GEMS ARTS AND SCIENCE COLLEGE, RAMAPURAM

POST GRADUATE DEPARTMENT OF APPLIED GEOLOGY

PROGRAMME OUTCOMES (POs), PROGRAMME SPECIFIC OUTCOMES (PSOs), and COURSE OUTCOMES (COs)

MSc. GEOLOGY

PROGRAMME OUTCOMES(Pos)

PO1. Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO2. Problem Solving: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired from humanities/ sciences/mathematics/social sciences.

PO3. Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO6. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1. Apply the concepts of Physical geology, Geomorphology, and Historical Geology.in solving problems and taking decisions.

PSO2. Understand the physical, chemical and optical characteristics of rocks and minerals, their economic aspects and distribution so as to suggest and promote the wise use of the resources.

PSO3. Understand the structural aspects of rock formations, global tectonics and earth dynamics in order to help the society in understanding and managing natural disasters, wherever possible.

PSO4. Discuss the applications of geoscience in environmental planning and management

COURSE OUTCOMES (Cos)

SEMESTER 1

COURSE CODE	PAPER NAME	CREDITS	COURSE OUTCOME
GEL 1C 01	PHYSICAL GEOLOGY &GEOMORPHOLOGY	4	CO1 The student will be able to discuss and explain about the origin and evolution of earth, earth's various layers and their properties.
			CO2 The student will be able to demonstrate the role of various geological agents and illustrate the landscape evolution .
			CO3 The student will be able to explain the geological significance, classification and mode of formation of wetlands.
			CO4 The student will be able to describe the geomorphology of Kerala and India.
			CO5 The student will be able to apply the principles of geomorphology in Civil Engineering, Hydrogeology, and Environmental Studies.
GEL 1C 02	STRUCTURAL GEOLOGY &GEOTECTONICS	4	CO1 The student will be able to demonstrate the geological mapping skills in any terrain
			CO2 The student will be able to illustrate the stress and strain concepts with the help of graphical representations.
			C 03 The student will be able to explain the relationship between various structural features and the processes responsible for their formation.
			CO4 The student will be able to illustrate the various tectonites and shear sense indicators
			CO5 The student will be able to describe tectonic evolution of Earth's continental crust.
			CO6 The student will be able to explain the plate tectonic system in earth, plate kinematics, and geodynamic evolution of Indian plate.
GEL 1C 03	GEOINFORMATICS	4	CO1The student will be able to explain the fundamentals of aerial photography and remote sensing.
			CO2The student will be able to discuss electromagnetic spectrum, resolution

			concepts, various sensors, and Indian remote sensing satellite missions.
			CO3The student will be able to explain the fundamentals of digital image processing and classification, thermal and microwave remote sensing.
			CO4 The student will be able to apply the remote sensing techniques in mineral exploration, ground water exploration, land use/land cover mapping and geomorphology
			CO5The student should be able to explain the working principles of Geogrpahic Information System.
			CO6 The student should be able to explain the GIS Applications in urban planning, groundwater studies, mineral exploration, disaster management, climate change analysis
GEL 1C 04	STRATIGRAPHY&INDIAN GEOLOGY	4	CO1 The student will be able to explain Stratigraphic principles and evolution, recent developments in stratigraphic classification and major geological events during the different periods of earth history.
			CO2 The student will be able to demonstrate the Indian Geology with particular reference to Precambrian and Phanerozoic stratigraphy and stratigraphic boundary problems.
GEL 1L 01	GEOMORPHOLOGY ,STRUCTURAL GEOLOGY,GEOINFORMATICS		C01 The student will be able to apply the principles of geomorphology, structural geology and geoinformatics in problem solving and map interpretation.

SEMESTER 11

COURSE CODE	PAPER NAME	CREDITS	COURSE OUTCOME
GEL 2C 05	CRYSTALLOGRAPHY & MINERALOGY	4	CO1 The student will be able to explain the basic laws of crystallography, application of X-ray crystallography and stereographic projection of crystals.
			CO2 The student will be able to describe the various crystal notations and derivation of the crystal classes with symmetry elements.
			CO3 The student will be able to distinguish the minerals based on their optical properties such as sign of elongation, order of interference colour and also on conoscopic observations.
			CO4 The student will be able to discuss the Earth mineralogy.
			CO5 The student will be able to describe the structure, chemistry, physical, optical characters of important rock forming minerals.
GEL 2C 06	ECONOMIC GEOLOGY	4	CO1 The student will be able to illustrate the important properties of ore minerals under the ore microscope.
			CO2 The student will be able to describe the various theories of ore genesis and association of rock types and ore minerals.
			CO3 The student will be able to explain the genetic classification of U and Th deposits, Strategic, critical and essential minerals of India, National Mineral Policy of India.
			CO4 The student will be able to understand various types of mineral deposits and its classification.
			CO5 The student will be able to describe the origin of coal deposits, petroleum formations and gas hydrates and distribution of these fossil fuels in

			India.
GEL 2C 07	HYDRO GEOLOGY	4	CO1 The student will be able to explain Origin of water, subsurface movement and vertical distribution of groundwater, and hydrological properties of rocks.
			CO2 The student will be able to describe the theory of groundwater flow, methods of pump test data analysis and evaluation of aquifer parameters.
			CO3 The student will be able to demonstrate various water quality parameters using graphical representations.
			CO4 The student will be able to demonstrate the various methods of groundwater exploration.
			CO5 The student will be able to describe the types of wells, drilling methods, various problems related to groundwater, and groundwater provinces of India.
GEL 2C 08	APPLIED PALAEONTOLOGY&SEDIMENTOLOGY	4	CO1 The student will be able to illustrate vertebrate paleontology - succession of vertebrate life through geologic time the general characteristics and evolution histories of Dinosaurs, Equus, Elephus and Man.
			CO2 The student will be able to apply the principles of micropaleontology and palynology in various fields.
			CO3 The student will be able to apply the information on heavy minerals in provenance studies.
			CO4 The student will be able to apply the information on textures and structures in order to understand about the origin of the rocks.
			CO5 The student will be able to describe sedimentary facies and depositional environments, Lithologies and structures formed in various environments, basin analysis, and the relationship between plate tectonics and sedimentation.

GEL 2L 02 (P)	CRYSTALLOGRAPHY,MINERALOGY,ECONOMIC GEOLOGY,HYDROGEOLOGY,PALAEONTOLOGY&SEDIMENTOLOGY	3	CO 1 The student will be able to apply the theoretical knowledge in solving problems, identification, interpretation and graphical interpretation.

SEMESTER III

COURSE CODE	PAPER NAME	CREDITS	COURSE OUTCOME
GEL 3C 09	IGNEOUS & METAMORPHIC PETROLOGY	5	CO1 The student will be able to understand the generation of magma and formation of igneous rocks at different tectonic setting.
			CO2 The student will be able to illustrate the significance of Bowen's reaction principle, textures and structures, phase rule and its applications, and isotopic studies in the study of igneous Rocks.
			CO3 The student will be able to describe the unary, binary, ternary and quaternary phase diagrams.
			CO4 The student will be able to describe the classification of igneous rocks under various schemes and also the petrography and petrogenesis of important igneous rock groups.
			CO5 This course provides a comprehensive knowledge in experimental metamorphic petrology, metamorphism in relation to space and time, and plate tectonics.
			CO6 The student will be able to discuss the equilibrium aspects of metamorphic reactions, phase diagrams and graphic

			representation of mineral assemblages, and experimental and thermodynamic appraisal of metamorphic reactions.
			CO7 The student s will be able to illustrate the petrogenetic significance of metamorphic textures and structures, progressive, contact and regional metamorphism of argillaceous, carbonate, basic igneous,and ultramafic rocks.
GEL 3E 01a	CLIMATOLOGY	3	CO1 Basic understanding of the various underlying principles of climatology in relation to the processes of Earth, especially in the light of climate change .
			CO2 Students will be able to understand various climate phenomenon including surface wind movements, geostrophic wind, jet streams, precipitations, rainfall, thunderstorm, lightning, cyclones etc.
			CO3 Students will be able to understand about air masses, fronts and different types of precipitation and condensation proces
			CO4 Students will be able to understand various geographic phenomenon like rainfall, thunderstorm, lightening, tornado and cyclones in detail
GEL 3E 02a	ENVIRONMENTAL GEOLOGY	3	CO1 Basic understanding of the immediate environment, pollution, EIA, and waste management practices
			CO2 The students will be able to explain the hydrologic cycle and theory of plate tectonics as related to natural hazards and earth resources.
			CO3 The students will be able to explain common earth materials and their relationship to environmental hazards
			CO4 The students will be able to explain how earth processes create hazards to life and property
			CO5 The students will be able describe the occurrence and formation of earth resources and significant environmental effects caused by their extraction, processing, and use
			CO6 To describe the major sources of water, soil, and sediment pollution and methods for their management.
			CO7 The students will be able explain the causes and effects of global climate

			change
GEL 3E 03a	MARINE GEOLOGY	3	CO1This course will help the students to understand history of Marine Geological studies.
			CO2 Students will be able to explain various topographical features of the sea bottom.
			CO3Students will be able to describe properties of physical and chemical sea water and its significance.
			CO4 Basic understanding of the marine and coastal processes, deposits and landforms in a geological perspective.
			CO5 Students will be able to understand general ocean circulation and related events.
			CO6 Students will be able to explain various types of marine sediments and marine mineral deposits.
GEL 3L 03(p)	IGNEOUS& METAMORPHIC PETROLOGY &ELECTIVE COURSE	4	CO1 The student will be able to apply the theoretical knowledge in solving problems, identification, interpretation and graphical interpretation.

SEMESTER IV

COURSE CODE	PAPER NAME	CREDITS	COURSE OUTCOME
GEL 4C 10	GEOCHEMISTRY AND ISOTOPE GEOLOGY	4	CO1 The student will be able to understand the origin and distribution of elements and geochemical characteristics of the earth.
			CO2 The student will be able to describe the chemistry of the universe, stars, nucleosynthesis, origin of the solar system, meteorites.
			CO3 The student will be able to describe the Laws of thermodynamics and geochemistry of weathering transportation and deposition.
			CO4 The student will be able to explain isotope geochemistry; applications in magmatic systems, geochemical cycle and principles of geochemical prospecting.
			CO5 The student will be able to explain geochronology and age of the Earth, radiogenic isotope systems.
			CO6 The student will be able to explain modern analytical techniques, fission track and other radiation damage methods of dating.
GEL 4E 04a	EXPLORATION GEOLOGY	4	CO1 The student will be able to describe the methods of surface and subsurface exploration, drilling and its types and methods of ore reserve estimation.
			CO2 The student will be able to explain the geological, geochemical, geophysical and radiometric exploration methods.

GEL 4E 05a	ENGINEERING GEOLOGY	3	CO1 The student will be able to describe the geological studies and evaluation in planning, design, construction and problems of major civil structures
			CO2 The student will be able to describe mining methods, ore dressing, and mineral legislation in India.
GEL 4L 04	GEOCHEMISTRY& ELECTIVE COURSE	3	CO1 The student will be able to apply the theoretical knowledge in solving problems, identification, interpretation and graphical interpretation