AMMS23 MINE PLANNING AND DESIGN

UNIT-1 INTRODUCTION

1.1 Stages/Phases of mine life; Preliminary evaluation of surface mining prospects;
1.2 Mine planning and its importance;
1.3 Mining revenues and costs, and their estimation;
1.4 Mine planning components, planning steps and planning inputs.

UNIT-2 ORE RESERVE ESTIMATION ORE ZONE AND BENCH/LEVEL COMPOSITING

2.1 Objectives and principles of ore reserve estimation; Estimation of grade at unknown point;
2.2 Methods of ore reserve estimation - vertical cross section method, horizontal cross section method and 3-D geological block method.
2.3 Stripping ratio Concept of stripping ratio; Types of stripping ratios and their significance; Choice between surface and underground mining.

UNIT-3 GEOMETRICAL CONSIDERATIONS BASIC BENCH GEOMETRY

3.1 Ore access; Pit slope geometry; Addition of haul road on pit plan; Pit layouts.
3.2 Pit Planning Development of economic block model;
3.3 Pit Cut-off grade and its estimation; Ultimate pit configuration and its determination – hand method, floating cone technique,
3.4 Lerchs-Grossmann algorithm, and computer assisted hand method.
3.5 Production planning Determination of optimum mine size and Taylor's mine life rule; Sequencing by nested pits;
3.6 Cash flow calculations; Mine and mill plant sizing,
3.7 Lanes algorithm for estimation of optimum mill cut of grade;
3.8 Introduction to production scheduling.

UNIT-4 ANALYSIS AND DESIGN OF HIGHWALL SLOPES AND WASTE DUMPS INFLUENCE OF PIT SLOPE ON MINE ECONOMICS

4.1 Highwall slope stability analysis and design methodology; Stability analysis and design methodology for waste dumps.
4.2 Design of haul roads Design of road cross section; Design of road width, curves and gradient; Haul road safety features and their design.
4.3 Design of drainage system in surface mines.
4.4 Selection of mining system vis-à-vis equipment system.
4.5 Closure of surface mines. Feasibility Report - Contents and preparation.

Reference Books:

1. . "Advanced Coal Mining" by B M Vorobjev and R T Deshmukh
2. "Introductory Mining Engineering" by Hartman