



Syllabus for BSc IInd Semester Courses in Geology (November 2019 onwards)

Contents:

- Theory Syllabus for Courses:
 - SGEO0201-Introduction to Petrology, Geotectonics and Economic Geology.
 - SGEO0202-Introduction to Physical Geology, Principles of Stratigraphy and Paleontology.
- Practical Course Syllabus for: SGEO02PR.
- Evaluation and Assessment guidelines.

F.Y. B.Sc. Geology

Course: SGEO0201

Title: Introduction to Petrology, Geotectonics and Economic Geology

Learning Objectives: As a part of the four formative courses which introduce the learner to the basics of geology, this module incorporates the necessary topics to appreciate and understand the processes which lead to the formation of various rock types and mineral deposits along with their relationship to tectonism. A brief understanding of the methods of exploration and exploitation of earth's natural resources is also discussed.

Number of lectures: 45

Unit 1

(15 lectures)

• **Igneous Petrology**

Rocks: definition, their classification.

Magma: definition, composition, origin, Bowen's Reaction Series, magmatic differentiation and assimilation.

Mode of occurrences, Intrusive and Extrusive forms.

Textures and structures.

Classification based on grain size and mineral composition.

Metamorphic Petrology

Metamorphism: definition, agents and types of metamorphism.

Metamorphic minerals: stress and anti-stress minerals, textures and structures.

Metamorphic facies and isograds, Relationship between metamorphism and deformation.

Rock cycle.

Unit 2

(15 lectures)

• **Sedimentary Petrology**

Sediments: weathering, transport, deposition, consolidation, diagenesis.

Textures and structures.

Classification: Terrigenous and Chemical sedimentary rocks.

Mineral Deposits

Classification and brief study of following mineral deposits: Hydrothermal, Magmatic, Sedimentary (evaporites, strata-bound, bedded iron formations), Placer, Residual.

Unit 3

(15 lectures)

• **Introduction to Mineral Exploration and Mining:**

Methods of mineral exploration: Surface methods – grid sampling. Sub-surface methods – Seismic, Electrical, Magnetic and Electrical.

Basic ideas about the methods of mining.

• **Geotectonics:**

Earthquakes: causes, effects, tsunamis, measurement of earthquakes, seismic belts, seismic zonation in India.

Volcanoes: types, causes and distribution.

Origin of Mountains, Oceans and Continents.

General relief features of the ocean floor.

List Of Recommended Reference Books

1. Ehlers, E.G. and H. Blatt (1982), Petrology, Igneous, Sedimentary and Metamorphic, W.H Freeman, San Francisco
2. Tyrell G.W. (1980), Principles of Petrology: An Introduction to the Science of Rocks., 1st Indian Edn., B.I. Publ. India.
3. Ramam P.K. (1989), Principles and Practices of Mineral Exploration., Publ. Geol. Soc. Ind.
4. Arogyaswami R.N.P. (1973), Courses in Mining Geology., Oxford & IBH
5. Agoskhov M., Borisov S., Layansky V. (1888), Mining of Ores and Non-metallic Minerals., Mir Publishers

Practicals

- I. Identification of group characteristics of 25 common rocks and their classification into major rock groups. Identification and systematic description of the megascopic features of these rocks.
- II. Identification and description of the physical properties, composition, occurrences of 10 commonly occurring economic ore minerals.

F.Y. B.Sc. Geology

Course: SGEO0202

Title:

Introduction to Physical Geology, Principles of Stratigraphy and Paleontology

Learning Objectives:

As the fourth module in the introductory courses in geology, the learner is exposed to the now accepted modern day concept of plate tectonics, which also explains the various surface features on our planet. The learner develops an understanding about the various surface phenomenon that lead to the development of soil and the breakdown of landforms. The last unit in this module introduces the learner to the basics of stratigraphy, whereby the concept of age related geological activities which shaped our planet are explained. Also explained is the basis of formation of fossils.

Number of lectures: 45

Unit 1 Introduction to Plate Tectonics and Physical Geology (15 Lectures)

Theory of Plate Tectonics and its proofs.

Introduction to Weathering and Erosion; Exogenic and endogenic geomorphic processes; Evolution of landscape.

Soil: definition, formation and functions; soil profile.

Unit 2 Landforms (15 Lectures)

Wind: erosion, transport and deposition; Aeolian landforms.

Rivers: development of a typical river system; erosion, transportation and deposition; Fluvial landforms

Glaciers: types, formation and morphology; erosion, transport and deposition; Glacial landforms.

Oceans: marine erosion and deposition; Coastal landforms.

Unit 3 Introduction to Principles of Stratigraphy and Paleontology (15 Lectures)

Definition of stratigraphy. Nature of stratigraphic records.

Principles of Stratigraphy- superposition, initial horizontality, lateral continuity, floral and faunal succession, cross-cutting relationship, and uniformitarianism. Types of stratigraphic classification in brief.

Concept of time in geology. Geological time scale. Major events of mass extinction.

Unconformities- types, formation and applications.

Introduction to paleontology. Fossils- definition, types of fossils, modes of preservation.

Collection of fossils. Introduction to common fossils. Applications of fossils in geology.

List Of Recommended Reference Books

1. Benton M.J. and Harper D.A.T. (2009), Introduction to Paleobiology and Fossil Record, Wiley-Blackwell Publication.
2. Ray Anis. K, (2008), Fossils in Earth Sciences, Prentice Hall of India
3. Butz S. (2007) Science of Earth Systems., (2nd Edition), Thomas Delmar.
4. Dasgupta, A.,(2005), Introduction to Palaeontology, (1st Edition), World Press
5. Skinner B.J., Porter S.C. and Botkin D.B. (1999), The Blue Planet., (2nd Edition) J. Wiley & Sons.

6. Nicols G. (2009). Sedimentology and stratigraphy. (2nd Edition) J. Wiley & Sons.
7. Holmes A. (1993), Principles of Physical Geology., ed by David Duff, Nelson Thornes Ltd
8. Emiliani C. (1992), Planet Earth: cosmology, geology and evolution of life and environment, Cambridge University Press.
9. Weller J.M. (1960), Stratigraphic Principles and Practice, Harper.

Practicals

1. Worksheets for the study of various landforms
2. Study of 3D models of the various landforms formed due to the geomorphic processes.
3. Chronostratigraphy of events of deposition for given geological cross section.
4. Introduction to standard symbols used to construct lithologs
5. Preparation and Correlation of the lithologs, and their interpretations.
6. Mode of preservation of fossils

Evaluation and Assessment: SGEO0201 and 202 courses

Evaluation (Theory): Total marks per course - 100.

Continuous Internal Assessment (CIA) - 40 marks

CIA 1: Written test -20 marks

CIA 2: One day Geological Field work around Mumbai with field report and viva on the fieldwork. -20 marks

End Semester Examination – 60 marks

One question from each unit for 20 marks, with internal choice. Total marks per question with choice -28 to 30.

Evaluation of SGEO02PR (Practicals) Total marks - 100.

Template for SGEO courses End Semester examination in Semester 1

UNITS	KNOWLEDGE	UNDERSTANDING	APPLICATION and ANALYSES	TOTAL MARKS-Per unit
1	10	06	04	20
2	10	06	04	20
3	10	06	04	20
-TOTAL - Per objective	30	18	12	60
% WEIGHTAGE	50	30	20	100%

St. Xavier's College, Mumbai
SGEO0201/202

Course:

Department of Geology

Roll Number: _____

UID Number: _____

MARKS: ____/20

Date: _____

Assessment Grid for Course: SGEO0201/202 CIA 2 (Field Work)

Parameters Category	Details of Assessment	80 – 100 % Excellent	60 – 80 % Good	40 – 60 % Satisfactory	20 – 40 % Poor	0 - 20 % Very Poor
Field Work (30 %)	1. Equipment – field diary, hammer, chisel, hand lens, map, Field discipline.(02)					
	2. Sample Collection and Instrument handling (01)					
	3. Prior Preparation (03)					
Field Report (60 %)	1. Field Diary (04)					
	2. Content, Presentation and Technical correctness (08)					
Viva Voce (10 %)	1. Ability to answer questions. (02)					
Total Marks/20						

Name, Signature of Course Instructor

Date: