



**SKE SOCIETY'S
GOVINDRAM SEKSARIA SCIENCE COLLEGE
BELAGAVI
(AUTONOMOUS)**

THE COURSE STRUCTURE & SYLLABUS OF UNDER GRADUATE

BACHELOR OF SCIENCE

GEOLOGY

3rd AND 4th Semesters

w.e.f.

Academic Year 2025-26 and Onwards

Submitted by
Chairman,
Board of Studies,
Bachelor of Science
(Geology)

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE, BELAGAVI
(AUTONOMOUS)**

Accredited with 'A' Grade by NAAC in 4th Cycle

FACULTY OF SCIENCE: DEPARTMENT OF GEOLOGY

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1. Board of Studies: Geology (UG)

Sl. No	Name and Designation	Position
01	Prof. Suraj Mense Head & Lecturer, Department of Geology, GSS College, Belagavi, Karnataka	Chairperson
02	Dr. Raju Sukhaye Lecturer, Department of Geology, GSS College, Belagavi, Karnataka	Member
03	Prof. Yogesh Kutre Lecturer, Department of Geology, GSS College, Belagavi, Karnataka	Member
04	Prof. Priyanka Shinde Lecturer, Department of Geology, GSS College, Belagavi, Karnataka	Member
05	Dr. J T Gudagur Professor, Department of Geology, Karnatak Science College, Dharwad, Karnataka	Subject Expert
06	Dr. Sanjay V Pathare Associate Professor and head, Department of Geology, Rajaram College, Kolhapur, Maharashtra	Subject Expert
07	Dr. Aditya Udayraj Joshi Assistant Professor, Department of Civil Engineering, Manipal Institute of Technology, Manipal, Karanatka	University Nominee
08	Dr. P T Hanamgond Retd. Associate Professor & Head, G.S.S. College, Belagavi, Karnataka	Member of the College Alumni
09	Mr. Sagar Waghmare Managing director, Dharti Geo insight Pvt. Limited, Belagavi, Karnataka	Representative from Industry

SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE, BELAGAVI

(AUTONOMOUS)

Accredited with 'A' Grade by NAAC in 4th Cycle

FACULTY OF SCIENCE: DEPARTMENT OF GEOLOGY

COURSE STRUCTURE FOR B.Sc. PROGRAMME

Semester	Paper 1		Paper 2		Paper 3		Elective (E) / Optional (O)		Languages (L)		Compulsory (C)		Total Credits
	Credits (L+P)	Teaching hrs/week	Credits (L+P)	Teaching hrs/week	Credits (L+P)	Teaching hrs/week	Credits (L)	Teaching hrs/week	Credits (L/P)	Teaching hrs/week	Credits (L)	Teaching hrs/week	
I	3+2	4+4	3+2	4+4	3+2	4+4	--	--	L-1=3 L-2=3	4 4	C-1=2	2	23
II	3+2	4+4	3+2	4+4	3+2	4+4	--	--	L-1=3 L-2=3	4 4	C-2=2	2	23
III	3+2	4+4	3+2	4+4	3+2	4+4	E-1=2	3	L-1=3 L-2=3	4 4	C-3=2	2	25
IV	3+2	4+4	3+2	4+4	3+2	4+4	E-2=2	3	L-1=3 L-2=3	4 4	#Skill-I-2	4	25
V	*S-3+3+2	4+4+4	*S-3+3+2	4+4+4	*S-3+3+2	4+4+4	--	--	--	--	#Skill-II-2	4	26
VI	*S-3+3+2	4+4+4	*S-3+3+2	4+4+4	*S-3+3+2	4+4+4	--	--	--	--	#Skill-III-2	4	26
	36		36		36		04		24		12		148

+ Languages have three credits each, but 4 hrs teaching / Week.

* There shall be specialization in 5th and 6th Semesters; S indicates Specialization; each specialization shall have at least two discipline / core elective papers (Courses).

Student shall study practical skill course of all the major courses at least one in each of the 4th, 5th and 6th semester.

Note: 3-6 credit courses shall have max. 100 marks (20 IA +80 SEE), Less than 03 credits shall have 50 marks (10 IA +40 SEE) for examination.

SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE, BELAGAVI (AUTONOMOUS)

Department of Geology

B.Sc. Semester wise Geology Course Scheme under
State Education Policy (SEP) with effect from 2024-25 onwards

The Geology Department of SKE's Govindram Seksaria Science College (Autonomous), Belagavi seeks to provide the basic and fundamental concepts in Geology through our educational, research, and outreach programs, in order to produce well-trained, young geoscientists capable of responding to social needs.

Department's Mission

- The Geology Department will develop in each student, art of imagination, critical thinking, and enthusiasm; build necessary skills to be a good geoscientist and to be the lifelong lover of mother earth.
- To facilitate integrated and interdisciplinary approach in their learning.
- Develop a greater awareness of Earth Sciences in the general public through outreach programs.

Objectives

The basic objective is to establish the Department of Geology of SKE's Govindram Seksaria Science College (Autonomous), Belagavi as the Center for Research in this part of the country and promoting the development of Geology.

The Geology department also strives to develop in each student the awareness towards sustainable use of natural resources such as- minerals, water and energy sources. Other important objectives are -

- To impart and inculcate the basic geological knowledge to students and prepare them to be a good geoscientist.
- To imbibe in them the love towards mother earth and care for the environment.
- To create awareness in them about the Earth's environment, critical issues and need for sustainable development.
- To produce well-trained, budding geoscientists capable of responding to societal needs.
- To achieve the knowledge and skills in Geology and to experience the multidisciplinary approach.
- To develop abilities of logical thinking and imagination; importance of field data collection, data analyzing, synthesizing and drawing fair conclusions.

SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE, BELAGAVI (AUTONOMOUS)

Department of Geology

B.Sc Semester wise Geology Course Scheme under
State Education Policy (SEP) with Effect from 2024-25 onwards

Note:

- a) **Open Elective Course (OEC):** All B.Sc. students must opt for at least one Open Elective Course (OEC) during the 3rd or 4th semester of their program. The OEC can be chosen **from any subject offered by the college**,
- b) **Skill Enhancement Course (SEC):** Each B.Sc. student is required to choose one Skill Enhancement Course (SEC) in each of the 4th, 5th, and 6th semesters. These SECs must be selected from within the subjects included in the student's chosen combination.
- c) **Student batch:** As this is a semi technical, each batch should consist of not more than 15 students for the regular practical classes.
- d) **Practical Record:** Submission of a well-maintained Journal of the Practical Work done during the semester is necessary before the Practical Examination.
- e) **Assignments:** The students will be given assignments, which are to be submitted before the 2nd Internal Test examination.
- f) **Geological Field Report:** As the geological features, structures, rock and mineral occurrence are better understood in the field, there will be a Geological Study Tour to the places of geological interest for 3- 10 days, mainly to study the field occurrence of geological features, rocks and minerals etc., during each semester, which carries weightage during semester end exam. Each student shall submit a consolidated study tour report along with the journal.

NATURE OF THEORY AND PRACTICAL EXAMINATION

a) Theory Examination: (Total 100 Marks)

i) There will be one theory paper of 80 marks in each semester.

Each paper will contain THREE Sections, which are to be written in the same answer book.

PART A: TWELVE Questions (Definitions/two sentence answers) numbered Question Number 1 (a-l), each of 2 marks. Students need to answer ANY TEN questions. (10x2 = 20 Marks)

PART B: SIX Questions (Short answers) numbered as 2, 3, 4, 5, 6 & 7. Each of FIVE marks students need to answer ANY FOUR questions (4x5 = 20 Marks)

PART C: FIVE Questions (Descriptive answers) numbered 8, 9, 10, 11 & 12. Each of TENmarks, students need to answer ANY FOUR questions (4x10 = 40 Marks)

ii) **The remaining 20 marks** are allotted for Internal Assessment Marks – of 1 hour 15 minutes **for two internal tests** in theory.

- Two internal tests of 20 marks each reduced to 14 marks.
- Internal Assignment/Seminars/Student project work/Viva-voce/Attendance (6 marks): Students are given assignments/seminars on the subject taught or a student project work.

b) Practical Examination: Total 50 Marks.

- Practical examination will have 3 or 4 Questions of **30 marks**.
- Practical Record (Journal), Field study tour report and Viva Voce carry (**10 marks**).
- Practical Internal test: One internal test of 30 marks reduced to 10 (**10 marks**).

c) Open Elective Course (OEC): Total marks 50

I. There will be one theory paper of 40 marks in III and IV semester.

Each paper will contain THREE Sections, which are to be written in the same answer book.

PART A: SIX Questions (Definitions/two sentence answers) numbered Question Number 1(a – f) each of 2 marks. Students need to answer ANY FIVE questions. (5X2 = 10 Marks)

PART B: THREE Questions (Short answers) numbered as 2,3 and 4. Each of FIVEmarks students need to answer ANY two questions (2X5 = 10 Marks)

PART C: TWO Questions (Descriptive answers) numbered 5, 6 and 7. Each of TEN marks, students need to answer ANY TWO questions (2x10 = 20 Marks)

i) **The remaining 10 marks** are allotted for Internal Assessment Marks – of 30 minutes **for two internal tests** in theory.

- Two internal tests of 10 marks each reduced to 7 marks.
- Internal Assignment/Seminars/Student project work/Viva-voce (3 marks): Students are given assignments/seminars on the subject taught or a student project work.

d) Skill Enhancement Course (SEC): Total marks 50

- Practical examination will have 3 or 4 Questions of **30 marks**.
- Practical Record (Journal) and Viva Voce carry (**10 marks**).
- Practical Internal test: One internal test of 30 marks reduced to 10 (**10 marks**).

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)**

**B. Sc. SEP-2024 SYLLABUS IN GEOLOGY
III SEMESTER THEORY PAPER**

Year	2025-26	Course Code: 24GEO301	Credits	3
Sem	III	Course title: 3.1 - PETROLOGY: IGNEOUS, SEDIMENTARY & METAMORPHIC (THEORY)	Hours	60
Course pre-requisites if any		NA		
Formative assessment marks: 20		Summative assessment marks: 80	Duration of SEE: 3 hrs	

Course Objectives

Petrology is the science of rocks. The course will help the students to exhibit an improved understanding of fundamental petrologic processes and common rock types and their occurrences. In practical's, students learn to identify, describe and classify rocks using hand specimens and under microscope.

Learning Outcomes

On completion of the course the students:

- (i) Will have gained an identification and understanding of the processes involved in the formation of a rock, their textures, structures, classifications and their importance.
- (ii) Will have learned to differentiate between the different rock types based on their physical and petrographic properties.

UNIT	TOPIC	Hrs
I	Introduction- Definition and scope of Petrology, Classification of rocks into igneous, sedimentary and metamorphic. Rock cycle.	12
	Igneous Petrology: Magma- Definition, origin and evolution, composition- acidic and basic magma. Bowen's reaction Series, Crystallization of magma – Introduction, , Phase rule, Unicomponent, Bicomponent and ternary system. Mode of occurrence of igneous rocks: Intrusive and extrusive igneous rocks.	
	Forms of Igneous rocks- Concordant – sill and laccolith, lopolith, phaccoliths. Discordant – dyke, stocks, bosses, volcanic neck and batholith. Structures of Igneous rocks – Vesicular, Amygdaloidal, Flow, Pillow, Ropy and Columnar.	
II	Textures in igneous rocks: Definition. Crystallinity, granularity, shape of the crystal, mutual relationship. Equigranular texture: Panidiomorphic, hypidiomorphic, allotriomorphic; Inequigranular texture: Porphyritic, poikilitic, ophitic/subophitic, basaltic (intersertal-intergranular); Intergrowth texture: graphic, Directive structure: Flow/trachytic.	12
	Classification of Igneous rocks: Chemical classification- IUGS, CIPW, Shand and Holmes, based on silica content (acidic, basic, intermediate and ultrabasic). Mineralogical classification- color index (leucocratic/felsic and melanocratic/mafic); Mineral content in rock: essential, accessory and Secondary minerals.	
III	Sedimentary Petrology: Introduction: Formation of sedimentary rocks, Weathering, erosion, transportation, deposition, lithification and diagenesis. Structures of sedimentary rocks: stratification, lamination, graded bedding, cross/ current bedding, ripple marks, mud cracks/sun cracks, rain prints and oolitic. Textures of sedimentary rocks: Clastic and non-clastic. Wentworth grain size classification. Sphericity and roundness.	12

	Classification of sedimentary rocks: Based on origin: Clastic/mechanical deposits and Non clastic deposits - residual, evaporites and non-evaporates/chemical and organic deposits; based on grain size- Rudaceous, arenaceous and argillaceous. Sedimentary Environments: Continental (Terrestrial), Transitional (Marginal Marine) and Marine Environments.	
IV	Metamorphic Petrology: Introduction: Agents of metamorphism- Temperature, pressure and chemically active fluids. Stress and anti-stress minerals. Metamorphic zones, metamorphic facies. ACF and AKF Diagram	12
V	Types of metamorphism with brief descriptions: Cataclastic, thermal, dynamothermal, plutonic metamorphism, and their effects on arenaceous, Argillaceous, calcareous, basic and ultra basic rocks. Textures of Metamorphic rocks: Crystalloblastic, Palimpsest. Structures of Metamorphic rocks: Cataclastic, Granulose, Gneissose & Schistose.	12

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B. Sc. SEP-2024 SYLLABUS IN GEOLOGY

III SEMESTER PRACTICAL PAPER

(w. e. f. 2025-26 and onwards)

Year	2025-26	Course Code: 24GEO302			Credits	2
Sem	III	Course title: 3.2 - PETROLOGY PRACTICAL			Hours	56
Course pre-requisites if any		NA	Time	4 hrs per week		
Formative assessment marks: 10		Summative assessment marks: 40		Duration of SEE: 4 hrs		

- Megascopic Structures:**
 - Igneous rocks:** vesicular, amygdaloidal, columnar, pillow.
 - Sedimentary rock-** Stratification, lamination, graded bedding, cross/current bedding, ripple, mud cracks, oolitic.
 - Metamorphic rock-** Granulose, schistose, gneissose and slaty cleavage.
- Megascopic study of Rocks:**
 - Igneous rock:** Granite, Syenite, Diorite and their porphyry; Pegmatite; Dolerite, Basalt, gabbro Dunite; Obsidian, Pumice.
 - Sedimentary rock:** Breccia, Conglomerate, Sandstone, Limestone, Shell/fossiliferous limestone, Shale, laterite and bauxite.
 - Metamorphic rock:** Slate, Marble, Schist (Talc, Mica, Garnet, Chlorite and hornblende), Quartzite, Gneiss (Banded & Augen).
- Study of Textures under microscope:**
 - Igneous rock:** Equigranular- Panidiomorphic, Hypidiomorphic, Allotriomorphic; Inequigranular- Porphyritic, Poikilitic, Ophitic/Sub- ophitic, Basaltic (Intergranular/Intersertal), Graphic.
 - Sedimentary rock:** Clastic, Non Clastic, Oolitic.
 - Metamorphic rock:** Granulose, Schistose, Gneissose
- Study of Rocks under microscope:**
 - Igneous rock:** Granite, Syenite, Diorite and their porphyry; Pegmatite; Dolerite, Basalt; Dunite.
 - Sedimentary rock:** Breccia, Conglomerate, Sandstone, Limestone, Shale, Shell/fossiliferous limestone, Laterite.
 - Metamorphic rock:** Marble, Quartzite, Schist (Mica, Garnet, Hornblende), Gneiss (Banded and Augen) and Slate.
- Field visit to a places of geological/geomorphological/industrial interest.

TEXT BOOKS

- Principles of Petrology- By G. W. Tyrrell, B.I.Publications Pvt. Ltd. Mumbai.
- Igneous and Metamorphic Petrology - By Turner and Verhoogen
- Igneous and Metamorphic Petrology - By Best M.G., CBS Publishers, Delhi
- Igneous Petrology - By Mihir K. Bose
- A guide to field geology by N .W .Gokhale.
- Fundamentals of sedimentary rocks by N .W .Gokhale.
- Theory of structural geology by N. W. Gokhale
- A manual of problems in structural geology by N. W. Gokhale.
- Igneous Petrology - By Anthony Hall
- Metamorphic Petrology - By Turner, CBS Publishers, Delhi
- Petrogenesis of Metamorphic Rocks - By Winkler H.G.F., Springer Verlag,/ Narosa Publishing House, New Delhi.
- Petrology of Metamorphic Rocks - By Mason Roger, CBS Publishers, Delhi
- Sedimentary Rocks – By Pettijohn, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
- Introduction to Sedimentology - By Sengupta, S
- Petrology - By Ehlers and Blatt, CBS Publishers, Delhi.
- Petrography - Williams, Turner, and Gilbert, CBS Publishers, Delhi.
- Sedimentary Petrology : an Introduction to the Origin Sedimentary Rocks by M.E.Tucker
- Principles of Sedimentology & Stratigraphy by S.J.Boggs (2006) Pettijohn.
- Practical Approach to Sedimentology by Roy Lindholm (1987)
- Origin of Sedimentary Rocks by Blatt, H. Middleton, G.V., & Murry, R.C.

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)
B. Sc. SEP-2024 SYLLABUS IN GEOLOGY
B.Sc III Semester Geology
Open Elective Course (OEC)
(w. e. f. 2025-26 and onwards)**

Year	2025-26	Course Code: 24GEO303			Credits	2
Sem	III	Course title: 3.1 - GEMOLOGY (Theory)			Hours	30
Course pre-requisites if any		NA	Time	3 hrs per week		
Formative assessment marks: 10		Summative assessment marks: 40		Duration of SEE: 1.5 hrs		

Course Objectives:

- To introduce fundamental principles of gemology. The course will help to develop skills for gemstone identification, geological formation, tool and techniques used in gemology. To gain knowledge about natural, synthetic and treated gems.

Learning Outcomes:

- Students will gain knowledge on gemstone formation, identification, and classification of gemstones.
- They will understand gemstone enhancement, grading, valuation methods and economic importance.
- They will learn about gemstone mining, processing, and ethical concerns.
- Distinguishing between natural and artificial and natural gems.

Unit	Topic	Hours
I	Introduction to Gemology: Definition and scope of gemology. Importance of gemstones in geology and industry. Formation and Occurrence of Gemstones: Geological processes leading to gemstone formation. Igneous, metamorphic, and sedimentary environments of gemstone deposits. Physical Properties of Gemstones: Color, Streak, Luster, Hardness, specific gravity, cleavage, fracture, and tenacity. Optical Properties of Gemstones: Refraction, birefringence, dispersion, pleochroism, and fluorescence. Qualities of gemstones: 4 Cs - Cut, color, clarity, and carat.	06
II	Classification of Gemstones: Precious and semi-precious stones, Organic and inorganic gemstones. Common Gemstones and their Properties: diamond, ruby, sapphire, emerald, topaz, garnet, quartz, and opal. Crystallography and Mineralogy of Gemstones: Crystal systems and habits of important gemstones. Optical and Spectroscopic Techniques in Gem Identification: Use of refractometer, polarizing microscope, and UV spectroscopy. Inclusions and their importance in Gemstones: Identification of natural, synthetic, and treated gems.	08
III	Synthetic and Artificial Gemstones: Methods of synthesis: Flame fusion, hydrothermal, flux growth, and CVD. Differences between natural and synthetic gemstones. Gem Treatments and Enhancements: Heat treatment, irradiation, diffusion, and surface coatings. Industrial and Commercial Aspects of Gemology: Global gemstone markets and trade, Certification and authentication of gemstones. Diamond Grading and Valuation:	08
IV	Gemstone Exploration and Mining: Important gem-producing countries and mining techniques. Lapidary Techniques and Gem Cutting: Faceting, cabochon cutting, carving, and polishing.	08

Text Books

- | | |
|---|---------------------|
| 1. Rutley's Elements of Mineralogy | H.H. Read |
| 2. Mineralogy for students | M.I. Batty |
| 3. Mineralogy | Berry & Mason |
| 4. Gemology | Peter G Read |
| 5. Gems and Gem Industry in India (JGSI M-45) | R.V. Karanth |
| 6. Gemstones Enchanting Gifts of Nature | R.V. Karanth |
| 7. Gems and Gem Industry in India | – B. K. Chakrabarti |
| 8. A Textbook of Gemology | – Aniruddha De |
| 9. Minerals and Gemstones of India | – D.K. Chakrabarti |
| 10. Gems and Jewels: The Indian Heritage | – B. N. Mukherjee |
| 11. Synthetic Gemstones | – Kurt Nassau |
| 12. Introduction to Lapidary | – P.G. Read |
| 13. Diamond Deposits of India | – A.K. Chatterjee |
| 14. Indian Gemstones: Mining to Market | – R. K. Sinha |

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)**

B. Sc. SEP-2024 SYLLABUS IN GEOLOGY

IV SEMESTER THEORY PAPER

(w. e. f. 2025-26 and onwards)

Year	2025-26	Course Code: 24GEO401			Credits	3
Sem	IV	Course title: 4.1 - PALEONTOLOGY, PRINCIPLES OF STRATIGRAPHY & INDIAN STRATIGRAPHY			Hours	60
Course pre-requisites if any		NA	Time	4 hrs per week		
Formative assessment marks: 20		Summative assessment marks: 80		Duration of SEE: 3 hrs		

Course Objectives

Stratigraphy and Paleontology, the two branches of Geology work together to unearth the history and evolution of the earth and its life. Stratigraphers study the composition and arrangement of layered or stratified rocks. Paleontologists study the remains of plants and animals which have been preserved in the earth's crust by natural processes. With these objectives in mind it becomes pertinent to understand the basic concepts of Stratigraphy and Palaeontology. Both these help to understand the geological timescale.

Learning Outcomes

The study of stratigraphy and Paleontology

i) Encompasses the aspects of the age of the earth, chronological arrangement of rocks and appearance and evolution of life through the geologic time.

ii) The knowledge of the concepts in stratigraphy, correlation, and paleontology would enable the students to understand the changes that occurred in the history of the earth and relate them to their field observations and also, in understanding the geological framework of the Indian stratigraphy.

UNIT	TOPIC	Hrs
	PALEONTOLOGY	
I	Introduction: Origin of life on Earth, Systematic classification of organisms. Fossil Definition, Mode of fossilisation- mummification, permineralisation, mould and cast, petrification, carbonisation, imprints, tracks and trails. Concept of index fossil. Significance and uses of fossils, classification of life into flora and fauna. General morphological characters, description, and geological distribution and range in time of following phyla in brief: i. Phylum Protozoa - Foraminifera – Microsphere and megalosphere. ii. Phylum Coelenterata - class Anthozoa, typical coral; class Graptolitoidea – Monograptus and Diplograptus.	12
II	General morphological characters, description, and geological distribution and range in time of following phyla in brief: iii. Phylum Brachiopoda , iv. Phylum Echinoderma - Regularia and Irregularia General morphological characters, description, and geological distribution and range in time of following phylum in brief: v. Phylum Mollusca : class Lamellibranchs; class Gastropoda; class Cephalopoda- Nautiloidea and Ammonoidea- types of suture lines (simple, Goniatitic, Ceratitic and Ammonitic), vi. Phylum Arthropoda : class crustacea- Trilobites vii. Introduction to plant fossils – Glossopteris, gangmopteris, Ptillophyllum, Lepidodendron, Sigillaria and Calamites.	12
	PRINCIPLES OF STRATIGRAPHY	
III	Principles of Stratigraphy: Concepts in stratigraphy: Basic principles and definitions, Stratigraphic correlation. Brief description of principal stratigraphic units: Lithostratigraphy, Biostratigraphy, Chronostratigraphy, Stratigraphic classification and code of Stratigraphic nomenclature., Geological Time Scale: eon, era, epoch and age. Important geological events in brief	12

	INDIAN STRATIGRAPHY	
IV	Physiographic divisions of India: Brief introduction to the physiographic and tectonic subdivisions of India. Archaean and Proterozoic Formations of Peninsular India – distribution and classification with reference to Karnataka. Sargur Group, Dharwar Super Group, Peninsular Gneiss. Proterozoic: distribution, classification and economic importance of Cuddapah and Kaladgi, Vindhyan, Bhima and Kurnool Groups.	12
V	Mesozoic:(i)Triassic successions of Spiti, (ii) Jurassic of Kutch, (iii) Cretaceous of Tiruchirappalli. Volcanic provinces of India: Deccan volcanic Province: Distribution, lithology, and biostratigraphy, classification, intertrappeans, intratrappeans, infratrappeans, Bagh beds and lameta beds, age and economic importance of deccan traps. Stratigraphic boundaries: Important Stratigraphic boundaries in India- i) Precambrian-Cambrian boundary, ii) Permian-Triassic boundary and iii) Cretaceous-Tertiary (KT) boundary.	12

TEXT BOOKS

1. Invertebrate paleontology - Henry woods
2. An introduction to Palaeobotany- Arnold, C.A.,
4. Principles of Paleontology, - Raup, D.M. and Stanely, M.S
5. Invertebrate Fossils -Moore , R.C., Laliker , C.G
6. Geology of India - Wadia D.N
7. Stratigraphy of India- Ravindrakumar K.R (2 edition).
8. Principles of Stratigraphy - Lemon R.Y
9. A manual of the Geology India and Burma - Pascoe, E.H.
10. General Stratigraphy - J.W. and Barret B.H
11. Historical Geology – Dunbar
12. Geology of India (GSI volume – I and II) – M Ramakrishnan & R Vaidynadhan,
13. GSI text book series – Geology of Karnataka; Maharashtra and Goa; Andhra Pradesh.

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)
B. Sc. SEP-2024 SYLLABUS IN GEOLOGY
IV SEMESTER PRACTICAL PAPER
(w. e. f. 2025-26 and onwards)**

Year	2025-26	Course Code: 24GE0402 Course title: 4.2 - PALEONTOLOGY & INDIAN STRATIGRAPHY PRACTICAL	Credits	2
Sem	IV		Hours	56
Course pre-requisites if any		NA	Time	4 hrs per week
Formative assessment marks: 10		Summative assessment marks: 40		Duration of SEE: 4 hrs

Max. Marks: 50

Time: 4 hrs/week

Total 56 Lectures

2. Sketch, label and describe with range in time of the following fossils.
 - i) **Phylum Protozoa:** Nummulites, Textularia
 - ii) **Phylum Coelenterata-** Monograptus-Diplograptus; Corals- Calceola, Zaphrentis, Montlivaltia.
 - iii) **Phylum Echinoderma:** Cidaris and Micraster
 - iv) **Phylum Brachiopoda:** Productus, Spirifer, Rhynchonella, Terebratula.
 - v) **Phylum Mollusca:** Class Lamellibranchia- Arca, Pecten, Gryphea, Inoceramus;

Class Gastropoda- Natica, Turitella, Turbo, Cypraea, Murex, Conus, Voluta, Fusus, Physa.
Class Cephalopoda- Nautilus, Goniatite, Ceratite, Ammonite, Belemnites.
 - vi) **Phylum Arthropoda:** Paradoxides, Calymene, Trinucleus.
 - vii) **Plant Fossils:** Glossopteris, Gangamopteris; Ptillophyllum, Calamites, Lepidodendron and Sigillaria.
3. Plotting of following important geological systems/formations in the given map of India:
 - i. Physiographic divisions – Peninsula, Extra peninsula, Indo-gangetic alluvial plain.
 - ii. Cuddappah
 - iii. Deccan Volcanic Province
 - iv. Kaladgi
 - v. Vindhya
 - vi. Gondwana
 - vii. Cretaceous of Trichinopoly
4. Field visit to a place of geological/geomorphological/ industrial interest.

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)
B. Sc. SEP-2024 SYLLABUS IN GEOLOGY
B.Sc IV Semester Geology
Open Elective Course (OEC)
(w. e. f. 2025-26 and onwards)**

Year	2025-26	Course Code: 24GE0403 Course title: 4.3 - ENERGY RESOURCES (Theory)	Credits	2
Sem	IV		Hours	30
Course pre-requisites if any		NA	Time	4 hrs per week
Formative assessment marks: 10		Summative assessment marks: 40		Duration of SEE: 1.5 hrs

Course Objectives:

- To understand different types of energy resources, their formation, and distribution.
- To explore conventional and non-conventional energy sources.
- To study energy resource exploration, exploitation, and environmental impact.

Learning Outcomes:

- **By end of the course, students will be able to:**
 - i) Classify and explain various energy resources
 - ii) Evaluate the significance, potential and technologies of both conventional and renewable sources.
 - iii) Analyse the impact of energy production and consumption.

UNIT	TOPIC	Hrs
I	Energy and Its Importance: Definition and significance of energy resources, Global and Indian energy demand and consumption trends. Classification of Energy Resources: Renewable and non-renewable resources, Conventional vs. non-conventional energy sources. Geological Aspects of Energy Resources: Formation, accumulation, and distribution of energy resources.	06
II	Coal as an Energy Resource: Origin, types, and classification of coal, Coal deposits of India, Methods of coal mining and coal-bed methane. Petroleum and Natural Gas: Origin, migration, and accumulation of hydrocarbons, Major oil and gas fields of India, Methods of petroleum exploration and production. Gas hydrates. Nuclear Energy Resources: Occurrence and distribution of uranium and thorium in India, Major nuclear power plants in India.	08
III	Hydroelectric Energy: Principles of hydroelectric power generation, Major hydroelectric projects in India. Solar and Wind Energy: Solar power potential and technologies, Wind energy resources and major wind farms in India. Geothermal and Tidal Energy: Geothermal energy sources and their utilization, Tidal energy generation and prospects in India. Biomass and Hydrogen Energy: Biomass energy production and applications, Hydrogen as a future fuel and challenges.	08
IV	Impacts of Energy Resource, Climate change and carbon emissions, carbon foot prints and carbon credits. Energy Conservation and Management: Strategies for energy conservation, Role of policy and government regulations in energy sustainability.	08

TEXT BOOKS

1. Economic Mineral Deposits - Bateman Allan .M.
2. Economic Geology – Charles Richardson
3. Mineral Deposits - Lindgren W
4. Introduction to Ore-Forming Processes – Lawrence Robb
5. Energy resources and systems by S.S. Kantha
6. Energy sources conventional and non conventional by Dr. B. K. Sharma
7. Environmental studies by Erach Bharucha
8. Ore Geology and Industrial Minerals – Anthony M Evans
9. Ore Deposits of India - G.K.Gokhale & Rao T.C.
10. Indian Mineral Resources - S.Krishnaswamy
11. Minerals of Karnataka - B.P.Radhakrishna
12. Treatise of Minerals of India - R.K.Sinha

**SKE SOCIETY'S GOVINDRAM SEKSARIA SCIENCE COLLEGE,
BELAGAVI (AUTONOMOUS)**

B. Sc. SEP-2024 SYLLABUS IN GEOLOGY

B.Sc IV Semester Geology

Skill Enhancement Course (SEC): Practical Skill in Geology

(w. e. f. 2025-26 and onwards)

Year	2025-26	Course Code: 24GEO404 Course title: 4.3 - HYDROGEOLOGY & GEOTECHNICAL INVESTIGATIONS PRACTICAL	Credits	2
Sem	IV		Hours	30
Course pre-requisites if any		NA		
Formative assessment marks: 10		Summative assessment marks: 40	Duration of SEE: 4 hrs	

Course Objectives

This course aims to provide foundational knowledge and practical skills in soils and water sampling, testing and classification. Students will learn to analyse key physical and chemical parameters using standard laboratory methods. The course also emphasizes interpreting test results for assessing water and soil suitability for agricultural, industrial and drinking purposes.

Learning Outcomes

1. Ability to Collect and Analyse Groundwater Samples
2. Competence in Conducting Pumping Tests and Aquifer Analysis
3. Proficiency in Soil Sampling and Classification
4. Capability to Perform Chemical Soil and water tests
5. Understanding of Soil and water properties.
6. Understanding the quality of soil and water.

1: Soil and water testing

- Sampling methods for soil and water-
- Performing soil tests - grain size analysis using sieve hydrometer method
- Analysis of soil - pH, acidity, organic carbon, Carbonate, Nitrogen, Phosphorus, Salinity, Electrical Conductivity. Water content, Density, Plastic limit, liquid limit, Shrinkage limit, specific gravity, consistency, compaction.
- Analysis of water quality parameters - pH, TDS, BOD, COD, EC, turbidity and hardness etc.
- Interpretation of groundwater quality for drinking or agricultural or industrial suitability.

Reference Books:

1. "Groundwater Assessment, Development, and Management" by K.R. Karanth
2. "Hydrogeology: Principles and Practice" by Kevin M. Hiscock
3. "Soil Mechanics and Foundations" by B.C. Punmia
4. "Geotechnical Engineering" by C. Venkatramaiah
5. "Laboratory Manual for the Examination of Water, Waste Water, and Soil" by H. Manivaskam
6. Chemical and biological methods for water pollution by R. K. Trivedi and P. K. Goel.
7. Environmental and water analysis by R. K. Trivedi and P. K. Goel.
8. Soil testing ISO code books - IS 2720, IS 1498, IS 2131
9. Water testing ISO code books – IS 3025, IS 10500, IS 14543, IS 5663.