

राष्ट्रीय शिक्षा नीति – 2020 आधारित

Choice Based Credit System (C.B.C.S.)

[नियमावली: 2024–25]

3 YEARS UG PROGRAMME

3 YEARS UG (HONS.) PROGRAMME

4 YEARS UG (HONS.) PROGRAMME

4 YEARS UG (HONS. WITH RESEARCH) PROGRAMME

Geology (Minor)

Ist and 2nd Sem

[EFFECTIVE: 2024-25 ONWARDS]



महाराजा सुहेल देव विश्वविद्यालय, आजमगढ़

Signature *Signature*

Maharaja Suhel Dev State University, Azamgarh

Syllabus
B.Sc. Geology (Minor)

For III and IV Sem

Year	Sem.	Course Code	Paper Title	Theory/Practical	Credits
2	III	B090301T	Minor: Palaeontology	Theory	6
2	IV	B090401T	Minor: Petrology	Theory	6

Year	Sem ester	Theory/ Practical	Compulsory / Elective	Course Title	Credits	Teaching Hours
2	Third	Theory	Minor	Minor: Palaeontology	06	90
2	Fourth	Theory	Minor	Minor: Petrology	06	90

Programme/Class: Minor		Year: First	Semester: First
Subject: Geology			
Course Code: B090101T		Course Title: Physical and Structural Geology	
Course outcomes: After completing the course, student Will learn origin of solar system and Earth Will understand internal structure of Earth Will understand interpretation stress-strain imprinted in earth Will learn the Interpretation of deformed structure Will understand role of weathering agents			
Credits: 6		Core: Minor	
Max. Marks: 100		Min. Passing Marks: as per rules	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 3-0-0			
Unit	Topics		No. of Lectures
I	Introduction to Geology and its scope, Earth and Solar system: origin, size etc., Age of Earth , Internal Structure and composition of Earth.		10
II	Sea-floor spreading; Basic concepts of Plate -Tectonics, Continental Drift		11
III	Weathering and erosion: factor, types, Erosion, transportation and deposition by wind and their related landforms.		12
IV	Erosion, transportation and deposition by rivers and glaciers, and their related landforms.		12
V	Basic idea about minerals and rocks; Introduction to structural geology; Dip and strike of beds; Forms of igneous bodies (concordant and discordant); Basic concepts of stress and strain		12
VI	Simple deformational structures: Fold morphology, their geometric and genetic classification, Top and Bottom of Beds		11
VII	Faults, Geometric and genetic classification of Faults (Normal, reverse and strike-slip faults); Causes of Fault; Recognition of faults in the field.		10
VIII	Unconformities: their classification and geological significance, Joint and its classification, Lineation and Foliation: basic introduction.		12

Suggested Readings:

1. The Blue Planet: An Introduction to Earth System Science – B.J. Skinner and S.C. Porter. 1995, John Wiley & Sons, Inc. 493p.
2. Introduction to Physical Geology – G.R. Thompson and J. Turk. 1998, Saunders College Publishers, Fort Worth. 371p.
3. Processes that Shape the Earth – D.M. Thompson. 2007, Infobase Publishing, NY. 116p.
4. Physical Geology – L.D. Leet, S. Judson and M.E. Kauffman, (1982). Prentice-Hall Inc. 629p.
5. Holme's Principles of Physical Geology – P.MvL.D. Duff, Fourth Edition (1993). StanleyThornes (Publishers) Ltd.
6. Bailey, B., 1992. Mechanics in Structural Geology, Springer.
7. Davis, G. H. and Reynolds, S. J., 1996. Structural Geology of rocks and regions, John Wiley. and Sons.
8. Ghosh, S. K., 1993. Structural Geology: Fundamentals, and modern developments, Pergamon Press.
9. Leyson, P: R. and Lisle, R. J., 1996. Stereographic projection techniques in structural geology, Cambridge

Programme/Class: Minor		Year: First	Semester: Second
Subject: Geology			
Course Code: B090201T		Course Title: Mineralogy and Crystallography	
Course outcomes: After completing the course, student Will learn the mineral and its types Will understand the crystal formation, form and occurrence Will learn formation of mineral groups and resource			
Credits: 6		Core: Minor	
Max. Marks: 100		Min. Passing Marks: as per rules	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 3-0-0			
Unit	Topics		No. of Lectures
I	Crystal, crystal growth and crystallisation; Laws of crystallography; Crystal morphology; Crystallographic axes and axial angles; Elements of symmetry.		10
II	Crystallographic notations; Crystal forms; Habit and classification; Crystal aggregate: Twinning and common twin Jaws.		11
III	Symmetry and forms of Hexagonal (beryl type and calcite type), Orthorhombic (Barytes type), Monoclinic (Gypsum type), and Triclinic (Axinite type) Crystal Systems		12
IV	Symmetry and forms of Cubic (Galena type, Pyrite type and Tetrahedrite type), and Tetragonal (Zircon type) Crystal Systems		12
V	Definition of mineral; Atomic bonding; Physical properties of minerals: colour, lustre, form, isomorphism, pseudomorphism, polymorphism, hardness, fracture, cleavage, specific gravity, and characters based on heat, electricity and magnetism;		12
VI	Physical properties, chemical composition, occurrences, and uses of minerals belonging to the Silica and Feldspar families, and clay minerals		11
VII	Physical properties; chemical composition, occurrences, and uses of Pyroxene, Olivine, Mica and Garnet families; Amphibole,		10
VIII	Nicol prism; Optically isotropic and anisotropic minerals; Polarisation of light; Optical properties of minerals under polarised light and crossed polars: refractive index, pleochroism, relief, twinkling, birefringence, interference colours, extinction and twinning; Classification of minerals into uniaxial and biaxial minerals		12

Suggested Readings:

1. Putnis A. 1992. Introduction to Mineral Sciences, Cambridge publication.
2. Cornelis Klein and Barbara Dutrow, 2007, The manual of Mineral Science, Wiley Publication
3. Mason, B., 1986. Principles of Geochemistry. 3 rd Edition, Wiley New York.
4. Rollinson H. 2007 Using geochemical data-evaluation. Presentation and interpretation. 2 nd Edition. Publisher Longman Scientific & Technical.
5. Walther John, V., 2009 Essentials of Geochemistry, student edition. Jones and Bartlett Publishers.
6. Albarede, F, 2003. An introduction to geochemistry. Cambridge University Press.

B.Sc. Geology (Minor) Syllabus For III and IV Sem.

Programme/Class: Minor		Year: Second	Semester: Third
Subject: Geology			
Course Code: B090301T		Course Title: PALAEONTOLOGY	
Course outcomes: After completing the course, student will know the palaeo-life of earth will know the reconstruction the earth based on fossils will be able to determine the age of rock formation-based fossils will be able to locate the resources based on fossils			
Credits: 6		Core: Minor	
Max. Marks: 100		Min. Passing Marks: as per rules	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 3-0-0			
Unit	Topics	No. of Lectures	
I	Introduction to palaeontology; Fossils and the processes of fossilization; Preliminary idea of the origin of life; Basic idea of trace fossils and their uses; Microfossils: Definition and significance; Geological Time Scale	12	
II	Morphology and geological history of Bivalvia, Brachiopoda	11	
III	Morphology and geological history of Gastropoda, Cephalopoda	10	
IV	Morphology and geological history of Echinoidea and Anthozoa.	12	
V	Morphology and geological history of Trilobita and Graptolithina	11	
IV	Introduction to Palaeobotany; Important Lower and Upper Gondwana plant fossils	12	
VII	Brief idea of concept of species; Classification of organisms; Principles of marine ecology, palaeoecology.	12	
VIII	Principles of sequence stratigraphy; Microplaeontology and its use	10	
Suggested Readings: 1. Cowen, R. (2000) History of Life, Blackwell Science. 2. E. N. K. Clarkson (2013) Invertebrate palaeontology and Evolution, Blackwell Science 3. Rhona M. Black, (1989) The Elements of Palaeontology, Cambridge University Press 4. Michael Benton, (2005) Vertebrate Palaeontology, Blackwell Publishing 5. Patrick Wyse Jackson, (2019) Introducing Palaeontology: A Guide to Ancient Life, Dunedin Academic Press Ltd. 6. Raymond Enay (2012) Palaeontology of Invertebrates, Springer-Verlag. 7. Peter Doyle, Understanding Fossils: An Introduction to Invertebrate Palaeontology. 8. Morley Davies (2008) An Introduction to Palaeontology, Read Books. 9. Sreepat Jain (2017) Fundamentals of Invertebrate Palaeontology: Macrofossils, Springer India 10. Roland Goldring, (2014) Field Palaeontology, Routledge			

Programme/Class: Minor	Year: Second	Semester: Fourth
Subject: Geology		
Course Code: B090401T	Course Title: PETROLOGY	
Course outcomes: After completing the course, student will learn to identify rock types and their mineralogical composition. will learn texture, structure found within the rock will understand the role of temperature and pressure in formation of rocks will understand the geo-thermoeter Understand stratigraphy and sedimentation history of different sedimentary basins of India will understand the process of sedimentation and rock formation		
Credits: 6	Core: Minor	
Max. Marks: 100	Min. Passing Marks: as per rules	
Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 3-0-0		
Unit	Topics	No. of Lectures
I	Rocks: types and origin. Phase Rule; Laws of thermodynamics; Phase equilibria studies in SiO_2 , Diopside-Anorthite, Albite-Anorthite, Leucite-Silica and Diopside-Albite- Anorthite systems	12
II	Brief introduction to rocks; Magma: definition, composition and origin; Bowen's reaction series; Magmatic differentiation and assimilation	10
III	Textures of igneous rocks; IUGS classification of igneous rocks, Brief petrographic description of common igneous rocks	11
IV	Definition, agents, types and grades of metamorphism; Metamorphic rocks: texture, structure and classification; Concept of index minerals, concept of isograds and metamorphic facies.	12
V	Regional metamorphism of pelitic, calcareous and basic rocks; anatexis; Brief description of common metamorphic rocks.	10
VI	Origin and classification of sedimentary rocks; Introduction to sedimentary rocks and their origin; Flow dynamics; Froude number; Reynold number and Types of flow (Laminar and turbulent flow)	12
VII	Sediment characteristics; Diagenesis; Textures of sedimentary rocks; Important primary Sedimentary Structures- bedding, ripple marks, cross bedding, mud cracks and rain prints.	11
VIII	Classification of sedimentary rocks: clastic and non-clastic; Classification of sandstone and carbonates with special reference to Folk's classification; Sedimentary basins in different tectonic settings	12
Suggested Readings: 1. Cox, K. G., Bell, J. D. and Pankhurst, R. J. 1979. Interpretations of igneous rocks. George Allen and Unwin, London. 2. Wilson, M. 1989. Igneous Petrogenesis. London Unwin Hyman. 3. Anthony R. Philpotts and Ague, J. J. 2009. Principles of Igneous and Metamorphic Petrology. Cambridge. 4. Winter, J. D. 2001. Igneous and Metamorphic Petrology. Prentice Hall. 5. Gautam Sen, 2014. Petrology: Principles and Practice: Gautam Sen (Springer). 6. Best, M. G. 2013. Igneous and Metamorphic Petrology. Wiley Blackwell.		