ANDHRA UNIVERSITY

Regulations and Syllabus relating to
Master of Technology (M.Tech.) Degree Courses

In
GEO-ENGINEERING
(w.e.f. the admitted Batch of 2007-2008)

M.Tech. Geo-Engineering course

An applicant for admission into the M.Tech. Geo-Engineering course should have at least a second class degree with not less than 55% of marks in either:

B.E. / B.Tech. in any Engineering
OR
Master’s degree in science

A) A regular course of study means attendance is not less than 75 per cent of lectures, practical, drawing exercises, workshop and practical and field and project work, if any, in such semester in such subject, according to the scheme of Instruction to be notified by the Head of the Institution, provided that in special cases for sufficient cause again the Vice-Chancellor may on the recommendation of the Principal, condone the deficiency in attendance, not exceeding 10 per cent, for reasons of ill-health when the application is submitted at the time of the actual illness and is supported by an authorized Medical Officer approved by the Principal.

B) However, in the case of students, who participate in activities, such as NCC, Inter-University Tournaments, National Tournaments Inter University Courses. NSS and any such other activities deemed genuine by the Head of the Department Concerned, the period of their absence for the above purpose can be condoned by the Principal on the recommendation of the Head of the Department.

A) There shall be a written examination at the end of each of the first two semester in the subjects offered in the respective semesters.

B) The candidates are required to submit, at the end of the third semester, three copies (as prescribed) of the dissertation on or before a date to be notified by the University from time to time, accompanied by three copies of a short summary, all of which will be retained by the University.
C) At the end of the third semester, there shall be (1) an evaluation of the dissertation, and (2) a viva voce on the dissertation and related subjects.

D) Marks for sessional work shall be allotted by the Teaching Staff of the college on the basis of class work, slip tests, practical works, etc., and the list of marks shall be sent to the Registrar, before the commencement of the written examination.

E) For taking the examination in the theory in any subject candidates shall be required to obtain a minimum of 50 per cent in sessional work in that subject, failing which, they shall be required to repeat the course in that subject in the semester in which it is offered again for study.

F) Candidates who fail to secure the minimum prescribed marks in that subject will be permitted to continue the studies in the next semester. They shall, however, be required to pass the examination in the subjects in which they have failed, in the subsequent examination.

G) Candidates who have secured not less than 40 per cent in any of the theory papers and not less than 50 per cent of the total maximum marks of the theory paper and sessionals put together shall be declared to have passed the examination in that subject. In the case of subjects in which no written examination is prescribed, candidates should secure 50 per cent of the marks allotted to each of these subjects.

A) The evaluation of project work / Research work will be done by conducting viva voce examination at the end of third semester by a Board of Examiners consisting of:
   1. Head of the Department
   2. Chairman, Board of Studies
   3. The Internal Research Director
   4. One or two experts from outside the Department / University nominated by the Vice-Chancellor.

The dissertation shall be either "recommended", or "Not recommended". Candidates who have passed all the subjects of the course and secured not less than 60 per cent of the aggregate of marks, shall be declared to have passed in first class. All the remaining successful candidates shall be declared to have passed in second class. Candidates who fail in the subjects of any semester will be deemed to have been conditionally promoted. They shall however, have to appear and pass only in the subjects in which they have failed. Candidates have to take the examination in the subjects in which they have failed during these semesters, when the University conducts the examinations in those subjects.
# M.Tech. Geo-Engineering (Revised Syllabus)

**Scheme of Instructions/ Examinations as per credit system w.e.f. admitted batch 2007-2008.**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the course</th>
<th>Periods per week</th>
<th>Examination Duration Hours</th>
<th>Max. marks</th>
<th>Credit</th>
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<td>Lectures Lab.</td>
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<td>4 - 3</td>
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<td>Earth Systems</td>
<td>4 - 3</td>
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<td>Principles of Remote Sensing</td>
<td>4 - 3</td>
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<td>Geo-exploration techniques</td>
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<td>GE 202</td>
<td>Geo-Engineering Investigations</td>
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<td>GE 203</td>
<td>Geographic Information Systems</td>
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<td>Environmental Studies</td>
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<td>Field work and data analysis</td>
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Course No. GE 101 - Mathematics and Statistics

Unit-1
Fundamentals: Sets and Subsets, Sequences, Operations on Sets; Counting sequences, and subsets (permutations and combinations) Algorithms and Psudocode: Induction and Recursion: Division in the integers: Matrices

Unit-2
Relations and Digraphs; Product sets & Paths in Relations & Digraphs; Properties of Relations; Equivalence Relations; Computer Representation and Digraphs; Manipulation of Relations; Transitive closure and Warshall's Algorithm.

Unit-3
a) Functions;
   Functions - The Pigeonhole principle; Permutations
b) Trees & Languages
Trees; Labeled Trees; Language; Representation of special grammars and Languages; Tree searching; Undirected Trees

Unit-4
Measurement of Central Tendency, Mean, Mode, Median, Geometric mean and Harmonic Mean.
Measures of variations - Range, Quintile deviations, Mean deviation, Standard deviation and variance, Coefficient of variations.
Probability concepts - Additions and multiplication laws, Basic problems on these laws. Concept of random variables and probability distribution.

Unit-5
1) Theoretical distribution; Binomial, Poisson and normal with application.
2) Correlation Analysis - Introduction, Karl Pearson's Coefficient of Correlation, Auto Correlation.
3) Regression Analysis - Linear regression analysis; Curve fitting concept of multiple regression analysis.

Text Books
1) Statistics by S.P. Gupta
2) Statistical theory and methods by SANCHETIC and Kapoor
3) Statistics by S.C.Gupta

Course No. GE102 - Fundamentals of Computers

Unit-1
Introduction to Computers / Data representation, Conversion of data. Memory organization, Different secondary storage devices and Magnetic media devices - Magnetic tape; CCTs, DATs, Cartridges, Magneto-optical disks, CDs (read and write) ZIP drives, PHDs (Pocket Hard Disks), Floppies and DVDs.
Data Representation - Representation of Characters in Computers, Representation of Integers, Representation of Fractions, Hexadecimal Representation of Numbers, Decimal to Binary Conversion, Error Detecting Codes.
Computer Memory - Memory Cell, Memory Organization, Read-only Memory, Serial Access Memory, Physical Devices used to Construct Memories, Magnetic hard Disk, Floppy Disk Drives, Magnetic Tape Drives.

**Unit-2**
Binary Arithmetic, Complement representation, Boolean functions, Registers, I/O Devices Types and Printers.
Processor - Structure of Instructions, Description of a Processor, A Machine Language Program. An Algorithm to Simulate a Hypothetical Computer.

**Unit-3**
Operating System Concepts, Structures, Files, Directories, Process and Memory management.

**Unit-4**
Concepts of analysis of algorithms, fundamentals of data structures, arrays, stacks and queues.

**Unit-5**

**Text Books**
1. Fundamentals of data structures by Horowitz F and Sahani S
2. Modern Operating Systems by Andres S Tanenbanm
3. Fundamentals of computers. V. Rajaraman

**Course No. GE 103 Principles of Photogrammetry and Photo interpretation**

UNIT- I
Fundamentals of Photogrammetry and Photo interpretation – types of photographs; Vertical photographs – principal point; scale; Stereoscopy; Vertical exaggeration – factors involved and determination; Overlap, sidelap and flight planning

UNIT- II
Geometric elements of vertical aerial photographs; Relief Displacement on vertical aerial photographs; Parallax and parallax measurement – monoscopic and stereoscopic methods; Determination of horizontal ground length, direction and angles from photo coordinates;

UNIT- III
Aerial mosaics: comparison with maps; Elements of aerial photo interpretation – (a) landforms; (b) surface drainage patterns; (c) erosion features, (d) gray tones; (e) miscellaneous elements.

UNIT - IV
Digital Photogrammetry: definition and scope; Photographs and images; Geo-referencing – Interior orientation, exterior orientation; aerotriangulation – single frame and block triangulation - pass points, tie points; ground control points; Satellite photogrammetry

UNIT - V
3-D surface modeling – DEMs, DSMs and DTMs; Triangulated irregular networks; Gridded surfaces; interpolation methods; Contour representation; Terrain visualization; DEM user applications.
Text Books
2. Elements of Photogrammetry, Paul R. Wolf, McGraw-Hill, 2000

Course No. GE 104 - Earth Systems

Unit-1
a) Earth - Orbit, Rotation, Time
b) Oceans - Depth, Bottom relief
c) Oceans - Temperature, Salinity, Density of seawater
d) Oceans - Waves, Tides, Currents
e) Climate and the atmosphere - scope, origin and nature, composition & vertical division of the atmosphere.

Unit-2
a) Meteorological parameters and their measurements - pressure, temperature, wind, precipitation, humidity, and radiation.
b) Geographical, seasonal and vertical distribution of temperature, pressure, wind and precipitation.
c) Solar and terrestrial radiation: Distribution in clear, cloudy and average conditions. Mean heat balance. Role of ozone, water vapour and carbon dioxide.

Unit-3
Climate and agricultural factors in crop production.
Monsoons : Concepts of the origin of monsoon - Indian Monsoons
Fundamental concepts of Geomorphology
Weathering, Mass wasting and erosion.

Unit-4
Wind and associated land forms
Oceans and associated land forms
Land forms associated with faults and folds
Rivers and associated land forms
Glaciers associated land forms

Unit-5
Soil & Regolith, Soil forming processes, Soil profile, Soil components.
Pedogenic regimes.
Classification of soils
Soils of India
List of Text Books
1. Structural Geology by Billings, M. 1984
2. Earth History & Plate Tectonics by Carl K. Seyfert, Leslie A. Sirkin
4. General Climatology by H.J. Critchfield
5. Physical Geology by Arthur Holmes
6. Physical Geography by Stahler

Course No. GE 105 – Principles of Remote Sensing

Unit-I Basics of Remote Sensing
Principles of Remote sensing, History of Remote sensing, Remote sensing in India, Electromagnetic Radiation and Electromagnetic Spectrum, EMR quantities: Nomenclature and Units
Thermal Emission of Radiation, Radiation Principles (Plank’s Law, Stephen Boltezman law), Interaction of EMR with the Earth Surface (Wien’s displacement law, Kirchoffs Law) Spectral signature, Reflectance characteristics of Earths cover types, Remote sensing systems.

PLATFORMS AND SENSORS
Platforms, Remote sensing sensors, resolutions Across track and along the track scanning, Optical sensors, Thermal scanners Microwave sensing radar satellite missions Landsat series, SPOT series, IRS satellite series, IKNOS, Metrological satellites

Unit-II a) Data reception, Data processing & Data generation
Ground station, Data generation, Data processing & correction

Radiometric and Geometric corrections
Radiometric corrections Random noise correction Atmospheric correction, Geometric errors and corrections, Distortion evaluated from tracking data, distortion evaluated from ground control Image correction.

Ground Investigation in support of Remote sensing
Uses of ground data, calibration correction, Interpretation of properties, Training sets, Accuracy evaluation, test sites Ground truth Instruments and spectral signature, techniques and Instruments, Global Positioning system (GPS) – Fundamentals location Information, Spectral Reflectance and spectral signature of vegetation

Unit-III Microwave Remote Sensing
Introduction - Electromagnetic spectrum, Airborne and Space borne radar systems basis instrumentation.
System parameters - Wave length, Polarization, Resolutions, Radar geometry.
Target parameters - Back scattering, Point target, Volume scattering, Penetration, Reflection, Bragg resonance, Cross swath variation. Speckie radiometric calibration.
Radar - Grametry - Introduction, Mosaicing Stereoscope.
Application : Geology, Forestry, Land use, Soils etc. Future trends and Research
**Unit-4 Thermal Imaging system**


IR - radiometers, Airborne and Satellite TTR scanner system

Characteristics of IR images
- Scanner distortion, ii) image irregularities, iii) Film density and recorded iv) Temperature ranges

Effects of weather on images
- i) Clouds, ii) Surface winds, iii) Penetration of smoke plumes

Interpretation of thermal imagery

Advantages of Thermal imagery

**Unit-V : Image Interpretation**

(a) Introduction to Image Interpretation

Basic principles of Image Interpretation

Elements of Image Interpretation

Techniques of Image Interpretation

Interpretation Keys

Methods of searching and sequence of Interpretation

Methods of analysis and Reference levels

(b) Data Formats:

Computer compatible tapes – Band sequential format, Band interleaved by Line format, Run-length encoding format.

Hardcopy outputs – Generation of B/W and False Colour Composites. Generally supported scales of the data products, Information about annotation of the products.

**List of Text Books**

Course No. GE 106 - Computer Programming in 'C' Practical

Introduction
Control Statements
Arrays
Functions
Storage classes
Pointer variables
Structures and Union
Command line Arguments
File Handling
Processor Devices & Data structures using C

GE 107 Photogrammetry and Photo interpretation Practicals

Testing stereo vision
Use of Lens stereoscope and Mirror stereoscope
Determination of vertical exaggeration
Use of Parallax Bar for height calculation from aerial photographs
Calculation of scale of the photographs
Marking Principal point and conjugate principal point on the stereopairs
Preparation of aerial mosaics
Interpretation of aerial photographs for identification of landforms of fluvial, Aeolian, glacial, coastal, volcanic and arid processes
Identification of tectonic elements from aerial photographs
Digital photogrammetry – digital image matching and collection of mass points
Construction digital terrain models
Application of DTMs – contour generation; fill; fly through; slope and aspect; viewshed analysis; watershed and drainage extraction; volumetric analysis; preparation of orthoimages.

Course No. GE 108 - Remote Sensing - Practical

Study of Remote Sensing Imagery for:
1. Identification of geological, geomorphologic and cultural forms (IRSIA & 1B)
2. Water resources studies (TMIRS & SPOT)
3. Environmental Impact assessment (SPOT)
4. The student should select a theme for visual interpretation and prepare a practical report as one of the inputs to the practical examination assessment.
Course No. GE 201 - Geo-Exploration Techniques

Unit-1
a) Geophysical Exploration Techniques
b) Electrical Methods
   i. Introduction
   ii. Self potential method
   iii. Equipotential and line potential methods
   iv. Direct current - Resistivity method

Unit-2
a) Seismic method
   i. Fundamentals of Principles
   ii. Theory of Refraction shooting.
   iii. Reduction of Seismic observations
   iv. Seismic operations
   v. Seismic field operation and interpretation
   vi. Acquisition of seismic data in water covered areas

Unit-3
i. Fundamental of quantitative log interpretation.
ii. Spontaneous potential curve
iii. Resistivity logging
iv. Gamma-ray logging
v. Determination of lithology and porosity
vi. Determination of Resistivity and Permeability

Unit-4
a) Geological Techniques
b) Geomorphological Techniques
c) Geohydrological Techniques
d) Hydrological Techniques

Unit-5
a) Soil Mechanics
b) Clay Minerals and Soils
c) Laboratory and in-situ tests of soil Drilling Techniques
d) Feasibility report

GE 202 - Geo-Engineering Investigations

Unit-1
Introduction
Geo-Engineering investigations for dams and reservoirs
Geo-Engineering investigations for tunnels
Geo-Engineering investigations for Air fields
Geo-Engineering investigations for Highways and Railway lines

Unit-2
Geo-Engineering investigations for coastal and offshore structures
Geo-Engineering investigations for canals and bridges
Geo-Engineering investigations for major industries, Thermal and Nuclear Power stations

Unit-3
Introduction to Rock Mechanics
Physical properties of rocks: Mineral composition, rock structure, texture
Classification of rocks: Lithological classification, engineering classification, R Q D and core recovery of rock
Theoretical basis of rock mechanics - elasticity and plasticity
Methods of rock exploration - geological, geophysical and drilling

Unit-4
Geo-Engineering Case Studies
D.B.K. Railway tunnel alignment
Visakha Steel Plant site investigations
Geophysical Techniques for Terrain Evaluation
Terrain Evaluation for Urban Planning

Unit-5
Geo-Engineering Investigations for river valley projects: case studies of Nagarjunasagar Dam, Srisailam Dam and Farakka Barrage project.
Dam-failure investigations

List of Text Books
2. Engineering Geology Publications of G.S.I.

Course No. GE 203 - Geographic Information Systems

Unit-1

Unit-2
Data structures for Thematic maps. Data structures for Geographic Information Systems. Points, lines and areas. Definition of a map Geographic data in the computer. File and data processing, data base structures, perceived structures and computer representation and geographical data. Raster data structure, Vector data structures for geographical entities. Data structures for thematic maps - The choice between raster and vector. Digital Elevation Models: The need of DEMs, methods of representing DEMs. Image methods, data sources and sampling methods for DEMs. Products that can be derived from a DEM. Automated landform delineation from DEMs. Map projections in GIS

Unit-3
Data input, verification, storage and output: Data input, data verification, correction and storage data output; data user interfaces. Methods of Data Analysis and Spatial Modeling: Introduction, definition of the database. Simple data retrieval. A general approach to map overlay, Cartographic modeling using natural language commands. Linking command sequences into cartographic models, advantages and disadvantages of cartographic modeling in land evaluation and planning.
Unit-4
Data Quality, Errors and Natural Variation: Sources of error, Errors resulting from natural variation of from original measurements. Errors arising through processing, problem; and errors arising from overlay and boundary intersections. Errors resulting from rasterizing a vector map. Errors associated with overlaying two or more polygon networks. The nature of boundaries. The statistical nature of boundaries. Combining attributes from overlaid maps. Classification methods: Classification, Multivariate analysis and classification, allocating individuals to existing classes. Expert systems for Geographical Information Systems. Classification methods in geographical information systems.

Unit-5
Methods of Spatial interpolation. The available methods for interpolation, global methods of interpolation, location interpolators, optimal interpolation methods using spatial auto covariance. Extensions of crigging to large areas. Comparing crigging with other interpolation techniques. Choosing a Geographic Information System. Designing the needs for GIS. The procedure to following when setting up a geographical information system. Tools for Map analysis: Single maps, Map reclassification, operations and attribute tables, spatial topological and geometric modeling and operations on spatial Neighborhood. Tools for map Analysis: Map pairs, map overlay and map modeling correlation between two maps. Tools for map analysis: Multiple maps, types of models, Boolean logic models, Index overlay models, Fuzzy logic methods.

Practicals
Arc-Info and Arc-View practice and ILWIS
Creation of different spatial layers
Map analysis

List of Text books

GE 204 - Environmental Studies

UNIT 1 - Environmental Concepts
Environment – meaning, scope, components of environments
Ecosystems – Concept, components, evolution and development. Types and classification of ecosystems
Primary and Secondary production, food chains, food pyramid and energy flow
Biogeochemical and nutrient cycles - hydrological and material cycles

UNIT II - Environmental Pollution
1) Air pollution – Sources of pollution, effects on humans. Global effects- green house effect, acid Rain, global warming and heat island effect. Effects on vegetation and materials, air pollution control
Water pollution – Sources of water pollution, water as an ecological factor and its role in the biosphere, water pollution control
Soil pollution – Sources of soil pollution, effects of soil pollution, soil pollution Control

UNIT III – Human Activities and Environmental Degradation
Human population and environment
Impact of human land use practices on environment
Deforestation and environmental change
Urbanization and industrialization. Urban environmental problems- air, water, noise, nuclear, thermal pollution and human health hazards

UNIT IV - Environmental Impact Assessment (EIA)
1) Need of EIA, EIA procedure, Environmental impact statement an procedure
2) EIA methodologies- Adhoc method, Check list method, Matrix method, Overlay method, Network method and Benefit-cost ratio method
3) Environmental impact assessment for Irrigation, Industrial, Airport, Transport and Thermal projects
4) Assessment of impacts on socioeconomic environment

UNIT V – Environmental Analysis
Application of Remote sensing and GIS in Environmental analysis
1) Change detection and mapping- vegetation change, erosion and deposition
2) Detection of air and water pollution
3) Encroachment and wetland degradation
4) Disaster management-cyclones, floods and droughts, earthquakes and volcanic eruptions

List of Text Books
1. Ecology and Environment, P.D. Sharma, Rastogi Publications
2. Environmental Science, M. Chandra Sekhar, The HI-TECH Publishers
3. Environmental Studies, R. Rajagopalan, Oxford University Press
7. Pollution Control and Conservation, Kovacs, M.(ed), Ellis Horwood Ltd., Budapest, 1985
9. Preventive and Social Medicine, Park & Park, Banarasidas

Course No. GE 205.1(elective) - Water Resources Evaluation

Unit-1
Quantitative geomorphology of drainage basins and channel
Runoff
Hydrology of Urban areas

Unit-2
Hydrology of Agricultural lands
Hydrology of Forest lands and Range lands
Hydrology of arid and Semi-arid regions
Floods

Unit-3
Groundwater Potential areas in India
Aquifer Properties and ground water flow
Well Hydraulics

Unit-4
Sea water intrusion
Ground water basin management and conjunctive use
Ground water pollution and legislation

**Unit-5**
Planning for water resources development in Rural and Urban areas with reference to Indian continent.
Water balance studies

**List of Text Books**
2. Groundwater by H.M. Raghunath

**Course No. GE 205.2(elective) – Water Resources Management**

**Unit-1 (Watershed Concept)**
Issues in watershed management - land degradation, agricultural productivity, reservoirs sedimentation, depletion of bioresources, floods and droughts. Principles and approaches - principles of watershed management, different approaches in watershed management; Problem oriented approach, three dimensional approaches, integrated approach, steps in watershed management.
Watershed characteristics - size, shape physiography, slope, climate, drainage, landuse, vegetation, geology, soils, hydrology, hydrogeology, socio-economics. Linear aspects of channel systems - Aerial aspects of drainage basins.

**Unit-2 (Land Management)**
Land capability classification, land degradation and problem soils. Reclamation of saline soils, alkaline soils, saline soils, acidic soils, sulphide soils; sediment yield modeling and watershed prioritization. The universal soil loss equation, sediment yield index method, statistical regression model, the European soil erosion model; Site selection from conservation measures.

**Unit-3 (Water Management)**
Surface water - Study of rainfall, estimation of run-off at micro catchments, stream gauging;
Rainwater harvesting catchment, harvesting, harvesting structures, Ground water - exploration of canal command areas, potential areas; integrated water resources management, conjunctive use.
Dry land Agriculture - Runoff agriculture, micro catchment forming, irrigation with saline water, reusing water, conserving water, sprinkler irrigation, drip irrigation, pot irrigation, other systems, reducing crop land percolation losses, reducing transpiration losses, selection of water use efficiency crops.

**Unit-4 (Integrated Management)**
Agriculture - Crop husbandry, soil enrichment, inter, mixed and strip cropping, copping pattern; sustainable agriculture, Hybrid and improved seeds; Biomass management, crop rotation, legumes, organic fertilization, spider farming, pastures and silvipastures; horticulture; tree culture; form forestry; bund utilization, boundary plantation; social forestry; Energy - Renewable resource water power, solar energy wind power; biomass, fire food synthetic fuels, burning of municipal / garbage, ocean tides and waves.
Appropriate Technology - Farm Equipment; Contour Methods; Check Dams, Water catchment and Harvesting, Kunds, Depression Harvesting, Harvesting below ground level, Harvesting below stream bed level, Ground water harvesting; low cost technology, Water Conservation, Utilization of Wasted Natural Resources, Novelities; Rural Technological Delivery Systems, Cultivating Wasted Lands, Tree Culture, Farm Forestry, Silvipastures, horticulture, Social Forestry, Afforestation, Wonder ways.

**Unit-5 (Monitoring and Evaluation)**

People's Part - Awareness, participation, Response; State and integrated approach, Appreciation of the concept, training, transfer of technology, Resource and Development, Agro-industrial infrastructure; Sustainable society, livestock, small animal farming, pisciculture, sericulture, Health and hygiene education, transport, cues.


**Text Books and References**


**Course No. GE 206 – Geo-Engineering Practicals**

a) Geoelectrical survey and computations
b) Seismic refraction and reflection data computations.
a) Laboratory determination of soil classification
b) Attenberg limits
c) Specific gravity
Lab, permeability by constant and failing head methods
Direct Shear and triaxial shear test
Compaction and bulk density
Consolidation test

**Text Books**

1. Application of surface geophysics to ground water Investigations by A.A.R. Zhody.
3. Log Interpretation by Schlumberger.
Course No. GE 207 – Field work and data analysis

Ground water exploration & Management
Well monitoring
Well/bore well pumping tests
Selection of pumps
Safe yield determination
Identification of gray areas
Design of rain water harvesting structures
Geotechnical exploration
Subsurface litho logy
Bed rock mapping
Identification of buried pipes
Location of infiltration wells in the river bed
Mobile mapping through GPS
point mapping
Linear mapping
Polygon mapping

Course No. GE 208 - Geographic Information Systems Practicals

Familiarity with D Base Commands including record updating and processing.
Theme representation by usage of graphics command resources data maintenance - Theme filling and retrieval and usage.
Exercise: Development / updating of data base management software packages for a selected practical problem using available GIS package.
Arc-Info and Arc-View practice and ILWIS
Creation of different spatial layers
Map analysis.

SEMESTERS III & IV

Dissertation & Viva Voce

Dissertation: Individuals dissertation work must be carried out by the student for the fulfillment of M.Tech. Degree in Geo-Engineering.
Comprehensive Viva Voce: A Viva Voce will be conducted to the student by the external examiner and the internal research guide and teachers who have taken class for M.Tech. Geo-Engineering on the topic of the dissertation carried out by the student and the subjects studied in the I and II Semesters.