

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BRANCH NAME: Mining Engineering**  
**SUBJECT NAME: Economic Geology - I**  
**SUBJECT CODE: 2162201**  
**B.E. 6<sup>th</sup> SEMESTER**

**Type of course: Mining Engineering**

**Rationale:** The degree pass outs have to plan, carryout mining of rocks, ores, minerals, etc. economically, which involves knowledge and skills of nature and quantum of such deposits based on proper studies and assessment. This course empowers students with such necessary knowledge and skills of geological deposits, their occurrence and its estimation for economical mining.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
3	0	2	5		70	20	10	20		10

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Introduction:</b> Brief history and uses of minerals and development of Economic Geology. Minerals and their economic classification. Rock forming and economic minerals. Metallic & non-metallic minerals and mineral fuels (Petroleum, Coal and Nuclear minerals). Ore and gangue minerals. Importance of minerals in national economy.	8	20 %
2	Classification of economic minerals deposit forming processes. Economic minerals deposit forming processes of Igneous association and Magmatic concentration: early and late magmatic concentration processes. Economic deposits associated with acidic, basic and ultrabasic rocks.	8	20 %
3	<b>Pegmatite:</b> As a rock and economic deposit forming process, Simple and complex pegmatite, Indian Pegmatite belts.	4	10 %

4	<b>Contract Metasomatism:</b> Skarns as a process of formation of economic deposit. Role of intrusive and invaded rocks.	6	15 %
	Characteristics of the deposits. Metamorphism as ore forming process.		
5	<b>Hydrothermal:</b> Process and deposits. Origin and nature of hydrothermal solutions. Wall rock alteration. Crustification and comb structures, cavity filling and metasomatic replacement type deposits. Hypo-, meso-, epi-, tele-, and Xenothermal deposits.	6	15 %
6	Volcanogenic Process and deposits; Characteristics, mode of occurrence and genesis of important Indian deposits of the following metallic deposits- golds, copper, lead & zinc, chromium and tungsten.	4	10 %
7	Mode of occurrence, genesis, and economic uses of Industrial minerals with special reference to following industries, Refractory, Abrasive, Glass and ceramic, fertilizer, cement, paint and pigment, and Gem stones.	6	10 %

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
68 %	22 %	6 %	2 %	1 %	1 %

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Reference Books:**

S. No.	Title of Books	Author	Publication
1.	General & Engineering Geology	Parbin Singh	SK Kataria & Sons
2.	Engineering Geology	K. M. Banger	Standard Publications, New Delhi
3.	Engineering Geology	R. S. Khurmi	Dhanpat Rai & Co. (P) Ltd.

4.	Rutley elements of Mineralogy	H. H. Read	Thomas Murby & Co. London
5.	Principle of Petrology	Tyrell	Chapman and Hall Publication
6.	Physical Geology	Dutta	Macmillan Publishers Ind. Ltd.
7.	Textbook of Geology	G.B.Mahapatra	CBS Publishers And Distributors
8.	Igneous & Metamorphic rocks	Berry \ Mason	Hoffman Laboratory, Harvard University, Cambridge,
9.	Structural Geology	M. P. Billings	Prentice-Hall Publication
10.	Economic Geology	Sen Ghua	

**Course Outcome:**

After learning the course the students should be able to:

- i. Explain rock formation and their distribution
- ii. Explain different geological deposits.
- iii. Describe occurrence of various geological deposits.
- iv. Describe the importance and property of various types of rock formation

**Major Equipment:**

- i. Geological models.
- ii. Various types of rocks specimen.
- iii. Brunton compass and clinometers.
- iv. Various types of structural models showing dip, strike, fault, fold etc.

**List of Open Source Software/learning website:**

- i. <http://en.wikipedia.org/wiki/Geology>
- ii. <http://geology.about.com/>
- iii. <http://geology.com/>
- iv. [www.youtube.com](http://www.youtube.com)
- v. [www.nptel.com](http://www.nptel.com)

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.