

**Mafatlal Gagalbhai Science Institute (Autonomous)  
(M. G. Science Institute), Ahmedabad  
Accredited “A” level by NAAC (3<sup>rd</sup> Cycle)**

**Managed by The Ahmedabad Education Society**

**Affiliated to  
Gujarat University  
(Recognized by University Grants Commission)**

**SYLLABUS  
(Outcome Based Education Pattern)  
For 3 years B. Sc. / 4 years B. Sc. (Honours) programme  
For**

**B. Sc. SEMESTER - III & IV  
Based on  
National Education Policy (NEP) 2020**

**For Graduate Degree in**

**GEOLOGY  
(Earth Sciences)  
(In force from June 2025)**

**Submitted by  
Geology Department  
M. G. Science Institute  
Navrangpura  
Ahmedabad – 380 009**

## **PROGRAM SPECIFIC OUTCOMES (PSOs)**

On completion of the course, the learner will be able to

### **PSO 1: Academic skills:**

- (i) Comprehend various branches of Mineralogy in detail such as optical mineralogy and crystallography. Grasp the knowledge of petrology, economic geology, physical geology, global tectonics and hydrogeology.
- (ii) Demonstrate the fundamental knowledge of the stratigraphy, paleontology, structural geology, geomorphology and dynamics of the earth.

### **PSO 2: Laboratory skills:**

Identification of minerals and rocks at megascopic and microscopic level. Study of crystal models with reference to forms. Modes of preservation of fossils and basic exercises of structural geology included.

### **PSO 3: Personal skills:**

Express the basic concepts of the most important branches of the subject. Communication skills developed through the participation in various programme related to the subject as well as during the data collection in the fieldwork.

### **PSO 4: Social skills:**

Social relevance of earth systems and processes related to other subjects.

**GUJARAT UNIVERSITY**  
**Design and Structure of Geology (Earth Sciences) UG Courses**

Course Type/ Department	Sem ester	Course		Credit	Work Hours/ Week
		No.	Name		
Geology Skill Enhancement Course (GESEC)	III	GESEC 236	Physical Geology	1	1
		GESEC 236 P	Physical Geology Laboratory	1	2
	IV	GESEC 246	Engineering Geology	1	1
		GESEC 246 P	Hydrogeology Laboratory	1	2

**COURSE OUTCOMES:**

On completion of the course, students should be able to

**CO 1:** Understand the mother earth very well with reference to various processes operated within and on the surface of the earth.

**CO 2:** Analyze the concept of engineering geology and hydrogeology.

**CO 3:** Practically they will be able to apply the plotting techniques on maps and geological time scale.

**CO 4:** Apply the hydrological properties of rocks like porosity, permeability, and specific yield along with watershed management.

**B. Sc. Semester III**  
**GEOLOGY - THEORY and PRACTICALS**  
**Course-wise detail syllabus**

**GESEC 236**

**Physical Geology**

Unit	Course details
Unit –1	Geochemical evolution of the earth. Coral reefs. Mountain building process. Age of the earth. Glaciation. Glacio-eustasy.

**Reference Books:**

- 1) Introduction to Physical Geology, A. K. Datta, Kalyani Publisher, New Delhi.
- 2) A Text Book of Geology, P. K. Mukerjee, World press.
- 3) A Text Book of Geology with Special Reference to India, G. B. Mahapatra.
- 4) General Geology, V. Radhakrishnan (1987), V.V.P. Publishers, Tuticorin.
- 5) Principles Physical Geology, Arthur Holmes (1978), ELBS.
- 6) Engineering and General Geology, Parbin Singh (1994), S.K. Kataria and Sons, Delhi.

**GESEC 236 P**

**Physical Geology Laboratory**

Course details
Plotting of Coral reefs, Tectonic mountains and Glaciers on the maps. Geological Time scale.

**B. Sc. Semester IV**  
**GEOLOGY - THEORY and PRACTICALS**  
**Course-wise detail syllabus**

**GESEC 246**

**Engineering Geology**

<b>Unit</b>	<b>Course details</b>
<b>Unit –1</b>	Geology in relation to engineering. Properties of rocks to be used as building stones. Important building stones of India. Foundations. Geology of Reservoirs and Damsites.

**Reference Books:**

- 1) Engineering and General Geology, Parbin Singh (1994), S.K. Kataria and Sons, Delhi.
- 2) Geology in Engineering, J. R. Schultz and A. B. Cleaves (1955), John Willey.
- 3) Hydrogeology, K. R. Karanth (1989), Tata Mc Graw Hill.
- 4) Groundwater Assessment – Development and Management, K. R. Karanth (1987), Tata Mc Graw Hill.
- 5) Hydrogeology, Stanley N. Davis and J. M. Dewiest Roger (1966), John Willey & Sons, Inc.
- 6) Ground Water, H. M. Raghunath (1987), Willey Eastern Ltd.
- 7) Water, V. Subramaniam (2000), Kingston Publishers. London.
- 8) Evaluation and Groundwater, Gautam Mahajan (1989), Ashish Publishing House.
- 9) Groundwater Hydrology, D. K. Todd (1980), John Wiley.
- 10) Ground Water, C. E. Tallman (1937), Mc Graw Hill.

**GESEC 246 P**

**Hydrogeology Laboratory**

<b>Course details</b>
Hydrological properties of rocks - porosity, permeability, specific yield. Classification of aquifers. Darcy's law and its validity. Concept of watershed management. Elementary knowledge of use of Aerial photographs and remote sensing techniques in hydrogeology.