DEGREE OF BACHELOR OF SCIENCE

CHOICE BASED CREDIT SYSTEM

Syllabus for

B.Sc. GEOLOGY

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to Periyar University from 2021-2022 onwards)
REGULATIONS

1. ELIGIBILITY
   Refer this office circular No: PU/R/AD-1/UG/PG/Programs Eligibility/2019

2. DURATION OF THE COURSE
   The course for the degree of Bachelor of Science shall consist of three years
divided into six semesters with internal assessment under choice based credit
system.

3. COURSE OF STUDY
   The course of study shall comprise instruction in the following subjects
according to the syllabus and books prescribed from time to time.

I. SEMESTER
   1. Language - I (Tamil etc.)
   2. Communicative English-I
   3. Core Geology Paper - I- Physical Geology and Geodynamics
   5. Skill Based Elective Course-I (Select any one from list-1 SBEC)
   6. Value education
   7. Professional English - I

II. SEMESTER
   8. Language - II (Tamil etc.)
   9. Communicative English - II
   10. Core Geology Paper - II-Geomorphology and Structural Geology
   11. Core Geology Practical Paper - I* Structural Geology and Surveying
   12. Allied Chemistry Paper-II (or) Allied Mathematics Paper - II
   14. Skill Based Elective Course – II (Select any one from list – 1 SBEC)
   15. Environmental Studies
   16. Professional English - II

III. SEMESTER
   17. Language - III (Tamil etc.)
   18. Communicative English - III
   19. Core Geology Paper – III Paleontology
   20. Allied Physics Paper - I
   21. Skill Based Elective Course – III (Select any one from list-1 SBEC)
   22. Non -Major Elective Course - I
IV. SEMESTER
23. Language - IV (Tamil etc.)
24. Communicative English - IV
25. Core Geology Paper – IV Stratigraphy
26. Core Geology Practical Paper - II Paleontology and Stratigraphy
27. Allied Physics Paper - II
28. Allied Physics Practical Paper - I*
29. Skill Based Elective Course – IV (Select any one from list -1SBEC)
30. Non -Major Elective Course - II
31. Add on course-Internship Training

V. SEMESTER
32. Core Geology Paper – V Crystallography
33. Core Geology Paper – VI Mineralogy
34. Core Geology Paper - VII Igneous Petrology
35. Core Geology Paper - VIII Sedimentary and Metamorphic Petrology
36. Skill Based Elective Course – V (Select any one from list - 1 SBEC)
37. Skill Based Elective Course – VI (Select any one from list - 1SBEC)

VI. SEMESTER
38. Core Geology Paper - IX Economic Geology
40. Core Geology Paper - XI Mining and Engineering Geology
41. Core Geology Paper - XII Hydrogeology and Environmental Geology
42. Core Geology Practical Paper - III* Crystallography and Mineralogy
43. Core Geology Practical Paper - IV* Economic Geology and Petrology
44. Skill Based Elective Course – VII (Select any one from list-1 SBEC)

LIST - 1: SKILL BASED ELECTIVE COURSES
1. Mapping Techniques in Geology
2. Gemmology and Gemstone Evaluation
3. Field Hydrogeology and Techniques
4. Water Quality Analysis
5. Granite Exploration and Exploitation
6. Geostatistics and Computer Applications
7. Remote Sensing and GIS
8. Mines and Minerals Legislation of India
9. Introduction to Geoinstrumentation
10. Cartography
11. Geology for Competitive Examination
12. Principles of Surveying

**LIST - 2: NON-MAJOR ELECTIVE COURSES**

1. Oceanography
2. Climatology
3. Basic Geochemistry
4. Basic Geophysics
5. Geohazards

**LIST - 3: COMPULSORY COURSES**

1. Value Education
2. Environmental Studies
3. Extension Activities (NSS, NCC, YRC, RRC, Green Club)

**4. EXAMINATIONS**

The Theory examination shall be three hours duration to each paper at the end of each semester. The candidates failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

**5. SCHEME OF EXAMINATION**

The scheme of examination of a different semester shall be as follows:
### I – SEMESTER

<table>
<thead>
<tr>
<th>PART</th>
<th>SUBJECT</th>
<th>INSTRUCTION HRS/WEEK</th>
<th>EXAM HRS.</th>
<th>CREDITS</th>
<th>UNIVERSITY EXAMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>INTERNAL (25%)</td>
</tr>
<tr>
<td>I</td>
<td>Tamil or any other Language Paper –I</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>25</td>
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<tr>
<td>II</td>
<td>English - I Communicative English</td>
<td>6</td>
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<td>3</td>
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<td></td>
<td>Core I - Geology Paper – I</td>
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<td>4</td>
<td>25</td>
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<tr>
<td>III</td>
<td>Core II Geology Practical Paper –I*</td>
<td>3</td>
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<td></td>
<td>Allied Chemistry Paper –I(or)Allied Maths Paper -I</td>
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<td>3</td>
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<tr>
<td></td>
<td>Value education</td>
<td>2</td>
<td>3</td>
<td>2</td>
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<tr>
<td></td>
<td>Professional English-Physical Science-I</td>
<td>6</td>
<td>3</td>
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*Examinations will be at the end of II semester*
## II SEMESTER

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<th>INSTRUCTION HRS/WEEK</th>
<th>EXAM HRS.</th>
<th>CREDITS</th>
<th>UNIVERSITY EXAMINATION</th>
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<tr>
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<tr>
<td></td>
<td>Core IV - Geology Practical Paper –I*</td>
<td>3</td>
<td>3</td>
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<td>Allied Chemistry Paper–I(or)Allied Maths Paper -II</td>
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<tr>
<td></td>
<td>Environmental Studies*</td>
<td>1</td>
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<td>6</td>
<td>3</td>
<td>4</td>
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*Continued from I semester and Examinations will be at the end of II semester

Total Credit for I and II Semester = 53 credits

Total Marks for I and II Semester = 1600Marks
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<tr>
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<th>INSTRUCTION HRS/WEEK</th>
<th>EXAM HRS.</th>
<th>CREDITS</th>
<th>UNIVERSITY EXAMINATION</th>
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<td>3</td>
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<td>Core V - Geology Paper – III</td>
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<td>3</td>
<td>4</td>
<td>25  75</td>
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<tr>
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<td>3</td>
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<td>-</td>
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<tr>
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<td>Allied Physics Paper –I</td>
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<td>3</td>
<td>4</td>
<td>25  75</td>
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<td>3</td>
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<td>Skill based Elective course-III (Select any one from the list-1)</td>
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<td>3</td>
<td>2</td>
<td>25  75</td>
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<td>Non-Major Elective Course – I</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>25  75</td>
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*Examinations will be at the end of IV semester*
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<th>EXAM HRS.</th>
<th>CREDITS</th>
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<td>Add on course-Internship(Field visit and Report preparation)</td>
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*Continued from III semester and Examinations will be at the end of IV semester*

Total Credit for III and IV Semester = 45 credits

Total Marks for III and IV Semester = 1400 Marks
### V Semester

<table>
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<tr>
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<th>EXAM HRS.</th>
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<td>Core XIV - Geology Practical – IV</td>
<td>3</td>
<td>3</td>
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<tr>
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<td>Skill based Elective course-V (Select any one from the list-1)</td>
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<td>3</td>
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<td>Skill based Elective course-VI (Select any one from the list-1)</td>
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*Examinations will be at the end of VI semester*
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<th>EXAM HRS.</th>
<th>CREDITS</th>
<th>UNIVERSITY EXAMINATION</th>
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<td>INTERNAL (25%)</td>
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<tr>
<td>III</td>
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<td>5</td>
<td>25</td>
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<td>2</td>
<td>3</td>
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</table>

*Continued from III semester and Examinations will be at the end of VI semester

Total credit for V and VI Semester = 48
Credits Total Marks for V and VI Semester = 1300 Marks

Total Credit for 3 years = 146 Credits
Total Marks for 3 years = 4300 Marks
6. QUESTION PAPER PATTERN FOR EXAMINATION

Time: 3 Hours

Maximum Marks: 75

Part - A (15 x 1 = 15 Marks)
(Answer all Questions) (Three questions from each unit)

Part - B (2 x 5 = 10 Marks)
(Answer any two Questions) (One question from each unit)

Part - C (5 x 10 = 50 Marks)
(Answer all Questions) (One question from each unit with internal choice)

7. MINIMUM PASSING MARKS

Theory-IA (25 marks)

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<th>PASSING MINIMUM</th>
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<td>Test</td>
<td>15 Marks</td>
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<tr>
<td>Assignment</td>
<td>05 Marks</td>
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<tr>
<td>Attendance</td>
<td>05 Marks</td>
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<tr>
<td>Total</td>
<td>25 Marks</td>
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<tr>
<td>UE</td>
<td>75 Marks</td>
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University Examination: 75 Marks

Practical-IA (25 marks)

<table>
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<th>EVALUATION OF IA</th>
<th>PASSING MINIMUM</th>
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<tbody>
<tr>
<td>Field visit, Collections and Report</td>
<td>10 marks</td>
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<td>Model Exam</td>
<td>05 marks</td>
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<tr>
<td>Record Submission</td>
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<tr>
<td>Attendance</td>
<td>05 marks</td>
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<tr>
<td>Total</td>
<td>25 marks</td>
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<tr>
<td>UE</td>
<td>75 marks</td>
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University Examination: 75 marks
8. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed in First Class. All other successful candidates shall be declared to have passed in Second Class. Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed in First Class with Distinction provide they pass all the examinations prescribed for the course at first appearance.

Candidates who pass all the examinations prescribed for the course in the first attempt and within a period of three academic years from the year of admission to the course alone are eligible for University Ranking.

EVALUATION OF CREDITS:

<table>
<thead>
<tr>
<th>LETTER GRADE</th>
<th>CUMULATIVE GRADE POINTS AVERAGE</th>
<th>GRADE DESCRIPTION</th>
<th>RANGE OF MARKS</th>
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<td>S</td>
<td>10</td>
<td>Outstanding</td>
<td>90-100</td>
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<tr>
<td>A</td>
<td>9</td>
<td>Excellent</td>
<td>80-89</td>
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<td>B</td>
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<td>Very Good</td>
<td>70-89</td>
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<td>RA</td>
<td>0</td>
<td>Re-Appear</td>
<td>0-39</td>
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\[
GP = \frac{(\text{Marks obtained in course} \times \text{credit})}{100}
\]

\[
GPA = \frac{\text{Total grade points earned in a semester}}{\text{Total credits registered in a semester}}
\]

\[
GPA = \frac{\text{Sum of grade points earned}}{\text{Sum of credits registered}}
\]

CLASSIFICATION:

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<th>CGPA</th>
<th>9 and above</th>
<th>I Class with Distinction</th>
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<td>Between 7 and 8.9</td>
<td>I Class</td>
</tr>
<tr>
<td>CGPA</td>
<td>Between 5 and 6.9</td>
<td>II Class</td>
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</table>

The above classification shall be given for overall performance including Non-Major Electives and Skill based Courses. i.e., For Performance in the Part III only.
9. MAXIMUM DURATION FOR THE COMPLETION OF UG PROGRAM

The maximum duration for the completion of UG Program shall not exceed twelve semesters.

10. COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2017 - 2018 and thereafter.

11. TRANSITORY PROVISION

Candidates who were admitted to the UG course of study before 2017 - 2018 shall be permitted to appear for the examinations under those regulations for a period for three years i.e. up to and inclusive of the examination of April/May 2021. Thereafter they will be permitted to appear only under regulations then inforce.

12. SUBJECT AND PAPER CODES

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<th>PAPER</th>
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<th>PAPERCODE</th>
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<td>Core Paper-I</td>
<td>Physical Geology and Geodynamics</td>
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<td>Geomorphology and Structural Geology</td>
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<td>Economic Geology</td>
<td>21UGY09</td>
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<td>Core Paper-X</td>
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<td>Field Hydrogeology and Techniques</td>
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<td>Water Quality Analysis</td>
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**PERIYAR UNIVERSITY**  
**B.Sc. GEOLOGY**  
**UG SYLLABUS**

<table>
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<td>Mines and Mineral Legislation of India</td>
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<td>Introduction to Geoinstrumentation</td>
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<td>Geology for Competitive Examination</td>
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<td>Principles of Surveying</td>
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**List of Non major Elective Courses**

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**ALLIED GEOLOGY PAPERS**

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<tr>
<td>Allied Geology Practical-I</td>
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</tbody>
</table>
B.Sc. GEOLOGY
SEMESTER-I
CORE I - PHYSICAL GEOLOGY AND GEODYNAMICS
21UGY01

COURSE OBJECTIVES:
1. Geology is the study of the Earth as a whole.
2. Physical Geology introduces different topics which define geology as a branch of Physical Geology.
3. The teaching and learning methodology involves class lectures, practicals and laboratory demonstrations. To impart knowledge of various tectonic features and their evolution.
4. Understand the formation of continent and ocean and distribution of volcanoes and earthquakes.

PHYSICAL GEOLOGY
UNIT-I

UNIT-II

UNIT-III

GEODYNAMICS
UNIT-IV
Topography features, Principles of Geodesy, Neotectonics.

UNIT-V


TEXT BOOKS:

REFERENCE BOOKS

B.Sc. GEOLOGY
SEMESTER II
CORE II - GEOMORPHOLOGY AND STRUCTURAL GEOLOGY
21UGY02

COURSE OBJECTIVE:
1. The dynamic instability of the lithosphere, continuous and discontinuous deformation takes place within the rocks in solid or semi-solid state.
2. To decipher the fundamentals of structures and the underlying physical processes of rock deformation and geotectonics to understand landforms and their evolution.
3. To educate the students about the concept rock deformation.
4. To understand qualitative aspects of brittle and ductile deformation processes, and descriptive analysis.
GEOMORPHOLOGY

UNIT-I

UNIT-II


UNIT-III


STRUCTURAL GEOLOGY

UNIT -IV

UNIT- V

Folds: Definition- Parts of Folds -Types of Folds-Classification of Folds-Recognition of Folds.

Faults: Definition- Types of Faults-Classification of Faults-Recognition of Faults.

Joints: Definition- Types of Joints-Classification of Joints.


TEXT BOOK:


REFERENCE BOOK:

1. V.V. Belousov-Structural Geology, Moscow
B.Sc. GEOLOGY
SEMESTER II
CORE PRACTICAL I - STRUCTURAL GEOLOGY AND SURVEYING
21UGYP01

STRUCTURAL GEOLOGY
Contour Maps and their Interpretation. Exercises to Predict Trends of the Outcrop of Horizontal, Vertical an Incline Beds with Respect to Topography – Reading of solid conformable maps – Deciphering Dip and Strike of Outcrops – Construction of map when three points over a bedding plane are given - Construction of vertical sections order of superposition – Vertical thickness of formations.
Reading of solid fold and fault maps construction of vertical sections – Determination of throw of vertical faults. Reading of unconformable solid maps – Construction of sections. Reading of solid maps of areas when more than one structure is involved – Determination of comparative ages of structures and intrusions – Geological history.
Determination of true dip & apparent dip and thickness by calculation and graphical method.
Description of features in Survey of India's (SOI) Topo sheet: Extra marginal, marginal, intra marginal information, major conventional signs and symbols, physical and socio-cultural features.

SURVEYING

B.SC. GEOLOGY
SEMESTER-III
CORE III - PALAEONTOLOGY
21UGY03

COURSE OBJECTIVES:
1. To make the participant to acquire knowledge on ancient life, skills on identification and documentation of paleontology.
2. The knowledge in palaeontology is to equip the students for understanding.
To educate various aspects biological events such as origin of life, evolution, mass extinctions, radiations, paleo-ecology, exceptional preservation, and functional morphology.

To prepare the students for professional job perspective in the field of basic paleontological research, to benefit them in the preparation of various exam.

UNIT I
Definition of Palaeontology – Scope of Palaeontology- Geological Time Scale.

UNIT II

UNIT III
Phylum Hemichordata – Class Graptzoa – General Morphology, Classification, Geological distribution.

UNIT IV
Phylum Brachiopoda: General morphology – Shell forms - Ornamentation, Classification, Geological history Distinguish between Lamellibranches and Brachiopods.
Phylum Echinodermata: Class Echinoidea: General morphology: Periproct, Corona, Peristome. Classification – Regular and Irregular Echinoids and Geological
history. Class **Crinoidea**: Morphology - Geological history. Class **Blastoidea**: Morphology - Geological history.

**UNIT-V**

**Phylum Protozoa** – Class **Sarcodina**: Order **Foraminifera**: General morphology – Dimorphism-Forms of Foraminiferal tests - Ornamentation-Geological history.

**Phylum Arthropoda** - Class **Crustacea**: Sub-Class: **Ostracoda** – Morphology –Classification and Geological history.


**Paleobotany**: General classification of Plant kingdom – Gondwana Indian Plant fossils – A brief account of the following Plant fossils: Glossopteris, Gangamopteris, Ptilophyllum, Calamites, Lepidodendron and Sigillaria. Introduction to Spores and Pollens. Significance and Paleoclimatic conditions of Gondwana flora. Applications of Micropalaeontology.

**TEXT BOOKS**

2. Romer, A.S. Vertebrate palaeontology, Chicagopress.
4. B.U. Hag and A. Boersma (1978), Introduction to marine Micropalaeontology, Elsevier, Netherlands

**REFERENCE BOOKS**

CORE IV – INDIAN STRATIGRAPHY
21UGY04

COURSE OBJECTIVE:
1. To impart basic knowledge about Indian Stratigraphy.
2. To train the students to understand the processes of formations of timescale stratigraphy and significance of fossils.

UNIT-I


UNIT- II


UNIT- III

Palaeozoic Stratigraphy: Distribution of Palaeozoic rock in India, Cambrian, Carboniferous and Permian of Salt Range, Palaeozoic of Kashmir Valley. Palaeozoic of Spiti Valley and Paleozoic rocks of Peninsular India.

UNIT- IV


UNIT- V

TEXT BOOKS
2. Wadia, D.N. (1953), Geology of India, TATA McGraw –Hill.
3. Ravindrakumar, K.R. Stratigraphy of India.

REFERENCE BOOKS
2. Gregory, J.W. and Barret B.H- General Stratigraphy

B.SC. GEOLOGY
SEMESTER-IV
CORE PRACTICAL PAPER-II PALAEONTOLOGY AND STRATIGRAPHY
21UGYP02

PALAEONTOLOGY
Megascopic identification and description of the following fossils:

**Pelecypoda:** Arca, Meretrix, Pecten, Cardita, Alectryonia, Spondylus, Inoceramas, Gryphaea, Exogyra, Radiolites, Ostrea, Unio, Venus, Cardium.

**Gasteropoda:** Natica, Turbo, Trochus, Turritella, Cerithium, Conus, Voluta, Murex, Fusus, Physa, Bellerophon.

**Cephalopoda:** Nautilus, Goniatites, Ceratites, Acanthoceras, Scholenbachia, Perispinctus, Hamites, Scaphites, Baculites, Turritilites and Belemnites.

**Echinodermata:** Pentrimites, Cidaris, Hemicidaris, Micraster, Holaster, Hemiaster, Stygmatophygus.

**Arthropoda:** Trilobita: Paradoxides, Calymene, Phacops. Trinucleus. **Brachiopoda:** Spirifer, Productus, Terebratula, Rhyconella, Atrypa, Athyris, Orthis.

**Graptolites:** - Phyllograptus, Tetragraptus, Didymograptus, Diplograptus, Monograptus.

**Corals:** Calceola, Zaphrenitis, Favosites, Halysites.

**Plant fossils:** Glossopteris, Gangamopteris, Ptilophyllum, Lepidodendron, Sigillaria and Calamites.

**Micro Fossils:** Lagen, Nodosaria, Textularia, Operculina, Elphidium, Ammonia.

**Diagrams:** Paradoxides, Pentremites, Trigonia, Arca, Meretrix, Murex, Turritella, Nautilus, Spirifer.

STRATIGRAPHY
Stratigraphy - Arranging the different Indian Stratigraphic horizons in accordance with age, Stratigraphic position, Fossil content and Order of Superposition.
SEMESTER-V
CORE V – CRYSTALLOGRAPHY
21UGY05

COURSE OBJECTIVE:
1. The course’s specific aim is to acquaint students about Crystal structures and their classification into unit systems and symmetry classes.
2. To acquaint students about various laws of crystallography governing the consistency of Crystal structures with respect to specific chemical composition.
3. To introduce how do minerals form. To explain chemical composition, bonding and internal structure of minerals.

UNIT-I

UNIT- II
Crystals Forms-Introduction of Holohedral, Hemihedral, Hemimorphic and Enantiomorphic.
Isometric System: Normal, Pyritohedral, Tetrahedral, Plagiohedral classes with references to well-developed crystals of Galena, Spinel, Garnet, Fluorite, Diamond, Pyrite, Tetrahedrite, Boracite, ad Cuprite.

Tetragonal System: Normal, Hemimorphic, Tripyramidal, Pyramidal - Hemimorphic Sphenoidal, Trapezohedral ,Tetrahexedral classes with references to well-developed crystals of Zircon, Rutile, Cassetite, Vesuviantic, Apophyllite, Shellie, Melonite, Wulfenite and Chalcopyrite.

UNIT- III
Rhombohedral Division: Rhombohedral, Rhombohedral-hemimorphic
UNIT-IV

Orthorhombic System: Study of the Symmetry elements, Forms and typical minerals of Normal, Hemimorphic and Sphenoidal classes with special reference to well-developed crystals of Barite, Olivine Topaz, Staurolite, Sulphur, Calamine, Struvite and Epsomite.

Monoclinic System: Study of the Symmetry elements and Forms of the Normal class.

Triclinic System: Study of the Symmetry elements and Forms of the Normal class.

UNIT- V


TEXT BOOKS

REFERENCE BOOKS
B.SC. GEOLOGY
SEMESTER-V
COURSE OBJECTIVES:

1. To study the physical chemical and optical properties of rock forming minerals. The course will lay the foundation for the broader understanding of the geology by imparting the basic knowledge about the rock forming minerals.

2. To learn about minerals their formation, complexity, association, identification of the basic idea of mineral interaction.

UNIT - I


**Physical Properties of minerals:** Based on cohesion: Form, structure, Cleavage, Hardness, Fracture, Tenacity, Specific gravity. Jolly balance and beam balance.

**Based on Light:** Colour, Streak, Lustre, Transparency, Fluorescence, Phosphorescence.

**Based on Heat:** Electricity, and Magnetism.

**Based on Senses:** Taste, Odour, feel.

**Chemical Properties of minerals:** Isomorphism, Polymorphism and Pseudomorphism. Outline of blow pipe tests.

UNIT - II

Mineralogy, Structure, Chemical Composition, Optical and Physical Properties, Modes of Occurrence and Industrial uses of the following group of minerals: **Quartz Group** - Description, General Characteristics, Crystalline Varieties, Cryptocrystalline Varieties, Amorphous Varieties.

**Feldspar Group:** Introduction, Crystal System. **Alkali Feldspar:** Orthoclase, Microcline, Perthite. **Plagioclase Feldspar:** Plagioclase Series.

UNIT - III

Mineralogy, Structure, Chemical composition, Optical and Physical properties, Modes of Occurrence and Industrial uses of the following group of minerals: **Feldspathoid Group:** Leucite, Nepheline, Cancrinite, Sodalite, Hauynite, Noselite, Lazurite.

**Pyroxene Group:** Orthopyroxene, Clinopyroxene, Clinoenstatites, Pigeonite, Diopside-Hedenbergite, Augite, Wollastonite, Agerite, Jadeite, Spodumene, Rhodonite.
UNIT-IV

Mineralogy, Structure, Chemical composition, Optical and Physical Properties, Modes of occurrence and Industrial uses of the following group of minerals: **Amphibole Group:** Anthophyllite, Cummingtonite, Tremolite, Actinolite, Hornblende, Barkevekite, Glaucophane, Ribeckite, Arfvedsonite.

Mineralogy, Structure, Chemical composition, Optical and Physical Properties, Modes of occurrence and Industrial uses of the following group of minerals: Olivine Group, Mica group, Garnet Group and Zeolite Group.

UNIT-V


TEXT AND REFERENCE BOOKS

SEMINTER-V
CORE VII - IGNEOUS PETROLOGY
21UGY07

COURSE OBJECTIVE:
1. To understand characteristics and genesis of Igneous rocks.
2. To understand igneous processes, physical and chemical characteristics of magma and various rock types its geological setting, petrogenesis, classification, and natural characteristics, textures and structures.
3. To identify mineral assemblages, textural and chemical composition of mineral.

UNIT-I
Introduction to Petrology – Igneous Rocks-Magma- Definition, Types and Origin: Basaltic, Andesitic, Rhyolitic magma – Rock Cycle - Plutonic, Hypabyssal and Volcanic rocks formation - Composition and Constitution of magma- Primary and Parental magma. Forms of Intrusive igneous rocks: Concordant and Discordant forms- Forms of Extrusive igneous rocks.

UNIT -II
Textures: Definition - Types: Crystallinity, Crystallites, Microlites, Devitrification, Granularity.


Structures: Definition- Types: Vesicular and Amygdaloidal, Blocky lava, Ropy lava, Pillow structure, Flow structure, Sheet joints, Mural joints, Columnar joints, Rift and Grain, Reaction Rims, Xenolithic structure.

UNIT- III

UNIT- IV
Classification of Igneous Rocks: CIPW classification, Mineralogical classification, Megasopic (or) field classification, Tyrrell tabular classification, - Classification based on the Alkali to Plagioclase feldspar.
UNIT- V

TEXT AND REFERENCE BOOKS
6. Hatch, F.H. Wells, A.K. (1949), Petrology of Igneous Rocks, Thomas Murby & Wells,

B.Sc. GEOLOGY
CORE-VIII
SEDIMENTARY AND METAMORPHIC PETROLOGY
21UGY08

SEDIMENTARY PETROLOGY:

COURSE OBJECTIVE:
1. To impart knowledge of formation of sedimentary rocks.
2. To train the students to understand the mode of formations, transportation and deposition of the sediments and also about the processes modifying the sediments after their burial.
3. To infer the metamorphic agents, kinds and formation of metamorphic rocks.
4. To understand implications of various physic-chemical parameters in formulating metamorphic history of rocks

SEDIMENTARY PETROLOGY
UNIT-I

Sedimentary Formation: Description and formation of Sedimentary Rocks-Mechanical deposits, Chemical deposits, Organic deposits and Pelitic deposits

UNIT- II


UNIT- III

Petrographic details of important Silicic and Carbonate rocks such as- Conglomerate, Breccia, Shale, Sandstone, Clay, Limestone, Dolomite, Coal-Iron ores of Sedimentary Origin-Gypsum-Rocksalt-Flint-Chert and Phyllite. Sedimentary Basins of India and Tamilnadu.

METAMORPHIC PETROLOGY

UNIT- IV


UNIT- V


TEXT AND REFERENCE BOOKS

2. Huang, W.T.-Petrology, MC Graw Hill
4. Harker, A. -Petrology for Students, Cambridge,
COURSE OBJECTIVES:
1. To study mineral deposits and processes of formation of deposits and the nature of different mineral deposits, its genesis and distribution of major ore minerals.
2. To understand the genetic controls of physical and chemical processes of ore formation in various geological settings.
3. To provide the knowledge on geological processes responsible for mineral and ore formation, weathering and other secondary mineralization processes.
4. To familiarize mode of occurrence of economic minerals, metallic and non-metallic minerals.

UNIT-I

UNIT- II

UNIT- III

UNIT- IV

**Mineral Resources of India** – Ore mineralogy, Association, Genesis, Modes of occurrence, origin and Indian Distribution of the following Metallic Ore Deposits- Copper, Gold, Silver, Uranium, Thorium, Beryllium, Zirconium, Tin, Lead and Zinc.

UNIT- V


**TEXT AND REFERENCE BOOKS**

CORE X - PHOTOGEOLOGY AND REMOTE SENSING
21UGY10

COURSE OBJECTIVE:
1. To understand the aerial photography and Preparation of Photo-geologic Maps. Mosaic controlling factors of aerial photograph.
2. To know about Electro-Magnetic Spectrum, Space platforms and Elementary idea about active and passive sensors.
3. Application of photo-geology and remote sensing in geological studies.
4. To impart knowledge of environmental geology, natural hazards and basic concepts of remote sensing and GIS.

PHOTOGEOLOGY

UNIT- I

UNIT- II

UNIT- III

REMOTE SENSING
UNIT -IV

UNIT- V

**TEXT AND REFERENCE BOOKS**


**B.SC. GEOLOGY**

**SEMESTER-VI**

**CORE XI - MINING AND ENGINEERING GEOLOGY**

**21UGY11**

**COURSE OBJECTIVES:**

1. To understand the basic fundamental concepts of various mining methods, their terminologies, and the type of sampling adopted, explosives used in the mine, and to have a basic knowledge about mine machineries.
2. To provide the knowledge of geological investigation for site selection of engineering projects.
3. To understand the rock type and their engineering properties, suitability of site conditions for Dam, tunnel, roads and highways.
4. To develop concept and applied aspect of geology in various civil or geo engineering projects.

**MINING GEOLOGY**

**UNIT- I**


**UNIT- II**

**Mining Methods:** Open cast Mining- Loading by Manual, Machines, Glory Hole and Kaoline Mining. **Underground Mining:** Stoping- Open Stopes, Overhand: Timbered, Filled, Shrinkage, Mitchell Slicing System and Caving Methods.

**UNIT-III**

**Alluvial Mining** – Pan and Batea-Rocker-Longtom-Sluicing-Derrick and Cable way -Hydraulicking-Drift and Dredging. **Coal Mining**: Pillar methods- Longwall advancing- Longwall retreating-Horizon mining and Miscellaneous: Underground hydraulic mining -Strip mining.

**ENGINEERING GEOLOGY**

**UNIT-IV**

**Introduction to Engineering Geology:** Scope, Engineering properties of rocks, Rock Discontinuity. Physical characters of Building, Decorative stones and Concrete aggregates and Road materials.

**Soils**: Physical and Engineering Properties. Soil Formation, Profile and Classification. Soil erosion and Its control. An account on Soil Group of India.

**Dams**: Definition, Types, Geological conditions, Site investigations and Dam foundations. A short note on Important Indian Dams.

**Reservoirs** - Definition, Selection of Reservoir sites and Groundwater conditions. Problems in Reservoirs: Sedimentations, Slope control, Leakage and Seismicity. Short account of Indian and Tamilnadu reservoirs.

**UNIT- V**

**Tunnels** - Definition, Parts of a Tunnel, Tunneling in hard and soft rocks, Geological investigation and Ground water conditions.

**Roads**- Complicated regions for Roads, Geological problems after road construction. Improvement of Sites- Soil stabilization.

**Foundations**- Definition, geological investigations and groundwater problems.

**Landslides**- Definition, Slope stability, Slope failure and Safety. Slope Control, Geological factors, Groundwater conditions and Remedial measures.

**Mass Movements**- Causes, Types, Monitoring and Controls of mass movements.
TEXT BOOKS
2. Mckinstry- Mining Geology.

REFERENCE BOOKS

B.SC. GEOLOGY
SEMESTER-VI
CORE XII
HYDROGEOLOGY AND ENVIRONMENTAL GEOLOGY
21UGY12

COURSE OBJECTIVE:
1. To impart knowledge of basic hydrogeology including groundwater origin, occurrence and distribution.
2. To train students on basics of well hydraulics, method of exploration, water budget and management.
3. To impart theoretical, practical and field knowledge pertaining to Hydrogeological domain.
4. To understand the relationship in between water and rock interaction and salt water intrusion and its remedial measures in the coastal aquifers.

HYDROGEOLOGY
UNIT-I


UNIT-II


UNIT-III


ENVIRONMENTAL GEOLOGY

UNIT-IV

Introduction to Environmental Sciences-A brief account of Energy System. Classification of Natural Resources -Renewable and Non-Renewable resources.


Land Resources: Land as a resource, Land degradation, Man induced landslides, Soil erosion and Desertification. Role of Individual in Conservation Natural Resources, Equitable use of resources for sustainable lifestyle.

UNIT- V


TEXTBOOKS


REFERENCES BOOKS
CRYSTALLOGRAPHY
Description of forms present and determination of Miller indices of the following:

CRYSTAL MODELS:
1. **Isometric System**: Normal Class – Galena, Fluorite, Magnetite, Garnet, and Leucite, Copper-Pyritohedral class – Pyrite, Tetrahedral Class – Tetrahedrite.
5. **Monoclinic System**: Normal – Gypsum, Pyroxenes and Amphiboles.
MINERALOGY
Megascopic identification and description of the following:
Quartz Group: Quartz, Chalcedony, Opal, Agate, Flint, Jasper, Amethyst, Rose quartz, Chert.
Feldspar Group: Orthoclase, Microcline, Albite, Oligoclase, Labradorite.
Feldspathoid Group: Adularia, Sanidine, Nepheline, Sodalite, Llapis lazul.
Pyroxene Group: Enstatite, Bronzite, Hypersthene, Augite.
Amphibole Group: Hornblende, Actinolite, Tremolite.
Olivine Group: Olivine, Serpentine.

Optical Mineralogy:
Microscopic identification and description of the following: Quartz, Orthoclase, Albite, Oligoclase, Andesine, Labradorite, Anorthite, Nepheline, leucite, Sodalite, Hypersthene, Augite, Diopside, Aegirine, Hornblende, Tremolite, Actinolite, Glauconaphe, Riebeckite, Muscovite, Biotite, Phlogopite, Olivine, Serpentine, Chlorite, Epidote, Garnet, Apatite, Zircon, Sphene, Magnetite, Tourmaline, Calcite, Dolomite, Andalusite, Staurolite, Sillimanite and Cordierite

Geochemistry:
Identification of the following mineral powders by simple blow pipe tests: Apatite, Barite, Calcite, Celestite, Ceresite, Chalcoprite, Galena, Gypsum, Chromite, Haematite, Magnesite, Magnetite, Psilomelane, Pyrolusite, Siderite, Sphalerite, Strontianite, Witherite, Stibnite, Ilmenite and Wolframite.

B.Sc. GEOLOGY
SEMESTER-VI
CORE PRACTICAL PAPER – IV
ECONOMIC GEOLOGY AND PETROLOGY
21UGYP04

ECONOMIC GEOLOGY:
Industrial Minerals:
Megascopic identification and description, Indian occurrences and uses of the following:
Magnesite, Gypsum, Asbestos, Fluorite, Calcite, Graphite, Barite, Talc, Witherite, Strontianite, Anhydrite, Bauxite, Halite, Dolomite, Aragonite, Kaolin, Garnet,
Corundum, Phosphate Nodule, Coal and its varieties.

**Fe Ores:** Magnetite, Hematite, Limonite, Pyrite, Marcasite and Siderite.

**Cu Ores:** Chalcopyrite, Cuprite, Bornite, Malachite, Azurite, Native Copper.

**Mn Ores:** Pyrolusite, Psilomelane, Rhodochrosite, and Rhodonite.

**Pb Ores:** Galena, Cerussite, Anglesite.

**Zn Ores:** Smithsonite, Sphalerite.

**Sn Ore:** Cassiterite.

**As and Sb Ores:** Realgar, Orpiment, Stibnite.

**Miscellaneous Ores:** Wolframite, Molybdenite, Bauxite, Chromite, Ilmenite, Rutile, Cinnabar.

**Radioactive Ores:** Monazite, Zircon, Pitchblende, and Pyrochlore.

**PETROLOGY:**

**Megascopic identification of the following rocks:**

**IGNEOUS ROCKS:**

Granite, Graphic granite, Pegmatite, Aplite, Schorl Rock, Granite Porphyry, Syenite, Syenite porphyry, Diorite, Gabbro, Anorthosite, Dunite, Pyroxenite, Dolerite, Dolerite Porphyry, Basalt, Trachyte, Rhyolite, Obsidian, Pumice, Scoria.

**SEDIMENTARY ROCKS:**

Conglomerate, Breccia, Sandstone, Arkose, Shale, Limestone, Laterite, Peat, Lignite.

**METAMORPHIC ROCKS:**

Slate, Phyllite, Schists, Gneisses, Quartzite, Marble, Amphibolite, Ecologite, Leptynite, Charnockite, Khondalite, and Basic Granulite.

**Microscopic identification and description of the following rocks:**

**IGNEOUS ROCKS:**


**SEDIMENTARY ROCKS:**

Conglomerate, Breccia, Sandstone, Arkose, Shale Limestone.

**METAMORPHIC ROCKS:**
B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES PAPER I - MAPPING TECHNIQUES IN GEOLOGY 21UGYS01

COURSE OBJECTIVE:
1. To impart knowledge of geological field survey.
2. To train the students to understand functioning of necessary instruments required during geological field survey.

UNIT- I

UNIT- II

UNIT- III
Topographic Maps: Definition of Topography- Parts of Topographic map – Features represented, Map Enlargement, Reduction and Preparation of Base map – Height / elevation datum in topographic maps.

UNIT- IV

UNIT- V

REFERENCE BOOKS
COURSE OBJECTIVES:
1. To learn and to examine the nature, quality, rarity of gemstones. To understand the physical and optical properties of gemstones.
2. To summarize the origin, classification of gems.
3. To give an idea about the gem testing instruments.
4. To gain knowledge and to provide skills to become a successful gemmologist.

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

REFERENCES AND TEXT BOOKS
PAPER III – FIELD HYDROGEOLOGY AND TECHNIQUES
21UGYS03

COURSE OBJECTIVE:
1. To impart knowledge of basic field hydrogeology including groundwater origin, occurrence and distribution.
2. To train students on basics of Calculation of Porosity and Permeability, Pump Test data, Calculation of Groundwater Fluctuations.

UNIT-I

UNIT-II
Hydrogeologic Parameters: Calculation of Porosity and Permeability, Pump Test data, Calculation of Groundwater Fluctuations.

UNIT- III

UNIT- IV
Hardrock Aquifers: Charnockites, Gneiss, Granite formation - Field observation and Measurement of Soil moisture zone, Zone of Aeration, Zone of saturation.

UNIT- V

TEXT BOOKS

B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES
PAPER IV - WATER QUALITY ANALYSIS
21UGYS04

COURSE OBJECTIVES:
1. To impart knowledge of basic water quality analysis.
2. To train students on basics of laboratory methods using quality of water.
3. Study about Recycling of water, Water borne diseases, Reverse Osmosis (RO) System and Desalination of water.

UNIT- I

UNIT- II

UNIT- III

UNIT- IV
Utility of Standards required for Potable, Agricultural and Industrial Purposes. Tools used for assessing the quality of water.

UNIT- V

REFERENCE BOOKS
5. APHA, (1980), Standard Methods for the Examination of Water and Waste Water,
15th edition, American Water Works Association and Water Pollution Control Federation, New York.

B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES
PAPER V - GRANITE EXPLORATION AND EXPLOITATION
21UGYS05

COURSE OBJECTIVES:
1. The objective of this course is to give hands on experience for the students in identifying types, mining methods of granite, exploration and marketing.

UNIT-I

UNIT-II

UNIT- III

UNIT- IV
   Machineries used in Granite Industries – Wire Saw Machine, Cutting and Polishing Machines.

UNIT-V

REFERENCE BOOKS
2. Economic minerals–U. Prasad-CBS
5. Field Geology-Mathur.
COURSE OBJECTIVE:
1. To understand the description of statistical parameters employed to analyse.
2. To synthesize geological data for accurate and authentic interpretation.

GEOSTATISTICS
UNIT- I

UNIT- II

COMPUTER APPLICATIONS
UNIT- III

UNIT- IV

UNIT- V
Introduction to GIS Software in GIS, Utility of computer Software in Geological studies – Bar diagram, Pie diagram, Role diagrams, Scatter diagram, X-Y plots.

TEXT BOOKS
3. C. Davis (1975), Statistics and data analysis in Geology, John Wiley &Sons.

REFERENCE BOOKS

B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES
PAPER VII -REMOTE SENSING AND GIS
21UGYS07

COURSE OBJECTIVE:
1. To impart knowledge and applications of remote sensing and GIS in Geology.
2. To learn basic of aerial remote sensing and its applications.
3. To understand the physics of electromagnetic spectrum and learn satellite remote sensing.
4. To have training in GIS components, models and applications

REMOTE SENSING
UNIT- I

Definition and Types: Aerial, Satellite and Radar, Development of Space Programmes - History and Organization Associated with Remote Sensing in India and in other Countries.

UNIT- II


UNIT- III

Fundamentals of Aerial Remote Sensing: Components of Aerial Camera, Types of Aerial Photographs, Marginal Information of Aerial Photographs, Elements
of Photo Interpretation.

GIS

UNIT - IV


UNIT - V


REFERENCE BOOKS

B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES
PAPER VIII - MINES AND MINERALS LEGISLATION OF INDIA
21UGYS08

COURSE OBJECTIVES:
1. The course aim to provide an overview of the legal and policy framework on the mining sector in India.
2. To understand the procedure for obtaining mineral concession of regulation and development.

UNIT- I

Introduction to Mineral Economics; Essential, Critical and Strategies minerals

UNIT-II


UNIT- III


UNIT- IV


UNIT- V


REFERENCE BOOKS


B.SC. GEOLOGY

LIST OF SKILL BASED ELECTIVE COURSES

PAPER IX-INTRODUCTION TO GEOINSTRUMENTATION

21UGYS09

COURSE OBJECTIVE:

1. To train the students to understand functioning of necessary instruments required during geological field survey.
2. To impart knowledge and applications of field photographic techniques and GIS in Geology.
3. To train the students description handling and application of the following equipments.

UNIT- I

Basic Equipments: Description, Handling and Applications of the following equipments: Hammers, Chisels, Hand lenses, Clinometer, Brunton Compass, Jacob's staff, Pedometer.

UNIT- II

Survey Equipments: Chain survey, Plane Table, Prismatic Compass, Theodolite, GPS. Field Photographic Techniques, Spot Analysis Kit for water and Soil test.

UNIT- III


UNIT- IV


UNIT-V

Geochemical Equipment: pH & Eh meters, Potentiometers, TDS determination, Chromatographic Techniques, AA Spectrometer, ICP – MS, XRF – XRD.

REFERENCE BOOKS
1. Field Geology - S.M. Mathur
2. Field Geology - Gokhale
3. Field Geology - F. Lahee
4. Field Geology - R. Compton
5. Surveying - Punmia
6. Geophysics - Telford
7. Geophysics – Ramachandra Rao
8. Mineralogy - Dennan
9. Text Book of Surveying - S.K. Husain and M.S. Nagaraj
B.SC. GEOLOGY

LIST OF SKILL BASED ELECTIVE COURSES

PAPER X – CARTOGRAPHY

21UGYS10

COURSE OBJECTIVE:
1. To understand the various purposes, roles and representation of cartography. To gain and practice language in the creative design process.
2. To gain and practice skills in cartographic design, representation and produced in a GIS environment.
3. To be able to create digital maps in formats reflecting the purpose, content and function of input data.

UNIT- I


UNIT- II


UNIT- III

Symbolization: Types of Cartographic Symbols - Point, Line, and Area symbols - Qualitative and Quantitative Data Generalization.

UNIT- IV


UNIT- V


REFERENCE BOOKS
2. Robinson - Elements of Cartography
4. Raiz - Principles of Cartography.

B.SC. GEOLOGY

LIST OF SKILL BASED ELECTIVE COURSES

PAPER XI - GEOLOGY FOR COMPETITIVE EXAMINATIONS

21UGYS11

COURSE OBJECTIVE:
1. To impart knowledge of objective geology for various competitive examination, know about various question paper pattern information.

UNIT-I
Types of Competitive examinations: State and Central Competitive examinations – TNPSC, UPSC (Civil Services, GSI, IFS), UGC-CSIR, ONGC, AMD, Coal India Ltd etc.

UNIT-II
Awareness of syllabus prescribed for various competitive examinations. Objective and descriptive type of questions. Preparation strategies - Collection of previous question papers - Internet and library search for information.

UNIT- III
Scope and limits of Objective type examinations - Pattern and Style of Objective type Questions - Level of difficulty and Standard Expected - Long Term study and Planning. Preparation strategies for short answer and short essay type examination.

UNIT- IV
Study methods - Objective type - Short essay type. Examination techniques: - Pre- Exam preparation - Writing / Choosing Questions from Simple to Complex (or) vem known to partly known before Answering/ writing Answers –Time Concept and Examination Ethics.

UNIT- V
REFERENCES BOOKS
2. Maddox, H. (1985), How to study, Rupa publications, Delhi
7. Jhulka, A. (1992), Objective Geology, CBCS, Delhi,

B.SC. GEOLOGY
LIST OF SKILL BASED ELECTIVE COURSES PAPER XII - PRINCIPLES OF SURVEYING
21UGYS12

COURSE OBJECTIVES:
1. The systematic investigation of geology the purpose of creating a geological map. And contour and cross section.
2. To know about survey types and methods for field and ground.
3. To train the students to understanding the survey equipments.

UNIT- I
Surveying - Definition - Scope and Content - Types of Surveying - Area measurement - Height determination - Advantages of Survey.

UNIT-II
Chain Survey - Accessibility - FMB - Methods of Chain Survey - Triangulation - Open and Closed traverse - Plotting of chain Survey and Results.

UNIT- III
Prismatic Compass - Parts of Prismatic Compass - Accessories - Traverse - Plotting of Prismatic Compass - Errors and its Corrections – Bow ditich's method of correction - Calculation of bearings from included Angles.

UNIT- IV
Plane Table - Equipments - Methods of Plane Table Survey - Preparation work for the Plane Table Survey - Leveling and Orienting the Table - Resection Points -
Trial and Error Method - Tracing Paper Method - Advantages and Disadvantages of Plane Table Survey.

UNIT- V

Height measurement - Determination of Height - By Dumpy level- Parts of Dumpy level- Methods of dumpy level survey - Height measurement by Indian Clinometer and Abney level.

REFERENCE BOOKS
1. Lekh Raj & Raghunandan Singh - Map work and practical geography.

B.SC. GEOLOGY
LIST OF NON-MAJOR ELECTIVE COURSES
PAPER-I OCEANOGRAPHY
21UGYN01

COURSE OBJECTIVE:
1. To impart basic knowledge of morphological and structural features, and operating processes in sea and ocean basins.
2. To train the students to in understanding the marine economic resources.

UNIT-I

UNIT- II

UNIT- III
UNIT- IV
Marine Deposits: Classification and Distribution - Coral Reefs types - Conditions for the Growth.

UNIT- V
Marine Resources: Types - Distribution and Uses - Tidal Energy - Role of National Institute of Oceanography in India.

REFERENCE BOOKS

B.SC. GEOLOGY
LIST OF NON-MAJOR ELECTIVE COURSES
PAPER II–CLIMATOLOGY
21UGYN02

COURSE OBJECTIVES:
1. To understand the meteorology and earth radiation balance.
2. To know the behaviour of meteorological parameters.
3. To learn the concept of EL Nino impact and weather forecasting.
4. To study the climate changes over geological period and its impact.

UNIT-I
Definition and Significances of Climatology - Rotation and Revolution of the Earth, Solistice, Equinox and Seasons, Elements of Weather and Climate, Composition and Structure of the Atmosphere, Isolation: factors affecting Isolation, Global energy budget, Horizontal and Vertical Distribution Inversion of Temperature and factors affecting them.

UNIT- II

UNIT- III
Atmospheric moisture and Precipitation: Humidity types - Condensation - Cloud types - Precipitation and Rainfall: Types and measurements.

UNIT- IV

UNIT- V
Climatic Classification: Need and Basis of Climatic Classification- Koppen's Climatic Classification -Weather forecasting: Observation, Types and Uses.

REFERENCE BOOKS
COURSE OBJECTIVE:
1. To impart basic knowledge of elemental and isotopic concentrations, classification and behaviour of elements in the crust, continental lithospheric mantle and mantle.
2. To train the students to understand the behaviour of geochemical elements in different igneous rock types.

UNIT-I

UNIT- II
Basic Crystal Chemistry: Minerals as chemical compounds-bonding – Ionization Potential-Electro negativity-Periodic Table of elements: Periodic law and its utility.

UNIT-III
Geochemical processes and their geochemical signatures - Processes controlling chemical composition of Igneous, Metamorphic, and Sedimentary rocks.

UNIT- IV
Geochemistry of REE, Trace elements, stable and radiogenic isotope and their applications.

UNIT- V
Geochemistry to mineral exploration: Elements, dispersion and halos around an ore body- sampling methodology-analytical techniques: AAS-ICP-MS-Gravimetry – Chromotography flame photometry-DTA.

REFERENCE BOOKS

B.SC. GEOLOGY
LIST OF NON-MAJOR ELECTIVE COURSES PAPER IV
BASIC GEOPHYSICS
21UGYN04

COURSE OBJECTIVE:
1. To impart knowledge of Geophysics and applications of physics in geology
2. To enhance knowledge and applications of geophysics in exploration of earth resources.

UNIT-I

UNIT- II
Seismic properties of rocks, Densities of various layers of earth (Lithosphere). Distribution of density and pressure within Earth. Survey Procedure: Electrical Profiling, Resistivity Sounding (VES), Precautions.

UNIT- III

UNIT- IV
Geochronology: Definition – Methods – Limitations – Radioactivity schemes – Concordia and Discordia ages.

UNIT -V
Isostasy: Definition – Scope – Different Theories and limitations of Isostasy. Introduction to Geophysical tools.

REFERENCE BOOKS
COURSE OBJECTIVES:
1. To explain students about the physical and geological processes causing geohazards. To discuss the methods for quantifying geohazards.
2. To understand the possible consequences as well as risk and disaster management.
3. To make them aware about landslides, floods, tsunamis and earthquakes, for which the geological and physical process were to be discussed.
4. To discuss potential interlinkages between different types of geohazards, disaster prevention and management and quantification and communication of uncertainties.

UNIT-I

UNIT- II

UNIT- III

UNIT- IV

UNIT- V
REFERENCE BOOKS

B.SC. GEOLOGY
LIST OF NON-MAJOR ELECTIVE COURSES
PAPER V - GROUNDWATER MANAGEMENT AND RAINWATER HARVESTING
21UGYN06

COURSE OBJECTIVE:
1. To impart knowledge of global and national scenario of water resources and associated challenges.
2. To familiarize about occurrence and movement of sub-surface water. Also to train students about various groundwater management techniques.
3. To understand the importance of rainwater harvesting for water supply and will learn about different types of rainwater harvesting systems.
4. To get familiar with different potential uses of rainwater and understand the advantages and limitations.

UNIT- I


UNIT- II


UNIT- III

UNIT- IV

UNIT-V

REFERENCE BOOKS

B.SC. GEOLOGY
GEological FIELD WORK
It is an integral part of the course students should be taken to a field training during the academic year.

FIRST YEAR
Students should be taken to the local area for studying geomorphological, structural aspects of geology. The duration of the trip may be a week and submit a report to the department.

SECOND YEAR
Students should be taken to nearby area and familiarize Paleontological and Stratigraphical aspect, collect geological samples from the field and display at the time of their practical examination for internal evaluation. The duration may be a week.

THIRD YEAR
A visit to geologically interested and mineralized zones within Tamil Nadu it includes mine visit, geological mapping, minerals, rocks collection and display at the time of their practical examination for internal evaluation. The duration may be for two weeks.
UNIT-I


UNIT-II


UNIT-III


UNIT-IV


UNIT-V

**Mineralogy II**: Description of the following minerals: Hornblende – Actinolite – Tremolite. Muscovite – Biotite – Chlorite. Topaz-Olivine – Serpentine –

**REFERENCE AND TEXTBOOKS**


**B. SC. GEOLOGY**

**ALLIED GEOLOGY PAPERS**

**ALLIED GEOLOGY**

**21UGYA02**

**UNIT-I**

**Palaeontology:** Definition of Palaeontology and fossils. Outlines of modes of preservation in sedimentary rocks. Brief account of the uses of fossils. Study of the morphological characters and geological age of the following fossil groups: Pelecypods, Gastropods, Cephalopods, Brachiopods, Corals, and Trilobites.

**UNIT-II**

**Stratigraphy:** Definition and scope of Stratigraphy. Outline of the Geological Time Scale. Brief account of the following geological formations in India: Dharwar Group, Cuddapah Group, Vindhyan Group, Gondwana Group, Cretaceous formations of Tiruchirappalli and Karewa Formation.

**UNIT- III**

**Igneous Petrology:** Definition of Igneous Petrology and Igneous rocks. Forms of Igneous rocks: Sill, Lopolith, laccolith, Phacolith, Dyke, and Batholith. Brief description of the following igneous rocks: Dunite, Pyroxenite, Gabbro, Dolerite, Syenite, Granite, Pegmatite, Aplite, Andesite, and Basalt.

**UNIT- IV**

**Sedimentary Petrology:** Definition of sedimentary rocks and sedimentary petrology. Primary structures of sedimentary rocks: Common bedding, cross-bedding, current-Bedding, graded-bedding. Surface structures: Ripple marks, Mud-cracks, and Rain prints. Brief description of the following sedimentary rocks: Sandstone, Arkose, Grit, Shale, and Limestone.

UNIT- V

Economic Geology: An outline of the following processes of ore formation: Magmatic – Hydrothermal – Placer – Marine Evaporites. Brief description of the physical properties and Indian occurrences of the following ore and industrial minerals: Graphite, Bauxite, Magnesite, Hematite, Magnetite, Chromite, Gold, pyrolusite, pyrite, Galena, Asbestos, Gypsum, Chalk, Calcite, Dolomite, Barite, and Kaolin. Brief description of the following coal types: Peat, Lignite, Bituminous, and Anthracite. Brief introduction to petroleum, its origin and occurrence in India.

REFERENCE AND TEXTBOOKS

B. SC. GEOLOGY
ALLIED GEOLOGY PAPERS
ALLIED GEOLOGY PRACTICAL


Magnesite, Barite, Gypsum. Coal varieties: Peat, Lignite, Bituminous, and Anthracite.

**Petrology:** Identification and physical description of the following rocks: Igneous rocks: Granite, Pegmatite, Syenite, Diorite, Gabbro, Dolerite, Dunite, Pyroxenite. Metamorphic rocks: Slate, Mica schist, Chlorite schist, Hornblende gneiss, Garnet-mica gneiss, Granulite, Marble. Sedimentary rocks: Sandstone, Conglomerate, Arkose, Grit, Shale, Limestone.

