The following different courses in 3-year Geology Programme:

Year	Semester	Course Code	Course Title	Course Outcomes (CO's)
I	I	2120-IA	Physical Geology and Crystallography	Upon completion of Paper students will be able to understand: **Physical Geology:** ● Geology Definition, scope, relation with other subjects. ● Importance of geology. ● Weathering and Erosion agents. ● Formation of Deferent land forms due to erosion agents - how the landscape changes. ● Volcanoes, Plate tectonics, Earthquakes. ● Origin and Age of the Earth. **Crystallography:** ● Crystal definition, Amorphous and Crystalline states. ●Morphology of crystals. ●The 48 Special Crystal Forms. ●Crystallographic axes. Symmetry. ● Parameters, Hermann-Mauguin Symbol. ●Classification of Crystals. ● Detailed study normal class of each System with examples.
I	II	2120-IB	Mineralogy and Optical Mineralogy	**Upon completion of Paper students will be able to understand:** **Mineralogy** ● Definition and scope of mineralogy. ●Occurrence of Minerals ● Processes of Mineral formation ●Mineral Identification, Physical properties of minerals. ●Classification of minerals, Silicate structures ● Physical properties, chemical properties and mode

				of occurrence of the major mineral groups **Optical Mineralogy** ● Uniaxial and Biaxial Minerals. ● Nicol Prism and its construction, ● Concept of crossed nicols. ● Petrological (Polarising) Microscope - its mechanical and optical parts ● Behaviour of minerals between crossed nicols
II	III	2220-IIA	Petrology (Igneous, Sedimentary and Metamorphic)	**Upon completion of Paper students will be able to understand:** ● Nature and scope of Petrology ● Distinguishing features of three types of rocks.● Rock cycle ● Solidification and Composition of magma ●Origin &Forms of Igneous rocks. ●Structures and textures ●Classification of igneous rocks ●Source of sediments, diagenesis and Lithification, ●structures, ●sedimentary processes and environments, ●Classification. ●Agents and types of metamorphism, Grades and Zonesof Metamorphism. ●Structures and Textures of Metamorphicrocks ●Classification of Metamorphic
II	IV	2220-IIB	Structural Geology & Paleontology	**Upon completion of Paper students will be able to understand:** **Structural Geology:** ● Stress and strain in the earth's lithosphere ● How Rocks behave when stressed, - how rock layers deform over time ● Strike and Dip● Primary & secondary structures ● Folds, faults, joints and unconformities – geometry, classification, interpretation, how they recognized in

				field and their uses. ● Elements of Geotectonics - surface of the Earth is broken up into different plates that move around **Paleontology:** ● Processes of fossilization. ● Fossil preservation types & uses ● Time Scale ● Evolution of life through time. ● Morphological characters, geological ages and Evolutionary trends of major Phyla. ● Elements of paleo botany.
III	V	2320-IIIA	Stratigraphy & Indian Geology	**Upon completion of Paper students will be able to understand:** **General Stratigraphy:** ●Stratigraphic Principles, ● Lithostratigraphy, Standard Geological Time Scale, ● Principles of correlation. ●The students learn how beds are correlate with one region to another region. ● To gain knowledge about chronological order. **Indian Geology:** Lithological Succession of different geological periods (Dharwars, Puranas Gondwanas, Triassic of spiti, Jurassic of Kutch, Cretaceous of Trichy. Deccan traps and Siwaliks) ● Geology of Andhra Pradesh. ● Able to understand which age of beds conserved mineral deposits. ● Understand the age of tectonic events in the past periods and determine the age of fossils. ● procure knowledge about paleo environments.
III	V	2420-IVA	Economic Geology	**Upon completion of Paper students will be able to understand:** • Ore mineral, Tenor of ore, Gangue minerals • Syngenetic deposits, Epigenetic and Endogenetic and Exogenetic deposits. • Classification of minerals deposits.

				• Process of formation of Mineral Deposition. • Magmatic concentration, Contact Metasomatism, Hydrothermal • Residual and Mechanical concentration • Oxidation and supergene enrichment. Metamorphism. • Properties, Mode of Occurance, distribution in India and uses of the metals. ● Major Mineral resources of Andhra Pradesh.
III	VI	2320-IIIB	Ground Water: Geology & Exploration	**Upon completion of Paper students will be able to understand:** • Scope and applications of hydrogeology • Definition of terms like Hydrology, Geohydrology and Hydrogeology • Concept of Hydrologic Cycle • Origin and classification of groundwater • Occurrence and vertical distribution of groundwater. • Aquifers: types and properties • Coastal aquifers - Salt water intrusion ● Water bearing properties of rocks • Favourable Geological conditions for Groundwater • Hydraulic conductivity. Darcy's law. • Methods of locating groundwater • Quality of groundwater ● Groundwater potential and Provinces in India
III	VI	2420-IVB	Mineral Exploration	**Upon completion of Paper students will be able to understand:** • Definitions of Prospecting and Exploration • Geological prospecting • Geochemical prospecting, • Geophysical prospecting

				• Types of ore reserves and their calculations • Ore estimation • Fundamentals of Mineral Beneficiation • Ore Sampling Methods • Open cast mining • Underground mining • Drilling Methods • Remote sensing techniques in mineral exploration
III	VI	2420-VB	Environmental Geology	**Upon completion of Paper students will be able to understand:** • Concepts of environmental geology ● Role of Geologist in environmental Protection • Geo environment Management. ● Earth and its spheres ● Definition of soil, soil formation, soil profile • soil properties, ● Types of soils, Classification of soils, Soil contamination, soil functions. ● Coastal erosion, management,sea level changes ● River-Flood plains. Floods and its types, Causes & Mitigation. • Mining impact on the environment - Health Hazards • Environmental considerations in location and construction • Waste disposal hazardous Earthquakes,Volcanic& Landslides- Prediction and Protection ● Causes for Tsunamis.
III	VI	2420-VIB	Remote sensing & Engineering Geology	**Upon completion of Paper students will be able to understand:** **Remote sensing:** ● Types of Aerial Photographs, ● Photo Geological Studies – Interpretation ● EMR Interaction with Atmosphere and Earth Surface ● Remote Sensing definition. Space, Sensor and Ground segments. ● Remote Sensing platforms.

				Sensors used in Remote Sensing. ● Indian Remote Sensing Satellites, Remote Sensing applications (mineral exploration geomorphology, soil mapping etc) ● GIS and its applications ● Remote Sensing for GIS. ● Data models, ● Main Segments of GIS, ● Components of GIS, **Engineering Geology:** • Role of geologist in Engineering planning, design and construction. • Engineering properties of rocks. • Site investigation methods • Geological, Geotechnical and Environmental considerations for Dams and Reservoirs Tunnels, bridges and highways