolf, P.R. “Elements of Photogrammetry”, Tata MaGrawHil Co., 1997.
7. Burnside C. D, “Electromagnetic Distance Measurement,” Bekman Publishers, 1971.
8. Anji Redy .M, “Remote sensing and Geographical information system,” B.S Publications,
9. Leudr D. R., “Aerial Photographic Interpretation,” McGrawHil, 1959.
10. Arora K. P, “Surveying “, Volume I, Standard Bok House, 2000.

Staff in Charge

HOD/Civil