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

B. Tech (Mining) III SEMESTER

Sl. No	Code	Name of the Subject	L	T	P	C
1.	BSC-105	Mathematics – III	3	0	0	3
2.	MIN-301	Mine Development	3	1	0	4
3.	MIN-302	Mine Surveying – I	3	1	0	4
4.	MIN-303	Mining Geology – I	3	0	0	3
5.	ECE-300	Basic Electronics Engineering	3	0	0	3
6.	MIN304L	Elements of Mining Engineering Lab	0	0	3	1.5
7.	MIN305L	Mine Surveying - I Lab	0	0	3	1.5
8.	MC-210	Environmental Science	2	0	0	0
TOTAL			**17**	**3**	**6**	**20**

[L= Lectures, T= Tutorials, P= Practical, C= Credits]

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B. Tech. (MINING) III SEMESTER
BSC-105
MATHEMATICS - III
STATISTICS, PROBABILITY, AND NUMERICAL TECHNIQUES

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

Module1: Statistical Methods
Introduction, Collection of Data, Graphical Representation, Measures of Dispersion, Moments, Skewness, Kurtosis, Correlation, Coefficient of Correlation, Lines of Regression. (Sections 25.1, 25.2, 25.3, 25.6, 25.9, 25.10, 25.11, 25.12, 25.13, 25.14 of Text Book)

Module2: Probability & Distributions
Probability, Addition Law of Probability, Independent Events, Baye's Theorem , Random Variable, Continuous Probability Distribution, Expectation, Moment Generating Function, Binomial Distribution , Poisson Distribution, Normal Distribution, Exponential Distribution. (Sections26.1,26.4,26.5,26.6,26.7,26.9,26.10,26.11,26.14,26.15,26.16,26.19(6) of Text Book)

Module3: Numerical Techniques-I
Solution of Algebraic and Transcendental Equations, Principle of Least Squares, Method of Least Squares, Fitting of Other Curves, Finite Differences, Forward Differences, Backward Differences. (Sections 28.2, 24.4, 24.5, 24.6, 30.2, 30.2(1), 30.2(2) Of Text Book)

Module4: Numerical Techniques-II
Central Differences, Other Difference Operators, Newton's Interpolation Formulae, Gauss's Forward Interpolation Formula, Interpolation with Unequal Intervals, Numerical Differentiation. Sections 29.7, 29.4, 29.6, 29.7(1), 29.9, 30.1.of Text Book)

Module5: Numerical Techniques-III
Numerical Integration, Trapezoidal Rule, Simpson's one –third Rule, Simpson's three-eight Rule, Weddle's Rule, Solution of Simultaneous Linear Equations (Iterative Methods)
(Sections 30.4, 30.6, 30.7, 30.8, 30.10, 28.5 of Text Book)

Text Book:
B.S Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publications.

References
1. Erwin Kreyszig, Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand &Sons
3. S.S. Sastry, Introductory Methods of Numerical Analysis, PHI Learning Pvt. Ltd.

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B. Tech. (MINING) III SEMESTER
MIN-301
MINE DEVELOPMENT

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

UNIT-I

Introduction: Mining is a basic industry. Contribution of mining to civilization and national economy. Indian mineral resources and world status. Mining and mineral based industries in India. Classification of mineral deposits. Mine entries: shafts, incline, adit and decline. Limitations and applications of entries. Definition of various terms associated with mining operations (coal and metal mining). Pit top and pit bottom layouts.

UNIT – II

Shaft Sinking: Location, shape and size of incline and vertical shafts. Surface arrangements for sinking shafts, tools and equipments, ordinary methods of sinking shaft, removal of debris and water , ventilation and lighting, temporary and permanent lining, widening and deepening of shafts.
Special Methods of Shaft Sinking: Pilling , Caisson , Freezing and Cementation methods. Modern techniques of shaft sinking. Design of shafts insets and pit bottoms.

UNIT-III

Boring: Various systems of boring, core recovery, single tube, double tube and wire line core barrels. Deflection of bore holes, fishing tools and their uses. Lithologs and interpretation of bore hole data.

UNIT-IV

Explosives : Classification of explosives, composition and functions of ingredients of principal types of commercial explosives used in mines, fuse detonators , exploders, storage, transport and handling of explosives, general applications and uses of explosives; safety considerations in manufacture, storage, transport and handling of explosives.

Blasting: Mechanics of blasting, blasting systems, electrical and non electric methods, delay blasting techniques, blasting in open pit mines, blasting in underground coal and metal mines. Accessories of blasting: Safety fuse, exploder, detonating fuse, shock tube, detonators.

UNIT-V

Supports: Objectives and limitations of mine supports, materials used for supports, treatment of timber, friction and hydraulic props, roof bars, chocks, arches, roof bolts, rope stitching and bamboo bolting.

Text/Reference Books

1. Deshmukh D.J. Elements of Mining Technology Volume I,II,III. Denett Publishers, Nagpur.
2. Singh R.D. Principles and Practices of Coal Mining. New Age International Publishers.
3. Pradhan G.K. Drilling and Blasting. Lovely Prakashan, Dhanbad
4. Das S K. Blasting Practices in Mines. Lovely Prakashan, Dhanbad.

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B. Tech. (MINING) III SEMESTER
MIN-302
MINE SURVEYING-I

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

UNIT - I

Introduction to surveying: Importance of surveying, Basic principles of surveying, Definitions of plane and geodetic surveying, Measurement of distances by chain, tape and other methods; Chain surveying, Chain traversing, errors in measurement, field notes, record of data and its related problems.

UNIT-II

Compass surveying: Construction and principles of Compass, Compass Traversing, Leveling; principles of leveling, methods of leveling; rise and fall method, line of collimation method and Contouring; plotting of contour. Its related problems.

UNIT-III

Theodolite surveying; Construction and working principles of theodolite. Measurement of horizontal and vertical angles; Temporary and permanent adjustments; Theodolite traversing; Computation of co-ordinates; Adjustment of traverse; Temporary and permanent adjustments. Triangulation.

UNIT-IV

Tachometric surveying: Definition and different systems of tachometric methods, Determinations of Tachometric constants , The stadia system, principle of stadia method. Fixed Hair method , Distance and elevation formulae. Movable hair method, Staff Normal, Staff Vertical. Subs tense Method, Principle of substance (or movable hair) method, the tangential system.

UNIT – V

Curves: Definitions and Notations, Designation of Curves, Elements of Simple Curves, Setting out simple curves - By ordinates from the long chord, By successive bisections of arcs and chords, By offsets from the tangents, By deflections distances, Rankin's method of tangential angles, Two theodolite method, Tachometric method. Transition curves.

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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B. Tech. (MINING) III SEMESTER
MIN-303
MINING GELOGY-I

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

UNIT-I

Physical Geology: Origin and evolution of earth, Earth as a member of solar system, Age of earth, Interior structure of earth, Important physical features of the earth's surface: Mountains, River valleys ,Oceans, Lakes and Volcanoes.

UNIT-II

Mineralogy: Definition of minerals and Rock forming minerals, Bowen's reaction series, Description of important rock forming minerals: Quartz, Orthoclase, Biotite , Hornblends , Augite and Oliving. Concepts of crystollography.

UNIT-III

Petrology: Definition of rock, elementary concepts of classification of rocks, basic principles of formation of Igneous, Sedimentary and Metamorphic rocks. Description of textural and mineralogical properties of important Igneous, Sedimentary and Metamorphic rocks: Granite, Dolerite, Basalt, Conglomerate, Sandstone, Limestone, Schist, Gneiss and Marble.

UNIT-IV

Stratigraphy and Indian Geology: Introduction, Principles of stratigraphy and correlations, geological time scale, physiographic divisions of India. Distribution, description and mineral wealth of the following stratigraphic divisions of India: Dharwarian system of Mysore, Cuddaph system, Vindhyam system, Kurnool system and Gondwana group.

UNIT-V

Paleontology: Definition and scope of palentology, Preservation of fossil–index fossils – Stratigraphic Important and uses of fossils, description of a) Fermenifara b) Trilobite c) Lamellibranch and d) Gastropods ltd. Significance and distribution of Gondwana Elora of India.

Text / References Books

1. Parbin Singh. Engineering and General Geology. Katson Educational Series.
2. Hommes A. Principles of Physical Geology. Nelson and Sons.
3. Dana E.S and Ford. WEA text books of Mineralogy. John Wiley and Sons.
4. Tyrrel G.W. The Principles of Petrology. Methuen.
5. Woods H. Palaontology Invertebrate. Cambridge University Press.
6. Krishnan M.S. Geology of India and Burma. Higgis Bothams.

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B. Tech. (MINING) III SEMESTER
ECE-300
BASIC ELECTRONICS ENGINEERING

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

UNIT – I

P-N junction and V-I characteristics, static and dynamic resistance, diode capacitance, effect of temperature, Avalanche and zener breakdown, Zener diode
Regulated power supply: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with capacitive and inductive Filters, Voltage regulator.

UNIT - II

Bipolar Junction Transistor (BJT) and Junction Field Effect Transistor (FET): Principle of Operation, Configurations and characteristics, Transistor as a switch and amplifier.

DC Analysis: Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Thermal runaway and stabilization, DC analysis of FET

UNIT – III

RC coupled amplifier and its frequency response, Feedback: effect of negative feedback on amplifier characteristics, positive feedback: RC and LC oscillators. Op-amp and its basic applications: adder, subtractor, integrator and differentiator.

UNIT - IV

Boolean algebra: postulates and theorems, basic and universal gates, Adders/subtractors- half adder, full adder, half substractor, full substractor, serial adder, parallel adder.

Flip flops- SR, JK, D and T, race around condition, master-slave JK Flip flop, and applications of Flip flops.

UNIT – V

Electronic Instrumentation: Physical measurement, forms and methods of measurements, CRO operation and CRT characteristics, Transducer & its classification. Strain gauge transducer, LVDT, variable gap capacitive transducer, thermistor and thermocouple, MEMS

Text /Reference Books:

1. Jacob Millman & Christos C. Halkias. Electronic Devices and Circuits. McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky. Electronic Devices and Circuits theory. 11th Edition, 2009, Pearson.
3. David A. Bel. Electronic Devices and Circuits. 5th Edition, Oxford.
4. Moris Mano. Digital Logic Design. Prentice Hall of India, New Delhi.
5. Jain RP. Modern Digital Electronics. Prentice Hall of India, New Delhi.
6. Roy Choudhary and Shail Jain. Linear Integrated Circuits. New Age International, New Delhi.

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B. Tech. (MINING) III SEMESTER
MIN-304L
ELEMENTS OF MINING ENGINEERING LAB

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

1. Study of core barrels.
2. Study of feeding mechanism in drills.
3. Study of fishing tools.
4. Determination of bore hole deflection.
5. Study of lithologs and interpretation of borehole data.
6. Study of detonators.
7. Study of exploders.
8. Study of friction and hydraulic props.
9. Study of arches, roof bolts and rope stitching.
10. Study of sylvester prop withdrawer.

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B. Tech. (MINING) III SEMESTER
MIN-305L
MINE SURVEYING - I LAB

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

1. Measurement of distance between two points.
2. Chain triangulation; booking, calculation of areas and plotting.
3. Traversing with compass.
4. Fly leveling and reduction of level.
5. Profile leveling and plotting the section.
6. Measurement of horizontal and vertical angles.
7. Theodolite traversing.
8. Finding distance between two in accessible points.
9. Curve ranging offsets by long chord.
10. Curve ranging by Rankin method.

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B. Tech. (MINING) III SEMESTER
MC-210
ENVIRONMENTAL SCIENCES

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

UNIT–I (8)

Introduction to Environmental Science: Environment and society, major environmental issues: Ozone layer depletion, Acid rains, global climate change etc, sustainable development,
Environmental impact assessment, environmental management

Natural Resources Utilization and its Impacts: Energy, minerals, water and land resources, Resource consumption, population dynamics, urbanization.

UNIT–II (8)

Ecology and Biodiversity: Energy flow in ecosystem, food chain, nutrient cycles, eutrofication value of biodiversity, biodiversity at global, national and local levels, threats for biodiversity, conservation of biodiversity.

UNIT–III (8)

Water Pollution: Sources, types of pollutants and their effects, water quality issues, contaminant transport, self-purification capacity of streams and water bodies, water quality standards, principles of water and wastewater treatment.

UNIT–IV (8)

Air Pollution: Sources, classification and their effects, Air quality standards, dispersion of pollutants, control of air pollution, automobile pollution and its control.

UNIT–V (8)

Solid Waste Management: Sources and characteristics of solid waste, effects, Collection and transfer system, disposal methods.

Text Books:

1. M. Chandrasekhar, Environmental science, Hi Tech Publishers, 2009.
2. P.N. Modi (2006), Water supply Engineering – Environmental Engineering (Vol. I) – Standard Book House.
3. Gerard Kiely, Environmental Engineering, McGraw Hill Education Pvt Ltd, Special Indian Edition, 2007.

References:

1. W P Cunningham, M A Cunningham, Principles of Environmental Science, Inquiry and Applications, Tata McGraw Hill, Eighth Edition, 2016.