

Chhattisgarh Swami Vivekanand Technical University, Bhilai

SCHEME OF TEACHING AND EXAMINATION

BE (MINING ENGINEERING) IV SEMESTER

| 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. | 339451(39) | Mine Climate & Ventilation | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 2 | Mining Engg. | 339452(39) | Engineering Materials | 3 | - | - | 80 | 20 | 20 | 120 | 3 |
| 3 | Electrical Engg. | 339453(24) | Basic Electrical Engineering | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 4 | Mining Engg. | 339454(39) | Mining Geology – II | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 5 | Mining Engg. | 339455(39) | Underground Coal Mining | 3 | 1 | - | 80 | 20 | 20 | 120 | 4 |
| 6 | Electronics & Telecom | 339456(28) | Basic Electronics and Instrumentation | 4 | 1 | - | 80 | 20 | 20 | 120 | 5 |
| 7 | Mining Engg. | 339461(39) | Mining Geology – II Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 8 | Mining Engg. | 339462(39) | Mine Climate & Ventilation Lab | - | - | 2 | 40 | - | 20 | 60 | 1 |
| 9 | Electrical Engg. | 339463(24) | Basic Electrical Engineering Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 10 | Mining Engg. | 339464(39) | Underground Coal Mining Lab | - | - | 4 | 40 | - | 20 | 60 | 2 |
| 11 | Humanities | 339465(46) | Health, Hygiene & Yoga | - | - | 2 | - | - | 40 | 40 | 1 |
| 12 | | | Library | - | - | 1 | - | - | - | - | - |
| | | | | 20 | 5 | 15 | 640 | 120 | 240 | 1000 | 32 |

L: Lecture, T: Tutorial, P: Practical, ESE: End Semester Exam, CT: Class Test, TA: Teachers Assessment

Note (1): Duration of all theory papers will be of Three Hours.

Note (2): Industrial Training of six weeks is mandatory for B.E. students. It is to be completed in two parts. The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during V Semester.

Chhattisgarh Swami Vivekanand Technical University, Bilai

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|-----------------------|---------------------------------------|--------------------------|--------------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339451(39) |
| Subject: | Mine Climate & Ventilation | Total Tutorial Periods: | 12 |
| Total Theory Periods: | 36 | Assignments: | Two (Minimum) |
| Class Tests: | Two (Minimum) | Maximum Marks: 80 | Minimum Marks: 28 |
| ESE Duration: | Three Hours | | |

Course Objectives:

1. Explain the origin, occurrence, effects, and detection of various mine gases.
2. Discuss the air conditioning of surface mines and underground mines.
3. Determine the quantity of air flow in mine roadways and mine ducts.
4. Discuss the mine doors, regulators, stoppings, air crossing and air locks.
5. Explain types of mine fans, their characteristics, suitability and selection of fans
6. Discuss the auxiliary and booster fans, series and parallel operation of fans.
7. Explain ventilation survey in underground mines and computer application in mine ventilation.

Course Outcomes:

1. The students are expected to enhance the technical knowledge on origin, occurrence, effects, and detection of various mine gases, air conditioning of surface and underground mining.
2. The students are expected to possess ability to identify, formulate and solve quantity of air flow in mine road ways, equivalent resistance of mines, types of fans used in mines.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for mine ventilation in underground mines.
4. Work effectively as an individual and as a member of a multidisciplinary team.

- UNIT-I MINE ATMOSPHERE:** Pollution of Mine Atmosphere, Mine Gases, Their Origin, Occurrence, Effects and Detection, Methane Drainage. Monitoring System of Mine environment, Analysis of Mine air. Heat and Humidity in Mine Atmosphere and Their Effects, Cooling Power of Mine Air, Assessment of Comfort Conditions, Air Conditioning of Mines, Surface, Underground and Divided Installations, Spot Coolers.
- UNIT-II Natural Ventilation:** Objects and Standard of Ventilation, Flow of air in Ducts and Mine Roadways, Resistance of Air Ways, Laws of Ventilation, Chezy's and Atkinson's Equations, Equivalent Resistance and Equivalent Orifice of Mine, Regulation Related with above topics.
- Natural Ventilation and its Measurements, Thermodynamics of Natural Ventilation, Distribution and Control of air Current, Doors, Regulators, Stoppings and Their Types, air Crossings, Air Locks.
- UNIT- III Mechanical Ventilation:** Theory of mine fans, Types of mine fans, their characteristics & suitability, Selection of fans. Auxiliary and booster fans, series and parallel operation of fans, mine characteristic and selection of mine fans, fan drift and ease, forcing and exhaust ventilation, reversal of ventilation, ventilating of headings.
- UNIT-IV Ventilation Survey:** Quantity and Pressure survey: Planing and Design of Ventilation Systems: Mine ventilation design criteria and ventilation design factors, ventilation standards, Ascensional, descensional homotropical, antitropical, central and boundary ventilation systems, Ventilation layouts for coal and metal mining, Network analysis: Hardy-Cross method. Computer application in mine ventilation.
- UNIT-V Ventilation Systems & Planning:** Calculation of pressure and quantity requirements, network

problems, Hardy-Cross method, ventilation planning and economic analysis, central and boundary ventilation, accessional and declensional ventilation, antitropical, homotropical ventilation.

Text Books:

1. Mine Env. By G.B. Mishra
2. Elements of Mining Tech. Vol.2 by D. J. Deshmukh

Reference Books:

1. H. L. Hartman, Mine Ventilation and Air Conditioning, John Wiley, Paperback edition, 1989.
2. H. L. Hartman, J. M. Mutmansky, R. V. Ramani and Y. J. Wang, Mine Ventilation And Air Conditioning, Wiley-interscience, 3rd Edition, 1997
3. S. P. Banerjee, Mine Ventilation, Lovely Prakashan, 1st Edition, 2003
4. M. A. Ramlu, Mine Disaster and Mine Rescue, Oxford & IBH, 1991

Chhattisgarh Swami Vivekanand Technical University, Bhilai

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|-----------------------|--------------------------------|--------------------------|--------------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339452(39) |
| Subject: | Engineering Materials | Total Tutorial Periods: | NIL |
| Total Theory Periods: | 36 | Assignments: | Two (Minimum) |
| Class Tests: | Two (Minimum) | Maximum Marks: 80 | Minimum Marks: 28 |
| ESE Duration: | Three Hours | | |

Course Objectives:

1. Discuss the classification of engineering materials, structure of metals and alloys, and Fe-C phase diagram
2. Explain the treatment of iron & steel, hardening, annealing, normalizing, and tempering.
3. Explain the various types of ropes and its construction and application.
4. Explain the classification of cement, RCC, application of fly ash mining.
5. Discuss the engineering behavior of materials.

Course Outcomes:

1. The students are expected to enhance the technical knowledge on classification of engineering materials, structure of metals and alloys and iron-carbon phase diagram.
2. The students are expected to possess ability to identify, formulate and solve treatment of iron & steel problem.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for engineering materials.
4. Work effectively as an individual and as a member of a multidisciplinary team.

- UNIT-I** **General:** Introduction, Classification of Engg. Materials, Structure of Metals and Alloys, Iron-carbon phase diagram.
- UNIT-II** **Treatment of Iron & Steel:** Different Types Of Steels, Their Properties and Uses, Different Types Of Heat Treatment Techniques viz. Hardening, Annealing, Normalizing & Tempering and Their Uses in Mining Industry.
- UNIT-III** **Wire Rope:** Types and Construction, Wire Rope Lays, Non- Stranded Ropes, Selection Of Wire Ropes, Ropes Used For Different Purpose, Mass & Strength Of Wire Ropes.
- UNIT-IV** **Construction Materials:** Cements – Classification & Properties, Quick Setting Cement, R.C.C., Shotcreting, Brick & Stone Masonries, Application Of Fly Ash In Mining.
- UNIT-V** **Engineering Behavior of Some Materials:** Stress-Strain Curves Of Typical Engg. Materials, Elastic And Plastic Deformation, Fracture, Fatigue And Creep.

Text Books:

1. Engineering Physical Metallurgy – Lakhtin – CBS Publishers & Distributors
2. D. J. Deshmukh, Elements of mining technology, Vol. 3, Vidyasewa, 3rd ed, 1989.
3. A Text Book of Material Science & Metallurgy – O.P. Khanna – Dhanpat Rai & Sons – New Delhi

Reference Books:

1. Elements of Material Science & Engg. - Van Vlack. – Addison – Wesley longman, 6th Edn., New York
2. Physical Metallurgy - Clark & Varney, East West Edn., New Delhi
3. Engineering Materials - Woulf series.
4. Material Science & Engg. – A first course – V. Raghavan – PHI (P) Ltd., Delhi, 2003
5. Physical Metallurgy Principles – Robert E Reed Hill – Affiliated East-West Press Pvt. Ltd., New Delhi, 2004

Chhattisgarh Swami Vivekanand Technical University, Bilai

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|-----------------------|-------------------------------------|--------------------------|--------------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339453(24) |
| Subject: | Basic Electrical Engineering | Total Tutorial Periods: | 10 |
| Total Theory Periods: | 40 | Assignments: | Two (Minimum) |
| Class Tests: | Two (Minimum) | Maximum Marks: 80 | Minimum Marks: 28 |
| ESE Duration: | Three Hours | | |

Course Objectives:

1. Explain the power measurement by single and two wattmeter methods, star & delta networks, types of cable, and electrical signaling in mines.
2. Discuss the construction and operation of transformer, auto transformer and three phase transformer.
3. Discuss the construction, principles of operation and characteristics of D C generator and D C Motor.
4. Construction and principles AC machines, induction & synchronous motors, types of electric braking.
5. Explain the transmission and distribution of power in mines.
6. Discuss the circuit breaker.

Course Outcomes:

1. The students are expected to enhance the technical knowledge on power measurement by single & two wattmeters, star – delta networks, and electrical signaling in mines.
2. The students are expected to possess ability to identify, formulate and solve the problems of transformer, AC machine & DC machines, and transmission & distribution of power in mines.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for power supply in mines.
4. Work effectively as an individual and as a member of a multidisciplinary team.

UNIT-I POLYPHASE CIRCUITS: Power measurement by single and two wattmeter methods, power factor correction by simple methods, star and delta networks, D.C. two wire & three wire system, A.C. three wire & four wire system. Types of cables, Underground distribution schemes, Electrical Signaling in mines.

UNIT-II TRANSFORMERS: Construction , principle of operation, equivalent circuits, phasor diagram, regulation and losses and efficiency, Open circuit and short circuit tests. Auto transformers and introduction to three phase transformers.

UNIT-III D.C. MACHINES: Construction , principle of operation and characteristics of D.C. Generators, losses and efficiency, Types of D.C. Motors and their characteristics, starters, speed control and industrial applications. Choice of motors for specific and based on characteristics of loads and motors.

UNIT-IV A.C. MACHINES: General principles and construction of alternators, induction motors and synchronous motors, induction motors types, equivalent circuits, torque slip characteristics, starting and speed control, synchronous condenser, use of synchronous and induction motors for rope haulage, locomotive, conveyors, winders, pumps, fan compressors etc, Electric Braking – types, sequence control, various motors enclosures.

UNIT-V TRANSMISSION AND DISTRIBUTORS OF POWERS IN MINES: D.C. two wire and three wire system, A.C. three wire and four wire system, Types of cable, Underground distribution schemes, Electrical signaling in Mines.

Switch Gear and Protection: Elementary idea of air break, switches, air break and oil break, circuit breakers, over current, earth fault protection, intrinsically safe apparatus, simplified connection diagram A.C. switch board. Switch gear for coal face machinery.

Text Books:

1. Electrical equipment in Mines by H.Cotton .

2. Electrical Machines by Smarajit Ghosh, Pearson Education
3. Performance & Design of A.C. Machines by M.G. Say, C.B.S. Publishers

Reference Books:

1. Performance & Design of D.C. Machines by A.E. Clayton & Hancock, C.B.S. Pbs.
2. Electric Machines by Nagrath & Kothari, TMH Pbs.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

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|-----------------------|--------------------------------|--------------------------|--------------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339454(39) |
| Subject: | Mining Geology – II | Total Tutorial Periods: | 12 |
| Total Theory Periods: | 36 | Assignments: | Two (Minimum) |
| Class Tests: | Two (Minimum) | Maximum Marks: 80 | Minimum Marks: 28 |
| ESE Duration: | Three Hours | | |

Course Objectives:

1. Discuss the principles of stratigraphy, units of stratigraphy, classification and correlation of stratigraphy.
2. Discuss the important geological formations: Archeans, Cuddapahs, Vindhyan, Gondwanas and Tertiaries.
3. Discuss the mode of occurrence, origin, distribution and industrial use of important metallic and non-metallic minerals
4. Explain the geophysical and geochemical prospecting.

Course Outcomes:

1. The students are expected to enhance the technical knowledge on stratigraphy of India and important geological formation of India.
2. The students are expected to possess ability to identify, formulate and solve the problems of economic minerals
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for geophysical and geochemical prospecting.
4. Work effectively as an individual and as a member of a multidisciplinary team.

- UNIT-I** **Indian Geology:** Major Geomorphic Divisions of India; General Review of Indian Stratigraphy; Descriptions of important Indian Geological formations- Archeans, Cuddapahs, Vindhyan, Gondwanas and Tertiaries.
- UNIT-II** **Economic Geology-I:** Introduction and Scope of the subject; Fundamental Terms and Their Definitions; Distribution and Morphology of Minerals Deposits; Brief Review of the Processes of Mineral Formation and the Genetic Classification of Mineral Deposits.
- UNIT-III** **Economic Geology-II:** Mode Of Occurrence, Origin, Distribution, Association and Industrial Uses of Important Metallic (Au, Al, Cu, Fe, Mn, Sn, Pb And Zn) and Non Metallic (Diamond, Mica, Radioactive Minerals, Gypsum, Dolomites, Fire-Clay, Magnesite, Talc, Asbestos, Graphite, Kyanite, Sillimanite, Corundum, Fluorite, Phosphorite, Precious and Semi Precious Stones) Minerals, Petroleum Deposits of India.
- UNIT-IV**
- UNIT-V** **Prospecting and Exploration:** Prospecting and Exploration -Their Definitions and Classification Of Methods; Elementary Methods Of Geological, Geophysical, Geochemical Prospecting; Guides To Ores- Ringed Targets, Intersection Loci, Physiographical, Mineralogical, Stratigraphical and Structural Guides To Ores.

Text Books:

1. A Text Book of Geology: P.K. Mukherjee
2. Engineering And General Geology: Parbin Singh
3. India's Mineral Resources: S. Krishnaswamy
4. Geophysical Prospecting: M.Dorbin & B. Miller
5. Courses in Mining Geology: Arogyaswamy

Reference Books:

1. Fundamentals of Historical Geology and Stratigraphy of India: Ravindra Kumar
2. Geology Of India and Burma: M.S. Krishnan
3. Economic Mineral Deposits: M.L.Jensen & A. Bateman
4. Applied Geology: S. Banger

Chhattisgarh Swami Vivekanand Technical University, Bilai

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|-----------------------|--------------------------------|--------------------------|--------------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339455(39) |
| Subject: | Underground Coal Mining | Total Tutorial Periods: | 12 |
| Total Theory Periods: | 36 | Assignments: | Two (Minimum) |
| Class Tests: | Two (Minimum) | Maximum Marks: 80 | Minimum Marks: 28 |
| ESE Duration: | Three Hours | | |

Course Objectives:

1. Discuss the theories of coal, classification of coal, choice of coal mining method and distribution of coal in India.
2. Explain the board and pillar mining, depillaring by stowing method, and caving method.
3. Discuss the longwall mining of extraction of coal underground mines.
4. Explain thick seam mining and room & pillar mining.

Course Outcomes:

1. The students are expected to enhance the technical knowledge on extraction of coal by board & pillar mining and longwall mining.
2. The students are expected to possess ability to identify, formulate and solve the problems of extraction of coal from the underground mines.
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for thick seam mining and room & pillar mining.
4. Work effectively as an individual and as a member of a multidisciplinary team.

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| UNIT-I | INTRODUCTION: Origin Of Coal, Theories Of Coal Formation, Classification Of Coal, Coaking Coal, Coal Seam and its Classification, Coal Seam Structures and Abnormalities like Faults, Joints, Cleats, Folds etc., Coal Measuring Rocks and Their Characteristics, Distribution Of Coal in India, Indian Coal Mining Industry; Choice Of Coal Mining Methods. |
| UNIT-II | BOARD AND PILLAR METHOD: Important Terminology, Development Size and Shape Of The Pillar, Galleries, Panel System and Without Panel System Of Development, Size Of Panel, Cycle Of Operation, Depillaring, Problems in Depillaring, Preparatory Arrangements, Depillaring by Stowing, Depillaring by Caving Methods, Pillar Extraction Techniques, Dangers Associated With Depillaring. |
| UNIT- III | LONGWALL MINING: Important Terminology, Types Of Longwall Faces and Their Choice, Merits and Demerits Of Longwall Mining, Development Of Longwall Panels and Faces, Longwall Advancing Method, Longwall Retreating Method, Length Of Longwall Faces, Rate Of Face Advance, Double Unit Longwall Faces, Face Organization and Material Supply. |
| UNIT-IV | THICK SEAM MINING: Problem in Mining Of Thick Seams, Choice Of Thick Seam Mining Methods, Inclined Slicing, Horizontal Slicing, Diagonal Slicing, Transverse Slicing, Sublevel Caving, Blasting Gallery Method, Cable-Bolting Method Of Thick Seam Extraction. |
| UNIT-V | ROOM AND PILLAR MINING: Vermelles Method, Slant Method, Sublevel Method, Coal Saw Method, Mining Of Contiguous Seams, Mining Of Steeply Inclined Seam, Mining Under Water, Mining of Seams Prone to Spontaneous Heating, Bumps, Air Blast etc. |

Text Books:

1. Elements of Mining Technology (Vol. 1 & 3): D. J. Deshmukh
2. Coal Mining: R.D.Singh
3. Modern Coal Mining: Samir Das

Reference Books:

1. Mining Engineer's Handbook (Vol. 1&2), 2nd Edition: Edited by Harold Hartman
2. Introduction to mining: Hartman

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Engineering**

Branch: **Mining Engineering**

Subject: **Basic Electronics &
Instrumentation**

Semester: **IV**

Code: **339456(28)**

Total Theory Periods: **40**

Total Tutorial Periods: **10**

Class Tests: **Two (Minimum)**

Assignments: **Two (Minimum)**

ESE Duration: **Three Hours**

Maximum Marks: 80 Minimum Marks: 28

Course Objectives:

1. Discuss the construction & characteristics of PN junction diodes, rectifiers, Zener diode.
2. Explain the construction of transistors, JFET, MOSFET
3. Explain active & passive transducer, analog & digital transducer, LVDT, Thermistor, Solar cell transducer.
4. Discuss the operation amplifier, passive filter, wheatstone bridge, diode clipper, data acquisition system

Course Outcomes:

1. The students are expected to enhance the technical knowledge on diodes, rectifiers, Zener diode.
2. The students are expected to possess ability to identify, formulate and solve the problems of transistor, JFET, MOSFET, transducer, LVDT, Thermistor, Solar cell..
3. The students are expected to possess ability to use the techniques, skills, and modern engineering tools necessary for amplifier, diode clipper, data acquisition system.
4. Work effectively as an individual and as a member of a multidisciplinary team.

- UNIT-I Semiconductor Diodes:** Construction & Characteristics of PN Junction diodes, Rectifier : Half wave, Full Wave & Bridge (Circuit and operation), Zener diode: construction, characteristics, specifications, Voltage regulator circuit using Zener diode.
- UNIT-II Transistors:** Junction Transistor : Construction, Various current components inside a transistor, circuit symbol of PNP and NPN transistors, transistor amplifier, input and output characteristics, relation between α and β of a transistor, CB, CE & CC configuration. Field Effect Transistor: construction, principal of operation and characteristics of JFET. Construction, principle of operation and characteristics of MOSFET 0 enhancement and depletion type MOSFET.
- UNIT-III Basics of Transducers:** Active & Passive Transducers, Analog & Digital Transducers, Classification of transducers according to Applications. Selection of a transducer. Construction, Principles of operation and applications of : Wire wound Potentiometer, Strain gauge, LVDT, Thermistor, Solar cell Transducer, Piezo-electric crystals.
- UNIT-IV Signal Conditioning Circuits:** *Operational Amplifiers:* Terminal characteristics, Ideal characteristics, OPAMP as Inverting amplifier, Non-inverting amplifier, Adder, Difference amplifier, differentiator, Integrator, Comparator, Instrumentation amplifier. *Passive Filters:* High Pass, Low Pass and Band Pass filter using RC- expression for their Gain – BW Product. *Wheatstone bridge. Diode Clipper and clamper* (only qualitative analysis, no mathematical derivation is required).
- UNIT-V Basic Instrumentation System & Components:** Block diagram of basic measurement systems: Distortion due to Mechanical loading, Distortion due to Impedance loading, Distortion due to change in signal frequency, Distortion due to electrical noise. *Data Acquisition System:* Objective of DAS, Single & Multi channel DAS, Computer based DAS. Data Loggers, (Only introductory idea is expected no detail analysis is required).

Text Books:

1. Electronic Instrumentation (2nd Ed.) by H S Kalsi, TMH
2. Elements of Electronic Instrumentation by J. Jha, M.Puri, R. Sukesh Kumar & M. Kowar, Narosa Publishing House.
3. Electronics & Instrumentation by B.R. Gupta, S. Chand & Co.

Reference Books:

1. Electrical & Electronics Measurement & Instrumentation by A.K. Sawheny, Dhanpat Rai Publishing Company.
2. Electronic Instrumentation & Measurement Techniques by Copper & Helfrick, PHI.

Chhattisgarh Swami Vivekanand Technical University, Bilai

Name of program: **Bachelor of Engineering**
Branch: **Mining Engineering**
Subject: **Mining Geology – II**
Laboratory

Semester: **IV**
Code: **339461(39)**

Total Lab Periods: **24**
Maximum Marks: **40**

Batch Size: **30**
Minimum **20**
Marks:

List of Experiments:

Practical Exercises of BE- V Semester (Mining Geology)

Megascopic Description and Distribution of Ore Forming Minerals and Industrial Minerals.
Study of Plant Fossils.
Study of Advance Geological Maps and Preparation of Cross Sections.

List of Equipment/Instruments/Machines/Software Required:

Chhattisgarh Swami Vivekanand Technical University, Bilai

Name of program: **Bachelor of Engineering**
Branch: **Mining Engineering**
Subject: **Mine Climate & Ventilation
Laboratory**

Semester: **IV**
Code: **339462(39)**

Total Lab Periods: **24**
Maximum Marks: **40**

Batch Size: **30**
Minimum Marks: **20**

List of Experiments:

List of Practical to be performed: 10

1. Detection of presence and accumulation of Firedamp in mine atmosphere.
2. Detection of presence and accumulation of CO in mine atmosphere.
3. Study of various techniques of methane drainage
4. Study of surface air-conditioning plant.
5. Study of underground air-conditioning plant.
6. Study of different types of ventilation devices.
7. Study of installation of axial flow fan.
8. Study of installation of centrifugal flow fan.
9. Study of installation and positioning of booster fan.
10. Study of characteristic curve of different fans and their comparison
11. Study of principal and working of vane anemometer
12. Study of principal and working of velocity meter.
13. Study of principal and working of pitot tube.
14. Study of central and boundary ventilation system.

List of Equipment/Instruments/Machines/Software Required:

Chhattisgarh Swami Vivekanand Technical University, Bilai

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|--------------------|--|----------------|-------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339463(24) |
| Subject: | Basic Electrical Engineering Laboratory | | |
| Total Lab Periods: | 48 | Batch Size: | 30 |
| Maximum Marks: | 40 | Minimum Marks: | 20 |

List of Experiments:

1. Magnetisation Characteristics of a separately excited DC Machine
2. Speed Control of a DC Shunt Motor.
3. Load Test on a DC Shunt/Compound Motor.
4. Load test on a DC Shunt / Compound Generator.
5. Connection, Starting Reversing and load Test on a 3 phase Induction motor.
6. Study of Electromagnetic Induction Disc Relay.
7. Study of Star- Delta Starter.
8. Measurement of 3 phase power by 2wattmeter method. .
9. Open Circuit and short circuit Test single phase Transformer and prediction of performance.
10. Load Test on single phase Transformer and calculation of performance.

List of Equipment/Instruments/Machines/Software Required:

Chhattisgarh Swami Vivekanand Technical University, Bhilai

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|--------------------|---|----------------|-------------------|
| Name of program: | Bachelor of Engineering | Semester: | IV |
| Branch: | Mining Engineering | Code: | 339464(39) |
| Subject: | Underground Coal Mining Laboratory | | |
| Total Lab Periods: | 48 | Batch Size: | 30 |
| Maximum Marks: | 40 | Minimum Marks: | 20 |

List of Experiments:

1. Study of layouts of Board and Pillar development working by without panel system.
2. Study of layouts of Board and Pillar development working by panel system.
3. Study of layout of Logwall Advancing system.
4. Study of layout of Logwall Retreating system.
5. Study of various line of extraction used for pillar extraction.
6. Study of stook extraction method under difficult roof conditions .
7. Study of surface arrangement required for stowing.
8. Study of sublevel caving method of thick seam mining.
9. Study of layout of Blasting gallery method.
10. Study of layout of Double Unit Longwall Faces.

List of Equipment/Instruments/Machines/Software Required:

Chhattisgarh Swami Vivekanand Technical University, Bilai

Name of program: **Bachelor of Engineering**

Branch: **Mining Engineering**

Subject: **Health, Hygiene & Yoga**

No. Of Periods: **2 Periods/Week**

Maximum Marks: 40

Semester: **IV**

Code: **339456(46)**

Total Tutorial Periods: **NIL**

Minimum Marks: 24

Course Objectives:

- 1 To provide understanding the importance of health.
- 2 To provide insight into the hygiene aspect & quality of life.
- 3 To study the concepts of various medical therapy.
- 4 To practice the various yogasans.
- 5 To provide knowledge about common diseases and its cure through yagasans and pranayam.
- 6 To develop concentration through various methods.

UNIT- I HEALTH & HYGIENE: Concept of health, Physical health and mental health and wellbeing and how to achieve these, longevity and how to achieve it, concept and common rules of hygiene, cleanliness and its relation with hygiene; Overeating and underrating, amount of food intake required, intermittent fasting; adequate physical labour, sleep; consumption of junk fast food vs nutritious food; fruits, vegetables cereals and qualities of each of these.

UNIT-II INTRODUCTORY KNOWLEDGE OF COMMON STREAMS OF MEDICINAL CURE: History, development, basic concepts, modes of operation of Alopthy, Ayurved, Homoeopathy, Biochemic, Unani, Siddha, Accurpressure, Accupunture, Naturopathy, Yogic and Herbal system of medicines, Introduction of Anatomy and Physiology concerned.

UNIT- III YOGASANS: Meaning and concept of Yoga, Yogasans and its mode of operation, How to perform Yogasans, Common Yogasans with their benefits, such as, Padahastasan, Sarvangasan, Dhanurasan, Chakrasan, Bhujangasan, Paschimottasan, Gomukhasan, Mayurasan, Matsyasan, Matsyendrasan, Pawanmuktasan, Vajrasan, Shalabhasan, Sinhasan, Shashankasan, Surya Namaskar, Halasan, Janushirasan, Utshep Mudra.

UNIT-IV YOGASANS FOR COMMON DISEASES: From Yogic Materia Medica with symptoms, causes, asans and herbal treatment.

- **Modern silent killers:** High blood pressure, diabetes and cancer, causes and cure; Common health problems due to stomach disorders, such as, indigestion, acidity, dycentry, piles and fissures, artheritis, its causes, prevention and cure.
- **Asans for relaxation:** Shavasana, Makarasan, Matsyakridasan, Shashankasan.
- **Asans to increase memory and blood supply to brain:** Shirsh padasan, Shashankasan.
- **Asans for eye sight:** Tratak, Neti Kriya .
- **Pranayam:** Definition and types: Nadi Shodhan, Bhastrik, Shitakari, Bhramari useful for students.

UNIT-V CONCENTRATION: Concentration of mind and how to achieve it. **Tratak (त्राटक)**. Concentration on breath, **Japa (जप)**. **Ajapajap (अजपाजप)**, internal silence (**अन्तर्माँन**), visualization in mental sky (**चिदाकाश धारणा**), Concentration on point of light (**ज्योति ध्यान**). Concentration on feeling (**भाव ध्यान**). Concentration on figure (**मूर्त्त ध्यान**).

Text Books:

Health, Hygiene & Yoga, Dr P B Deshmukh, Gyan Book Pvt Ltd. New Delhi.

Reference Books:

- (1) Yogic Materia Medica
- (2) Asan, Pranayam and Bandh.

