DEPARTMENT OF GEOLOGY PROGRAME OUTCOME AND COURSE OUTCOME

# KENDRAPARA AUTONOMOUS COLLEGE KENDRAPARA, ODISHA, 754211

**Name of the Program – B.Sc Geology (Geology)**

**Duration of Program – 3 years Number of Semesters - 6**

**Program Outcome**

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| PO | Particulars |
| PO – 1 | The syllabus is based on an integrated curriculum with an approach to provide learning through problem solving and hands on training techniques. |
| PO – 2 | To provide adequate basic understanding of geology and its uses among students. |
| PO – 3 | Program aims to develop intellectual ability and geological skills through an appropriate blending of theoretical subject education, practical exercises and field training. |
| PO – 4 | To provide basic knowledge, training, skills and eligibility degree for various higher academic courses and Technical Assistant job position in research institutions. |
| PO – 5 | To provide basic degree required to appear for job selections in various services as recruited by UPSC, State and Central Government organisations. |
| PO – 6 | To train students to take up the technical assistant functions at various geological organisations like Survey of India, Oil and Natural Gas Commission, Geological Survey of India etc. |
| PO – 7 | To motivate students to take up higher studies and ultimately research in different sub disciplines of the subject in India and abroad. |
| PO – 8 | To develop appropriate skills in the students to make them competent to take up self employment in innovative geology related fields. |
| PO – 9 | At the end of three years of B. Sc. Geology course students would gain through understanding in the fundamental concepts of geological sciences. |

**Course Outcome**

**First Semester (CC-I & CC-II)**

# **CC-I (**General geology and Quaternary geology**)**

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| CO -1 | Understand the tectonic plates their movement and their significance. |
| CO - 2 | Comprehend the significance earth’s plate movement. |
| CO - 3 | Analyse the process of aerial photography and its significance |
| CO - 4 | Understand the marine sediments their types and genesis. |

At the end of this course, a student will have developed ability to:

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| CO-1 | Understand the scope of geology, earth and solar system:  origin, size, shape, mass, density and its atmosphere. |
| CO- 2 | Understand earth’s origin theories and its interior composition. |
| CO - 3 | Analyse all the process of weathering and erosion. |
| CO - 4 | Understand the earthquakes and seismic waves,  Volcanoes, their types and products. |
| CO - 5 | Comprehend the significance of Quaternary period in present time. |

**CC-2 (**Tectonics and remote sensing**)**

At the end of this course, a student will have developed ability to:

**CC-3 (**Crystallography and Mineralogy **)**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the terms associated with crystal description. |
| CO - 2 | Analyse familiarity with measurements of crystal axes, angles & interfacial angles. |
| CO - 3 | Understand the concept of crystal parameters and notation systems. |
| CO - 4 | Comprehend different elements of crystal symmetry and will be able to describe the normal class of various crystal systems, mentioning nature of their crystal axes, symmetry and forms present. |

# **CC-4 (**Optics and Geochemistry**)**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the concept of mineral, its definition & analise general characters. |
| CO - 2 | Define the common physical properties displayed by minerals in hand specimens, their chemical composition and diagnostic physical properties of certain common rock forming minerals. |
| CO - 3 | Understand the parts and functioning of polarizing petrologic microscope, concept of ordinary and polarized light, various optical properties of minerals’ thin sections studied under them and under crossed nicols. |
| CO - 4 | Recognize the optical properties of certain common rock forming minerals as studied under the petrologic microscope. |
| CO - 5 | Understand the chemical aspects of geology |
| CO - 6 | Undertand the basics of crystal chemistry, chemical bonds, coordination number. Colloids, ion exchanges and Periodic Table. |
| CO - 7 | Comprehend the cosmic abundance of elements, composition of planets and meteorites, geochemical evolution of earth and geochemical cycle. |
| CO - 8 | Understand the Gold Schmidt’s geochemical classification of elements and distribution of major, minor and trace elements in various categories of rocks. |
| CO - 9 | Understand the basics of geochemical thermodynamics, isomorphism and polymorphism and isotope geochemistry. |

# **CC-5 (**Igneous petrology**)**

At the end of this course, a student will have developed ability to:

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| CO -1 | Understand the definition, composition, types and origin of magma, forms and textures of igneous rocks. |
| CO -2 | Understand reaction principles, crystallization of unicomponent and bi-component magma, mix crystals, Bowen’s Reaction Series, and development of various igneous rocks through differentiation and assimilation. |
| CO - 3 | Comprehend the mineralogical and chemical classification of igneous rocks. |
| CO - 4 | Understand the petrography and writing description of igneous rocks. |

# **CC-6 (**Sedimentary petrology **)**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the formation, classification, textures and structures of sedimentary rocks. |
| CO - 2 | Comprehend the petrographic details of certain common and important siliciclastic and carbonate rocks. |
| CO - 3 | Understand the concept of sedimentary basins |
| CO - 4 | Recognise the petrography and writing description of sedimentary rocks. |

**CC- 7(Metamorphic petrology )**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand thye definition, composition, types and origin of magma, forms and textures of Metamorphic Rocks |
| CO - 2 | Analyse the mineralogical and chemical classification of Metamorphic Rocks . |
| CO - 3 | Recognise the petrography and writing description of Metamorphic Rocks . |
| CO - 4 | Understand formation, classification, textures and structures of Metamorphic Rocks . |
| CO - 5 | Distinguish the petrographic details of certain common and important metamorphic rocks. |

# **CC- 8 (**Palaeontology**)**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the fossils their characters and significance, taxonomical binomial nomenclature, modes and conducive conditions of fossilization. |
| CO -2 | Comprehend the morphology and geological distribution of brachiopods, pelecypods (bivalves), and cephalopods. |
| CO - 3 | Comprehend the morphology and geological distribution of trilobites and echinoids. |
| CO - 4 | Understand the evolutionary history of horses, morphology, distribution and significance of Gondwana flora. |

**CC- 9 (Stratigraphy)**

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand definition, principles of stratigraphy, geological time scale and stratigraphic classification.  Physiographic divisions of India. |
| CO - 2 | Distinguish the Precambrian, Paleozoic, Mesozoic Cretaceous sucessions of different parts of india. |
| CO - 3 | undderstandtype localities of Gondwana and Deccan Trap. |
| CO - 4 | Understand the Paleogene and Neogene sequences of northwest Himalaya and Assam. |

# – 10: Structural geology

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the contours, topography, elementary idea of Bed, Dip & Strike, effect of structures on outcrop, use  of clinometer / brunton compass |
| CO - 2 | Understand the types of deformation, nomenclature and types of folds. |
| CO - 3 | Distinguish among faults nomenclature, geometrical and genetic classifications, normal, thrust and dip faults. |
| CO - 4 | Understand the definition, kinds and significance of joints and unconformity. |

CC–11 Processes of formation and Mineral economics

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the ore and ore deposits, ore minerals and gangue minerals, tenor of ores, metallic and non-metallic ore minerals, strategic, critical and essential minerals. |
| CO - 2 | Understand the processes of formation of ore deposits, magmatic, contact metasomatic and hydrothermal sedimentation process. |
| CO - 3 | Understand the important metallic and non-metallic (industrial) minerals. |
| CO - 4 | Comprehend the distribution of coal and petroleum in  India. |

# CC–13 Ground water and Engineering geology

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand the definition and hydrological cycle. |
| CO - 2 | Distinguish hydrologic parameters like precipitation, evaporation, transpiration and infiltration. |
| CO - 3 | Understand the origin of groundwater, it’s vertical distribution and types of aquifers, porosity, permeability, specific yield and specific retention. |
| CO - 4 | Comprehend the geological and geophysical methods of groundwater exploration and ground water provinces of India. |
| CO - 5 | Understand the basic engineering properties of rocks and soils. |
| CO - 6 | Distinguish various types of soils, conditions of their development and their distribution in India. |
| CO - 7 | Understand the dams, their types, geological and environmental considerations in deciding the location, design/ type of dam and geological problems of reservoirs. |

CC – 14 Mining and Environmental geology

At the end of this course, a student will have developed ability to:

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| CO - 1 | Compare nad understand the elementary idea of geological and geophysical prospecting for mineral exploration. |
| CO - 2 | Understand elementary idea of mining. |
| CO - 3 | Comprehend the environmental considerations for mining. |
| CO - 4 | Distinguish and understand atmosphere, hydrosphere, lithosphere, biosphere and man and various earth materials. |
| CO - 5 | Understand the energy budget, solar radiation, global environments: coastal, riverine, desertic, tropical, cold, polar; global warming and climate change. |
| CO - 6 | Understand the important geological hazards: earthquakes, volcanoes, landslides, avalanches, floods and, draughts; hazard mitigation. |
| CO - 7 | Comprehend and distinguish the Conventional and nonconventional energy resources and their management, water resources and watershed management, land use planning and land reclamation. |

# DSE I: Fuel Geology

At the end of this course, a student will have developed ability to:

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| CO - 1 | Understand coal and its genesis |
| CO - 2 | Distinguish among coal ranks and know about its distribution in world and India. |
| CO - 3 | Understand petroleum and its genesis |
| CO - 4 | Analyse the distribution of petroleum in world and India |

DSE- 2 Climate Change And Disaster Management

At the end of this course, a student will have developed ability to:

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| CO – 1 | Understand important geological hazards: earthquakes, volcanoes, landslides, avalanches, floods and, draughts; hazard mitigation. |
| CO – 2 | Comprehende the earth and its spheres, atmosphere, hydrosphere, lithosphere, biosphere and man and various earth materials. |
| CO – 3 | Understand the energy budget, solar radiation, global environments: coastal, riverine, desertic, tropical, cold, polar; global warming and climate change. |
| CO – 4 | Understand the global warming and climate change. |

# DSE- 3 Earth And Climate

At the end of this course, a student will have developed ability to:

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| CO – 1 | Understand important geological causes and factors of climate change |
| CO – 2 | Understand earth and its atmosphere |
| CO – 3 | Analyse the importance of surface and ground water . |
| CO - 4 | Comprehend the global warming its geological history. |