

Scheme & Syllabus of
UNDERGRADUATE DEGREE COURSE
B.Tech. VII & VIII Semester

Mining Engineering



Rajasthan Technical University, Kota
Effective from session: 2020 – 2021



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Scheme & Syllabus

IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

Teaching & Examination Scheme

B.Tech.: Mining Engineering

4th Year - VII Semester

THEORY											
SN	Category	Course		Contact hrs/week			Marks				Cr
		Code	Title	L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	7MI4-01	Mine Legislation and Disaster & Environmental Management in Mines	3	0	0	3	30	120	150	3
2	OE		Open Elective - 1	3	0	0	3	30	120	150	3
			Sub Total	6	0	0		60	240	300	6
PRACTICAL & SESSIONAL											
4	PCC	7MI4-21	Advanced Methods of Mining	0	0	3	2	45	30	75	1.5
5		7MI4-22	Mineral Processing	0	0	2	2	30	20	50	1
6		7MI4-23	Environmental Management in Mines	0	0	3	2	45	30	75	1.5
7	PSIT	7MI7-30	Industrial Training	1	0	0		75	50	125	2.5
8		7MI7-40	Seminar	2	0	0		60	40	100	2
9	SODE CA	7MI8-00	Social Outreach, discipline, Extra Curricular Activities	0	0	0		0	25	25	0.5
			Sub Total	3	0	8		255	195	450	9
			TOTAL OF VII SEMESTER	9	0	8		315	435	750	15

L: Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

ETE: End Term Exam, **IA:** Internal Assessment

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B.Tech.: Mining Engineering

4th Year - VIII Semester

THEORY											
SN	Categ ory	Course		Contact hrs/week			Marks				Cr
		Code	Title	L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	8MI4-01	Mine Planning and Mine Economics & Mine Closure	3	0	0	3	30	120	150	3
2	OE		Open Elective - 2	3	0	0	3	30	120	150	3
			Sub Total	6	0	0		60	240	300	6
PRACTICAL & SESSIONAL											
4	PCC	8MI4-21	Mine Planning & Design	0	0	2	2	30	20	50	1
5		8MI4-22	Mine Economics and Mine Closure	0	0	2	2	30	20	50	1
6	PSIT	8MI7-50	Project	3	0	0		210	140	350	7
7	SODE CA	8MI8-00	Social Outreach, discipline, Extra Curricular Activities	0	0	0		0	25	25	0.5
			Sub Total	3	0	4		270	205	475	9.5
		TOTAL OF VII SEMESTER		9	0	4		330	445	775	15.5

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List of Open Electives for Mining Engineering			
Subject Code	Title	Subject Code	Title
Open Elective - I		Open Elective - II	
7AG6-60.1	Human Engineering and Safety	8AG6-60.1	Energy Management
7AG6-60.2	Environmental Engineering and Disaster Management	8AG6-60.2	Waste and By-product Utilization
7AN6-60.1	Aircraft Avionic System	8AN6-60.1	Finite Element Methods
7AN6-60.2	Non-Destructive Testing	8AN6-60.2	Factor of Human Interactions
7CH6-60.1	Optimization Techniques	8CH6-60.1	Refinery Engineering Design
7CH6-60.2	Sustainable Engineering	8CH6-60.2	Fertilizer Technology
7CR6-60.1	Introduction to Ceramic Science & Technology	8CR6-60.1	Electrical and Electronic Ceramics
7CR6-60.2	Plant, Equipment and Furnace Design	8CR6-60.2	Biomaterials
7CE6-60.1	Environmental Impact Analysis	8CE6-60.1	Composite Materials
7CE6-60.2	Disaster Management	8CE6-60.2	Fire and Safety Engineering
7CS6-60.1	Quality Management/ISO 9000	8CS6-60.1	Big Data Analytics
7CS6-60.2	Cyber Security	8CS6-60.2	IPR, Copyright and Cyber Law of India
7EE6-60.1	Electrical Machines and Drives	8EE6-60.1	Energy Audit and Demand side Management
7EE6-60.2	Power Generation Sources.	8EE6-60.2	Soft Computing
7EC6-60.1	Principle of Electronic communication	8EC6-60.1	Industrial and Biomedical applications of RF Energy
7EC6-60.2	Micro and Smart System Technology	8EC6-60.2	Robotics and control
7ME6-60.1	Finite Element Analysis	8ME6-60.1	Operations Research
7ME6-60.2	Quality Management	8ME6-60.2	Simulation Modeling and Analysis
7PE6-60.1	Pipeline Engineering	8PE6-60.1	Unconventional Hydrocarbon Resources
7PE6-60.2	Water Pollution control Engineering	8PE6-60.2	Energy Management & Policy
7TT6-60.1	Technical Textiles	8TT6-60.1	Material and Human Resource Management
7TT6-60.2	Garment Manufacturing Technology	8TT6-60.2	Disaster Management

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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

7MI4-01: Mine Legislation and Disaster & Environmental Management in Mines

Credit : 3
3L+0T+0P

Max. Marks: 150(IA:30, ETE:120)
End Term Exam : 3 Hours

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course.	1
2	General Principles of Mining Laws, Development of mining legislation in India, Post independence trend of changes, National Mineral Policy.	4
3	Principal provisions of Mines and Minerals (Development and Regulation) Act & Mineral Concession and Development Rules.	3
4	Mines Act 1952 with upto date amendments	2
5	Mines Rules 1955 with upto date amendments	2
6	Coal Mines Regulation 1957 with upto date amendments	2
7	Metalliferous Mines Regulations 1961 with upto date amendments	2
8	Principal provisions of pit head and bath rules, creche rules , mine vocational training rules,	2
9	Explosive rules(related to mines); Electricity rules applicable to mines and oil fields	2
10	Principal provisions of industrial dispute act, workmen's compensation act, trade union act,	3
11	Payment of wages act and minimum wages act, Rescue rules; Legal requirements, Important technical circulars issued by DGMS	3
12	Introduction: Objective, scope and outcome of the course.	1
13	Man and Mine Environment: Changes of social environment caused by mining; Socio-economic factors;	2
14	Occupational health hazards due to mine dust, poor lighting and ventilation, noise and vibration, trace elements, radioactive emission, Impact of surface subsidence.	2
15	Air and Water pollution: Sources, ill effects, measurement and monitoring, standards; Preventive and mitigating measures	1
16	Dust in mines: Dangers, formation, prevention and suppression; Dust sampling apparatus, their construction and applications	1

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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

17	Noise and Vibration: Sources, ill effect, measurement and monitoring, standards; Preventive and mitigating measures	1
18	Acid Mine Drainage: Sources, mechanism of formation and ill effects; Preventive and mitigating measures	1
19	Land Reclamation: Re-vegetation and restoration methodologies; Plant species selection; Case studies of coal and metalliferous mine dumps/spoils	1
20	Environmental Management: Factors to be considered, EIA, EMP preparation , Mine Closure Planning	1
21	Environmental laws and acts; Main provisions of Environmental Protection Act 1986, EIA notification 2006 and Circulars issued by MoEF,	1
22	Forest Conservation Act 1980 and Forest Conservation Rules 1981 related with the Mining	1
Total		39



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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

7MI4-21: Advanced Methods of Mining

Credit : 1.5

Max. Marks: 75(IA:45, ETE:30)

OL+OT+3P

Contents
1. Powered supports, their Classification, principles of operation and design features and application,
2. Support of wide excavation, longwall faces and depillaring,
3. Hydraulic fluids, Shotcreting, Roof stitching
4. Mining over old underground workings;
5. Placer mining: hydraulicking,
6. Dredging,
7. Dump leaching, Solution mining, ore mining by leaching, Bacterial leaching, under water/Sea-bed mining
8. deep sea mining.
9. Steep angle conveyor, high angle conveyor,
10. Mining by surface miner, In pit crushing and cross pit conveying techniques.
11. Mining of coal under difficult Situations: Contiguous seams, seams prone to outburst and bumps; Mining of seams prone to fire and spontaneous combustion,
12. Remote controlled operations and use of robots in coal mining
13. Hydraulic Mining: The concept; Layout of workings on district and level systems;
14. In-situ Gasification: The concept and chemistry; Methods- using underground excavations, and using vertical or directionally drilled boreholes from surface



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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

7MI4-22: Mineral Processing

Credit : 1
OL+OT+2P

Max. Marks: 50(IA:30, ETE:20)

Contents
1. Jaw crushers and their comparison
2. Roll crushers and their comparison
3. Gyratory crushers and their comparison
4. The ball mill and its application
5. Various types of classifiers
6. Determination of various sized product with sieve shaker
7. Concept and apparatus of froth flotation
8. Process of thickening & filtration
9. Wilfrey table
10. Filter press
11. Laboratory jig
12. Flowsheet of lead-zinc ore (Zawar)
13. Flowsheet of copper ore (Khetri)
14. Flowsheet of Gold, Iron ore, Manganese ore
15. Flowsheet of coal washing



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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

7MI4-23: Environmental Management in Mines

Credit : 1.5

Max. Marks: 75(IA:45, ETE:30)

OL+OT+3P

Contents
1. Occupational health hazards and their remedial measures.
2. Standards for water, air, noise, dust etc. and their impact when found in excess
3. Measurement of dust contents with the help of dust sampler
4. Measurement of dust by instruments used in mines
5. Sound level meter and measurement of noise level produced by various mining machineries
6. Measurement of vibration with the help of Blastmate series III seismograph
7. Reclamation of dumps for mechanized opencast mines
8. Preparation of EMP of mines, collection of various fields data and their evaluation
9. Measurement of vibrations produced in mines by seismograph
10. Measurement of pH value of water samples collected from mine discharge and analyzing its adverse effects
11. Gravimetric dust sampler
12. Preparation of EIA
13. Sound level measurement
14. Problem for Acid mine drainage
15. Case study of reclamation and valley filling.



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IV Year- VII & VIII Semester: B. Tech. (Mining Engineering)

8MI4-01: Mine Planning and Mine Economics & Mine Closure

Credit : 3
3L+0T+0P

Max. Marks: 150(IA:30, ETE:120)
End Term Exam : 3 Hours

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course.	1
2	Feasibility study: Its function and preparation of feasibility report for metallic and non-metallic minerals	2
3	Minerals inventory and ore reserves	2
4	Different types of underground mining methods as per the organizational and technical parameters	3
5	Determination of size of mine, life of mine and production rates	3
6	Design for mining the mineral deposits by open-pit mining, underground mining and the combination of both	2
7	The ultimate open pit profile based on physical and economical parameters; Optimum pit design	3
8	Division of underground mine into parts, levels and panels; Determination of level interval; Size of long wall faces. Slope design-the basic concepts	2
9	Different planning stages- micro and macro planning, Project scheduling	3
10	Computer applications; Information systems; Information technology, Design for mining mineral deposits by underground mining	2
11	Production planning: Selection of machines; Haul road design; Optimum load haul system; Optimum blast design	2
12	Introduction: Objective, scope and outcome of the course.	1
13	Introduction: Economic importance of the mining industry; mining economy; risky nature of the mining industry; the state and the mining industry; Marketing and export of minerals; National mineral policy	2
14	Loss of mineral in Mining: Classification and incorporation of losses, coefficient of recovery of mineral extraction; Dilution and recovery	2
15	Mine examination and Valuation: Examination and report on mines/mineral properties; valuation of mines/mineral properties; present value and its computation; ore value and profitability of mining; recoverable value	2

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16	Cost of Mining: Capital and operating cost, factor affecting operating cost, method of estimating future costs; computation of cost of development and stoping operation Financial Analysis: Revenue and mining costs; Taxes and royalties; Net Present Value (NPV); Internal Rate of Return (IRR); Effect of inflation on NPV of a project; Sensitivity analysis	2
17	Financial Statements: Nature and limitations of financial statements. Interpretation of financial statements. Uni-variate and multivariate ratio analysis. Limitation of ratio analysis	2
18	Cost analysis: Various cost concept; Cost-Volume-Profit analysis; Break-even analysis; Cost indifference point. Decision making with the cost data. Cost and budgetary control	2
19	Mine Closure plan, its need, preparation and approval.	1
Total		39



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8MI4-21: Mine Planning & Design

Credit : 1
OL+OT+2P

Max. Marks: 50(IA:30, ETE:20)

Contents
1. Estimation of ore reserve based on bore hole data of lime stone deposit
2. Estimation of ore reserve based on bore hole data of Iron ore deposit
3. Estimation of ore reserve based on bore hole data of Bauxite deposit
4. Estimation of ore reserve based on bore hole data of Lead zinc deposit
5. Design of drive in a lead zinc mine
6. Design of Raise/ winge in a lead zinc mine
7. Design of shaft in a lead zinc mine
8. Design of box cut in an o/c mine
9. Design of haul road
10. Problem related to ultimate slope in o/c mine
11. Problem for shovel dumper combination
12. Design of length of long wall face
13. Problem related to scheduling
14. Optimum blast design for o/c mine
15. Optimum blast design for u/g mine



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8MI4-22: Mine Economics and Mine Closure

Credit : 1

Max. Marks: 50(IA:30, ETE:20)

OL+OT+2P

Contents
1. Practicals as per the theory syllabus, to be declared at the start of session by respective teacher.

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