

Recommendations/ Report of subject expert committee on the introduction of cluster electives in Geology (VI Semester- VIII Paper) for UG BSc.,

- Ref: 1. D.O. Letter from Special Commissioner, Technical Education & Collegiate Education, No: 4 Introduction of Geology cluster/AC-12/2016-17, dated 31-10-2017.
 2. Lr No. APSCHE/Secy/Syllabus/2017, dated 2 November 2011 from the Secretary, AP State Council of Higher Education

Minutes of the Meeting

In pursuance of the orders of the Secretary, AP State Council of Higher Education (APSCHE) vide letter no: APSCHED/Secy/Syllabus/2017, dated 2 November 2011, the Chairman and the members of the committee on framing the cluster electives in geology for the academic year 2017-18, have met on 3rd November 2017 and 15th November 2017 in the Adikavi Nannaya University under the Chairmanship of Prof. Y. Srinivasa Rao to propose the cluster electives for Geology. Following resolutions were adopted.

1. It is resolved to propose the following Cluster electives for UG Geology in **VIII Paper** in Semester VI).

S. No	Cluster No	Title of the Paper - VIII	Hrs./ week	Max. Marks	Mid Sem. Exam	Credits
Paper VIII- Cluster Electives						
1	Cluster A - Theory	A -1: Introduction to Mineral Exploration	3	75	25	3
		A-2: Environmental Geology	3	75	25	3
		A-3: Introduction to Remote Sensing & GIS	3	75	25	3
	Cluster A - Lab	A -1Lab: Mineral Exploration Lab	2	50	--	2
		A-2 Lab: Environmental Geology Lab	2	50	--	2
		A-3 : Project work	2	50	--	2
2	Cluster B - Theory	B-1: Elements of Geochemistry	3	75	25	3
		B-2: Introduction to Mining Geology	3	75	25	3
		B-3: Introduction to Remote Sensing & GIS	3	75	25	3
	Cluster B Lab	B-1Lab: Geochemistry Lab	2	50	--	2
		B-2 Lab: Field report on nearest mines	2	50	--	2
		B-3: Project work	2	50	--	2

Detailed syllabi for the proposed cluster papers is enclosed herewith.

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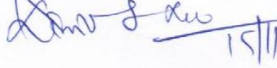
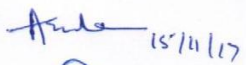

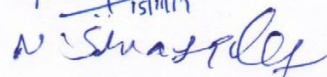
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2. It is also resolved to suggest the following modifications in the syllabi from the next academic year (i.e., 2018-19) in view of the recommendations made by the UGC and also to make it convenient to the students.

S. No	Semester	Title of the Paper	Hrs./ week	Max. Marks	Mid Sem. Exam	Credits
1	I - Theory	Paper-I- Physical Geology & Crystallography	4	75	25	3
	I-Lab	Physical Geology & Crystallography Lab	2	50	--	2
2	II-Theory	Paper- II- Mineralogy& Optical Mineralogy	4	75	25	3
	II-Lab	Mineralogy & Optical mineralogy Lab	2	50	--	2
3	III-Theory	Paper -III- Petrology (Igneous, Sedimentary and Metamorphic)	4	75	25	3
	III-Lab	Petrology (Igneous, Sedimentary and Metamorphic) Lab	2	50	--	2
4	IV-Theory	Paper-IV- Structural Geology & Stratigraphy	4	75	25	3
	IV-Lab	Structural Geology Lab	2	50	--	2
5	V-Theory	Paper-V- Indian Geology & Palaeontology	4	75	25	3
	V-Lab	Palaeontology Lab	2	50	--	2
6	V-Theory	Paper VI – Economic Geology	3	75	25	3
	VI-Lab	Economic Geology	2	50	--	2
7	VI-Theory	Paper VII: (Elective) Hydrogeology (OR) Field Geology	3	75	25	3
	VII-Lab	Hydrogeology lab (OR) Field Geology lab	2	75	25	2

Following members attended the Meeting

1. Prof. Y. Srinivasa Rao - Chairman  15/11
2. Sri Alluri Surendra - Member  15/11/17
3. Dr. M.R. Goutham - Member  15/11/17
4. Sri N. Srinivasa Rao - Member 

Cluster A

VIIIA -1: Introduction to Mineral Exploration (Theory)

UNIT - I

Definitions of Prospecting and Exploration. Reconnaissance, Preliminary and Detailed survey. Geological prospecting: Guides and Criteria. Structural, Lithological and Stratigraphic Guides.

UNIT- II

Geophysical Exploration - brief description and application of gravity methods - instruments in gravity method: gravimeters. Brief description and application of magnetic methods – instruments in magnetic method: magnetometers. Brief description and application of seismic methods - instruments in seismic method: geophones.

UNIT- III

Brief description and application of electrical methods - instruments in electrical method: Resistivity meter. Brief description and application of radioactive methods - instruments in radioactive method: G-M Counter, Scintillometer, ionisation chamber.

UNIT – IV

Geochemical prospecting – primary and secondary dispersion – Geochemical association and path finders. Sampling Methods – Channel, Chip, Grab, Car, groove, Wagon, Pitting and trenching and drill hole sampling. Coning and quartering. Average Assay

UNIT-V

Mining: Alluvial, Quarrying (Open cast mining) and Underground mining. Drilling Methods – Rotary drilling and Percussion drilling. Remote sensing techniques in mineral exploration.

Text Books:

- | | | |
|---|---|------------------------|
| 1. Geological Prospecting & Exploration | - | V. M. Kneiter |
| 2. Mineral Economics | - | R.K.Sinha & N.L.Sarma. |
| 3. Mining Geology | - | McKinnstry |

Mineral Exploration – Syllabus (Practical)

1. Estimation of Ore reserves: Bedded type and vein type (Extended area and included area methods)
2. Field work in neighboring areas of geological importance: submission of dissertation/ field report. Study and interpretation of topographic maps

VIIIA-2: Environmental Geology

Unit-I

Introduction, Concepts of environmental geology – History of environmental geology- environmental awareness, Role of Geologist in environmental Protection and Planning, Management. Environmental problems- natural and manmade problems.
Earth system science: atmosphere, hydrosphere and lithosphere.

Unit-II:

Definition of soil, soil formation, soil profile, Types of soils, Classification of soils and its properties, Soil distribution in India. soil degradation and contamination. Pollution: definition, types (air, water, land,soil). Global warming, ozone depletion

Unit-III

Natural disasters: earthquake and tsunamis- Earthquake terminology, seismic zones of India, history of earthquakes & tsunamis of India and major earthquakes & tsunamis in the world. Volcanoes: volcanic hazards its effects on human beings and environment. Indian volcanoes
Landslides: Types ,causes and mitigation methods.

Unit-IV

Coastal hazards: definition of coasts. waves and currents, types of coastal hazards, sediment supply and erosion. coastal zone protection and management. Introduction to coastal zones, Indian coast lines. Floods and cyclones: types, causes & mitigation.

Unit-V

Mining impact on environment and health hazards, Environmental considerations in location and construction of dams, reservoirs and tunnels. Types of wastes and its disposal with special reference to hazardous chemical wastes and radioactive waste. Oil leakages in ocean and its impact on marine life.

Practicals:

1. Grain size analysis.
2. Soil profile,
3. Identification of historical events of earthquake and tsunamis in India and world.
4. Identification of locations of volcanoes in world and India in the map.
5. Line drawings of Landslides, Types of dams
6. Line drawings of Coastal features, coastal profile.

Text Books:.

1. Environmental Geology - K S Valdiya
2. Environmental Geology - Sudarshan V, Ravi C and Krishna Ch
3. Living with Earth: An introduction to Environmental Geology - Travis Hudson
4. Environmental Geology - Strainer & Strahier
5. Environmental Geology - Landgreen
6. Environmental Geology - Keller

VIIIA-3: Introduction to Remote sensing & GIS

UNIT – I

Introduction to Aerial Photography, Define of Map, Aerial Photo, Imagery. Orthographic and Perspective projection. Types of Aerial Photographs, Elements of Visual interpretation.

UNIT - II

Mosaics, Types of Stereoscopes, EMR Interaction with Atmosphere and Earth Surface.

UNIT - III

Remote Sensing definition. Space, Sensor and Ground segments. Remote Sensing platforms – Ground based, Air-borne and space borne. Different sensors used in Remote Sensing.

UNIT – IV: Indian Remote Sensing Satellites, Image classification: supervised and unsupervised. Remote Sensing applications in mineral exploration, Geomorphology, soil mapping and ground water potential zones.

UNIT - V

Introduction to GIS. Data models, Main Segments of GIS, Components of GIS, GIS – Integration, GIS applications in landslide hazard zonation and environmental pollution studies

Books Recommended:

1. Bhatta, B., 2008. Remote Sensing and GIS. Oxford, New Delhi.
2. Gupta, R.P., 1990. Remote Sensing Geology. Springer Verlag.
3. Lilleasand, T.M. and Kiffer, R.W., 1987. Remote Sensing and Image Interpretation. John Wiley.
4. Pandey, S.N., 1987. Principles and Application of Photogeology. Wiley Eastern, New Delhi.
5. Sabbins, F.F., 1985. Remote Sensing – Principles and Applications. Freeman.
6. Siegal, B.S. and Gillespie, A.R., 1980. Remote Sensing in Geology. John Wiley.

VIII A-3: Project work

Cluster - B
VIIIB-1: Elements of Geochemistry

Unit 1:

Concepts of geochemistry

Introduction to properties of elements: crystal chemistry

Chemical bonding, Geochemical classification of elements

Unit 2 :

Geochemistry of solid Earth:

The Earth in relation to the solar system, Cosmic abundance of elements.

Composition of different planets.

Layered structure of Earth and their chemistry

Unit 3:

Classification of Meteorites and their chemistry, Geochemical dispersion. Distribution of major, minor and trace elements in igneous, metamorphic and sedimentary rocks.

Unit 4:

Geochemical cycle. Introduction to isotope geochemistry., Stable isotopes and unstable isotopes and its applications, Half life. Isomorphism and polymorphism

Unit 5:

Geochemistry and principles of evolution of atmosphere, hydrosphere and biosphere

SUGGESTED READINGS:

1. Mason, B. (1986) Principles of Geochemistry. 3rd Edition, Wiley New York.
2. Rollinson, H. (2007) Using geochemical data – evaluation, presentation and interpretation 2nd Edition. Publisher Longman Scientific & Technical.
3. Walther, J. V. (2009). Essentials of geochemistry. Jones & Bartlett Publishers.
4. Albarède, F. (2003). Geochemistry: an introduction. Cambridge University Press.

Elements of Geochemistry - (Practical)

1. Identification of rocks based on the geochemical data given.
2. Geochemical classification of water.

VIIIB-2: Introduction to Mining Geology

UNIT-I

Mining Geology: Introduction: Definition, basic concepts, terminology, broad classification of mining methods, planning, Mines & Minerals Regulation & Development Act,

UNIT-II

Exploration and exploratory mining of surface and underground mineral deposits; Geological factors considered for the selection of mining method viz.- Alluvial/Surface mining, Quarrying, Open-cast mining, and Underground mining methods;

UNIT-III

Geological conditions for- Types of openings, their position, shape and size -adits, inclines, shafts, levels, cross-cuts, winzes and raises. Types of drilling methods. Hydraulic drilling, dredging.

UNIT-IV

Opencast/open pit/pit mining – Methods – bench cut, glory hole, strip mining. Factors considered for mechanization and transportation. Advantages and disadvantages

UNIT-V

Underground mining methods: Board and pillar, room and pillar, long wall mining. Mine supports-factors considered for types of supports used. Mine ventilation- planning, its significance and effects; Drainage planning, its significance and its effect. Mining hazards: mine inundation, fire and rock burst

SUGGESTED READINGS:

1. Mining geology. Mckenistry.
2. Mining Geology: R. N. P. Arogya Swamy
3. Principles of Mine Planning By Jayanth Bhattacharya. Allied Publ.

Practical: Field report on nearest mines.

VIIIB-3: Project work