

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Geology

(Choice Based Credit System)

(with effect from the academic year 2017-2018 onwards)

Sem	Part I/II/III IV/ V	Sub. No	Subject Status	Subject Title	Course /Paper	Hrs./ Week	L Hrs/ Week	T Hrs/ Week	P Hrs/ Week	C Credits
Semester I	I	1	Language	Tamil / Other Languages	1	6	6	0	0	4
	II	2	Language	English	1	6	6	0	0	4
	III	3	Core	General Geology	1	4	4	0	0	4
	III	4	Core	Paleontology	1	4	4	0	0	4
	III	5	Major Practical-I	Practical- Paleontology	1	2	0	0	2	2
	III	6	Allied-I	Chemistry	1	4	4	0	0	3
	III	7	Allied Practical-I	Practical- Chemistry	1	2	0	0	2	2
	IV	8	Common	Environmental Studies	1	2	2	0	0	2
			Total		8	30	26		4	25
Semester II										
	I	9	Language	Tamil / Other Languages	1	6	6	0	0	4
	II	10	Language	English	1	6	6	0	0	4
	III	11	Core	Stratigraphy and Indian Geology	1	4	4	0	0	4
	III	12	Core	Crystallography	1	4	4	0	0	4
	III	13	Major Practical-II	Practical- Crystallography	1	2	0	0	2	2
	III	14	Allied-II	Chemistry	1	4	4	0	0	3
	III	15	Allied Practical-II	Practical- Chemistry	1	2	0	0	2	2
	IV	16	Common	Value based education/ சமூக மதிப்பு அடிப்படையிலான கல்வி/ Social Harmony	1	2	2	0	0	2

			Total		8	30	26		4	25
Semester III	I	17	Language	Tamil / Other Languages	1	6	6	0	0	4
	II	18	Language	English	1	6	6	0	0	4
	III	19	Core	Structural Geology	1	4	4	0	0	4
	III	20	Major Practical-III	Practical– Structural Geology	1	2	0	0	2	2
	III	21	Allied-III	Physics	1	4	4	0	0	3
	III	22	Allied Practical-III	Practical- Physics	1	2	0	0	2	2
	III	23	Skill based –I Core	Exploration Geophysics or Gemology	1	4	4	0	0	4
	IV	24	Non- Major Elective-I	Climatology or Fundamentals of Geology	1	2	2	0	0	2
			Total		8	30	26		4	25
Semester IV	I	25	Language	Tamil / Other Languages	1	6	6	0	0	4
	II	26	Language	English	1	6	6	0	0	4
	III	27	Core	Mineralogy	1	4	4	0	0	4
	III	28	Major Practical-IV	Practical– Mineralogy	1	2	0	0	2	2
	III	29	Allied-IV	Physics	1	4	4	0	0	3
	III	30	Allied Practical-IV	Practical- Physics	1	2	0	0	2	2
	III	31	Skill based- common	PD and Yoga	1	4	4	0	0	4
	IV	32	Non- Elective-II Major	Basic Hydrology or Mineral Economics	1	2	2	0	0	2

	V	33	Extension Activity	Extension activity NCC, NSS, YRC, YWF						1
			Total		8	30	26		4	26
Semester V	III	34	Core	Igneous Petrology	1	5	5	0	0	4
	III	35	Core	Sedimentary and Metamorphic Petrology	1	5	5	0	0	4
	III	36	Elective	Metamorphic Petrology /Geostatistics and Computer Application in Geology	1	5	5	0	0	4
	III	37	Elective	Marine Geology/ Environmental Geology	1	5	5	0	0	4
	III	38	Major Practical-V	Based on Igneous Petrology	1	2	0	0	2	2
	III	39	Major Practical-VI	Based on Sedimentary and Metamorphic Petrology	1	4	0	0	4	2
	III	40	Major Practical-VII	Based on Marine Geology	1	2	0	0	2	2
	IV	41	Skill based Common	Computers for Digital Era	1	2	2	0	0	2
			Total		8	30	22		8	24
Semester VI	III	44	Core	Economic Geology	1	6	6	0	0	4
	III	45	Core	Applied Geology – I (Geophysics, Geochemistry, Engineering Geology, Mining Geology, Ore dressing)	1	6	6	0	0	4
	III	46	Core	Hydrogeology	1	5	5	0	0	4
	III	47	Elective	Geology of Tamil Nadu or Applied Geology – II (Natural Hazards, Remote Sensing and Geographic Information System) or Medical Geology	1	5	5	0	0	4
	III	48	Major Practical-VIII	Based on Economic Geology and Hydrogeology	1	4	0	0	4	2

III	49	Major Practical-IX	Based on Applied Geology – I and Elective- Geology of Tamil Nadu	1	2	0	0	2	2
III	50	Major Practical-X	Field and Industrial training/ Geological mapping (in Second year) – One week - Geological tour (more than two weeks in third year) Specimen collection during Geological tour, Periodical short field trips/ Viva Voce on Geological mapping, Geological tour and Reports Submission	1	2	0	0	2	2
		Total		8	30	22		8	22
	Total No. of Courses			48					
	Total No. of Hours				180				
	Total No. of Lectures					148			
	Total No. of Practical's							32	
	Total No. of Credits								147

*L- Lecture *T- Tutorial *P- Practical *C- Credit

Notes:

1. Distribution of marks for external and internal assessment in theory = 75:25
2. Distribution of marks for external and internal assessment in practicals = 50:50
3. There is a pass minimum of 60% for external and overall components.

GENERAL GEOLOGY

L T P C

Objective:

To know about the basic principles of Geology, various earth's surface geological processes such as erosion, transportation, deposition and various landforms and endodynamic processes like earthquake, volcanoes & tectonic process.

UNIT-I

Definition and branches of Geology - **Solar system:** components- nebular, planetesimal and tidal hypothesis of origin of the earth. Interior of the Earth: an outline of the composition and constitution of the interior of the earth. Age of the earth: an outline of the important methods for determining the age of the earth.

UNIT-II

Rock Weathering: Geology and weathering- agents of weathering, processes of weathering-mechanical weathering: Frost wedging, frost heaving, salt action and sheeting, chemical weathering: solution, hydration, hydrolysis, oxidation/reduction, carbonation and chelation. Biotic weathering: biophysical and biochemical. Mixed processes: spheroidal, exfoliation and differential weathering. Land forms by weathering.

Geological work of wind: Erosional methods- deflation, corrosion and its impact. Erosional features- By abrasion: undercut hills, cave rock, mushroom rock, mesa, yardang, vertifacts. By Deflation: desert pavement, deflation hallows. Transportation- saltation, suspension and traction. Deposition- causes and types, sheets-loess, volcanic ash and dust, piles-dunes formation, migration and types. Desert-description and kinds, desert features- plains, bajadas, pediment.

UNIT-III

Development of drainage system and work of stream: channel characteristics- stream erosion characteristics, types of stream, drainage patterns, Erosional features- valleys, river piracy, waterfalls, cascade, water gaps, pot holes and plunge pools, river terraces, meanders, ox-

bow lakes, pediments and peneplains, transportation methods, causes of stream deposition, depositional features- deltas, point bars, natural levees, alluvial fans, flood plain, back swamps, and braided rivers. Types of streams and drainage patterns.

Work of Ground water: movement of ground water due to gravity and pressure difference- ground water discharge- springs, wells and artesian wells and springs, thermal springs. Erosion by ground water and erosional features. Transportation by ground water, deposition by ground water and forms of deposits.

UNIT-IV

Glaciers and their classification- Work of sea and its deposits: waves, breakers, rip-current, long-shore current. Processes of erosion, erosional features, transportation and depositional features.

UNIT-V

Volcanoes- types-phases, products and origin. Earthquakes- classification - distribution- scales – effects – causes - seismogram and seismograph. Plate Tectonics. Elementary knowledge of Plate Tectonics – Historical background, Elements of tectonics, characteristics of plates, world plates, different plate boundaries.

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Text Book:-

1. Arthur Holmes – 1981. Principles of physical Geology, ELBS, III Edition,.
 2. Thornbury – 1969 - Principles of Geomorphology, John Willey & sons New York,.
 3. Longwell, Flint and Sanders. 1970. Physical Geology, John Willey and sons, Newyork.
 4. Radhakrishnan, V. 1997. General Geology, VVP Publishers Tuticorin, 282p.
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PALEONTOLOGY

L T P C

Objective

To know about the general outline of the vertebrate, invertebrate and plant fossils, their mode of preservation, classification and characters of various important phyla, morphology, distribution and geologic range.

UNIT-I

Divisions, Scope – relation to other disciplines – Fossil – Definition – conditions and modes of preservation – Uses of fossils – General classification of animals and plants relevant to the study of fossils.

UNIT-II

General Morphology of Foraminifera, Classification, Geological history, Uses of Foraminifera – some fossils of Foraminifera – Textularia, Nodosaria, Lagena, Globigerina, Ammonia. Phylum-Porifera – canal systems, skeleton of sponges, classification, geological history. Some fossils of sponges – Ventriculites, Siphonia. Phylum – Coelenterata – Coral morphology, classification and geological history, Coral fossils – Montlivaltia, Calceola, Zaphrentis.

UNIT-III

General Morphology of Phylum – Brachiopod, classification and Geological History – Fossils – Productus, Spirifer, Terebratula, and Rhynchonella. General Morphology of Pelecypoda, Classification and geological history, Fossils – Arca, Spondylus, Trigonina, Meretrix, Venus, Alectryonia, Ostreae, Gryphaea, Exogyra.

UNIT-IV

General Morphology of Gasteropoda, classification and geological history – Fossils – Physa, Turritella, Fusus, Trochus. General morphology of Cephalopoda, classification and geological history. Fossils – Nautilus, Goniatite, Ceratite, Acanthoceras, and Belemnites.

UNIT-V

General morphology of Class-Trilobita – classification and geological history. Fossils – Paradoxides, Calymene. General morphology of Echinoidea, classification and geological history – Fossils –Cidaris, Hemiaster, Micraster, Stigmatopygous. Morphology of plant fossils – Glossopteris, Gangamopteris, Ptillopyllum.

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Text Book:-

1. Alfred S.Romer Vertebrate Palaeontology,1963. University of Chicago press,.
2. Bigot .G. 1985, Elements of micropaleontology, Graham & Trotman, London.
3. Derek V.Ager, 1963, Principles of Palaeoecology, McGraw Hill Book Co.,.
4. Woods, H. 1963, Invertebrate Paleontology, Cambridge University Press, VIII Edition.
5. Raup, O.M. and Stanley, S.M., 1985. Principles of Paleontology, CBS Publishers and Distributors, II Edition.
6. Twenhofel and Shrock. 1953. Invertebrate Palaeontology, McGraw-Hill Book Co. Inc.
7. Moore, R.C, Lalicker C.G and A.G. Fisher. 1952, Invertebrate Fossils Mc raw Hill Book Co.
8. H.H.Swinerton.,1961. Outlines of Paleontology, Edward Arnold Publisher Reference Books.

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MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Geology) / Semester – I / Major Practical –I
PALEONTOLOGY

L T P C

Identification and Description of Following Fossils.

Coelenterata	: Montlivaltia Zaphrentis
Brachiopoda	: Productus Spirifer, Terebratula, Rhynchonella
Pelecypoda	: Arca, Spondylus, Trigonia, Meretrix, Venus, Alectryonia, Ostreae, Gryphaea, Exogyra
Gasteropoda	: Physa, Turritella, Fusus, Trochus, Conus.
Cephalopoda	: Nautilus, Ceratite,

Aconthoceras

Belemnites

Trilobites : Paradoxides,
Calymene.

Echinoids : Hemiaster,
Micraster,
Stigmatopygous.

Plant Fossils : Glossopteris,
Gangamopteris,
Ptillophyllum,
Wood fossil.



STRATIGRAPHY AND INDIAN GEOLOGY

L T P C

Objectives

To learn about the geological time scale, principles of stratigraphy and the description of strata and their relationship to tectonics, climate, fossils along with their distribution in different parts of India from Precambrian to recent and geological boundary problems and applications of stratigraphy.

UNIT-I

Principles of Stratigraphy: Laws of Stratigraphy, Correlation, Geological time scale, Facies and facies change, Hiatus in records, Physiographic divisions of India.

UNIT – II

Archaean of Peninsular India, Cuddapah system and Vindhyan system of rocks, their general characteristics and economic mineral deposits.

UNIT – III

Palaeozoic formations of Salt Range, Spiti and Kashmir. Age of Saline series. Umaria marine beds. Gondwana formations of Tamilnadu and India with special reference to its flora.

UNIT – IV

General characteristics and correlation with other parts of India of Triassic rocks of Spiti, Jurassic rocks of Kutch and Cretaceous rocks of Trichinopoly. Deccan traps and its age.

UNIT – V

Tertiary rocks of Assam and its economic deposits, Rise of Himalayas, Siwalik system with its fauna, Karewa formations, coastal Cenozoic formations of Peninsula, Cuddalore Sand stone. Warkala beds,

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Text Book:-

1. Dunbar, C.O. & Rogers, J. 1961. Principles of Stratigraphy, Wiley.
 2. Eicher, L.D. 1968. Geologic time,. Prentice Hall.
 3. Gignoux, M. 1960. Stratigraphic Geology, Freeman.
 4. Krishnan M.S., 1968. Geology of India and Burma, Higginbothams,.
 5. Wadia D.N. 1953. Geology of India, Macmillian and Co.
 6. Pasco E.S. 1973. A manual of the Geology of India and Burma.
 7. Stokes W.L. 1965. Essentials of Earth History.
 8. Ravindra Kumar. 1985. Fundamentals of Historical Geology and Stratigraphy of India.
 9. Weller, J.M 1960. Stratigraphic principles and practice, Harper and Row.
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CRYSTALLOGRAPHY

L T P C

Objectives:

To know about the nature, forms, habit, symmetry elements, measurement of interfacial angles and twins in crystals. The classification of crystals into system and classes

UNIT-I

Definition for crystal – Morphological characters of crystals – Faces – Forms – Edge, Solid angle – Interfacial angle – Uses of Contact Goniometer.

UNIT-II

Law of constancy of the Interfacial angles, Symmetry elements, crystallographic axes – Miller indices – Law of rational indices. Definition of Holohedral, Hemimorphic, Enantiomorphic and Hemihedral.

UNIT-III

Cubic system: Normal class, Pyritohedral class with special reference to well developed crystals. Galena, Spinel, Garnet, Fluorite, Diamond, Pyrite. Tetragonal system – Normal class with special reference to the crystals Zircon, Rutile, Cassiterite, Vesuvianite, Apophyllite. Hexagonal systems – Normal class, Hemimorphic class, Rhombohedral class with special reference to its type crystals Beryl, Zincite, Calcite, Corundum.

UNIT-IV

Orthorhombic system – Normal class, Hemimorphic class, and Sphenoidal class with special reference to the crystal Barite, Staurolite, Sulphur, Topaz, Calamine, and Epsomite. Monoclinic system – Normal class with special reference to Gypsum, Epidote, Orthoclase. Triclinic system – Normal class with special reference to its crystals Axinite and Albite.

UNIT-V

Twin crystals – definition – Evidence of twins – Twin plane, Twin axis and Composition plane. Laws of Twinning – Classification of Twins – Contact and Penetration Twins – Simple Twin – Repeated Twin – Polysynthetic Twin. Twinning in Feldspar – Baveno, Carlsbad, Manebach, Pericline, Albite and Cross – Hatched Twins.

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Text Book:-

1. F.C. Phillips. 1946. An Introduction to crystallography –.
 2. Ernest, E.Walhstrom, 1960, Optional Crystallography -, John Wiley & Sons,
 3. Dana, E.S.1935. A Text Book of Mineralogy-, John Wiley & Sons,
 4. Buerger, M.J. 1956. Elements of Crystallography, John Wiley and sons.
 5. Mitra.S. 1994. Fundamentals of Optical, Spectroscopic and X-ray Mineralogy, available at S.R.Technico Book House, Ashok Raj Path, Patna.
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MSU/ 2017-18 / UG-Colleges /Part-III (B.Sc. Geology) / Semester – II /Major Practical -II
PRACTICAL-II- CRYSTALLOGRAPHY

L T P C

Identification and Description of Following Crystals.

Cubic System : Normal Class – Galena, Spinel, Garnet, Fluorite, Diamond.
: Pyritohedral class – Pyrite.

Tetragonal System : Normal Class – Zircon, Rutile, Cassiterite, Vesuvianite,
Apophyllite.

Hexagonal System : Normal Class – Beryl.
: Hemimorphic Class – Zincite
: Rhombohedral class – Calcite and Corundum.

Orthorhombic System : Normal class – Barite, Staurolite, Sulphur, Topaz.
: Hemimorphic class – Calamine.
: Sphenoidal class – Epsomite.

Monoclinic System : Normal class – Gypsum, Epidote, Orthoclase.

Triclinic System : Normal class – Axinite and Albite.

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Text Book:-

1. F.C. Phillips. 1946. An Introduction to crystallography –.
 2. Ernest, E.Walhstrom, 1960, Optional Crystallography -, John Wiley & Sons,
 3. Dana, E.S.1935. A Text Book of Mineralogy-, John Wiley & Sons,
 4. Buerger, M.J. 1956. Elements of Crystallography, John Wiley and sons.
 5. Mitra.S. 1994. Fundamentals of Optical, Spectroscopic and X-ray Mineralogy, available at S.R.Technico Book House, Ashok Raj Path, Patna.
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