GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

TEACHING SCHEME (w. e. f. Jan' 12)

Semester - VI

Sr. No.	SUB. CODE	SUBJECT	TEACHING SCHEME (HOURS)			CREDITS
			THEORY	TUTORIAL	PRACTICAL	
1	**2362201**	Mine Surveying - II	3	0	4	7
2	**2362202**	Mine Management Safety & Legislation	3	0	0	3
3	**2362203**	Project - II	0	0	12	12
4	**2362204**	Under Ground Mining of Coal	3	0	2	5
5	**2362205**	Under Ground Matalifferous Mining	3	0	2	5
		TOTAL	**12**	**0**	**20**	**32**

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DIPLOMA IN MINING ENGINEERING

Semester: VI

Subject Name: Mine Surveying -II
Subject Code: 2362201

Sr. No.	Subject Content	Total Hrs.
1.	**Triangulation:** 1.1 Introduction-principle-purpose, classification triangulation system- Reconnaissance selection of stations-station map signals well conditioned triangles - base of verification- base of expansions. Forms triangulation - Simple chain triangulation - Double triangles - Theodolites used for triangulation - Base line measurements - corrections, problems based on corrections.	8
2.	**Tachometric Survey:** 2.1 Principles of Tacheomatry - Difference between Theodolite and Tachometer. Tachometer - construction stadia rod - common method of Tacheomatry - stadia method Tangential method, angular Tacheomatry - Tacheometric constants. Numerical problems. Based on various methods - Field work Method of booking - Errors and precision, Auto reduction tachometer - calculations of volume, mineral stock pile - (by taping profile & Techeomatric survey)	8
3.	**Setting Out :** 3.1 Setting out a point of known rectangular coordinates, points for foundation, shaft surveys, selection and fixing of underground stations, difficulties in underground curve laying, Introduction to U/g curves, numerical examples. 3.2 Giving and maintaining direction and gradient for inclined shafts, slopes, levels and tunnels, maintaining alignment. 3.3 Auxiliary Telescope-Top and side telescope surveying for open pits.	6
4.	**Underground Survey:** 4.1 Introduction, purpose, advantages of correlation surveys. 4.2 Description of methods used in correlation survey 4.3 Underground traversing and setting of new road ways 4.4 Stope surveying- purpose and advantages 4.5 Classification of stope surveying-Methods and instruments used	8

5.	**Astronomy Basic :** 5.1 Terms and definitions 5.2 Determination of true meridian 5.3 Latitude and longitude.	**8**
6.	**Miscellaneous:-** 6.1 Map projection system 6.2 Correlation of mine survey to the National Grid 6.3 Gyrotheodolite 6.4 Principle photogrammetion and it's application in Mining 6.5 The role of the mine surveyor and his legal responsibilities 6.6 The provision and maintenance of statutory mine plans 6.7 Maintenance of survey instruments.	**4**
	Total	**42**

Note: Following are the minimum experiences required, but the college can do more experiences if possible.

Laboratory Experiences:

1. Tacheometric contouring-Sheet I
2. Tangential method & Techeometry-Practice.
3. Setting out of simple circular curves.(a) By linear method
4. Triangulation survey practice.
5. Setting out correlation method of survey by Co-planning method.
6. Setting out correlation method of survey by Wiess batch triangle method.
7. Setting out correlation method of survey by Wiess Quadrilateral method.
8. Study of Gyrotheodolite method.

References Books:

1. Surveying (Vol-II & III) Kanetakar
2. Mine surveying Agor
3. Surveying Ponamiya
4. U.M.S.
5. Mine surveying(Vol-II & III) S . Ghatak

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

Semester: VI

Subject Name: Mine Management Safety and Legislation
Subject Code: 2362202

Sr. No.	Subject Content	Total Hrs.
1.	**Management** 1.1 Basic concepts of Management and functions of Management, brief discussions on planning, organising, co-ordinating, Motivating, Directing, & Controlling. 1.2 Scientific management - main principles-advantages. 1.3 Personal Management - brief concept. 1.4 Management by objectives-meaning of the term-essentials for success of MBO-advantages of MBO. 1.5 Work study-meaning of the term-Time & motion study-basic concepts-procedure -advantages. 1.6 Wages-Definition essentials of a good wage system, Meaning of the, terms:- Nominal wages, real wages, living Wage minimum wages, fair wages, fall back wages, etc – different method of wage payments, merits and Demerits of each system,wage boards - Meaning of the term, lead- lift, Tub pushing etc. 1.7 Incentives-basic concepts. 1.8 Inventory - basic concepts - merits & demerits. 1.9 Trade Unions & their functions.	8
2.	**General Legislation:** 2.1 Main provisions of Industrial Disputes Act'56 2.2 Workmen's compensation Act '23 2.3 Payment of Wages Act '36 2.4 Minimum Wages Act ' 48	3
3.	**Mine Legislation:** 3.1 Concession: Mineral Concession Rule 1960, Minor Mineral Concession Rules. 3.2 Conservation & Development: Mineral Conservation and Development Act 1957, Mineral Conservation and Development Rules 1988,Forest Conservation Act 1980. 3.3 Safety and Welfare: Main Provisions of Mine Act 1952, Provision of Regulation of Coal Mines and Metalliferrous Mines Regulations-on methods of working, roof support, explosive, ventilation, shafts & outlets, plans / sections & machinery, Mines Rules Relating to Firstaid, Sanitation, Drinking water.	23

	Main provision of Mines Creches Rules 1966, Mines Vocational Training Rules 1966, Electricity Rules 1956 as applicable to mines. Indian Explosive Act 1884 and Rules 1983,Oil Mining Regulation (OMR).	
4.	**Accident, Health And Safety:** 4.1 Classification and analysis of accidents in mines,their causes and remedial measures and cost of accidents.Importance of mine safety and good house-keeping, safety publicity, selection of important places for display of posters. Occupational diseases, their causes and preventive measures. Pit safety committee.	**8**
	Total	**42**

References Books:

1. Industrial Management — O.P.Khanna
2. Mine Management — V.N.Singh
3. Mine Legislation — Rakesh & Prasad
4. Mine Act, Rules, Regulations. — M.C.R.1960, M.C.V.R.1988,F.C.A. 1980, I.E.R.1956, I.E.A.1884, I.E.R.1983, O.M.R.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

Semester: VI

Subject Name: Project -II
Subject Code: 2362203

Sr. No.	Subject Content
1.	Problems related to mine planning will be given during the course work at the start of the term, students will be sent to various mining organizations to collect the data & specifications of machineries From the mine. Some models/charts related to methods of working, Operation of machineries shall also be prepared at institutional level. The students will submit the report. One week will be given for report preparation. The report will be prepared on hard and soft copies. A power point presentation of report should be done during seminar. Technical and new subject should be considered for the projects. Each group of students should be given two to three choices to select the project topic of their interest. Proper guideline and input should be given by the project guide.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

Semester: VI

Subject Name: Under Ground Mining Of Coal
Subject Code: 2362204

Sr. No.	Subject Content	Total Hrs.
1.	**Characteristics Of Indian Coal And Coal Measures Rocks:** 1.1 Mining conditions in INDIAN coal fields. Raniganj, Bihar, Orissa,M.P. ,A.P Assam etc. 1.2 Methods of Mining with their merits & demerits. 1.3 Board & pillar single & multisection. 1.4 Longwall advancing & retreating. 1.5 Horizon Mining.	3
2.	**Board & Pillar Methods:** 2.1 Size of pillars, shape of pillars, square, rectangular etc. 2.2 Width of heading, height of headings.	5
3.	**Development Work:** 3.1 Layouts : Panel systems , advantages, size of panel. 3.2 Methods of driving Roadways' galleries, manual, mechanical with use of explosives, mechanical-without use of explo sives. 3.3 Use of explosive in underground coal production with safety precautions & statutory restrictions. 3.4 Ventilation of mine working procedure in gassy mines. 3.5 Coal & Material Transport.	9
4.	**Depillaring /Final Extraction of Coal.:** 4.1 Seams in Board & pillar: Extraction Methods, subsidence, systematic control of subsidence and strata during pillar extraction. 4.2 Strata control Measures : by stowing Methods in single & multiple sections. 4.3 Local falls, premature collapse/ subsidence, Air Blasts on account of subsidence.	9
5.	**Longwall Method:** 5.1 **Types of longwall :** Methods Advancing longwall - Merits & demerits, Retreating longwall, Merits & demerits. 5.2 **Longwall layouts:** Length of face directions, face size, panel size, width,	9

	height of roadways, actual driving of roadways. 5.3 **Panel formation –** various road ways driving mechanized methods with or without use of explosives. 5.4 Longwall extractions traction cyclic & continuous Methods Mechanised Methods of extraction by coal ploughs, shearers etc. pan or snaking chain conveyors etc. 5.5 Ventilation of long wall faces. - Dust control. 5.6 Coal transportation of longwall productions. 5.7 Face support on longwall faces in advancing/retreating faces.	
6.	**Stowing Organisation:** 6.1 Different types of stowing (names only) Hydraulics and showing, advantages & limitation, factors influencing adaption of stowing. 6.1.1 Stowing Organisation: Sand gathering/ mining operation of river bed end. Methods manual, shovel, pontoon, pumping of sand slurry. 6.2 Transportation of sand. 6.2.1 Manual loading of tubs/trucks/dumpers 6.2.2 Shovel loading of dumpers. 6.2.3 Pile haulages. 6.2.4 Railways. 6.2.5 Aerial ropeways. 6.2.6 Belt conveyors. 6.3 Surface sand bunkers. 6.4 Surface sand stowing operation. Mixing chambers, various devices for efficient hydraulic conveyance of sand, Layout of stowing pipes in shafts & roadways up to stowing faces. 6.5 Actual underground stowing operation. 6.6 Rates of stowing in tones/hours, pipe jamming, pipe-wears, Maintenance of stowing installation. 6.7 Safety aspect of stowing.	**7**
	Total	**42**

Note: Following are the minimum experiences required, but the college can do more experiences if possible.

Laboratory Experiences:

1. Study & Layout of a board & pillar Method of working.
2. Determination of size of panel in board and pillar method.
3. Study & layout of longwall Method of working.
4. Determination of size of panel in longwall method of mining.
5. Determine H.F.L.& gradient line for stowing practice in u/g mines.
6. Study of Stowing Organisation system used in mines.

7. Determination of Percentage extraction of cool in a development area.
8. Layout of hydraulic Mining.

Visits Of U/G Coal Mining Field Should Be Arranged.

References Books:

1. Elements of mining D.J.Deshmukh
2. U.M.S.
3. Advanced coal Mining B.Singh.
4. Advance coal Mining Tech. Samir Kumar Das.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN MINING ENGINEERING

Semester: VI

Subject Name: Under Ground Metalifferous Mining
Subject Code: 2362205

Sr. No.	Subject Content	Hrs.
1.	**Introduction to Metaliferrous Mine Working:** 1.1 Scope & limitations of underground mining. 1.2 Choice of mode of Entries of underground deposits Adits, Shafts, inclines, combined modes & their applicability number & disposition. 1.3 Choice of level interval / back length, shaft station & pocket orebins, waste bins etc.	10
2.	**Mine Development**: 2.1 Driving of raises & winzes. 2.1.1 Alimake raise climber in cycle of operation. 2.1.2 Drop raising using large diameter drill holes. 2.1.3 Raise borers. 2.1.4 Winzes and pit bottom station method of slope preparation. 2.1.5 Open raising method. 2.1.6 Compartment method of raising. 2.2 Drivage of compainion level, cross-cut, drift their size shape and position.	15
3.	**Method of Working:** 3.1 Selection of stopping methods. 3.2 Classification of stopping methods. 3.3 Various methods of stopping. 3.3.1 Underhand, overhand method. 3.3.2 Breast stopping method 3.3.3 Shrinkage stopping method 3.3.4 Cut and fill stopping methods 3.3.5 Block caving method 3.3.6 Vertical creater method 3.3.7 Square set stopping method 3.3.8 Sub level stopping method	17
	Total	42

Note: Following are the minimum experiences required, but the college can do more experiences if possible.

Laboratory Experiences:

1. Study of Raise drivage methods.
   (a) Compartment Method.
   (b) Alimake Raise Climber.
2. Study of development of Metalliferous ore deposits.
3. Study of various Storing Methods.
   (a) Brest storing method.
   (b) Under Hand & Over Hand storing method.
   (c) sub-level Storing Method.
   (d) Shrinkage Storing Method.
   (e) Block Caving Method.
   (f) Square-set-Timbering Method.

VISIT OF U/G METALLIFEROUS MINING FIELD SHOULD BE ARRANGED

References Books:

1. Elements of mining (Vol-3) D.J.Deshmukh
2. U.S.M.
3. Metalliferous mining methods Y.P.Checharkar
4. Introduction to Mining Hartman
5. Surface Mining G.B.Mishra