

Chhattisgarh Swami Vivekanand Technical University, Bhilai
SCHEME OF TEACHING AND EXAMINATION
B.E. VII SEMESTER MINING ENGINEERING

S. No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/Practical				
							ESE	CT	TA		
1	Mining Engg.	339731(39)	Mine Economics	4	1	-	80	20	20	120	5
2	Mining Engg.	339732(39)	Mine Surveying - III	4	1	-	80	20	20	120	5
3	Mining Engg.	339733(39)	Rock Mechanics	4	1	-	80	20	20	120	5
4	Mining Engg.	339734(39)	Mine Fires and hazards	4	1	-	80	20	20	120	5
5	Refer Table -2		Professional Elective-II	4	1	-	80	20	20	120	5
6	Mining Engg.	339761(39)	Mine Surveying – III Lab	-	-	4	40	-	20	60	2
7	Mining Engg.	339762(39)	Rock Mechanics Lab	-	-	4	40	-	20	60	2
8	Mining Engg.	339763(39)	Mine Fires and hazards Lab	-	-	2	40	-	20	60	1
9	Mining Engg.	339764(39)	Minor Project	-	-	2	100	-	40	140	1
10	Mining Engg.	339765(76)	Innovative & Entrepreneurial Skills	-	-	2	-	-	40	40	1
11	Mining Engg.	339766(39)	**Practical Training	-	-	-	-	-	40	40	-
12			Library	-	-	1	-	-	-	-	-
Total Periods of 40 per week				20	05	15	620	100	280	1000	32

L – Lecture, T – Tutorial, P – Practical, ESE- End Semester Exam, CT- Class Test, TA – Teacher’s Assessment
****To be completed after VIth Sem. and before the commencement of VIIth Sem.**

Table –2

Professional Elective - II			
S.No.	Board of Studies	Name of Subject	Code
1	Mining Engg.	Mine Planning	339741(39)
2	Mining Engg.	Industrial Engg.	339742(39)

Note (1) – 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a Particular academic session .
Note (2) – Choice of elective course once made for an examination cannot be changed in future examinations.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Mine Economics**

Code: **339731(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

To choose proper method of sampling for different ore bodies and mineral heaps.

To estimate grade and reserves.

To choose proper method of mine valuation for valuation of any mine and also able to determine the NPV of any mine.

To perform various financial management aspects related with the mine.

Course outcomes:

Apply knowledge of mine economics for understanding, formulating and solving problems related with the mine economics.

Identify analyze and solve financial management problems.

Acquire knowledge and hands-on competence in applying the concepts of management in the development of mine economics

UNIT 1. Sampling- Methods of sampling, errors in sampling, analysis of samples, estimation grade and reserves, salting and precautions against salting. Different types of reserves.

UNIT 2. Mine Valuation - Different methods, depreciation, amortization and redemption of capital, Life of a mine and present value of a mine.

UNIT 3. Financial Management - Methods of framing and financing industrial enterprises, memorandum and articles of association, shares, debentures, dividends and interest. Break even chart and inventory control.

UNIT 4. Investment Decisions - discounted cash flow methods, non-discounted cash flow methods, advantages and disadvantages of them, Internal rate of return, Net Present Value.

UNIT 5. Book Keeping, Preparation of Balance sheet, Profit and Loss Account.

Reference Books :-

1. Mineral Economics by R.T. Deshmukh
2. SME Handbook Vol. I
3. Mineral Economics by Sinha and Sharma

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Mine Surveying III**

Code: **339732(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

To choose proper method of correlation surveys for an underground mine.

To measure the base line and perform triangulation survey.

To perform various types of correlation survey.

To determine the distance and elevation of any point with the help of photogrammetric survey and total station survey.

To determine the azimuth.

Course outcomes:

Apply knowledge of surveying for understanding, formulating and solving surveying problems.

Identify, analyze and solve surveying problems.

Acquire knowledge and hands-on competence in applying the concepts in the development of mine surveying .

UNIT 1: Triangulation

Principles and network of triangles; Selection of sites for base line and triangulation stations; Base and Check base lines; Extension of base line, Base line measurement, satellite station, Signal and tower, Measurement and adjustment of angles by simple methods; Calculation of Co-ordinates.

UNIT 2: Correlation Survey

Methods of correlation of surface and underground surveys through adits, inclines, and shafts; Use of magnetic needle and Gyro Theodolite for correlation survey ; Different methods of stope surveying and open pit surveying, Calculation related with correlation survey.

UNIT 3: Astronomical Survey

Definitions of important terms, spherical trigonometry, various coordinate systems in field astronomy, Determination of azimuth by astronomical observations, Calculation related with field astronomy.

UNIT 4: Photographic Surveying

General Principles; Terrestrial surveying: Phototheodolite; Stereo photographic Surveying, Aerial Surveying - Field of application; Vertical and oblique photographs; Aerial photography; Flight planning, ground control in photogrammetry Preparation of Photographical maps by simple methods, Calculation related with Photogrammetric surveying.

UNIT 5: Modern Surveying Techniques

Principle of EDM, Electronic distance measuring equipment; Merits and demerits of EDM, Geodimeter, Tellurometer, Distomat, Total Station, Introductory knowledge of Remote Sensing and Global Positioning System .Surveying software

Text Books

1. Mine surveying by S. Ghatak
2. Surveying & Levelling by B. C. Punamia
3. Surveying & Levelling by Kanetkar & Kulkarni
4. Mine surveying by Winniberg

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Rock Mechanics**

Code: **339733(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

To learn various physico mechanical & rheological properties of rock and the rock mass classification.

To determine the RMR of any mine

To measure the insitu stress in the underground mines.

Course outcomes:

Apply knowledge of rock mechanics for understanding, formulating and solving strata control problem in any underground mine.

Identify, analyze and solve rock mechanics problems.

Acquire knowledge and hands-on competence in applying the concepts in the development of rock mechanics.

UNIT 1: INTRODUCTION

Application of rock mechanics in mining, Definition of important terms used in Rock mechanics, Classification of rock mass, Parameters of rock mass classification, Importance of rock mass classification, RQD, Q –system and Bieniskiwi's Geomechanics, classification of rock mass.

UNIT 2: Rock properties, Physico-mechanical properties of rock, Preparation and testing of specimen in the laboratory, ISRM standards, Determination of Physico-mechanical properties of rock as per ISRM standard testing procedures, Strength indices and their importance. Point load, Protodyaknov, Impact and Cone Indenter strength Index.

UNIT 3: Rock as an elastic medium, Principle of elastic analysis, Rheological properties of rock, Importance of rheological models, Different types of rheological models, Dynamic properties of rocks, Anisotropy and Creep.

UNIT 4: Principal stress and Principal plane, Analytical method of determining the magnitudes and directions of normal and shear stress on failure plane, Mohr's circle, Theories of failure of rock, Coulomb-Navier theory, Mohr's theory, Griffith's theory, Empirical theories of failure of rock, Different modes of failure of rock.

UNIT 5: Earth stresses, Importance of measurements of in situ stress, measurements of in situ stress by Flat jack, Over coring and Hydraulic fracturing technique. Design of circular and elliptical openings. Determination of safe span of roof.

Text Books

1. Rock Mechanics By Obert and Duvall
2. Rock Mechanics By Goodman
3. Rock Mechanics By Jager & Cook
4. Rock Mechanics by B.S. Verma

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Mine Fires and Hazards**

Code: **339734(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

To choose proper fire fighting method for different types of fire.

To be able to perform reopening a sealed off area.

To investigate accidents caused by various types of explosions, fires strata fall and inundation in an underground coal mines.

To perform rescue and recovery works during any accident in the mine.

Course outcomes:

Apply knowledge of mine environment for understanding, and solving problems related with mine accidents.

UNIT 1 : MINE FIRES

Mine fires, fires in quarries and surface storage systems, Causes and prevention of fires, control of fires and fires extinguishers, study of atmosphere behind sealed off areas, conditions and procedure of Reopening a sealed off area, fire fighting organisations.

UNIT 2: SPONTANEOUS HEATING

Causes, detection and preventive measures in underground and surface coal mines, stacks and dumps, control of spontaneous heating, fire stopping and sealing off an area.

UNIT 3: EXPLOSION

Fire damp and coal dust explosions, their causes and prevention, stone dust and water barriers, investigations after explosion.

UNIT 4: RESCUE AND RECOVERY

Types of rescue equipment and their use, rescue stations, first aid appliances, training of personnel, and organisation of rescue and recovery work during mine fires, explosion, inundation.

UNIT 5: MINE INNUNDATION

Causes and precautionary measures, bulk head doors, barriers, dams, precautions to be taken while approaching old workings, recovery of flooded mines and de watering of old workings.

Text Books:

1. Mine Env. By G.B. Mishra
2. Elements of Mining Tech. Vol.2 by D. J. Deshmukh
3. U/G Mine Env. by Mcpherson
4. Mine fires by Dr. Ramlu

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Professional Elective-II(Mine Planning)**

Code: **339741(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

To prepare feasibility report and detailed project report for any mine.

To work out planning and scheduling for any mine.

To choose proper mode of opening and method of underground mine for any coal seam / mineral deposit

To design a mine and mine openings.

Course outcomes:

Apply knowledge of mine planning for understanding, formulating and solving mine planning & scheduling problems.

Identify, analyze and solve mining problems.

Acquire knowledge and hands-on competence in applying the concepts in the development of mine planning

UNIT 1: Coal reserves and their estimation, Geological and technological data needed for mine planning, Preparation of project report and feasibility report. Planning and scheduling of various mining operations.

UNIT 2: linear programming, Simplex methods and transportation problem. Operation Research - Scope of application in mining, Linear programming, formulation and solution, Network planning with special reference to CPM/PERT, System approach for project scheduling.

UNIT 3: Division of mine area into units and sub units, Area, Reserve, Life and Capacity of mine, Panel size, Design of long wall face, design of pillar and shaft pillar,.

UNIT 4: Cost of various mining operations, Optimum size of mines, Mode of opening up of deposits, Choice of opening, Location and size of Development openings, mine closure plan.

UNIT 5: Mine Services

Design of haulage, hoisting and drainage systems, Design of pit top and pit bottom, Coal handling plants, Railway siding etc.

Books Recommended.

1. Advance Coal Mining by R.T. desh mukh and V.S. Vorobjev
2. Mine Planning by S.P. Mathur
3. Mine Planning by B.J. Bhattacharya

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Professional Elective-II(Industrial Engineering)**

Code:**339742(39)**

Total Theory Periods: **36**

Total Tutorial Periods: **12**

No. of class Tests to be conducted: **2 (Minimum)**

No. of assignments to be submitted: **2 (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks in ESE: **80**

Minimum Marks in ESE: **28**

Course Objective

UNIT-I General

Introduction; Definition of industrial Engineering, History & development of industrial Engineering, place of industrial Engineering in an organization, related Discipline; Management, Operation Research, Statistics, Ergonomics, Manufacturing Engineering etc. System approach in industrial Engg.

UNIT-II Work study; purpose; objectives and application of work-study, Productivity and work-study

(A) Method Study: Introduction to method study, Basic Procedure movement of workers in working area, flow process charts multiple activity charts, movement at the workplace, principles of the motion economy, therbligs, Development of improved methods.

(B) Work Measurement: Definition & purpose of work measurement, Work sampling, time study, selecting & timing the job, rating, scales of rating, allowances, determination of standard time.

UNIT-III

(A) Information systems in Organizations: Role of IS in business, increasing value of information technology, Internet work enterprise, Internet, intranet and extranet, Globalization and IT, competitive advantages with IT.

(B) Business process Reengineering: Definition, Need for reengineering, characteristics of BPR, industrial Engineering and reengineering, Role of IT in reengineering business process advantages of reengineering.

UNIT-IV

(A) Maintenance management: Objectives and need for maintenance, types of maintenance, Breakdown predictive and preventive maintenance.

(B) Equipment Replacement policy: Reasons for replacement, deterioration, obsolescence, depreciation, and methods for depreciation calculation.

(C) Value Analysis: Objectives and scope of value analysis, applications and techniques of value analysis.

UNIT- V Inventory Control, Different techniques, ABC Analysis, Ordering of Inventory, Procurement techniques

Reference Books :-

1. SME Mining Engg. Handbook Vol. II by Cummins
2. SME Mining Engg. Handbook by Hartman

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: Mining Engineering
Subject: Mine Surveying – III Lab

Semester: VII
Code: 339761 (39)

Total Practical Periods: 50

Total Marks in End Semester Exam: 40

List of Practical to be Performed

1. Baseline measurement
2. Baseline extension
3. To connect the baseline to main triangulation network
4. Reduction to centre
5. Angle adjustments in triangulation network
6. Plotting the survey by co-ordinate methods
7. Correlation survey by Weisbach triangle method
8. Study of EDM
9. Study of Total station
10. Handling of surveying software

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Subject: **Rock Mechanics Lab**

Code: **339762(39)**

Total Practical Periods: 50

Total Marks in End Semester Exam: 40

List of Practical to be Performed

1. Determination of moisture content of rock sample by ISRM standard method
2. Determination of porosity of rock sample by ISRM standard method
3. Determination of Density of rock sample by ISRM standard method
4. Determination of slake durability strength index of rock sample by ISRM standard method
5. Determination of point load strength index of rock sample
6. Determination of Proto-dyakonov strength index of rock sample
7. Determination of Uni-axial Compressive strength of rock sample by ISRM standard method
8. Determination of Tensile strength of rock sample by Brazilian method
9. Determination of Single Shear and Double Shear strength of rock sample
10. Determination of Tri-axial Compressive strength of rock sample by ISRM standard method
11. Determination of Young' Modulus of rock sample by ISRM standard method

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Name of the Programme: :::: Duration of the Programme: Four Years

Branch: **Mining Engineering**
Subject: **Mine Fires and Hazards Lab**

Semester: **VII**

Code: **339763(39)**

Total Practical Periods: **28**

Total Marks in End Semester Exam: **40**

List of Practical to be Performed

1. Study of erection of sand bag fire stopping
2. Study of working of soda acid fire extinguishers.
3. Study of working of foam extinguishers.
4. Study of erection of German type stone dust barriers
5. Study of erection of Polish type stone dust barriers
6. Study of erection of Double brick fire stopping
7. Study of principle and working of self contained breathing apparatus Dragger 174-A
8. Study of principle and working of Aero lox Liquid oxygen apparatus.
9. Study of principle and working of self rescuers.
10. Study of various types of water dam constructed in U/G mines

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY BHILAI (C.G.)

Name of the Programme: ::: Duration of the Programme: Four Years

Branch: **Mining Engineering**

Semester: **VII**

Branch: Common to all Branches

Subject: **Innovative and Entrepreneurial skills**

Code: **300765(76)**

Total Theory Periods: 28

Total Tutorial Period: NIL

Total Marks in End Semester Exam: 40

Minimum no. of Class test to be conducted:--

Unit I

Innovation: innovation- an abstract concept; creativity, innovation and imagination; types of innovation -classified according to products, processes or business organizations.

Unit II

Entrepreneurship: who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of Entrepreneurship for sustainable development.

Unit III

Difference between entrepreneur and entrepreneurship, Difference between entrepreneur and intra-preneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting Entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

Unit IV

Identification of Business Opportunities: Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

UNIT-V

Techno-Economic Feasibility of the project: Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

Text and Reference Books:

- _ Competing through Innovation-Bellon & Whittington, Prentice Hall of India
- _ A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
- _ Entrepreneurship- Rober D Hisrich, Peters, Shepherd- TMH
- _ Entrepreneurship in Action- Coulter, Prentice Hall of India
- _ Entrepreneurship Management and Development – Ajith Kumar, HPH
- _ Fundamentals of entrepreneurship- Mohanty, PHI
- _ Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edition.