

M.Sc. Geology Scheme of Examination
Effective from the Academic Year 2006-2007

I Semester Course

Paper No. and Code No	Title of the Paper	Theory Max. Marks		Hours	Practical Max. Marks		Hours	Exam Hours
		Internal	External		Internal	External		
PI - G101	Mineralogy, Crystallography and Crystal Optics	20	80	50	10	40	58	3
PII – G 102	STRUCTURAL GEOLOGY AND TECTONICS	20	80	50	10	40	58	3
PIII – G 103	HYDROGEOLOGY	20	80	50	10	40	58	3
PIV – G 104	GEMORPHOLOGY	20	80	50	10	40	58	3
P V – G 105	SURVEY	20	80	50	10	40	58	3

TOTAL MARKS: THEORY : 400 + PRACTICAL: 200 + Survey : 50 = 650

II SEMESTER

per No. and Code No	Title of the Paper	Theory Max. Marks		Hours	Practical Max. Marks		Hours	Exam Hours
		Internal	External		Internal	External		
PI - G201	Igneous and metamorphic petrology	20	80	50	10	40	58	3
PII – G 202	Indian mineral deposits	20	80	50	10	40	58	3
PIII – G 203	ENVIRIONMENTAL GEOLOGY	20	80	50	10	40	58	3
PIV – G 204	SEDIMENTOLOGY AND MARINE GEOLOGY	20	80	50	10	40	58	3
P V – G 205	FIELD WORK	20	80	50	10	40	58	3

Total Marks: Theory: 400+Practical: 200+Field Work: 50 = 650

SEMESTER - III

Paper No. and Code No	Title of the Paper	Theory Max. Marks		Hours	Practical Max. Marks		Hours	EXAM HOURS
		Internal	External		Internal	External		
PI - G301	GEOCHEMISTRY AND MINERAL EXPLORATION	20	80	50	10	40	58	3
PII – G 302	FUEL GEOLOGY	20	80	50	10	40	58	3
PIII – G 303	STATISTICAL AND COMPUTER APPLICATIONS IN GEOLOGY	20	80	50	10	40	58	3
PIV – G 304	REMOTE SENSING AND GIS	20	80	50	10	40	58	3

Total Marks: Theory: 400+Practical: 200 = 600

SEMESTER - IV

Paper No. and Code No	Title of the Paper	Theory Max. Marks		Hours	Practical Max. Marks		Hours	Exam Hours
		Internal	External		Internal	External		
PI - G401	GEMMOLOGY	20	80	50	10	40	58	3
PII – G 402	PETROLEUM EXPLORATION	20	80	50	10	40	58	3
PIII – G 403	ADVANCED HYDROLOGY	20	80	50	10	40	58	3
PIV – G 404	ADVANCED REMOTE SENSING AND GIS	20	80	50	10	40	58	3

Total Marks: Theory: 400+Practical: 200 = 600

Grand Total: I Semester:650+II Semester:650+III Semester:600+IV Semester:600 = 2500

Syllabus of Theory Paper
(with effect from the batch admitted in 2006)

Acharya Nagarjuna University
Department of Geology
M.Sc., Geology course
Paper 104 – Geomorphology

Unit -1

Introduction : scope, objectives and recent trends in Geomorphology.
Fundamental concepts in Geomorphology

Unit-II

Analysis of geomorphic processes – weathering, mass wasting, erosional processes.
Topographic characteristics on folded and faulted structures. Volcanic landforms.

Unit- III

Fluvial cycle and landforms, complications in fluvial cycle.
Arid cycle and desert landscape. Aeolian landforms.

Unit-IV

Coastal processes and marine landforms.
Theories on glaciation; Glacial processes and topographic characteristics.
Planar surfaces; Peneplanation and pediplanation concepts.

Unit-V

Applied geomorphology for hydrology, economic geology and engineering projects.
Morphometry and statistical studies in geomorphology.

References

1. Principles of Geomorphology – William D. Thornbury.
2. A text book of Geomorphology – P.G. Worcester.
3. Physical Geography – A.N.Strahler.
4. Coastal Geomorphology - Enayat Ahamad.
5. Fluvial process in Geomorphology – L.B. Leopold. and Wolmen.

Syllabus of Practical Paper
(with effect from the batch admitted in 2006)
Acharya Nagarjuna University
Department of Geology
M.Sc., Geology course
Paper 104 – Geomorphology

1. Interpretation of topographic maps for physiograph, structure, lineament, drainage, geomorphology and hydromorphology.
2. Topographic profiles
3. Drainage morphometry analysis
4. Slope morphometry analysis
5. Hypsometry analysis

Syllabus of Theory Paper
(With effect from the batch admitted in 2006)
Acharya Nagarjuna University
Geology Department
M.Sc. Geology Second Semester (2007)
Paper 203- ENVIRONMENTAL GEOLOGY

UNIT-1

Definition, scope and objectives of environmental geology; Basic concepts; Ecosystem and natural resources; Interaction of biotic communities with physical environment; Bio-geo-chemical cycles. Global climate - atmospheric circulation and oceanic circulation

UNIT-II

Geological resources and energy - mineral sources, conventional and alternative energy sources eg. solar, ocean waves, wind, geothermal; Conservation of mineral resources; Impacts due to mining, fossil fuels usage, deforestation, industrialization and urbanization.

UNIT- III

Geological hazards - volcanic activity, earth quakes, landslides, floods, cyclones, coastal erosion and tsunamis; Preventive measures to reduce damages.

UNIT-IV

Soil types in India, Soil erosion and degradation, conservation and management; Geo technical aspects for construction and building, beach and river management; seismology and seismic zones, dam and reservoir sites, tunnel alignment and highways.

UNIT-V

Chemical and biochemical pollution; Effect of pollution on rain, surface and ground water and ocean waters; Impacts due to global warming and green house gases.

Geological factors of environmental health - fluorine, iodine, zinc, selenium, lead, arsenic and mercury.

Environmental policy and legislation.

Reference books

- 1.Environmental Geology by Edward A Keller
2. Geological Hazards, Resources and Environmental Planning by Gary B. Griggs and John A. Gilchrist
3. Geology in Environmental Planning by Arthur D. Howard and Irwin Remson
- 4.Environmental Geology Indian context by K.S.Vladia
5. Soil Erosion and conservation by Tripathi R.P and Singh H.P
6. The Dynamic Earth System by Patwardhan A.M
7. India's Environmental Problems and perspectives by B.P.Radhakrishna and K.K.Ramachandran

Syllabus of Practical Paper
(With effect from the batch admitted in 2006)
Acharya Nagarjuna University
Geology Department
M.Sc. Geology Second Semester (2007)
Paper 203 - ENVIRONMENTAL GEOLOGY

1. Study on thematic maps- plate boundaries, earth quakes, volcanoes and seismic zones of world.
2. Preparation of physiographic, soil types and vegetation maps of India
3. Drainage basin analysis for geo environmental aspects.
4. Construction of hydrographs and thalwegs.
5. Chemical analysis procedures for water analysis and air pollution
6. Study of engineering properties of major rock types.
7. Satellite image interpretation for coastal environment and off shore sediment movement.

Syllabus of Theory Paper
(With effect from the batch admitted in 2006)
Acharya Nagarjuna University
Geology Department
M.Sc.Geology - Third Semester (2007)
Paper 304 - Remote sensing and Geographic Information System

Unit-I

Basic concepts in Remote sensing: Introduction, Electro magnetic spectrum, Electromagnetic energy, Black body radiation.

Interaction of electromagnetic radiation with atmosphere: Composition of atmosphere, absorption of electromagnetic radiation in the atmosphere, Atmospheric windows, Atmospheric scattering.

Interaction of electromagnetic radiation with Earth's surface: Reflection (Spectral reflectance), Absorption, Spectral regions useful for remote sensing.

Unit-II

Remote sensing data acquisition systems: Sensors, Platforms, Satellite types - ERTS, Meteorological satellites, Global positioning satellites

Multispectral remote sensing: Multispectral photography, Multispectral scanning, Characteristics of scanner data.

Unit-III

Aerial photography: Introduction, fundamentals of photography, Flight mission, Photo scale, Types of photographs and properties, Photo mosaics, Factors affecting result, Stereoscope, Instruments used in photo study.

Unit-IV

Fundamental in GIS : Introduction, definition, components.

Spatial analysis: Spatial elements, spatial measurement levels, spatial location and reference,, spatial patterns.

Unit-V

Spatial data modelling: Entity definition, spatial data models,spatial data structures, modelling surfaces, modelling networks

Attribute data management: Introduction, Database data models, Creating database,Database application.

Reference Books

- 1.Photo Geology- Remote Sensing Applications in Earth Sciences: Bruno Marcolongo and Franco Mantovani -1997 (Oxford and IBH Pub.)
2. Remote Sensing Principles and Interpretation; Sabins FF-1978 (WH Freeman and co.)
- 3.Aerial Photographic Interpretation: Leuder DR-1959 (McGraw Hill)
- 4.Image Interpretation in Geology: Drury SA-1987 (Allen &Unwin)
- 5.An Introduction to Geographical Information Systems: Ian Heywood, Sarah Cornelius and Steve Carver-2003 (Pearson Edu.)
- 6.Priciples of Geographic Information Systems : PA Burrough and RA McDonnell-1998 (Oxford Uni Press)
- 7.Exploring Geographic Information Systems: Nicholas Chrisman - 2001 (John willey sons)
- 8.Fundamental of Geogrphic Information Systems: MN Demers -2001 (John wiley and sons)
- 9.Remote Sensing and Geographical Information Systems: M. Anjai Reddy-2001 (BSP Bs Pub.)

Syllabus of practical paper

(with effect from the batch admitted in 2006)

Acharya Nagarjuna University

Geology Department

M.Sc. Geology- Third Semester (2007)

Paper 304 - Remote Sensing and GIS

1. Stereovision training with Stereoplets
2. Stereograms interpretation for geological aspects
- 3.Stereopairs interpretation for geological aspects
4. Learning ArcView Basics
5. Getting data into ArcView
6. Displaying Themes
- 7.Working with Tables

Syllabus of Theory Paper

(With effect from batch admitted in 2006)

Acharya Nagarjuna University

Geology Department

M.Sc.Geology - Fourth Semester (2007)

Paper-404- Advanced Remote Sensing and Geographic Information System

Unit-I

Remote sensing in Microwave region: Passive system and active system, Radar principle and scattering, Radar wave bands, SLAR system and SAR system, Resolution in radar imagery,,Radar return and image signature, Radar image characteristics.

Unit-II

Interpretation methods: Visual image interpretation Strategy - Types of pictorial data products, detection, categorisation, identification, recognition, Basic image elements and geological elements,

Digital image interpretation- Basic character of digital image, Preprocessing, Image registration, Image enhancement, spatial filtering, Image transformation and Image classification.

Unit-III

Applications of remote sensing: Applications in geological aspects-Geological structures, lithological units, Geomorphology, surface and ground water, and Engineering projects.

Unit-IV

Data input and editing: Methods of data input, Data editing,

Data analysis: Measurements of lengths, perimeters and areas, Queries, Reclassification, Buffering and neighbourhood functions, integrating data (map overlay),Spatial interpolation, Analysis of surfaces, Network analysis

Unit-V

Data output: Maps out put, Non cartographic out put, Spatial multimedia, GIS and decision support.

Reference Books

1. Photo Geology- Remote Sensing Applications in Earth Sciences: Bruno Marcolongo and Franco Mantovani -1997 (Oxford and IBH Pub.)
2. Remote Sensing Principles and Interpretation; Sabins FF-1978 (WH Freeman and co.)
3. Aerial Photographic Interpretation: Leuder DR-1959 (McGraw Hill)
4. Image Interpretation in Geology: Drury SA-1987 (Allen & Unwin)
5. An Introduction to Geographical Information Systems: Ian Heywood, Sarah Cornelius and Steve Carver-2003 (Pearson Edu.)
6. Principles of Geographic Information Systems : PA Burrough and RA McDonnell-1998 (Oxford Uni Press)
7. Exploring Geographic Information Systems: Nicholas Chrisman - 2001 (John Willey sons)
8. Fundamentals of Geographic Information Systems: MN Demers -2001 (John Wiley and sons)
9. Remote Sensing and Geographical Information Systems: M. Anjai Reddy-2001 (BSP Bs Pub.)

Syllabus of practical paper
(with effect from the batch admitted in 2006)
Acharya Nagarjuna University
Geology Department
M.Sc. Geology- Fourth Semester (2007)
Paper 404 - Advanced Remote Sensing and GIS

1. Stereo pairs interpretation for geological aspects
2. Satellite image interpretation basing on single band data
3. Satellite image interpretation basing on false colour multispectral data
4. Creating and editing /shape files
5. Querying and analysing themes
6. Creating Layouts