

Department of geology
Tulasi women's college, Kendrapara
Programme Outcomes, Programme
Specific Outcomes and Course Outcomes
For UG

Programme outcome:-

Geology is a branch of Science with a Multidisciplinary approach. The UG Course program of Geology comprises of 3 year degree course consisting of six papers encompassing various branches of Geology to achieve aim of study.

Student pursuing graduation with B.Sc. in Geology should be able to: -

- Understand the basic geological concept, principles and theories of stratigraphy.
- Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classroom.
- Expose the student to the vast scope of Geosciences in the field of disaster management, watershed management, water pollution, oil exploration, mining etc.
- Emphasize the importance of geology as the most important discipline for sustaining the existing industries and establishing new ones to create job opportunities at all levels of employment.

Programme specific outcomes:-

- Collaborative learning is encouraged during the field training programmes and educational tours.
- Encouraging faculty members to participate in conferences, seminars, workshops and other faculty development programmes to enrich and update their academic and administrative knowledge and capacity building.
- Encouraging standard research activities of faculty members and students.
- Organizing Career Counselling sessions for students.
- Imparting training to members of the non-teaching staff to utilize computer facilities in documentation
- Overall development of an ethical sense and increasing awareness in terms of gender sensitization, cleanliness, environmental protection etc.

- Inculcation of value-orientation in students through the promotion of a sensitive attitude towards one's surrounding and culture
- Assists students in competitive examination and PG entrance examination (JAM, BHU PET, PU PET, IISC, NISER, IISER, CUCET and other University entrance examination)

Course outcome:-

The UG course in geology has 14 core papers, 2 ability enhancement course, 2 elective course, 4 discipline specific elective course distributed throughout the 6 semesters.

Semester -1

Core 1- General geology and Quaternary geology

The study of this paper strengthens student's knowledge with respect to understanding the essentials of the dynamics of earth, origin and age of our Solar system and planets including earth, and its physical parameters. Students will also enrich themselves with the knowledge of seismology, volcanoes, earthquakes, coriolis force, atmospheric circulation, concept of isostasy, geological work of river, wind, groundwater, ocean, glacier, and Quaternary geology and glaciations.

Core 2- Tectonics and Remote sensing

Students will earn knowledge on plate tectonics, tectonic movement, continental drift, isostasy, relief and sediments of ocean floor, and a brief knowledge on remote sensing. They will acquire knowledge on aerial photography, and its application in mineral exploration, ground water exploration, and geomorphology.

Semester-2

Core 3- Crystallography and Mineralogy

The course is designed to understand the basics of mineralogy and crystallography which helps to gain overall knowledge in Geology. The course deals with the study of crystals with respect to their

morphology, symmetry notations, normal crystal classes and various laws of crystallography, study of minerals, their physical, chemical and optical characteristics.

The students will be able to identify common rock forming minerals in hand specimens and in thin section and will gain knowledge about various mineral groups.

Core 4- Optics and Geochemistry

Students will gain knowledge on petrological microscope and its use, behaviour of various mineral and rocks in polarized and unpolarized light and its properties. Further, the paper is designed to throw a light on concepts of geochemistry, radiogenic isotopes, geochronology, cosmic abundance of elements, geochemical cycles and its behaviour, and concept of chromatography.

Semester-3

Core 5- Igneous petrology

The course of this paper designed to understand the processes involved in the formation of rocks i.e. building blocks of earth.

The students will be able to understand the formation of igneous rocks. They acquaint about various processes responsible for the formation of different types of rocks. This paper gives a brief idea on petrographical studies on various igneous rock clans.

The students will understand the forms, structure, texture of igneous rocks interpreting crystallization history.

Core 6- Sedimentary petrology

The students will acquire knowledge on formation of sediment and sedimentary rock. They will learn more on fabric and texture of the rocks and they will be able to identify and naming the rock. Further the petrographic studies on various rock type will help the student to grasp the subject. The microscopic studies will briefly tell about the genesis of the rock.

Core 7- Metamorphic petrology

This unit will help the students to learn more on importance of temperature and pressure and how it can affect the rock types and grades. ACF and AKF diagram will help to classify the metamorphic rock clan. Further, concept on index mineral, zones and grades and metamorphic facies will enhance the knowledge on metamorphic petrology. Microscopic studies and petrographic studies will help to analyze the rock types and its parent rock types.

Semester-4

Core 8- Palaeontology

Students will gain knowledge on fossils, conditions of fossilization and modes of preservation. Further, they will be able to identify different types of fossils on basis of morphology and geological history. This unit throws light on origin of vertebrates, major steps in vertebrate evolution, mesozoic reptiles evolution and extinction, palynology, and gondwana flora.

Core 9- Stratigraphy

Students will gain knowledge on fundamentals of litho, bio and chrono-stratigraphy. Introduction to concepts of dynamic stratigraphy, code of stratigraphic nomenclature, Sequence stratigraphy and their subdivisions with Indian examples. Further, students will learn more on concept of paleogeographic reconstruction, pysiographic and tectonic subdivisions of India, phanerozoic Stratigraphy of India, GSSP, precambrian stratigraphy, precambrian stratigraphy.

Core 10- Structural geology

The course designed for the students to understand geological structures developed in rocks by the action of force action on them.

The students will be able to understand the geometry and mechanics of the various structures that result through rock deformation.

To determine possible causes of formation of structures and forces responsible for its deformation.

This course also helps to know the relation of structure with tectonics.

Learn how to read geologic maps and solve simple map problem using strike and dip and preparation of cross sections.

Learn to use equipment and field tools to collect data for laboratory analyses.

Semester-5

Core 11- Process of formation and Mineral economics

In this paper, students will learn about process of formation of ore body via magmatic concentration, hydrothermal process, wall rock alteration, paragenesis, zoning, residual and mechanical concentration, oxidation and supergene enrichment, sedimentation, evaporation. Further, students will learn more on origin, occurrence, distribution and uses of coal and petroleum, atomic minerals, strategic and essential mineral, critical mineral and conservation of mineral resources.

Core 12- Economic geology

Students will gain knowledge on ores and gangues and their classification, controls of ore localisation, metallogenic epochs and provinces, techniques of mineral exploration. Further, it throws light on mineralogy, mode of occurrence, origin, Indian occurrence, uses of metallic minerals and industrial minerals.

Semester-6

Core 13- Ground water and Engineering geology

Students will acquire knowledge on water bearing characteristics of rocks, ground water exploration techniques and quality, ground water pollution. Further, it throws light on engineering properties of materials, geology of dams and reservoir site selection, geology of tunnel and bridges, their alignment and earthquake resistant structures.

Core 14- Mining and Environmental geology

This paper is designed to give students a brief introduction on mining, open cast and underground mining, drilling and surveying, sampling, ore reserve and estimation.

Further, it throws light on disaster management, resource management, management of solid wastes, environmental protection, arsenic poisoning, and remedial measures.

Discipline specific elective

Discipline specific elective subject is introduced on 5th and 6th semester of 3rd year to enhance the knowledge of geology honours students.

Dse 1- Fuel geology

Students will learn more on origin, classification, uses and fundamentals of coal and petroleum geology. Further, petroleum reservoir and traps, their types and classification will help student to grasp the subject better. Students will be able to identify different types of coal samples and their uses.

Dse 2- climate change and Disaster management

This paper will help the students to learn more on natural disaster, their causes, effects, mitigation techniques, climate change, glacial periods, green house gasses and global warming. Further, this paper will help to understand the world weather, thermal and composition of atmosphere, jet streams and its influence on world weather.

Dse 3- Earth and Climate

This paper will help the students to learn the climate system better. Students will learn more on climate system and anthropogenic effect on world weather, heat budget of earth, monsoons, effects of monsoons, layers of atmosphere, atmospheric circulation, oceanic circulation, heat transfer in ocean, global oceanic conveyor belt.

Further, students will learn more on glacial periods, melankovitch cycle, and marine isotope changes.

Dse 4- Project/ evolution of life through time

A student can choose a suitable topic for project work to enhance the practical knowledge on geology or he /she can choose to write this paper.

In this paper, students will earn knowledge on origin of life, evolution and extinction of life through the ages, fossils, abundance and diversity of microbes,

and mineral interaction, life in palaeozoic, mesozoic and Cenozoic era, origin and extinction of life through the ages.