Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

for

B.Tech in Mining Engineering

Semester-VIII

(Effective from the session: 2019-20)

Faculty of Engineering,
Shri Rawatpura Sarkar University, Raipur

B.Tech Mining Engineering
Semester-VIII
Examination Scheme
(Effective from the session: 2019-20)

S.No	Course Code	Th/Pr	Subject	Type of Course	Teaching hours per week			TC	Examination Scheme				Total Marks
					L	T	P		Theory		Practical		
									EX	IN	EX	IN	
1	BENMN801	Th	Mine Surveying- III	Core	3	1	-	4	70	30	-	-	100
2	BENMN802	Th	Pollution Control Engineering	Core	3	1	-	4	70	30	-	-	100
3	BENMN803	Th	Strata Control	Core	3	1	-	4	70	30	-	-	100
4	BENMN804	Th	Professional Elective – III	Core	3	1	-	4	70	30	-	-	100
5	BENMN805	Th	Open Elective – III	Core	3	1	-	4	70	30	-	-	100
6	BENMN801P	Pr	Mine Surveying - III Lab	Core	-	-	4	2	-	-	35	15	50
7	BENMN802P	Pr	Pollution Control Engineering Lab	Core	-	-	4	2	-	-	35	15	50
8	BENMN803P	Pr	Strata Control Lab	Core	-	-	4	2	-	-	35	15	50
9	BENMN807P	Pr	Major Project	Core	-	-	4	2	-	-	100	50	150
	Total Contact hr per week: 36			**Total Credit: 28**					**Grand Total Marks:**				**800**

Professional Elective III

Subject Code	Subject Name
BENMN804A	GIS & Remote Sensing in Mining
BENMN804B	Production Drilling for Oil Wells
BENMN804C	Rock Excavation Engineering

Open Elective III

B.Tech in Mining Engineering
Semester-VIII
2019-20

Subject Code	Subject Name
BENMN805A	Safety Engineering
BENMN805B	Supply Chain Management
BENMN805C	Ecology and Sustainable Development

Course Title	Mine Surveying- III

B.Tech in Mining Engineering
Semester-VIII
2019-20

Course Code	**BENMN801**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Mine Environment-I				
Course objectives	**This course will enable students to:** 1. Discuss the triangulation survey for l measurements 2. Discuss about the Gyro theodolite and different stope surveying methods. 3. Discuss the astronomical surveying. 4. Brief discussion on types photographic surveying.				
Course Contents	**UNIT I** **TRIANGULATION** Principles forming network of triangles; Selection of sites of triangulation stations; Base andCheck base lines; Measurement and adjustment of angles by simple methods; Calculation of Co-ordinates. **UNIT II** **CORRELATION SURVEY** Methods of correlation of surface and underground surveys through adits, inclines, and shafts; Use of magnetic needle and Gyro theodolites; Different methods of Stope surveyingand open pit surveying **UNIT III** **ASTRONOMICAL SURVEY** Definitions of important terms; Determination of azimuth by astronomical observations. .**UNIT IV** **PHOTOGRAPHIC SURVEYING** General Principles; Photo theodolite, Stereo photographic Surveying; Aerial Surveying - Field of application; Vertical and oblique photographs; Aerial photography; Preparation of photographical maps by simple methods **UNIT V** **MODERN SURVEYING TECHNIQUES** Electronic distance measuring equipment; Geodimeter, Tellurometer, Total Station, Distomat, Softwares.				
Course Outcome	**At the end of the course student will be able to:-** 1. Apply knowledge of Surveying and Environmental Engg. to the miners for keeping them safe and improving their efficiency and productivity. 2. Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mining engineering in particular. 3. Make awareness among the miner to avoid any problems related to surveying.				
Text Books	1.Surveying & Levelling by Kanetkar & Kulkarni 2.Mine surveying by Winniberg				

Reference Books	1.Mine surveying by S. Ghatak 2.Surveying & Levelling by B. C. Punamia

Course Title	**POLLUTION CONTROL ENGINEERING**

B.Tech in Mining Engineering
Semester-VIII
2019-20

Course Code	**BENMN802**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Mine Geology-I & II				
Course objectives	**This course will enable students to:** • Learn various physico and mental problems in and the mine. • Determine the pollution condition of any mine. • Measure the insitu stress in the underground mines.				
Course Contents	**UNIT I:** **\ENVIRONMENTAL POLLUTION** Introduction and classification of environmental pollution, ecological conservation. Salientfeatures ofthe environmental laws in India and Occupational disease. . **UNIT II** **AIR POLLUTION** Air pollution due to various gases and suspended particulate materials, causes ,consequences, preventive measures, dust sampling equipments **UNIT III** **WATER POLLUTION** Water pollution, its causes and preventive measures, acid-mine drainage, water pollutionin mines andmineral beneficiation plants, water purification schemes in brief. **UNIT IV** **LAND POLLUTION** Land scape pollution and land reclamation, methods of land reclamation. **UNIT V** **NOISE POLLUTION** Pollution due to noise and its consequences, noise produced by different machinery, control andsafety, measurement of noise levels				
Course Outcome	**At the end of the course student will be able to:-** 1.Apply knowledge of pollution control for understanding and solving different types ofenvironmental pollution problem in any mine. 2.Identify, analyze, control and solve environmental pollution problems 3.Acquire knowledge and hands-on development of pollution control.				
Text Books	1.Legislation in Indian Mines – A Critical appraisal by Rakesh and Prasad 2.Env. Impact of Mining By Down and Stokes				

Reference Books	1.Air & Water Acts 2.Forest Conservation acts 3.Legislation in Indian Mines – A Critical appraisal by Rakesh and Prasad

Course Title	**STRATA CONTROL**

Course Code	**BENMN803**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites					
Course objectives	**This course will enable students to:** • Choose proper method of sampling for different ore bodies and mineral heaps. • Estimate grade and reserves. • Choose proper method of mine valuation for valuation of any mine and also able to determine the support system of any mine. • Perform various financial management aspects related with the mine.				
Course Contents	**UNIT I :SUPPORTS** Timber & steel supports, Examination of roof, Roof bolting roof stitching, method of supporting roadways. Supporting under different conditions viz. Pit bottom, crossing, junctions, faulted area, longwall faces, depillaring areas and stoping areas, support loads .SSR, CTR, Support plan, Support withdrawal **UNIT II : POWERED SUPPORTS** Powered supports: their principles of operation, Frame support, Chock support, shield support & chock shield support: Classification, designation, constructional features, merits demerits and applications, Hydraulic fluids, powerpack. **UNIT III :STOWING** Principal methods of stowing, their relative merits, demerits and applicability, Hydraulic stowing, Pneumatic stowing,Mechanical stowing, Hand packing, face arrangements, pipe wear, pipe jams. Hydraulic gradient. **UNIT IV :STRATA CONTROL** Theories of ground movement, Rock pressure due to Narrow and Wide excavation, Front abutment and back abutment, Failure of roof and floor, measurement of strata movement, Causes and preventive measures against Rockburst, Bumps& Gas outbursts. **UNIT V :SUBSIDENCE** Theories of subsidence, Types of subsidence, damage and loss due to subsidence, vertical and lateral movements andtheir estimation, angle of fracture and angle of draw, factors affecting subsidence, subsidence control, protection of surface structures, design				

	of protective pillars including shaft pillars. Pot holes. .
Course Outcome	**At the end of the course student will be able to:-** 1. Apply knowledge of mine economics for understanding, formulating and solving problems related with the mine strata. 2. Identify analyze and solve subsidence management problems. 3. Acquire knowledge and hands-on competence in applying the concepts of management in the development of mine roof pressure.
Text Books	1. Strata control in mines : Chaing & Peng 2. Winning and Working of Coal : R. T. Deshmukh & D. J.Deshmukh 3. Modern Coal Mining Practices : R. D. Singh 4. D.G.M.S. Circulars (Tech.) 1995 onwards 5. Longwall Mining : Syd. S. Chaing & Peng
Reference Books	1. Strata control in mines : Chaing & Peng 2. Winning and Working of Coal : R. T. Deshmukh & D. J.Deshmukh 3. Modern Coal Mining Practices : R. D. Singh 4. D.G.M.S. Circulars (Tech.) 1995 onwards

Course Title	**GIS & REMOTE SENSING IN MINING**				
Course Code	**BENMN804A**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Applied geology				
Course objectives	• Mining Engineering is the application of the knowledge of science and other branches of engineering for the extraction of minerals and ores from the surface of the earth or from the underground. • Geology becomes the first step of mining education. • It is essential to know and identify mineral and ore, their modes of occurrences in the earth crust and the formation and deposition of various rocks.				
Course Contents	**UNIT I** Introduction to Remote Sensing: Terminology In Remote Sensing, Types Of Remote Sensing ,Advantages And Disadvantages Of Remote Sensing Data, Electromagnetic Radiation, Atmospheric Windows, Remote Sensing Platforms And Sensors Systems, Path-Row Referencing System, Remote Sensing Data Product, Procedure For Obtaining Satellite Data. Hardware and Software related to Remote Sensing. . **UNIT II** Image Interpretation And Analysis: Elements of Visual Image Interpretation, Digital Image Pre- Processing, Radiometric Correction, Geometric Correction, Resolution Of Remote Sensing Data,Image Enhancement, Contract Enhancement, Spatial Filtering, Band Ratio Image Classification,Supervised And Unsupervised Classification. Remote Sensing Applications in Forestry, Geology, Hydrogeology, Land use and Land Cover Mapping. **UNIT III** Fundamentals of GIS: Basic Concepts including Definition and History of GIS, Essential Elements ofGIS, Uses and Users of GIS, General GIS Applications, Advantages of GIS. Geodesy, Grids, Datum'sand Projection Systems, GIS Data Formats, GIS Layers Digitization. Overview of GPS and its Applications. Hardware and Software related to GIS. **UNIT IV** Raster and Vector Based GIS: Raster based GIS, Definition and Concept of Raster Based GIS, Spatial Referencing, Definition and Representation of Raster Data. Vector based GIS, Definition and Concept of Vector Based GIS, Data Structures, Data Capture and				

	Basic Operations of Spatial Analysis, Advantages and Disadvantages in Raster and Vector Based GIS, Introduction to Networks in GIS. GIS-Project Planning, Management and Implementation. **UNIT V** Application of computers in mining; computer application in mine planning, mine surveying, mine exploration, strata control etc.
Course Outcome	**At the end of the course student will be able to:-** 1. Apply knowledge of mine planning for understanding, formulating and solving mine planning &scheduling problems. 2. Identify, analyze and solve mining problems. 3. Acquire knowledge and hands-on competence in applying the concepts in the development of mine planning
Text Books	1.Digital Image Processing - R.C. Gonzalez & R.E. Woods Pearson Edu. Asia 2.Principles of Geographical Information Systems- P.A. Burrough& R.A. McDonnell Oxford
Reference Books	1.Remote Sensing of The Environment - J.R. 2.ensen Pearson EducationDictionary of 3.Remote Sensing - S. M. Rashid

Course Title	**SAFETY ENGINEERING**				
Course Code	**BENMN805A**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Applied geology				
Course objectives	• Mining Engineering is the application of the knowledge of science and other branches of engineering for the extraction of minerals and ores from the surface of the earth or from the underground. • Geology becomes the first step of mining education. • It is essential to know and identify mineral and ore, their modes of occurrences in the earth crust and the formation and deposition of various rocks.				
Course Contents	**UNIT I** **Safety philosophy and principles of accident prevention** Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries. Theories & principle of accidents casualty, cost of accident, computation ofcost, utility of cost data. Accident reporting & Investigation, Identification of the key facts, corrective actions, classification of facts.Regulation- American (OSHA) and Indian Regulation. **UNIT II** **Safety Management** Division of responsibility, location of Safety function, size of safety department, qualification, for safetyspecialist, safety committee – structure and functions. **UNIT III** **Safe working condition and their development** Standard Operating Procedure (SOP) for various mechanical equipments, incidental safety devices andmethods, statutory of provisions related to safeguarding of Machinery and working condition **UNIT IV** **Safety in Operation and Maintenance** Operational activities and hazards, starting and shut down procedures, safe operation of pumps, compressor, heaters, reactors, work permit system, entry into continued spaces. **UNIT V** **Safety in Storage and Emergency Planning** Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories,emergency preparedness on site plan, off site plan, toxic hazard control.				

Course Outcome	**At the end of the course student will be able to:-** 4. Apply knowledge of planning for understanding, formulating and solving safety planning &scheduling problems. 5. Identify, analyze and solve industrial problems. 6. Acquire knowledge and hands-on competence in applying the concepts in the development of industrial safety planning
Text Books	1.Safety Management : Strategy And Practice -Pybus R - Butterworth Heinmann, Oxford 2.Safety and Accident Prevention in Chemical Operation – H.H. Faweett and Wood
Reference Books	1.Industrial Safety Management- Trafdar N K, Tarafdar K J – Dhapat Rai, New Delhi 2.Safety Management In Industry- Krishna, N V- Jaico Publication House; New Delhi 3.Industrial Safety And Pollution Control Hand Book - Nagraj, J N & Rameshchandar, R V

<table>
<tr><td>Course Title</td><td colspan="5">MINE SURVEYING-III LAB</td></tr>
<tr><td>Course Code</td><td colspan="5">BENMN801P</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>-</td><td>-</td><td>4</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Knowledge about various survey needed for any type of construction.</td></tr>
<tr><td>Course objectives</td><td colspan="5">This course will enable students to:
• Discuss the triangulation survey for measurements.
• Explain the astronomical surveying .
• Discuss the photographic surveying.
• Brief discussion on types of leveling instruments, temporary and temporary adjustment of leveling instruments, trigonometric leveling, reciprocal leveling.</td></tr>
<tr><td>Course Contents</td><td colspan="5">LIST OF EXPERIMENT
1. Baseline measurement
2. Baseline extension
3. To connect the baseline to main triangulation network
4. Reduction to centre
5. Angle adjustments in triangulation network
6. Plotting the survey by co-ordinate methods
7. Correlation survey by Weisbach triangle method
8. Study of EDM
9. Study of Total station
10. Handling of surveying software.</td></tr>
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Course Title	**POLLUTION CONTROL ENGINEERING- LAB**				
Course Code	**BENMN802P**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**4**	**2**	
Prerequisites	Mine environment-I lab				
Course objectives	**This course will enable students to:** • Learn the sampling of dust and physiological effect of the dust to the miner. • Learn about the various miner occupational diseases and is preventive measures • Prepare the enquiry report of a mine accident. • Know the major accident occurred in Indian mines and their causes.				
Course Contents	**LIST OF EXPERIMENTS** 1. Study of various deasese due to water pollution in underground mine. 2. Study of erection of Polish type stone dust barriers 3. Study of methods of land reclamation in opencast mine. 4. Study of different types of nose pollution in underground mine. 5. Study of land failure in opencast mine. 6. Study of working of foam extinguishers. 7. Study of erection of German type stone dust barriers 8. Study of principal and working of Aero lox Liquid oxygen apparatus. 9. Study of principal and working of LHD. 10.Study of various types of water pollution in U/G mines				

<table>
<tr><td>Course Title</td><td colspan="5">STRATA CONTROL -LAB</td></tr>
<tr><td>Course Code</td><td colspan="5">BENMN803P</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>-</td><td>-</td><td>4</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Knowledge about various survey needed for any type of construction.</td></tr>
<tr><td>Course objectives</td><td colspan="5">This course will enable students to:
Discuss the chain survey for linear measurements
Explain the compass survey
Discuss the plane table surveying and Miner’s Dial
Brief discussion on types of leveling instruments, temporary and temporary adjustment of leveling instruments, trigonometric leveling, reciprocal leveling.</td></tr>
<tr><td>Course Contents</td><td colspan="5">LIST OF EXPERIMENT
1Study of Conventional support systems.
2Study of constructional features and working of Friction props
3.Study of constructional features and working of hydraulic props
4.Study of methods to support roof by roof bolts, roof stiching and cable bolts
5.Study of withdrawal of supports by Sylvester prop withdrawer
6.Study of methods to support junctions and faulted area
7.Study of constructional features and working of powered supports
8.Study of Hydraulic stowing System and the arrangement required for it
9.Study of pneumatic stowing System and the arrangement required for it
10.Study of Subsidence measurement techniques.</td></tr>
</table>

Course Title	**MAJOR PROJECT**				
Course Code	**BENMN807P**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**2**	**1**	
Prerequisites	Project				
Course objectives	• Identify different works to be carried out in the project. • Collect data relevant to the project. • Arrive at efficient method from the available choices based on preliminary investigation. • Design the required elements of the project as per standard practices. • Prepare working drawing for the project. • Prepare schedule of time and sequence of operations. • Prepare charts or models for each project. • Prepare project report.				
Course Contents	**The students should follow the following procedures:-** 1. Identification of the Project. 2. Collection of data. 3. Organisation of the data. 4. Design of Project elements. 5. Preparation of drawings. 6. Schedules and sequence of operations. 7. Preparation of charts and models. 8. Preparation of report**.** . Students shall be divided into several groups and each group shall be assigned a problem that calls for application of the knowledge. Project work will be allotted by the concerned Head of Section and assign a staff member as guide at the beginning of VI semester. The students are exposed to the U/G workings or Industries for collecting information or relevant data from respective areas during the entire VI semester, to collect information after the institutional working hours or during holidays – second Saturdays / Sundays/ Winter/ holidays and prepares project report under the supervision of guide. Project report will be assessed at the end of VI Semester for final examination. Project may be selected from among the following suggested topics – 1. Study of Methane Detector Device.				

	2. Optimization of Blasting With Steel Plant. 3. Study of Roll Crusher. 4. Study of Multi Purpose Camp Lamp. 5. Study Of Acid Mine Drainage Generation and its Control and Treatment by Saps. 6. Study of Hydraulic Mining Method. 7. To Reduce Fog in O/C Mines. 8. Study of Slop Stability in surface Mining. 9. Study of Inundation risk Measurement Device. 10. Study of Water Jet Technology for Extraction of Coal. 11. Study of Impact of Mine Dust in Surrounding. 12. Study of Aerial Ropeway. 13. Study of Coal Handling Plant. 14.Study of Remote Control Shovel.