

Course Name : 03 Years Diploma in Mining Engineering

Year : First

Subject Title : Mine Surveying-I

Subject Code : M106

Teaching and Examination Scheme:

Teaching Scheme			Examination					
L	T	P	Full Marks.	External Exam Marks	Internal Exam Marks	External Pas Marks	Total Pass Marks	Duration of External Exams
02			100	80	20	26	40	3 Hrs
Practical		2	50	40	10	13	20	4 Hrs

NOTE:

Internal marks will be allotted on the basis of two snap tests and 2 assignment of equal marks to be conducted by the faculty teaching the subject.

RATIONALE:

The important job functions of mine surveyor include the activities of detailed surveying, plotting of survey data and setting out works.

It is therefore essential to give emphasis on the development of skills on using various survey instruments and their application in underground mines for preparation plans & sections of workings. In addition, for providing basic principles of surveying and levelling, it is necessary to arrange appropriate field exercises and small projects.

OBJECTIVES:

Student will be able to

1. Acquire skills of using various survey instruments.
2. Develop skills of preparation of mine plan & section.
3. Understand and apply principles and method of survey to conduct subsidence survey.
4. Carryout and suggest the repairs needed to survey instruments.
5. Understand and apply various statutory provisions of regulation while preparing mine plan & section.

DETAILED CONTENTS:

CHAPTER	CONTENTS	Marks	Hrs
1.	INTRODUCTION TO SURVEYING 1.1 Definition of surveying, objects of surveying, Plane and Geodetic surveying. Classification & Basic principles of surveying. Chain Surveying : 1.2 Principle of chain surveying. Equipments in chain surveying, cross staff , optical square its principle and use. 1.3 Different operations in chain surveying, Ranging: direct & reciprocal ranging. Line ranger structure, principle of working and its use. Chaining: Chaining on flat & slopping ground, obstacle in chaining(No numerical). Errors in changing. Offsetting.	16	10
2.	COMPASS SURVEYING 2.1 The Prismatic & Surveyors compass, their Comparison. 2.2. Bearing of a line: Definitions: True & Magnetic Meridian; True and Magnetic bearings, Fore & Back bearings, Declination. Whole circle bearing system & Quadrantal Bearing system. Conversion of bearings from one system to other. Calculation of angles from bearings. Calculation of bearings from angles. 2.3. Local attraction: Sources, detection & its elimination. Magnetic Dip & Magnetic declination. Calculation of True bearings. 2.4. Traversing with compass: Closed and open traverse; Plotting a compass traverse; Checks for open & closed traverse; Closing error, Graphical adjustment of closing error.	16	10
3.	PLANE TABLE SURVEYING 3.1 Introduction, Plane table and its accessories, Temporary adjustments of Plane table, centering, levelling, orienting the plane table by method of back sighting by method of magnetic needle. 3.2 Methods of plane tabling Radiation, Intersection, Traversing, Resection method. 3.3 Advantages & disadvantages of plane table survey, Errors in plane table survey.	16	10

CHAPTER	CONTENTS	Marks	Hrs
4.	<p>LEVELLING</p> <p>4.1 Definitions of the terms used in Levelling. Concept of datum, Back sight, Foresight stations, change point, height of instrument. Dumpy and tilling level Construction and temporary adjustments. Levelling staff, their types. balancing of back sight and Fore sight distances. Holding and Reading the staff, simple and differential levelling, and booking of readings.</p> <p>4.2 Reduction of levels by Collimation system and by Rise & fall system. arithmetic check, computation of missing readings.</p>	16	12
	<p>4.3 Classification of levelling: Differential, Reciprocal, and Fly levelling, Profile levelling, cross sectioning. Plotting of a profile and cross section.</p> <p>4.4 Difficulties in levelling, common mistakes in levelling. Permanent adjustments of Dumpy & Tilling level. Automatic level (General idea only)</p> <p>4.5 Study and use of level Auto set level, Temporary adjustments.</p>		08
5.	<p>CONTOURING</p> <p>Introduction and concept, definitions, purpose, Characteristic of Contour line, contour interval, factors affecting contour interval, Horizontal equivalent. Methods of Locating contours Direct method, Indirect method. Interpolation of contours by estimation, arithmetical and by graphical method. Plotting of contour maps. Uses of contour map.</p>	16	10
	Total	80	60

LIST OF PRACTICAL

1. Demonstration of measuring chain, tape, ranging rod, peg, arrow, optical square, line ranger.
2. Laying and ranging a chain line and taking offsets by tape on either side.
3. Chain and cross-staff survey for finding out area of a given field.
4. Perform temporary adjustment of prismatic compass and observing fore & back bearing and calculation of included angles from observed bearings.
5. Measure fore & back bearing of five sided closed traverse, identify stations affected by local attraction and calculate corrected bearings
6. Demonstration of plane table and accessories, temporary adjustment, locating points by radiation.
7. Methods of plane Tabling- orientation of plane table by back sighting and locating details by intersection method.
8. Demonstration of Dumpy level and tilting level.
9. Carrying out, Temporary adjustments of dumpy level and conduct simple levelling, recording readings in levelling book and apply arithmetic check.
10. Differential levelling with Dumpy level- recording in level book, reduction of levels by both methods, apply arithmetic check.

11. Fly levelling for carrying benchmark at a station at least 300 m away by tilting level.
12. Demonstration of auto level.
13. Draw Contour line of given area using level.
14. Generate Profile of given area using Contour data.
15. Draw 2D Contour of given data using available software.
16. Draw 3D contour of an area using available software.

REFERENCE BOOKS :

Author	Title	Year of publication	Publisher
T. P. Kanetkar & S. V. Kulkarni	Surveying and leveling Vol. I & II	1995	Pune Vidyapith Griha Prakashan Pune.
B.C. Punmia	Surveying-I & II		
Amarjit Aggarwal.	Surveying & Levelling	1992	H.Tata International Publication, Delhi- 51