B. Tech (Mining) VII SEMISTER

S. No	Course Code	Course Title	Scheme of Instruction			Lecture hr/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC 4101MN	Mine Planning	3	1	-	4	30	70	4
2	PC 4102MN	Numerical Modeling in Mining	3	1	-	4	30	70	4
3	PC 4103MN	Mineral Processing	3	1	-	4	30	70	3
4	PC 4104MN	Mineral Processing Laboratory	-	-	3	3	25	50	1.5
5	PC 4105MN	Numerical Modeling in Mining Lab	-	-	3	3	25	50	1.5
6	PC 4106MN	Survey & Geological camp	-	-	-	-	100	-	1
7	PC 4107MN	Internship – II (Metal Mining)	-	-	-	-	100	-	0.5
8	PC 4108MN	Project Stage 1	-	-	3	3	50	-	1.5
9	OE-I*	Open Elective –I*	2	-	-	2	30	70	2
TOTAL			**11**	**3**	**9**	**23**	**420**	**380**	**19**

OPEN ELECTIVE –I (OE*)**

OE4101HS	Human Resource Management
OE4102HS	Cyber Law and ethics
OE4103HS	Intellectual Property Rights

- The Internship – II taken during summer vacation after VI Semester.
- The duration of Survey & Geological camp is between 7-10 days (under special conditions duration can be changed by HEAD, Mining)
- The Internship – III is to be conducted after completion of VII Semester for a duration of 15 days to be evaluated in VIII Semester

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

B Tech (Mining) VII- Semester

PC4101MN

MINE PLANNING

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

UNIT I

Introduction:

Technical factors in mine planning, methodology of mine planning, short range & long range, mine modeling, mine simulation systems approach to mine planning based on mine subsystems and their elements, mine plan generation.

UNIT II

Open Pit Mining:

Selection of initial mine cuts, location of surface structures, division of mining area into blocks, mine design, bench drainage, geometry, haul roads, slope stability; open pit limits and optimization, calendar plan, production planning, production scheduling, economic productivity indices.

UNIT III

Underground Mining:

Location of mine entries, mine and auxiliary, optimization of mine parameters, design of shaft pillars and protective pillars, planning of production capacity, layout of development drives/raises/winzes etc, length of faces, size of panels, etc planning of support systems, ventilation, layout of drainage system, planning production scheduling and monitoring, selection of depillaring/stopping method, manpower management, economic/productivity indices, techno economic analysis, mine reclamation design

UNIT IV

Equipment Planning:

Latest technological developments in increase in both types and capacities of equipments used in mining operations. Planning and selection of equipment for different mining conditions. Equipment design for optimum drilling and blasting operations. Equipment information, performance, monitoring and expert systems; Innovative mining systems

UNIT V

Project Implementation and Monitoring:

Pre-project activities feasibility report, environmental clearance, detailed project report, sources of funds, import of technology, selection of contracts and contract administration, time management, cost control material management system, project quality assurance, social responsibility, government orders and guidelines. Environmental impact assessment and preparation of environmental management plan. Mine closure plan.

Text / Reference books:

1. Jayanth Bhattacharya, Principles of Mine Planning-Allied Publishers, Delhi 2003.
2. Hustrulid, W. and Kuchta, M., (eds)., Fundamentals of Open pit Mine Planning and Design, Elsevier, 1995
3. Ehrenburger, V and Fajkos, A., Mining Modeling, Elsevier, 1995.
   Bawden, W.F., and Archibald. J.F., Innovative Mine Design for the 21st Century Elsevier, 1993.

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

B Tech (Mining) VII- Semester

PC4102MN

NUMERICAL MODELLING IN MINING

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

UNIT I

Introduction to elastic and plastic models:

Fundamentals, elastic, plastic, homogeneous and isotropic, non-linear elastic and elastoplastic models Need for numerical modelling in design of excavations in mines; Domain and boundary conditions; Discretisation of domain and boundary; Methods of numerical simulation for excavations in mining

UNIT II

Finite difference methods:

Concept, formation of mesh element, finite difference patterns, solutions, application to mining Commercial Software's for application in mining. Explicit finite difference method; Finite difference equation; Mechanical damping, mechanical time-step determination, solution stability, advantages and their limitations; Non-linear solution methods Introduction to Numerical Modelling Packages: FLAC.

UNIT III

Finite element methods:

Concept, discretisation, element configuration, element stiffness, Assembling elements to form a structural stiffness matrix; Imposing boundary conditions and solving structural equations Elements on assumed displacements, constant strain triangle, isoparametric formulation, advantages and their limitations., two and three dimensional solutions, linear and non-linear analysis, applications in geomechanics; simulation of joints in strata. Commercial Software's for application in mining: ANSYS.

UNIT IV

Boundary element method:

Concept, discretisation, formulation, merits, demerits and limitations, different methods of solution for isotropic and infinite media. Commercial Software's for application in mining, Boundary Element Method: Introduction, formulation, advantages and their limitations.

UNIT V

Applications in mines:

Design of underground structures such as accesses of the deposit, pillar during development and depillaring operations, barrier pillar and panel. Performance of longwall powered support. Design of pit and dump in opencast mines. Prediction of subsidence

Text / Reference books:

1. Desai CS and Abel JF. Introduction to the finite element method. Van Nostrand Riehokl Co., New York. 1983.
2. D Deb. Finite element method: concepts and application in geo-mechanics. PHI publishers. 2012.
3. Zienkiewicz OC. Finite element method in engineering science. Tata McGraw Hill. 1972.
4. Segerlind LJ. Applied finite element analysis. John Wiley and Sons, New York. 1987.
5. Mukhopadyay M. Matrix finite element – computer and structural analysis. Oxford and IBH Publishing co. 1984.
6. Brown ET. Analytical and computational methods in engineering and rock mechanics. Allen and Unwin, London. 1987.

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

B Tech (Mining) VII- Semester

PC4103MN

MINERAL PROCESSING

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

UNIT I

Introduction:

Definition, scope and limitation, concepts of mineral beneficiation, properties of minerals, useful in concentration; Importance of mineral beneficiation and coal cleaning; Liberation and sorting

UNIT II

Comminution:

Introduction to Comminution, purposes of Comminution, primary, secondary and tertiary crushing techniques. Types of crushers and mills; Flow sheet for wet/dry grinding; Mechanism of crushing

UNIT III

Size Analysis and Classifiers:

Sieve analysis, choice of sieve sizes, Gates-Gaudin - Schuhmann and Rosin- Rammler method. Screens, importance of screens, factors effecting performance of screens, various types of screens and sizes analysis

Classifiers, mechanism of classifiers, hindered settling and free settling types. Types of classifiers, hydro cyclone and factors effecting its performance

UNIT IV

Concentration and Dewatering techniques:

Introduction to concentration techniques, DMS, Jigging, Tabling, Magnetic separators, High tension separators and forth flotation

Dewatering: Thickness, Filters and Thermal Drying

UNIT V

Flow Sheets:

Coal Preparation &General importance of coal cleaning, sink & float tests, wash ability curves.

Flow Sheets: Simplified flow sheets for coal, magnetite, iron, copper, lead, zinc.

Text / Reference books:

1. MalleswarRao, "Introduction to mineral processing Vol. I and II"
2. Wills B.A and Napier-Munn T.J," Mineral processing technology"
3. Jain SK., "Ore Processing "
4. Gardin, "Principle of mineral dressing

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

B Tech (Mining) VII- Semester

OE4101HS

HUMAN RESOURCE MANAGEMENT

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

UNIT – I

Introduction of HRM:
Introduction to HRM – Line Managers – HR Role and responsibilities – New Approaches to Organizing HR – Globalization & Competition Trends – Technological Trends – Trends in Nature of Work – Workforce and Demographic Trends – Economic Challenges – High Performance Work System's – Labor Legislation in India

UNIT – II

Recruitment and Selection:
Basics of Job Analysis and talent Management process – Methods for Collecting Job A alysis Information – Job Descriptions and specifications – Job Satisfaction – Job Enlargement, Job Enrichment, Job Rotation, HR Planning – Recruitment & Selection Process – Planning & Forecasting of human resources – Sources of Recruitment – Recruitment on Diverse Work Force

UNIT – III

Training and Developing and Performance Management:
Importance of Training and Development – Training process - Analyzing Training needs & Designing the program – Implementation of training programs – training methods – Management development process – Evaluation of training and development programs.

UNIT – IV

Compensation and Employee welfare:
Basic factors in determining pay rates – Job evaluation methods - Establishing pay rates – Pricing Managerial and Professional Jobs – Performance based pay -Benefits – Insurance – Retirement Benefits – Employee Welfare facilities.

UNIT – V

Employee Relations – Labor Movement – Collective Bargaining Process – Grievances – Grievances handling procedure – Employee Separation – Employee Safety and Health – Occupational Safety Law – Work Place Health Hazards Problems & Remedies – Salient features of Industrial Disputes Acts 1947 – Factories Act

Text / Reference books:

1. Gary Dessler, Biju Varkkey, Human Resource Management, 4e, Pearson 2017.
2. Robert L.Mathis, John H.Jackson, Manas Ranjan Tripathy,Human Resource Management, Cengage Learning 2016.
3. Uday Kumar Haldar, Juthika Sarkar, Human Resource Management, Oxford University Press 2013.
4. K. Aswathappa, Human Resource Management, Text and Cases, TMH, 2011.
5. Sharon Pande and Swapnalekha Basak, Human Resource Management, Text and Cases. Vikas Publishing, 2e, 2015.
6. Nick Wilton, “An Introduction to Human Resource Management” Sage, 2012

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

B Tech (Mining) VII- Semester

OE4102HS

CYBER LAW AND ETHICS

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

UNIT – I

Introduction to Cyber law:
Evolution of computer Technology, emergence of cyber space; Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions

UNIT – II

Information Technology Act:
Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatur s, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records

UNIT – III

Cyber law and Related Legislation:
Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Na es and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code

UNIT – IV

Electronic Business and legal issues:
Evolution and development in E-commerce, paper vs paper less contracts E-Commerce models- B2B, B2C, E security. Business, taxation, electronic payments, supply chain, EDI,E-markets, Emerging Trends

UNIT – V

Cyber Ethics:
The Importance of Cyber Law, Significance of cyber Ethics, Need for Cyber regulations and Ethics; Ethics in Information society, Introduction to Artificial Intelligence Ethics: Ethical Issues in AI and core Principles, Introduction to Block chain Ethics

Text / Reference books:

1. Cyber Laws: Intellectual property & E Commerce, Security- Kumar K, dominant Publisher
2. Cyber Ethics 4.0, Christoph Stuckelberger, Pavan Duggal, by Globethic
3. Information Security policy & Implementation Issues, NIIT, PHI
4. Computers, Internet and New Technology Laws, Karnika Seth, Lexis Nexis Butterworths WadhwaNagpur.
5. Legal Dimensions of Cyber Space, Verma S, K, Mittal Raman, Indian Law Institute, New Delhi,
6. Cyber Law, Jonthan Rosenoer, Springer, New York, (1997).
7. The Information Technology Act, 2005: A Handbook, OUP Sudhir Naib,, New York, (2011)
8. Information Technology Act, 2000, S. R. Bhansali,, University Book House Pvt. Ltd., Jaipur (2003).
9. Cyber Crimes and Law Enforcement, Vasu Deva, Commonwealth Publishers, New Delhi, (2003)

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

B Tech (Mining) VII- Semester

OE4103HS

INTELLECTUAL PROPERTY RIGHTS

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

UNIT – I

Introduction to Intellectual Property Law:
Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights - Compliance and Liability Issues

UNIT – II

Introduction to Copyrights:
Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration - Copyright Formalities and Registration – Limitations – Infringement of Copyright

UNIT – III

Introduction to Patent Law:
Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty

UNIT – IV

Introduction to Trade Mark:
Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings - Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

UNIT – V

Introduction to Trade Secrets:
Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law

Text / Reference books:

1. Deborah E.Bouchoux: "Intellectual Property". Cengage learning, New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M. Ashok Kumar and Mohd Iqbal Ali: "Intellectual Property Right" Serials Pub

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

B Tech (Mining) VII- Semester

PC4104MN

MINERAL PROCESSING LABORATORY

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

1. Coning and quartering
2. Ruffle sampler
3. Working of Jaw Crusher and roller crusher
4. Working of Gyratory crusher
5. Working of Cone crusher
6. Working of Ball Mill and rod mill
7. Sieve Analysis
8. Magnetic Separators
9. Jigging
10. Tabling
11. Froth flotation

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

B Tech (Mining) VII- Semester

PC4105MN

NUMERICAL MODELLING IN MINING LABORATORY

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

1. Assessment of pre and post behavior of the entries after excavation.
2. Design of entries of the deposit.
3. Design of the mine pillar.
4. Design of the barrier pillar.
5. Design of the mine panel.
6. Design of the longwall mine workings.
7. Prediction of subsidence.
8. Design of the highwall of the opencast mine.
9. Design of the overburden dumps.
10. Performance of the powered support.

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

B. Tech (Mining) VIII SEMISTER

S. No	Course Code	Course Title	Scheme of Instruction			Lecture hr/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	PC4201MN	Mine Legislation & Safety	3	1	-	4	30	70	4
2	PE-II*	Professional Elective –II	3	1	-	4	30	70	3
3	PE-III**	Professional Elective –III	3	1	-	4	30	70	3
4	PC4208MN	Mine Planning Laboratory	-	-	3	3	25	50	1.5
5	PC4209MN	Project Stage 2	-	-	6	6	50	100	3
6	PC4210MN	Internship – III (Surface Mining)	-	-	-	-	100	-	0.5
7	OE-II***	Open Elective	2	-	-	2	30	70	2
8	MC4201CE	Circular Economy- Sustainable Material Management	-	-	-	-	-	-	0
9	MC42AHS / MC42BHS	Yoga Practice / NSS	-	-	-	-	-	-	0
Total			**11**	**3**	**9**	**23**	**295**	**430**	**17**

Professional Elective – II (PE-II*)

PE4202MN	Mine Economics
PE4203MN	Marine Mining
PE4204MN	Mine Subsidence Engineering

Professional Elective – III (PE-III)**

PE4205MN	Rock Fragmentation Engineering
PE4206MN	Remote Sensing and Geographical Information System
PE4207MN	Rock Slope Engineering

OPEN ELECTIVE –II (OE*)**

OE4201CE	Disaster Management
OE4202HS	Operational Research
OE4208HS	Human Values and Professional Ethics

- The Internship – III taken after VII Semester.
- The students have to complete MC4201CE using any one of the MOOC platform or any other online source & pass the test conducted by the Department
- The student has to select MC42AHS or MC42BHS and clear the test conducted by the Department.

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

B Tech (Mining) VIII- Semester

PC4201MN

MINE LEGISLATION AND SAFETY

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

UNIT I

Introduction to Mining Laws and Legislation:
General principles of mining laws, development of mining legislation in India. Mineral Concession Rules, Reconnaissance Permits (RP), Prospecting Lease (PL) and Mining License (ML). Recognized Qualified Person (RQP).

UNIT II

Acts Rules and Regulations I :
Mines Act, Mines Rules, Coal and metalliferous Mines Regulations, Bye- laws, Circulars. Payment of Wages Act, Gratuity and P.F Rules

UNIT III

Acts Rules and Regulations II:
Indian electricity rules. Coalmines conservation and development act, Workman's compensation act. General provisions of Mines and Minerals regulations and Development Act, Vocational Training Rules, Crèche Rules, Maternity benefit act, Explosives act, Rescue Rules, Environmental protection act
Controlled flow models by critical path method, natural splitting solution of problems by hardy cross and other techniques.

UNIT IV

Accidents and Diseases:
Classification of accidents, causes and prevention of accidents, accident enquiry report, cost of accidents, occupational diseases and their social effects.

UNIT V

Mine Safety:
Role of management**,** labour and government, safety audit, instrumentation, organization, for disaster management in mines, safety conferences. Safety Management plan.

Text / Reference books:

1. Mines Act 1952, lovely Prakashan, Dhanbad, 1995.
2. Coal Mine Regulations, 1961, lovely Prakashan, Dhanbad, 1995.
3. Metal Mine Regulations, 1961, lovely Prakashan, Dhanbad, 1995.
4. DGMS Circulars, By National Council of Safety in Mines, Dhanbad, 1995.
5. The Mines Rescue Rules, 1986, lovely Prakashan, Dhanbad, 1995.

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

B Tech (Mining) VIII- Semester

PE4202MN

MINE ECONOMICS

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

UNIT I

Introduction:

Mineral industry and its role in national economy; world and national mineral resources; mining a unique investment environment; special risk factor in mine investment and evaluation; national mineral policy.

UNIT II

Ore Reserve Estimation:

Methods of sampling, sampling frequency; analysis of sampling data, estimation of reserves, introduction to geo statistical methods, classification of reserves. UNFC classification for reserves.

UNIT III

Mine Valuation:

Time value of money; annuity; redemption of capital. Net present value; depletion allowance; depreciation; inflation; escalation; rates of return; Hoskold'method. Capital and operating cost including wages, incentives, material, etc; assets; liabilities; cash flows and discount cash flow; profitability index- their implications in mine economic evaluation.

UNIT IV

Project Appraisal:

Methods of project evaluation- pay back, annual value, benefit/cost ratio, ERR and IRR, etc., evolution of exploratory mining areas and operating mines; mine project financing, its risks and constraints; mine taxation; critical impact of depreciation, depletion, type of funding, reserves., life, etc., on mine profitability.

UNIT V

Finance and Accounting:

Sources of mine funds- shares, debentures, fixed deposit, sinking fund, capital gearing, P&L account, balance sheet, typical case studies of mine feasibility. Cost estimation of individual mining operations and overall mining cost. Cost control methods.

Text / Reference books:

1. Deshmukh RT —Mineral Economics, Meera Publishers, Nagpur.
2. Mineral Economics, GB Misra.
3. Rubawsky —Mineral Economics, Elsvvier Science pub.
4. Sharma N.L. —Mineral Economics

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

B Tech (Mining) VIII- Semester

PE4203MN

MARINE MINING

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

UNIT – I

Introduction:
Marine environment, development & status of ocean resources of mining in India and other parts of the world; profile of sea, shelf, slop and rise; nature of deposits

UNIT – II

Marine Geology:
Physical and chemical properties of seawater, overview of marine mineral deposits, deep-sea bed mineral resources, polymetallic nodules, sulphate nodules, chemicals from the ocean, dissolved and undissolved mineral deposits, sea water as resource and beach placers

UNIT – III

Exploration:
Shallow and deep sea bed, oceanographic instruments, mining of manganese nodules, deep sea drilling methods, ocean bottom samplers, drag buckets, grab buckets, coring systems, ocean bathymetry, temperature measurement systems, water samplers, ocean dynamic analysis, beach placer mining, underwater photographs

UNIT – IV

Oil Exploration:
Offshore exploration of oil and gas, vehicles and transportation, Environmental problems, Modern technologies

UNIT - V

Deep sea bed Mining:
Wells and algae for extraction of minerals, economy and technology, Environmental impact of marine mining; Law of the sea, Legal considerations in ocean mining

Text / Reference books:

1. Manjula R Shyam "matals from Sea bedprospects of mining polymetallic nodules of India" Oxford & IBH
2. Graff, W.J., Introduction to Offshore Structures: Design, Fabrication and Installation, Gulf Publishing Company, London, 1961.
3. Herbich, J.B., Coastal and Deep Ocean Dredging, Gulf Publishing Co. Houston, 1975.
4. Murthy, T.K.S., Mining the Ocean, CSIR Golden Jubilee Series, CSIR Publications, New Delhi

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

B Tech (Mining) VIII- Semester

PE4204MN

MINE SUBSIDENCE ENGINEERING

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

UNIT-I

Subsidence:
Various terminologies associated with subsidence, types of subsidence – sub critical, critical and super critical, factors affecting the subsidence, non effective width of extraction.

UNIT-II

Theories of subsidence:
Vertical, normal, dome, beam, trough and continuum theory. Zones of movement in the overlying beds in various mining methods. Rock kinematics

UNIT-III

Subsidence survey and measurement techniques:
Leveling and linear measurements techniques; wire line method, time domain reflectometry (TDR) method and mechanical grouting method.

UNIT-IV

Subsidence prediction methods:
Graphical method, analytical method, profile function, influence function, physical models and numerical methods. Subsidence control techniques, special mining layouts to minimize subsidence and impact of subsidence on structures.

UNIT-V

Computer applications in subsidence:
Prediction of subsidence for various mining methods: bord and pillar, blasting gallery, continuous miner technology, longwall mining and other metal mining methods using numerical modeling.

Text / Reference books:

1. Deb D and Verma AK. Fundamentals and application of rock mechanics. PHI publication, New Delhi. 2016.
2. Deb D. Finite element method: concepts and application in geo-mechanics, 2nd edition. PHI publication, New Delhi. 2012.
3. Brady HG and Brown ET. Rock mechanics for underground mining, 3rd edition. Springer. 2006.
4. Singh RD. Principles and practices of modern coal mining. New age international publications. 1997.
5. Peng, Mine Ground Control

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

B Tech (Mining) VIII- Semester

PE4205MN

ROCK FRAGMENTATION ENGINEERING

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

UNIT - I

General theory of rock cutting, selection of cutting tools for optimum penetration and wear characteristics. Mechanics of rotary, percussive and rotary-percussive drilling, short and long hole drilling equipment, different types of bits, bit wear, drilling in difficult formations, drillibality of rocks, drilling performance and costs.

UNIT – II

Mechanism of rock breaking machines, Pneumatic and Hydraulic rock hammers. Mechanics of rock fragmentation and fracture by explosive action, explosive. Blasting accessories, blasting parameters, design of blasting rounds for opencast and underground mines, Blastability of rocks, blasting efficiency, mean fragment size

UNIT - III

Computational models of blasting, transient ground motion, misfires, blown out shots, incomplete detonation ~~t~~heir cases and remedial measures.

UNIT - IV

Controlled blasting techniques, perimeter blasting, safety precautions, ground vibrations and air over pressure from blasting.

UNIT – V

Instrumentation in blasting, Borehole pressure transducer, V.O.D probe, vibration monitor, high speed video camera. Impact of ground vibration and sound on the neighboring structures and communities, and mitigative measures

Text / Reference books

1. Pradha G.K., Ghosh A.K. 'Drilling & Blasting' Mine Technology
2. Sastry V.R. – 'Advances in Driiling & Blasting

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

B Tech (Mining) VIII- Semester

PE4206MN

REMOTE SENSING & GEOGRAPHICAL INFORMATION SYSTEM

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

UNIT-I

Basic principles of Remote Sensing:
Definition and components, Electro Magnetic Radiation; Wavelength regions of electro-magnetic radiation; Types of remote sensing with respect to wavelength regions; Black body radiation; Reflectance; spectral reflectance of land covers.

UNIT-II

Sensors and platforms:
Types of sensors: Multispectral, Hyper-spectral, Microwave, scanners-along track and across track; Platform and their types-Geostationary and Polar orbiting, platforms based on altitudes. Satellite missions –MODIS, IRS, LANDSAT, SPOT, marine/ocean observation satellites

UNIT-III

Digital Image Processing (DIP):
Interpretation of Images; Registration: Transfer of Information from Imagery to Base Map; Classification; Exposure to various Image Processing Techniques and Generation of digitally processed outputs.

UNIT-IV

Geographical Information System (GIS):
Definitions, History and development of GIS, components of GIS, applications of GIS; Coordinate Systems - Geographical Coordinate Systems, Projected Coordinate System, map projections; Geospatial data - Data input-existing GIS data, creating new data; attribute data query, spatial data query, raster data query.

UNIT – V

Applications:
Recent trends in RS&GIS and Environmental assessment & monitoring, Land Use and Land cover classification, Vehicle tracking system, Application of Geo-statistical methods and GIS in mineral prospecting and ore reserve estimation, Applications of GPS in Mineral Resource Surveys, Mapping and Navigation. Role of DGPS surveys in mining leases and identifying illegalities.

Text / Reference books:

1. Anji Redddy M. Remote sensing and geographical information systems. 3rd edition. 2008.
2. Kaplan ED. Understanding GPS: principles and application. British Library Catalogue. 2006
3. Lillesand TM and Kiefer RW. Remote sensing and image interpretation. John Wiley and Sons, New York, 2004.
4. ML and Chouhan TS. Remote sensing and photogrammetry: principles and applications. Vigyan Prakashan, Jodhpur. 1998.

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

B Tech (Mining) VIII- Semester

PE4207MN

ROCK SLOPE ENGINEERING

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

UNIT I

Basic mechanics of rock slope failure:
Rock slope economics, slope parameters, effect of water pressure, factor of safety of slopes, slope height vs. slope angle, design of slopes.

UNIT II

Geological and strength properties:
Geological parameters affecting slope stability; physico-mechanical properties affecting slope stability, shearing on incline plane, determination of shear strength of rock and rock discontinuities; Ground water flow in rock masses; field measurement of permeability; measurement of water pressure.

UNIT III

Plane failure:
Plane failure analysis; graphical analysis of stability; influence of ground water on stability, Influence of tension crack; rock reinforcement; analysis of failure on a rough plane; case studies

UNIT IV

Wedge failure:
Analysis of wedge failure; wedge analysis including cohesion and water pressure; case studies

UNIT V

Circular and toppling failure:
Conditions for circular failure; derivation of circular failure analysis; effect of ground water; Types of toppling failure; analysis of toppling failure; Influence of slope curvature on stability; slope depressurization: protection of slopes: control of rock falls.

]

Text / Reference books:

1. Singh, R.N. and Ghose, A.K., Engineered Rock Structures in Mining and Civil Construction, A.A. Balkema, Netherlands, 2006.
2. Rock Slope Engineering: Civil and Mining by Duncan C. Wyllie.

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

B Tech (Mining) VIII- Semester

OE4201CE

(OE4201CE) DISASTER MANAGEMENT

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

UNIT I

Understanding Disaster:
Concept of Disaster - Different approaches- Concept of Risk - Levels of Disasters - Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerabilities:
Natural and man-made hazards; response time, frequency and forewarning levels of different hazards - Characteristics and damage potential or natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards.

UNIT II

Disaster Management Mechanism:
Concepts of risk management and crisis managements - Disaster Management Cycle - Response and Recovery - Development, Prevention, Mitigation and Preparedness - Planning for Relief

UNIT III

Capacity Building:
Capacity Building: Concept - Structural and Nonstructural Measures Capacity Assessment; Strengthening Capacity for Reducing Risk - Counter-Disaster Resources and their utility in Disaster Management - Legislative Support at the state and national levels

UNIT IV

Coping with Disaster:
Coping Strategies; alternative adjustment processes - Changing Concepts of disaster management - Industrial Safety Plan; Safety norms and survival kits - Mass media and disaster management

UNIT V

Planning for Disaster Management:
Strategies for disaster management planning - Steps for formulating a disaster risk reduction plan - Disaster management Act and Policy in India - Organizational structure for disaster management in India - Preparation of state and district disaster management plans

Text / Reference books:

1. T. Bhattacharya," Disaster Science and Management" McGraw Hill Education (India) Pvt. Ltd Wiley 2015
2. Mrinalini Pandey, "Disaster Management" Wiley 2014
3. Manual on Disaster Management, National Disaster Management, Agency Govt of India
4. N. Pandharinath, CK Rajan," Earth and Atmospheric Disasters Management" BS Publications 200

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

B Tech (Mining) VIII- Semester

OE4202HS

OPERATION RESEARCH

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

UNIT – I

Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications

Allocation: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle

UNIT- II

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy

Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem

UNIT – III

Sequencing – Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines-graphical model

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely- Group Replacement.

UNIT – IV

Theory of Games: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.

Inventory: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost

UNIT – V

Waiting Lines: Introduction–Terminology-Single Channel–Poisson arrivals and Exponential Service times – with infinite population and finite population models– Multichannel – Poisson arrivals and exponential service times with infinite population

Dynamic Programming: Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

Text / Reference books:

1. J K Sharma," Operation research " MacMilan Publications
2. A. M. Natarajan, P. Balasubramaniam, A. Tamilarasi," Operation research " Pearson Publications
3. P Rama Murthy, " Operation research " New Age International Publishers

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

B Tech (Mining) VIII- Semester

OE4208ME

HUMAN VALUES AND PROFESSIONAL ETHICS

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

UNIT I

Human Values:
Morals, values & ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, caring, sharing, honesty, courage, valuing time, co- operation, commitment, empathy, self-confidence, character and spirituality

UNIT II

Engineering Ethics:
Senses of Engineering Ethics, variety of moral issues, types of inquiry, moral dilemmas, moral autonomy, moral theories, Engineering as social experimentation: Engineering as experimentation, engineers as responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study

UNIT III

Safety, Responsibilities and Rights:
Safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflicts of int rest, professional rights, employee rights, Whistle blowing

UNIT IV

Collegiality:
Techniques for Achieving Collegiality –Two Senses of Loyalty- obligations of Loyalty-misguided Loyalty – professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self- interest, Customs and Religion- Ethical egoism-Collective bargaining

UNIT V

Global Issues:
Multinational corporations - environmental ethics, computer ethics, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of ethics, Ethics and codes of business conduct in MNC

Text / Reference books:

1. D.R. Kiran, *Professional Ethics and Human Values*, New York: McGraw Hill, 2013.
2. Govindarajan. M, Natarajan. S, Senthil Kumar. V.S, *Professional Ethics and Human Values*, New Delhi: Prentice Hall of India, 2013.
3. Mike Martin and Roland Schinzinger, *Ethics in Engineering*, 4th ed. New York: McGraw Hill, 2014.
4. Charles D. Fleddermann, *E r gineering Ethics*, 4th ed. New Delhi: Prentice Hall, 004.

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

B Tech (Mining) VIII- Semester

MC4201CE

CIRCULAR ECONOMY- SUSTAINABLE MATERIAL MANAGEMENT

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks : -
-	-	-	0	External Marks : -

1. Introduction
2. Circular Business Model
3. Circular Design, Innovation and Assessment
4. Policies and network

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

B Tech (Mining) VIII- Semester

MC42AHS

YOGA PRACTICE

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

UNIT I

Introduction:
Yoga definition, health definition from WHO, yoga versus health, basis of yoga, yogaisbeyond science, Gist of eighteen chapters of Bhagavad-Gita, four types of yoga: Karma, Bhakti, Gnyana and Raja yoga, Internal and External yoga, elements of Ashtanga yoga (Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana and Samadhi), Pancha koshas and their purification through Asana, Pranayama and Dhyana.

UNIT II

Suryanamaskaras (Sun Salutations):
Definition of sun salutations, seven chakras (Mooladhaar,Swadhishtaan, Manipura, Anahata, Vishuddhi, Agnya and Sahasrar), various manthras (Om Mitraya, Om Ravaye, Om Suryaya, Om Bhanave, Om Marichaye, Om Khagaye, Om Pushne, Om Hiranya Garbhaye, Om Adhityaya, Om Savitre, Om Arkhaya, and Om Bhaskaraya) and their meaning while performing sun salutations, physiology, seven systems of human anatomy, significance of performing sun salutations.

UNIT III

Asanas (Postures):
Pathanjali's definition of asana, sthiramsukhamasanam, 3rd limb of Ashtanga yoga, loosening or warming up exercises, sequence of perform in asanas (standing, sitting, prone, supine and inverted), nomenclature of asanas (animals, trees, rishis and so on), asanas versus chakras, asanas versus systems, asanas versus physical health, activation of Annamaya kosha.

UNIT IV

Pranayama (Breathing Techniques):
Definition of Pranayama as per Shankaracharya, 4th limbofAshtanga yoga, various techniques of breathing, Pranayama techniques versus seasons, bandhas and their significance in Pranayama, mudras and their significance in Pranayama, restrictions of applying bandhas with reference to health disorders, Pranayama versus concentration, pranayama is the bridge between mind and body pranayam versus mental health, activation of Pranamaya kosha through Pranayama.

UNIT V

Dhyana (Meditation):

Definition of meditation, 7th limb of Ashtanga yoga, types of mind (Conscious and Sub-Conscious), various types of dhyana. Meditation versus spiritual health, Dharana and Dhyana, extentionof Dhyana to Samadhi, Dhyana and mental stress, activation of Manomaya kosha through dhyana, silencing the mind

Text / Reference books:

1. *Light on Yoga* by BKS lyengar.
2. 2. *Yoga Education for Children,* Vol-1 by Swami SatyanandaSaraswati.
3. 3. *Light on Pranayama* by BKS lyengar.
4. 4. *Asana Pranayama Mudra and Bandha* by Swami SatyanandaSaraswati.
5. 5. *Hatha Yoga Pradipika*by Swami Mukhtibodhananda.
6. 6. *Yoga education for children,* Vol-11 by Swami NiranjanandaSaraswati.
7. 7. *Dynamics of Yoga* by Swami SatyanandaSaraswati.

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

B Tech (Mining) VIII- Semester

MC42BHS

NSS

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

List of Activities:

1. Orientation program about the role of NSS in societal development.
2. Swachh Bharat Program.
3. Guest lectures from eminent personalities on personality development.
4. Plantation of saplings/Haritha Haram Program.
5. Blood Donation / Blood Grouping Camp.
6. Imparting computer education to school children.
7. Creating Awareness among students on the importance of Digital transactions.
8. Stress management techniques.
9. Health Check-up Activities.
10. Observation of Important days like Voters' day, World Water Day and so on.
11. Road Safety Awareness Programs.
12. Energy Conservation Activities
13. Conducting Programs on effective communication skills
14. Awareness programs on national integration.
15. Orientation on Improving Entrepreneurial Skills.
16. Developing Effective Leadership skills.
17. Job opportunity awareness programs in various defense, public sector undertakings.
18. Skill Development Program.
19. Creating awareness among students on the Importance of Yoga and other physical activities.
20. Creating awareness among students on various government sponsored social welfare schemes for thepeople.

Note: At least Ten Activities should be conducted in the Semester**.** Each event conducted under Swachh Bharat, Plantation and important days like Voters' day, world water day may be treated as separate activity

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

B Tech (Mining) VIII- Semester

PC4208MN

MINE PLANNING LABORATORY

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

1. Flowcharts and Symbols for mining activities
2. Optimization of Drilling- Opencast and Underground.
3. Optimization of Blast Design –Open cast & Underground
4. Design of open pit and dump slopes using numerical modeling
5. Prediction of subsidence in various mining methods.
6. Applications of CPM/PERT network in Mine Planning.
7. Design of Support system for Underground Mining Methods.
8. Design Open pit Mine using Minex / Surpac.
9. Design of Underground Mine using Minex/Surpac.
10. Design of Ventilation system for Underground Mine.