Faculty of Engineering &Technology
KAKATIYA UNIVERSITY, WARANGAL -506009
Department of Mining Engineering

B. Tech. (MINING)

IV SEMESTER

Sl.No	Code	Name of the Subject	L	T	P	C
1	MIN-406	Mine Ventilation and Planning	3	1	0	4
2	MIN-407	Mine Surveying – II	3	1	0	4
3	MIN-408	Mining Geology – II	3	0	0	3
4	ME-400	Mechanical Technology	3	0	0	3
5	MIN-409	Drilling and Blasting	3	0	0	3
6	MC-220	Constitution of India	2	0	0	0
7	MIN-410L	Mine Ventilation and Planning Lab	0	0	3	1.5
8	MIN411L	Mining Geology Lab	0	0	3	1.5
9	MIN-412L	Mine Surveying Lab – II	0	0	3	1.5
10	MIN-413	Mine Visits	0	0	2	1
TOTAL			**17**	**2**	**9**	**22.5**

Note:
Practical Training is to be conducted after completion of SEMESTER – IV for 30 days duration and to be evaluated in the SEMESTER - V.

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B. Tech. (MINING) IV SEMESTER
MIN-406
MINE VENTILATION AND PLANNING

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT-I

Mine Gases: Origin, occurrence, physical, chemical and physiological properties of mine gases, instruments used for spot detection of mine gases. Various damps, methane drainage techniques. Gas chromatography.

UNIT-II

Mine Climate and Control: Sources of heat and humidity in mines and their effects, instruments used for measurement of temperature, humidity, pressure and velocity. Heat stress indices, Cooling power and method of improving cooling power.

UNIT-III

Natural Ventilation and Laws of Air flow: Natural ventilation, Factors effecting NVP, Direction of air flow, Derivation of NVP, Motive column, Atkinson law governing airflow in mine openings.

UNIT-IV

Mechanical Ventilation: Definition of Mechanical ventilation, Different types of fans and their characteristics, Operating point, Fan laws, installation. Ventilation appliances, economic size of roadways, determination of quantity and head requirements. Fan selection and evasee.
Ventilation networks: simple and complex, solutions to simple ventilation network. Introduction to Hardy cross method for solving complex network. Introduction to ventilation software's.

UNIT-V

Ventilation Planning: Standards of ventilation, ascensional ventilation, descensional ventilation, ventilation planning for different mining methods: Bord and pillar, Longwall mining method and cut and fill, sub level caving and shrinkage stoping method.

Text / Reference books:

1. Mishra GB. Mine Environment and Ventilation. Oxford University Press, 1992.
2. Hartman HL. Mine Ventilation and Air Conditioning. Wiley Interscience publication, 1993.
3. Pherson Mc. Subsurface Ventilation and Environmental Engineering. Chapman and Hall Publication, London, 1993.
4. Vutukuri VS. Mine Environment Engineering. Trans Tech Publishers, 1986

Faculty of Engineering &Technology
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B. Tech. (MINING) IV SEMESTER
MIN-407
MINE SURVEYING-II

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	1	0	4	External Marks: 70

UNIT - I

Correlation: Correlation by different methods; weisbach triangle method, weiss quadrilateral method measurement of depth of shaft. Correlation of mine survey to the national grid. Gyro theodolite survey. Its related calculations.

UNIT – II

Photographic Surveying: General principles, elements of Photogrametry, orientation of photographs, finding heights and distances of ground points from photographs.

Field Astronomy: Astronomical terms and definitions. Determination of the meridian, longitude and latitude of a place.

UNIT – III

Advanced Surveying: Electronic surveying**;** EDM-Components, base line measurement, setting out a work ,care and maintenance. GPS - Fundamentals, receivers, observers, transformation of GPS results. GIS, Total Station; Components, Traversing, care and maintenance.

UNIT – IV

Subsidence Surveying: Construction and layout of subsidence monitoring stations, Subsidence survey over the Bord and pillar panel, Longwall panel and other methods. Subsidence prediction by InSAR technology.

UNIT – V

Stope Surveying: Purpose; Methods of survey in moderately and steeply inclined ore bodies, flat and vertical ore bodies/seams.
Application of Automation & IT in surveying: Data acquisitions; Preparation of plans and sections; Calculation of earth works. Introduction to surveying softwares.

Text /Reference books:

1. Punimia BC. Surveying Vol I, II and III. Laxmi Publication, New Delhi, 1991.
2. Kenetkar TP. Surveying and Levelling Vol I and Vol II. United Book Corporation, Poona, 1991.
3. Ghatak. Mining Surveying. Lovely Prakashan, Dhanbad,1990.

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Department of Mining Engineering

B. Tech. (MINING) IV SEMESTER
MIN-408
MINING GEOLOGY-II

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

UNIT-I

Structural Geology: Definition and Scope, Primary and Secondary Structure: Bedding, Lineation, Foliation, Cleavage, Attitude of beds determination of strike and dip of formations; thickness of beds; structures of intrusive bodies.

Description and recognition of major structural elements

a) Folds: Introduction, Nomenclature of folds, Anticline, Syncline, Symmetrical fold, Asymmetrical fold, Overturned fold, recumbent fold, Ion clinal fold, Homocline, Closed and Open folds and Drag folds.
b) Joints: Introduction, Geometrical classification of Joints
c) Faults: Introduction, General characteristics, Translational and rotational movements, relative movements, Types of faults, Norse and Graben.

UNIT-II

Un-conformations: Introduction, Types of unconformities, Recognition of unconformities.
Ground Water: Introduction, Scope, Utilization of ground water, Hydrological cycle, Origin and occurrence of ground water, Vertical distribution of ground water, Water table.

Table Aquifers: Types of aquifers, Confined aquifers, Unconfined aquifers, Perched aquifers.
Porosity, Void ratio and Permeability of rocks.

UNIT-III

Economic Geology: Aim and scope of economic geology, Definition of ore and gangue, Simple ore, Complex ore, Tenor and grade of ore. Processes and formation of ore deposits, Sygenetric deposits, Epigenetic deposits, Secondary mineral deposits: Oxidation and supergere enrichment deposits , Mechanical Concentration deposit, Residual/ Concentration deposits.

UNIT-IV

Occurance and distribution of important metallic mineral deposits in India: Iron, Copper, Lead and Zinc, Manganese, Aluminum, Chromium. Occurrence and distribution of important metallic deposits: Asbestos, Kyanite and Sillimanite.
Coal: Origin and formation of coal, Distribution of important coal fields in India.

UNIT-V

Petroleum: Origin, Migration and Accumulation of Petroleum, Reservoir and Cap rocks, Structural and stratigraphic traps, Distribution oil fields in India.
Occurrence and distribution of radioactive minerals in India: Uranium, Thorium and Beryliam.

Text / References Books

1. Parbin Singh. Engineering and General Geology.
2. Hommes A. Principles of Physical Geology.
3. Tyrrel G.W. The Principles of Petrology.
4. Woods H. Palaontology Invertebrate.
5. Krishnan M.S. Geology of India and Burma.

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B. Tech. (MINING) IV SEMESTER
ME-400
MECHANICAL TECHNOLOGY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

UNIT-I

Mechanical Power transmission : Cams various types ,cam followers, working principles and application of the cams (design of cam profiles omitted), nature of types of gears ,nomenclature for straight toothed spur , helical spur , bevel and skew ,gear trains , simple , compound , reverted and epicyclic. Simple problems on calculation of velocity ratios and number of teeth of gears in the above gear trains (further details not required).

UNIT-II

IC Engines: IC Engine components and basic engine nomenclature – classification of IC engines, otto cycle, diesel cycle, two stroke and four stroke spark ignition and compression ignition engines. Application of IC engines, study of fuel supply systems in SI and CI engines. Study of fuel ignition, cooling and lubrication systems. Simple calculation of indicated power, brake power, mechanical efficiency, thermal efficiency and fuel consumption. Coal diesel, coal water, slurries as alternate diesel fuel. Simple maintenance techniques.

UNIT-III

Compressed air generation and applications: Types of air compressors, reciprocating and rotary air compressors, like roots blower, vane type, centrifugal axial flow, mixed flow, screw type. Equation for kg of air compressed with and without clearance volume in a reciprocating air compressor, two stage air compressor with inter cooling, simple problems, distribution of compressed air, application of compressed air, simple maintenance techniques. Effect of altitude on air compressors.

UNIT-IV

Power Plant Engineering: Introduction to Energy and Power, sources of energy, various conventional and non conventional energy sources, principal types of power plants, combustion of fuels, classification of Steam power plants, layout of steam power plant, coal handling systems, fluidized bed combustion, ash handling, dust collection, study of simple vertical boiler, impulse and reaction turbine, steam condenser.

UNIT – V

Introduction to Machine Design: General considerations in the design of engineering materials and their properties , selection, manufacturing consideration in design, tolerances and fits , BIS codes of steels.

Shaft Couplings: Rigid couplings , Muff, Split muff and Flange couplings. Flexible couplings and flange coupling (Modified).

Text/Reference Books:

1. Ballany P.L. Theory of Machines and Mechanisms.
2. Ballany P.L. Thermal Engineering.
3. Ganesham V. IC Engines
4. Rttan S.S. Theory of Machines

Faculty of Engineering &Technology
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Department of Mining Engineering

B. Tech. (MINING) IV SEMESTER
MIN-409
DRILLING AND BLASTING

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
3	0	0	3	External Marks: 70

UNIT –I

Exploratory Drilling: Drilling for exploration and other purposes; various types of drilling equipment – their merits, demerits and limitations; core recovery –single and double tube core barrels, wire line drilling; directional drilling, fishing tools; borehole surveying; borehole logging; novel and special drilling techniques. Drilling for oil and ground water.

UNIT – II

Production Drilling: Production drilling; Various methods of drilling - percussive, rotary, rotary percussive, Factors affecting drilling; mechanics of drilling; drillability and drilling index; micro-bit drilling; selection of drilling equipment; different types of bit, bit wear; drill hole economics; case studies

UNIT – III

Explosives, Accessories and Tools: Explosives and Blasting Agents- ANFO, slurry, emulsion, LOX, permitted explosives, bulk explosives; Selection of explosives; Blasting accessories, Initiation systems, Testing ofexplosives; Storage, transportation and handling of explosives; Destruction of explosives and accessories. Theories of rock breakage; mechanics of rock fragmentation by explosive action, Instrumentation in blasting –V.O.D probe, vibration monitoring, high speed video camera, etc.

UNIT – IV

Blasting in Underground Mines: Design of blast for coal and metal underground mines – gallery, Solid blasting techniques, periphery blasting, drilling pattern for tunneling and shaft sinking, controlled blasting techniques, dangers associated with underground blasting and preventive measures; misfires, blown out shots, incomplete detonation – their causes and remedial measures.

UNIT – V

Blasting in Surface Mines and Allied Engineering Fields: Methods of blasting in surface mines, Blast design, Primary and secondary blasting, Rock fragmentation studies, Dangers associated with blasting in opencast mines and preventive measures, Environmental impacts

due to blasting, Controlled blasting techniques, Blasting in opencast coal mines of developed galleries, Blasting economics, Computer aided design of blasts. Blasting for road constructions, trench cutting, demolition of buildings etc; Blasting for Dimensional stones; Underwater blasting. Alternatives to blasting.

Text/Reference Books:

1. Hustrulid W A. Blasting Principles of Open Pit Mining, Vol. 1- General Design Concept. A.A. Balkema, Rotterdam, 1999.
2. Jimeno C L, Jimeno EL, Carcedo EJ. Drilling and Blasting of Rocks. A.A.Balkema, Rotterdam, 1995.
3. Clark G B. Principles of Rock fragmentation. Wiley Interscience Publication, 1987.
4. Konya C J and Walter E J. Surface Blast Design, New Jersey, 1990.
5. Sushil Bhandari. Engineering Rock Blasting Operations. A.A.Balkema, Rotterdam, 1997.

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B. Tech. (MINING) IV SEMESTER
MC-220
CONSTITUTION OF INDIA

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks: 30
2	0	0	0	External Marks: 70

UNIT -1

1. Making of Indian Constitution - Constituent Assembly
2. Historical Perspective of the Constitution of India
3. Salient Features and characteristics of the Constitution of India

UNIT -2

1. The Fundamental Rights
2. The Fundamental Duties and their Legal Status
3. The Directive Principles of State Policy – Their Importance and Implementation

UNIT -3

1. Federal Structure and Distribution of Administrative, Legislative and Financial Powers between the Union and the States
2. Parliamentary Form of Government in India – The Constitutional Powers and Status of the President of India
3. Amendment of the Constitutional Provisions and Procedure

UNIT -4

1. The Judiciary
2. Constitutional and Legal Frame Work for Protection of Environmental in Global and National Level
3. Corporate Social Responsibility (CSR) International and National Scenario.

Text books:

1. D.D. Basu: An Introduction of Indian Constitution
2. Greanvile Austin: The Indian Constitution
3. Paras Diwan: Studies on Environmental cases

References books:

1. KhannnaJustice.H.R: Making of India’s Constitution, Eastern Book Companies.
2. Rajani Kothari: Indian Politics
3. Ghosh Pratap Kumar: The Constitution of India. How it has been Formed, World Press.
4. A.Agrawal (Ed): Legal Control of Environmental Pollution.

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B. Tech. (MINING) IV SEMESTER
MIN-410L
MINE VENTILATION AND PLANNING LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks:25
0	0	3	1.5	External Marks: 50

1. Detection of mine gases using detectors.
2. Determination of relative humidity using Hygrometer.
3. Determination of cooling power using Kata thermometer.
4. Calibration of inclined manometer.
5. Determination of friction and drag coefficient of an obstruction in mine road way.
6. Determination of method factor and discharge coefficient for orifice plate
7. Determination of performance of evasee.
8. Measurement of air quantity by anemometer, velometer and smoke tube.
9. Study of fans in series and parallel connection.
10. Study of fan reversal system.

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B. Tech. (MINING) IV SEMESTER
MIN-411L
MINING GEOLOGY LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks:25
0	0	3	1.5	External Marks: 50

1. Identification of Physical properties of Minerals.
2. Identification and description of igneous, sedimentary and metamorphic rocks.
3. Determination of True thickness and Vertical thickness of beds.
4. Interpretation of structural maps.
5. Point problems.
6. Megascopic and identification of important metallic and industrial mineral deposits.
7. Geological mapping of igneous, sedimentary and metamorphic terrains.

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B. Tech. (MINING) IV SEMESTER
MIN-412L
MINE SURVEYING – II -LAB

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks:25
0	0	3	1.5	External Marks: 50

1. Reading of mine plans.
2. Correlation by two shaft method S/T and U/T.
3. Correlation by two shaft co-planation method.
4. Correlation by single shaft weisbach method.
5. Correlation by single shaft Weiss quadrilateral method.
6. Finding horizontal & vertical distance by tachometry.
7. Finding the height of an in accessible object.
8. Traversing by Total station and GPS.
9. Finding of quantity of sand stowing yard.
10. Prediction of subsidence over panel.