JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech in GEOTECHNICAL ENGINEERING
Effective from Academic Year 2019 - 20 admitted batch

R19 COURSE STRUCTURE AND SYLLABUS

I YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - I	Advanced Soil Mechanics	3	0	0	3
Professional Core - II	Advanced Foundation Engineering	3	0	0	3
Professional Elective - I	1. Soil Structure Interaction 2. Ground Improvement Techniques 3. Theoretical Soil Mechanics	3	0	0	3
Professional Elective - II	1. Applied Statics 2. Environmental Geotechnology 3. Environmental impact Assessment	3	0	0	3
Lab - I	Advance GTE Lab – I	0	0	4	2
Lab - II	Geotechnical Computational Lab	0	0	4	2
	Research Methodology and IPR	2	0	0	2
Audit - I	Audit course - I	2	0	0	0
	Total	**16**	**0**	**8**	**18**

I YEAR II – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Core - III	Soil Dynamics and Machine Foundations	3	0	0	3
Professional Core - IV	Subsurface Investigations and Instrumentation	3	0	0	3
Professional Elective - III	1. Offshore Geotechnical Engineering 2. Design of substructures 3. Engineering rock mechanics	3	0	0	3
Professional Elective - IV	1. Earth Retaining Structures 2. Geotechnics for Infrastructures 3. Physical and Constitutive Modeling on Geomechanics	3	0	0	3
Lab - III	Rock Mechanics and Geosynthetics Lab	0	0	4	2
Lab - IV	Advance GTE Lab – II	0	0	4	2
	Mini Project with Seminar	0	0	4	2
Audit - II	Audit Course - II	2	0	0	0
	Total	**14**	**0**	**12**	**18**

II YEAR I – SEMESTER

Course Code	Course Title	L	T	P	Credits
Professional Elective - V	1. Stability analysis of slopes 2. Pavement Analysis and Design 3. Geotechnical Earthquake Engineering	3	0	0	3
Open Elective	Open Elective	3	0	0	3
Dissertation	Dissertation Work Review - II	0	0	12	6
	Total	**6**	**0**	**12**	**12**

II YEAR II - SEMESTER

Course Code	Course Title	L	T	P	Credits
Dissertation	Dissertation Work Review - III	0	0	12	6
Dissertation	Dissertation Viva-Voce	0	0	28	14
	Total	**0**	**0**	**40**	**20**

***For Dissertation Work Review - I, Please refer 7.8 in R19 Academic Regulations.**

Audit Course I & II:

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by yoga
8. Personality Development Through Life Enlightenment Skills

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

ADVANCED SOIL MECHANICS (PC – I)

Course objectives:

1. To Analyze the field loading conditions and predict the behavior of soil under loading and unloading condition in drained and untrained conditions of soil
2. To predict the probable seepage from the reservoir and for checking the stability of the structure under hydro dynamic conditions
3. To determine various application-based parameters of consolidation for safe design of structures on clay soils

Course Outcomes: At the end of the course, student will be able to;

1. Understand the behavior of soils stress paths and to determine the shear parameters under different load and drainage condition
2. Estimate Seepage and numerical modeling of Steady and transient flow condition
3. Determine Compressibility characteristics of NCC and OCC soils

UNIT- I

Geostatic Stresses & Stress Paths: Stresses within a soil mass: Concept of stress for a particulate system, Effective stress principle, Geostatic stresses, Soil water hydraulics: Principal stresses and Mohr's circle of stress, Stress paths; At Rest earth pressure, Stress paths for different practical situations.

UNIT- II

Flow through soils: Permeability, seepage, mathematical analysis – Finite difference formulae for steady state and transient flows – flow nets – computation of seepage – uplift pressure, and critical hydraulic gradient.

UNIT- III

Compressibility and Consolidation: One dimensional compression, Oedometer test, parameters – coefficient of volume change, constrained modulus, compression index, swell or unloading, maximum past consolidation stress, Over consolidation ratio, Primary and secondary compression, consolidation -One, two- and three-dimensional problems, Consolidation of partially saturated soils, Creep/Secondary Compression in soils.

UNIT- IV

Stress-Strain-Strength Behaviour of soils: Shear strength of soils; Failure criteria, drained and undrained shear strength of soils. Significance of pore pressure parameters; Determination of shear strength; Drained, Consolidated Undrained and Undrained tests; Interpretation of triaxial test results. Behaviour of sands; Critical void ratio; dilation in soils;

UNIT- V

Critical State Soil Mechanics: Critical state parameters; Critical state for normally consolidated and over consolidated soil; Significance of Roscoe and Hvorslev state boundary surfaces; Yielding, Bounding Surfaces.

REFERENCE:

1. Das, B. M.- Advanced Soil Mechanics, Taylor and Francis. 7 edition (2008)
2. Mitchell J.K. - Fundamentals of soil behaviour - John Wiley and Sons, Inc., New York. (third edition) 2005

3. Craig, R. F.- Soil Mechanics, Van Nostrand Reinhold Co. Ltd. (1987)
4. Lambe, T. W. and Whitman, R. V.- Soil Mechanics SI version , John Wiley & Sons.(2011) Muniram Budhu.- Soil Mechanics and Foundations, John Wiley & Sons, Inc.(2007)
5. Atkinson J. H. - An Introduction to the Mechanics of Soils and Foundation - through critical state soil mechanics, McGraw- Hill Co. (1993)
6. Wood, D.M.- Soil Behavior and Critical State Soil Mechanics. Cambridge university press (1991)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

ADVANCED FOUNDATION ENGINEERING (PC – II)

Course Objectives:

1. To interpret and select the design parameters from the test data
2. To analyze and design shallow and pile foundations
3. To abreast with advanced techniques of foundation analysis and design

Course Outcomes: At the end of the course, student will be able to:

1. Able to plan and select the soil exploration methods
2. Determine the Bearing capacity of soil and settlements for the design of shallow foundations
3. To design the deep foundations under different loading conditions
4. To design the foundations on problematic soils and reliability-based design for shallow and deep foundations

UNIT- I

Soil Exploration: Exploration Methods; Planning the Exploration Program; Boring and Sampling; In Situ Tests: Standard & Cone Penetration Tests, Field Vane & Borehole shear tests, Dilatometer, Pressure meter; Rock Sampling, Core Recovery, RQD; Geophysical Exploration; Preparation of Soil Report.

UNIT- II

Shallow Foundations: **Bearing Capacity:** - General Formulae; Effect of Water Table; Footings with eccentric or Inclined Loads, Foundations on Layered Soils, on finite layer with a Rigid Base at Shallow Depth, effect of compressibility of soil.

UNIT- III

Settlement: Components – Immediate, Consolidation & Creep, Stresses and Displacements in Homogeneous, Layered and Anisotropic Soils; Consolidation Settlement; One, Two- & Three-Dimensional Consolidation; Secondary Compression Settlement; Bearing Pressure using SPT, CPT, Dilatometer and Pressure meter; Settlement of foundations on Sands - Schmertmann and Burland & Bus bridge methods; Structure Tolerance to Settlement and Differential Settlements, Rotation of Tall Structures.

UNIT- IV

Deep Foundations: **Single Pile:** Vertically loaded piles, Static capacity α, β and λ Methods, Dynamic formulae; Point Bearing Resistance with SPT and CPT Results; Bearing Resistance of Piles on Rock; Settlement; Pile Load Test; Uplift Resistance; Laterally Loaded Piles -Ultimate Lateral Resistance; Negative Skin Friction; Batter Piles; Under Reamed Piles; Ultimate Capacity of Pile Groups in Compression, Pullout & Lateral Load; Efficiency; Settlements of Pile Groups; Interaction of Axially & Laterally Loaded Pile Groups.

UNIT- V

Special Topics of Foundation Engineering

Foundations on Collapsible Soils: Origin and occurrence, Identification, Sampling and Testing, Preventive and Remedial measures.

Foundations on Expansive Soils: The nature, origin and occurrence, Identifying, testing and evaluating expansive soils, typical structural distress patterns and Preventive design & construction measures.

Introduction to Reliability-Based Design: Methods, LRFD for structural strength requirements, LRFD for geotechnical strength requirements, Serviceability requirements.

REFERENCE:

1. Das, B. M. - Principles of Foundation Engineering 7th Cengage Learning (2013)
2. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012. Phi Learning (2008)
3. Bowles, J. E. - Foundation Analysis & Design 5th Edition McGraw-Hill Companies, Inc. (1996)
4. Poulos, H. G. & Davis, E. H. - Pile Foundation Analysis and Design john wiley & sons inc (1980-08)
5. Reese, L. C. & Van Impe, W. F. - Single Piles and Pile Groups under Lateral Loading - Taylor & Francis Group (Jan 2000)
6. Tomlinson, M. J. - Foundation Design and Construction - Prentice Hall (2003)
7. Lymon C. Reese, William M. Isenhower, Shin-Tower Wang- Analysis and Design of Shallow and Deep Foundations (2006)
8. Salgado, R. - The Engineering of Foundations McGraw-Hill, Boston (2008)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

SOIL STRUCTURE INTERACTION (PE - I)

Course Objectives:

1. To understand soil structure interaction.
2. To analyse the stress-strain behavior of soils
3. To estimate interaction parameters under static and dynamic conditions
4. To analyse the foundations resting on soil as beam-plate on elastic foundation

Course Outcomes: At the end of the course, student will be able to:

1. Apply different soil response models for specific problem based on the
2. requirement.
3. Analyze footings/rafts resting on soil as beams/plates on elastic foundation and work out design bending moments/shear and displacements.
4. Estimate interaction parameters under static and dynamic loading conditions
5. Understand the effect of structure on foundation ground response for various loading

UNIT-I

Soil-Foundation Interaction: Introduction to soil-foundation interaction problems, Soil behaviour, Foundation behaviour, Interface behaviour, Scope of soil foundation interaction analysis, soil response models, Winkler, Elastic continuum, Two parameter elastic models, Elastic-plastic behaviour, Time dependent behaviour.

UNIT-II

Beam on Elastic Foundation- Soil Models: Infinite beam, Two-parameters models, Isotropic elastic halfspace model, Analysis of beams of finite length, combined footings.

UNIT-III

Plates on Elastic Continuum: Thin and thick rafts, Analysis of finite plates, Numerical analysis of finite plates.

UNIT-IV

Analysis of Axially and Laterally Loaded Piles and Pile Groups: Elastic analysis of single pile, Theoretical solutions for settlement and load distributions, Analysis of pile group, Interaction analysis, Load distribution in groups with rigid cap, Load deflection prediction for laterally loaded piles, Subgrade reaction and elastic analysis, Interaction analysis, Pile-raft system.

UNIT-V

Ground-Foundation-Structure Interaction: Effect of structure on ground-foundation interaction, Static and dynamic loads.

REFERENCES:

1. Selvadurai, A. P. S. - Elastic Analysis of Soil-Foundation Interaction, 1979
2. Rolando P. Orense, Nawawi Chouw & Michael J. Pender - Soil-Foundation-Structure Interaction, CRC Press, 2010 Taylor & Francis Group, London, UK.
3. Soil Structure Interaction – The real behaviour of structures, the institution of structural engineers, London, March 1989.
4. Poulos, H. G., and Davis, E. H. - Pile Foundation Analysis and Design, 1980
5. Scott, R. F. - Foundation Analysis, Prentice Hall, Englewood Cliffs, 1981

6. Bowles, J. E. - Foundation Analysis & Design 5th Edition McGraw-Hill Companies, Inc. (1996)
7. Das, B. M. - Principles of Foundation Engineering 5th Edition Nelson Engineering

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING
GROUND IMPROVEMENT TECHNIQUES (PE – I)

Course objectives:

1. To select suitable ground improvement techniques for problematic soils.
2. To select suitable mechanical and hydraulic modifications.
3. To evaluate suitable physical and chemical modifications.
4. To adept soil reinforcement techniques.

Course Outcomes: At the end of the course, student will be able to:

1. Understand, Analyse and Apply the mechanical and hydraulic ground improvement
2. methods for problematic soils
3. Apply Physical and Chemical Modification techniques to improve the in-situ soil
4. Design suitable ground improvement methods using reinforcement technique

UNIT- I

Introduction to Engineering Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT- II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT- III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains.

UNIT- IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT- V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

REFERENCES:

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
2. M. P. Moseley and K. Krisch (2006) – Ground Improvement, II Edition, Taylor and Francis
3. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey
4. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
5. Xianthakos, Abreimson and Bruce - Ground Control and Improvement, John Wiley & Sons, 1994.
6. K. Krisch & F. Krisch (2010) - Ground Improvement by Deep Vibratory Methods, Spon Press, Taylor and Francis

7. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

THEORETICAL SOIL MECHANICS (PE - I)

Course Objectives:

1. To impart knowledge required for computing stress and settlement at any point in the semi-infinite elastic soil medium, anisotropic medium and layered deposits due to foundation loads.
2. To evaluate the stability of foundations, slopes, cuts and retaining structures both for the conditions of undrained and drained loading through theorems of plastic collapses.

Course OUTCOME: At the completion of the course, the students will be able to

1. Decide the type of mathematical models to be used for analyzing the behavior of soil mass at critical state
2. Understand the elastic and plastic behavior of soils under various loads.
3. Analyze and evaluate stress deformation behavior for various loads and subsoil conditions.

UNIT- I

Theory of Elasticity: Basic concepts, definitions and notations of stress & strain components – Generalized Hooke's Law, Equilibrium and Compatible conditions in Cartesian, Polar coordinates – Principal stresses and strains

UNIT- II

Theory of Plasticity: Ideal Plastic substance strain hardening – yield criteria – Tresca, & Van Mises, Mohr & Coulomb, Drucker-Prager theories, Critical State Soil Mechanics, – applications to soil mechanics problems.

UNIT- III

Stresses and Displacements due to Surface and Subsurface Loads – Boussinesq, Cerutti, Mindlin Solutions, Stresses and Displacements in Finite Layer & Multi-Layered Systems. Stress-path methods; Rotation of Foundations.

UNIT- IV

Critical state & constructive behavior of soils – introduction to yield criteria, constructive modeling.

UNIT- V

Underground Structures: Stresses and Displacements around Underground Openings unlined and lined tunnels.

REFERENCES:

1. Poulos, H. G. & Davis, E. H. – "Elastic Solutions for Soil and Rock Mechanics, John Wiley and Sons, New York, 1974
2. Das, B. M. - Principles of Foundation Engineering 5th Edition Nelson Engineering (2004)
3. Harr,M.E. – "Foundations of Theoretical Soil Mechanics" Mc Graw-Hill, 1966.
4. Atkinson J. H. - An Introduction to the Mechanics of Soils and Foundation - through critical state soil mechanics, McGraw- Hill Co. (1993)
5. Wood, D.M.- Soil Behavior and Critical State Soil Mechanics. cambridge university press (1991)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

APPLIED STATISTICS (PE - II)

Course Objectives:

1. To apply statistics in various areas of sampling, analysis and modeling.
2. To select the most common statistical tests and understand their assumptions and limitations.
3. To formulate and choose a suitable methodology for testing in a given situation.
4. To perform estimation in regression models and evaluate a proposed model.

Course OUTCOMES: At the end of the course, student will be able to:

1. Identify various methods of statistics to solve problems
2. Understand the different methods of probability and regression analysis
3. Analyse multiple data sets and sampling technique in statistics

UNIT-I

Introduction & Sampling Techniques: Histogram, Frequency diagram, Role of Probability and Statistics in Civil Engineering, Skewness; Kurtosis; Definitions and Applications; Simple random sampling; Stratified sampling; Systematic sampling; Sample Size determination; Collection & Presentation of data, Design of Experiment.

UNIT-II

Statistical Distributions and Probability: Random Variability, conditional probability, Uniform, Binomial, Poisson, Exponential and Normal distributions; Fitting of distributions; Skewness and Kurtosis, Mean and variance; Chi-square test of goodness-of-fit; lognormal, Beta distribution Probability - Laws of Probability; Conditional probability and Independent events; Kolmogorov – Smirnov (K-S test) Laws of expectation.

UNIT-III

Regression And Correlation: Linear/non-Linear and multiple linear correlation analysis, Linear regression and correlation; Multiple correlation; Multiple correlation coefficient; Standard error of estimate; Analysis of Variance; Curvilinear regression;

UNIT-IV

Multi-Variate Data Analysis and Exact Sampling Distributions: Types of data; Basic vectors and matrices; Simple estimate of centroid, Standard deviation, Dispersion, Variance and covariance; Correlation matrices; Principal component analysis; Time series analysis. Exact Sampling Distributions - Chi-square distribution; Students T-distribution;

UNIT-V

Tests Of Significance & Confidence Interval Estimation & Statistical Testing – I & II: Large sample and small sample tests; Tests for single mean, Means of two samples, Proportions, two variances, two observed correlation coefficients, paired T-tests, Applications. Tests Of Significance & Confidence Interval – Intervals for mean, variance and regression coefficients; Tests of Hypothesis, goodness of fit test.

REFERENCES:

1. Haldar, A.S. & Mahadevan, S., Probability, Reliability, Statistical Methods in Engineering Design, John Wiley and Sons Inc., New York, 2007.
2. Ang, A.H.S. & Tang, W.H. - Probability Concepts in Engineering – Emphasis on Applications to Civil Environmental Engineering, John Wiley and Sons Inc., New York, 2007.

3. Fenton, G.A. and Griffiths, D.V. - Risk Assessment in Geotechnical Engineering, John Wiley and Sons Inc., New York, 2008.
4. Montgomery, D.C. and Runger, G.C. – Applied Statistics

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

ENVIRONMENTAL GEOTECHNOLOGY (PE - II)

Course Objectives:

1. To identify various sources of contamination and to characterize contaminated ground, solid waste.
2. To model the contaminant transport process.
3. To apply suitable ground remediation technique.
4. To identify waste disposal site and design of landfill components.

Course Outcomes: At the end of the course, student will be able to:

1. Identify various sources of contamination of ground and characterize contaminated ground and waste
2. Model the contaminant transport process
3. Understand the various remediation methods for contaminant ground and identify most appropriate method of remediation for different sites.
4. Understand the significance of components of landfills

UNIT-I

Sources and Site Characterization: Scope of Geoenvironmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterisation methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterisation of solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, Bioremediation, Phytoremediation.

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, remediation of NAPL sites, Emerging Remediation Technologies.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

REFERENCES:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004)
3. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001
4. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
5. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

ENVIRONMENTAL IMPACT ASSESSMENT (PE - II)

UNIT - I

Introduction: Environment and its interaction with human activities - Environmental imbalances - Attributes, Impacts, Indicators and Measurements -Concept of Environmental Impact Assessment (EIA), Environmental Impact Statement, Objectives of EIA, Advantages and Limitations of EIA

UNIT - II

Environmental Indicators - Indicators for climate - Indicators for terrestrial subsystems - Indicators for aquatic subsystems - Selection of indicators - Socio-economic indicators - Basic information - Indicators for economy - Social indicators - Indicators for health and nutrition - Cultural indicators - Selection of indicators.

UNIT - III

Environmental issues in water resource development - Land use - Soil erosion and their short and long term effects - Disturbance and long term impacts - Changes in quantity and quality of flow - Sedimentation - Environmental impact assessment of water resource development structures - Case studies, Water Quality Impact Assessment - Attributes, Water Quality Impact Assessment of Water Resources Projects, Data Requirements of Water Quality Impact Assessment for Dams, Impacts of Dams on Environment, Case Studies.

UNIT - IV

Environmental Issues in Industrial Development: On-site and Off-site impacts during various stages of industrial development, Long term climatic changes, Green house effect, Industrial effluents and their impact on natural cycle, Environmental impact of Highways, Mining and Energy development.

UNIT - V

Methodologies for Carrying Environmental Impact Assessment: Overview of Methodologies Adhoc, Checklist, Matrix, Network, Overlays, Benefit Cost Analysis, Choosing A Methodology, Review Criteria.

REFERENCES:

1. Jain, R.K., Urban, L.V., Stracy, G.S., (1991), "Environmental Impact Analysis", Van Nostrand Reinhold Co., New York
2. Rau, J.G. and Wooten, D.C., (1996), "Environmental Impact Assessment", McGraw Hill Pub. Co., New York
3. UNESCO, (1987), "Methodological Guidelines for the Integrated Environmental Evaluation of Water Resources Development", UNESCO/UNEP, Paris
4. Canter, L.W., (1997), "Environmental Impact Assessment", McGraw Hill Pub. Co., New York.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

ADVANCED GEOTECHNICAL ENGINEERING LAB – I (Lab – I)

Course Objectives: To determine the Index and Engineering properties of soils under different conditions.

Course Outcomes: At the end of the course, student will be able to

1. Conduct suitable laboratory tests based on the soil and its conditions,
2. Interpret the obtained soil test results
3. Identify obtained soil test results to apply for a specific Civil Engineering project.

List of Experiments:

1. Classification of soils
2. Hydrometer Analysis
3. Determination of insitu density by core cutter and sand replacement methods
4. Scale effect of permeability
5. Effect of compactive effort on compaction of different soils
6. Variation of CBR values for different soils in soaked and unsoaked conditions
7. Effect of saturation on shear parameters from direct shear tests (tests to be conducted in unsaturated as well as saturated condition)
8. Determination of shear parameters from unconfined compression tests
9. Determination of shear parameters from Triaxial Tests- UU Test
10. Triaxial Tests- CU Test with pore pressure

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

GEOTECHNICAL COMPUTATIONAL LAB (Lab – II)

Course Objectives: Using software student should be able

1. To determine bearing capacity of substrata and vertical stress distribution
2. To Analyze settlements of shallow foundations
3. To determine Load carrying capacity of piles
4. To check the stability of reinforced soil walls

Course Outcome: At the end of the course, student will be able to Identify, create and execute the geotechnical model to analyze, Evaluate and Design Geotechnical structures using developed / available software.

List of Experiments:

1. Presentation of field test data and borelog preparation
2. Bearing capacity of shallow foundations using different theories for different soils
3. Determination of Vertical Stress distribution under different loading conditions and planes
4. Settlement analysis of shallow foundations for different soils
5. Determination of Pile load carrying capacity under compression
6. Determination of lateral pile load capacity
7. Design of underreamed pile foundation
8. Design of Reinforced soil walls

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

RESEARCH METHODOLOGY AND IPR

Prerequisite: None

Course Objectives:

- To understand the research problem
- To know the literature studies, plagiarism and ethics
- To get the knowledge about technical writing
- To analyze the nature of intellectual property rights and new developments
- To know the patent rights

Course Outcomes: At the end of this course, students will be able to

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

UNIT-I:

Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT-II:

Effective literature studies approaches, analysis, Plagiarism, Research ethics

UNIT-III:

Effective technical writing, how to write report, Paper. Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

UNIT-IV:

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT-V:

Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

TEXT BOOKS:

1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students’”
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”

REFERENCES:

1. Ranjit Kumar, 2nd Edition, “Research Methodology: A Step by Step Guide for beginners”
2. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
3. Mayall, “Industrial Design”, McGraw Hill, 1992.
4. Niebel, “Product Design”, McGraw Hill, 1974.
5. Asimov, “Introduction to Design”, Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “Intellectual Property in New Technological Age”, 2016.
7. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

SOIL DYNAMICS AND MACHINE FOUNDATIONS (PC – III)

Course Objectives:

1. To understand the basics of dynamics, like damping, wave propagation, resonance and
2. effect of modes of vibrations.
3. To determine the dynamic soil properties by field and laboratory tests.
4. To study the effect of liquefaction and anti liquefaction measures.
5. To study vibration isolation, machine foundation design.

Course Outcome: At the end of the course, student will be able to:

1. Understands theory of vibration and wave propagation through the ground.
2. Determination dynamic soil properties required for design.
3. Evaluate liquefaction potential of any site and remediation.
4. To design machine foundations for reciprocating and impact loads.

UNIT- I

Fundamentals of Vibration: Definitions, Simple harmonic motion, Response of SDOF systems of Free and Forced vibrations with and without viscous damping, Frequency dependent excitation, Logarithmic decrement, Determination of viscous damping, Systems with Two and Multiple degrees of freedom, Vibration measuring instruments.

UNIT- II

Wave Propagation and Dynamic Soil Properties: Propagation of seismic waves in soil deposits - Attenuation of stress waves, Stress-strain behavior of cyclically loaded soils, Dynamic soil properties - Laboratory and field-testing techniques, Elastic constants of soils, Correlations for shear modulus and damping ratio in sands and clays.

UNIT- III

Foundation Vibration Analyses: Types, General Requirements, Permissible amplitude, Allowable soil pressure, Modes of vibration of a rigid foundation block, Vertical vibration of circular foundations resting on Elastic Half Space- Lambs, Reissner, Quinlan & Sungs analogies.

UNIT- IV

Design of Machine Foundations: Analysis and design of block foundations for reciprocating engines, IS code of practice design procedure for foundations of reciprocating and impact type machines. Vibration isolation and absorption techniques.

UNIT- V

Machine Foundations on Piles: Introduction, Analysis of piles under vertical vibrations, Analysis of piles under translation and rocking, Design procedure for a pile supported machine foundation.

REFERENCE:

1. Swami Saran - Soil Dynamics and Machine Foundation, Galgotia Publications Pvt. Ltd. (2010)
2. Prakash, S. - Soil Dynamics, McGraw Hill Book Company (1981)
3. I. Chowdhary and S P Dasgupta - Dynamics of Structures and Foundation, 2009.
4. Arya, S. D, O'Neil, M. and Pincus, G.- Design of Structures and Foundations for Vibrating Machines, Gulf Publishing Co., 1979.

5. Prakash, S. and Puri, V. K. - Foundation for Machines: Analysis and Design, John Wiley & Sons, 1998.
6. Kameswara Rao, N. S. V. - Vibration Analysis and Foundation Dynamics, Wheeler Publication Ltd., 1998.
7. Richart, F. E. Hall J. R and Woods R. D. - Vibrations of Soils and Foundations, Prentice Hall Inc., 1970.
8. Das, B. M. - Principles of Soil Dynamics, PWS KENT publishing Company, Boston.2002
9. Bharat Bhushan Prasad – Advanced Soil Dynamics and Earthquake Engineering, PHI Learning Pvt. Limited, New Delhi, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

SUBSURFACE INVESTIGATIONS AND INSTRUMENTATION (PC – IV)

Course Objectives:

1. To appraise soil and rock exploration procedures
2. Develop the understanding of different soil and rock parameters required for design of foundations
3. Learn and apply advanced soil exploration methods

Course Outcomes: At the end of the course, student will be able to:

1. Implement subsurface investigation based on the requirement of Civil Engineering project and site conditions.
2. Execute different subsurface exploration tests, collect disturbed/undisturbed samples for laboratory tests and can suggest design parameters.
3. Differentiate methods for estimation of dynamic soil properties
4. Apply instrumentation scheme for monitoring of critical sites

UNIT- I

Introduction: Data required for soil investigation - Methods of Exploration - Planning the Exploration Program

UNIT-II

Sampling and Programme: Soil Boring - Soil Samplers and Sampling - Underwater Sampling Groundwater Table (GWT) Location - Number and Depth of Borings - Drilling and/or Exploration of Closed Landfills or Hazardous Waste Sites – Preparation of Soil Report

UNIT-III

Penetration Tests: Standard Penetration Test - SPT Correlations - Design *N* Values - Cone Penetration Tests - Field Vane Shear Testing - Borehole Shear Test - Flat Dilatometer Test - Pressure meter Test.

UNIT-IV

Rocks: Rock Sampling – RQD – Strength and modulus from classifications, Classification based on strength & modulus and strength and fracture strain, Geoengineering classification.

UNIT-V

Non-Destructive testing: Techniques–sounding techniques, Rader techniques, Ultrasonic pulse wave tests, Bender elements etc.

REFERENCE:

1. Bowles, J. E. - Foundation Analysis & Design 5th Edition McGraw-Hill Companies, Inc. (1996)
2. Das, B. M. - Principles of Foundation Engineering 5th Edition Nelson Engineering (2004)
3. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012.
4. Goodman – Introduction to Rock mechanics, Willey International (1980).
5. Geotechnical Investigation Methods: A Field Guide for Geotechnical Engineers. Roy.E HUNT, Taylor & Francis, .2006.
6. Handbook of Geotechnical Investigation and Design Tables, Routledge, (2007).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

OFFSHORE GEOTECHNICAL ENGINEERING (PE - III)

Course Objectives:

1. To understand the type of soil strata available in offshore.
2. To develop a structure under different environmental condition.
3. To design the anchors in the sea.

Course Outcomes: At the end of the course, student will be able to:

1. Understand the marine deposits and their behavior under different loading conditions
2. Design the shallow foundations and study the foundation stability of offshore structures.
3. Design the piles for offshore structures and submarine pipe lines

UNIT- I

The nature of Submarine Soils: origin, classification and distribution of marine sediments; in-situ stress state in submarine deposits; inorganic clay deposits; calcareous sediments; siliceous sediments. Offshore Geotechnical Investigations: phases of the investigation, geophysical survey, drilling and sampling procedures, in-situ testing techniques, laboratory testing.

UNIT- II

Foundations for Offshore Gravity Structures: construction, installation, instrumentation of gravity platforms, stability analysis, deformation analysis based on elastic theory, piping and erosion. Design of suction piles for offshore structure.

UNIT- III

Foundations for Jack-up Rigs: foundations types and design loads, Prediction of individual footing performance, prediction of mat footing performance, seabed anchors, load capacity of anchors, breakout forces, anchor systems for floating structures.

UNIT- IV

Offshore Pile Foundations: types of offshore piles, temporary support of piled structures, dynamic analysis of pile driving, axial load capacity, axial deformation analysis, Lateral loading, and dynamic response.

UNIT -V

Seafloor Stability: causes of seafloor instability, geological features of submarine slides, mechanisms of instability, slope stability under gravity forces and wave forces, Effects of soil instability on piles, installation and stability of submarine pipelines.

REFERENCE:

1. Marine Geotechnics – H.G. Poulos (1988), Prentice Hall Inc.
2. Construction of marine and offshore structures – Ben C Gerwick, jr., CRC Press, Taylor and Francis Group (2012)
3. Seabed Reconnaissance and Offshore Soil Mechanics (for the installation of petroleum structures) – Pierre LE Tirant (1979), Gulf Publishing Company, Houston, Texas.
4. API (2000) – Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms – API, RP2A.

5. Pile design and construction practice – M J Tomlinson, View point Publications, Palladian Publications Limited (1987)
6. Port Engineering planning, construction, maintenance and security – George P Tsinker, John Wiley & Sons, Inc. (2004)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

DESIGN OF SUBSTRUCTURES (PE - III)

Course Objectives:

1. To gain familiarity about different types of foundation.
2. To design of shallow foundations and deep foundations.
3. To check the stability of Retaining walls
4. To design Machine foundations and Special foundations.

Course Outcome: At the end of the course, student will be able to

1. Design shallow and deep foundations for different loading conditions
2. Check the stability of retaining walls
3. Design machine foundations

UNIT – I

Shallow Foundations: Basic requirements of foundation –Types and selection of foundations. Design of reinforced concrete isolated, combined, eccentric, strip, and strap footings used for infrastructure projects

UNIT – II

Raft Foundations: Types of rafts, Design of slab raft foundation and Design of beam and slab raft foundation used for infrastructure projects.

UNIT – III

Pile Foundations: Introduction, design of piles, pile caps and pile- raft foundation.

UNIT – IV

Design of Retaining walls: Stability Analysis and design of gravity, Cantilever retaining walls.

UNIT – V

Machine Foundations: Vibration analysis of machine foundation - Design of foundation for Reciprocating machines and Impact machines - as per I.S. Codes.

REFERENCE:

1. Bowles. J.E., “Foundation Analysis and Design”, McGraw Hill Publishing co., New York, 1986.
2. Tomlinson. M.J, “Foundation Design and Construction”, Longman, Sixth Edition, New Delhi, 1995.
3. Das, B.M., Principles of Foundation Engineering, Design and Construction, Fourth Edition, PWS Publishing, 1999.
4. Narayan V. Nayak, Foundation design manual, Dhanpat Rai & Sons, 2006.
5. Prakash Shamsher and Puri Vijay K, Foundations for Machines, Analysis and Design” John Wiley and Sons, USA, 1988.
6. IS 2911: Part 1: Sec 1: 1979 Code of practice for design and construction of pile foundations: Part 1 Concrete piles, Section 1 Driven cast in-situ concrete piles.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

ENGINEERING ROCK MECHANICS (PE - III)

Course Objectives:

1. To classify rock available for tunneling, mining etc.
2. To determine strength parameters based on the nature of the rock and predicting its behavior under loading condition settlement, bearing capacity etc.
3. To check for stability of natural rock slopes & cuts in rock mass- predicting and checking the probable failure modes
4. To identify suitable explosives and blasting method based on site condition

Course Outcome: At the end of the course, student will be able to:

1. Determine the required rock properties and classify rock mass
2. Determine bearing capacity of rocks,
3. Checking the stability of slopes, and design underground and open excavation.
4. Predict strength of rock mass with respect to various Civil Engineering applications

UNIT-I

Engineering Classification of Rocks: Classification of intact rocks, Rock mass classifications, Rock Quality Designation (RQD), Rock Structure Rating (RSR), Rock Mass Rating (RMR), Norwegian Geotechnical Classification (Q-system), Strength and modulus from classifications, Classification based on strength & modulus and strength and fracture strain, Geoengineering classification.

UNIT-II

Laboratory and In-Situ Testing of Rocks: Physical properties, Compressive strength, Tensile strength, Direct shear test, Triaxial shear test, Slake durability test, Schmidt rebound hardness test, Sound velocity test, In-Situ Tests: Seismic methods, Electrical resistivity method, In situ stresses, Plate loading test, Goodman jack test, Plate jacking test, In-situ shear test, Field permeability test.

UNIT-III

Strength, Modulus and Stresses-Strain Responses of Rocks: Factors influencing rock response, Strength criteria for isotropic intact rocks, Modulus of intact rocks, effect of confining pressure, Uniaxial Compressive strength, Strength criteria for intact rocks, Strength due to induced anisotropy in rocks, Stress Strain Models: Constitutive relationships, Elastic, Elasto-plastic, Visco-elastic, Elasto-viscoplastic stress-strain models.

UNIT-IV

Stability of Rock Slopes and Foundations on Rocks: Rock slopes, Modes of failure, Rotational failure, Plane failure, Design charts, Wedge method of analysis, Buckling failure, Toppling failure, Improvement of slope stability and protection. Foundations on Rock: Introduction, Estimation of bearing capacity, Stress distribution, Sliding stability of dam foundations, strengthening measures, Settlements in rocks, Bearing capacity of pile/pier in rock, Remedial measures, Foundations located on edge of jointed slope.

UNIT-V

Underground and Open Excavations: Blasting operational planning, Explosive products, Blast Design, Underground blast design, Controlled blasting techniques, blasting damage and control, Safe practice with explosives and shots.

REFERENCES:

1. Goodman – Introduction to Rock mechanics, Willey International (1980).
2. Ramamurthy, T. - Engineering in Rocks for slopes, foundations and tunnels, Prentice Hall of India.(2007)
3. Jaeger, J. C. and Cook, N. G. W. – Fundamentals of Rock Mechanics, Chapman and Hall, London.(1979)
4. Hoek, E. and Brown, E. T. - Underground Excavation in Rock, Institution of Mining and Metallurgy, 1982.
5. Brady, B. H. G. and Brown, E. T. - Rock Mechanics for Underground Mining, Chapman & Hall, 1993.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

EARTH RETAINING STRUCTURES (PE - IV)

Course Objectives:

- To calculate earth pressure under different loads and conditions
- To check the stability of gravity and cantilever Retaining walls
- To design sheet pile walls and bracings
- To design Reinforced soil walls

Course Outcomes: At the end of the course, student will be able to

- Calculate the earth pressures under different loads and conditions
- Design conventional retaining walls and check the stability
- Design flexible retaining walls, like sheet piles and reinforced earth walls
- Design the supporting systems for deep excavations

UNIT-I

Earth Pressure Theories: Rankine's and Coulomb's Earth pressure theories for cohesive and cohesionless soils, stresses due to compaction and surcharge loads.

UNIT-II

Conventional Retaining Wall: Types of retaining walls, Stability (sliding, overturning, bearing capacity & overall) of gravity and cantilever walls, proportioning of retaining walls, Backfill material and drainage.

UNIT-III

Flexible Walls: Sheet pile walls, Construction methods**-** Cantilever and Anchored (Free and Fixed support methods) sheet pile walls in coarse- and fine-grained soils, moment reduction method.

UNIT-IV

Reinforced Soil Walls/Mechanically Stabilized Earth: - Failure mechanisms-bond and rupture failures, Analysis methods, Limit equilibrium method- Internal and external stability, Static analyses.

UNIT-V

Braced Cuts and Soil Nailing: Lateral earth pressure in braced cuts, Design of various components, Stability of braced cuts, base heave and stability, yielding and settlement of ground surrounding excavation, Soil Nailing.

REFERENCE:

1. Das, B. M. - Principles of Foundation Engineering 5th Edition Nelson Engineering (2004)
2. Bowles, J. E. - Foundation Analysis & Design 5th Edition McGraw-Hill Companies, Inc. (1996)
3. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Hand Book -Springer (2001)
4. Hans Friedrich Winterkorn, Hsai-Yang Fang - Foundation Engineering Handbook, Van Nostrand Reinhold, 1975
5. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

GEOTECHNICS FOR INFRASTRUCTURES (PE - IV)

Course Objectives:

- To impart Knowledge on Site investigation and soil testing methods.
- To be able to design types of foundations, suitable for different Structures.
- To identify soil types suitable for construction.

Course Outcome: At the end of the course, student will be able to

- Plan and select the soil exploration method in the field
- Estimate the bearing capacity and settlements of shallow foundations for different infrastructure projects
- Design deep foundations under different types of loads
- Design foundations for Highrise buildings, towers, chimney etc
- Design foundations on soft or problematic soils and supporting systems for excavations

UNIT – I

Site Investigation for Infrastructure Projects: methods of site investigation, types of soil samples and samplers- Geotechnical field testing – SPT, CPT, Plate Load Test, Pile Load Test.

UNIT – II

Shallow Foundations for Railway & Highway Bridges and Port & Harbour Structures: types of foundations, design forces, safe and allowable bearing capacity of shallow foundations, settlement computation;

UNIT – III

Pile Foundations for Railway & Highway Bridges and Port & Harbour Structures: Pile foundations – types, axial and lateral capacity of pile, pile group analysis and pile cap; Introduction to drilled piers, caissons, well foundations.

UNIT – IV

Foundations for Transmission Line, Radar Antenna, Microwave and TV Tower and Chimneys: Introduction, foundations for towers and chimneys, design forces, behaviour of pad and chimney foundations, design of chimney and pad foundations, anchor foundations (rock anchors), design of foundations for towers and chimneys, analysis of raft on pile foundations; design and construction of shallow foundations on rocks.

UNIT – V

Sheet Piles - introduction, types of sheet pile walls, cantilever sheet pile wall, anchored sheet pile wall, stability analysis of anchored bulkhead by free earth support and fixed earth support method, position of anchorage.

Expansive and Collapsible Soil: Difficult soils- loose granular soils, soft clays and shrinkable soils-identification, swell and swell pressure.

REFERENCES:

1. Soil Mechanics and foundation engineering – P. Purushottama Raj, Pearson Education.
2. Construction of marine and offshore structures – Ben C Gerwick, jr., CRC Press, Taylor and Francis Group.
3. Dynamic soil tests and applications – N S V Kameswara Rao, Wheeler Publishing.

4. Pile design and construction practice – M J Tomlinson, View point Publications, Palladian Publications Limited.
5. IS: 4091 (1979) - Design and construction of foundations for transmission line towers
6. IS: 11233 (1985) - Design and construction of foundations for Radar Antenna, Microwave and TV Tower.
7. Principle of foundation engineering – B.M. Das, CENGAGE Learning, Thomson, Brooks/Cole.
8. Foundation Engineering -Varghese, Prentice Hall of India.
9. Foundation analysis and design – J.E. Bowles, McGraw Hill Books Company

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

PHYSICAL AND CONSTITUTIVE MODELLING ON GEOMECHANICS (PE - IV)

Course Objectives:

- To understand geotechnical modeling considerations
- To select model to simulate field conditions
- To use and acquire data using various instruments
- To compare with recent development geotechnical modelling

Course Outcomes: At the end of the course, student will be able to

- Understand scaling laws and modeling considerations for physical modeling in geotechnical problems both for static and dynamic conditions.
- Comprehend physical modeling, scale effects, simulation of field conditions, conceptualization and fixing boundary conditions etc.
- Data acquisition for all the conditions
- Know new improvements in physical modeling

UNIT-I

Similitude and Modeling Principles: Importance of physical Modeling, scaling laws, small-scale model studies in 1-g and N-g, historical Perspectives.

UNIT-II

Design of physical model and model ground preparation: scale effects, flexible and rigid boundary conditions, preparation of sand/clay bed preparation, wet pluviation, dry pluviation, tamping techniques, slurry consolidation, uniformity of sand/clay beds.

UNIT-III

Model planning and measurement strategy: Selection of Model dimension, model containers, preparation of models to test shallow and deep foundations, pull-out behavior, retaining walls, shaking table studies, vertical and inclined loading system, Perspex walls, markers, digital analysis.

UNIT-IV

Sensors and Data Acquisition: Strain gauges, Load cells, Earth Pressure Transducers, LVDTs, Linear Potentiometers, pore pressure transudes, accelerometers, Hydraulic jack, calibration methods, dead weight calibration, pneumatic calibration, frequency of calibration, calibration charts, calibration factor, In-soil & fluid calibration, data acquisition system.

UNIT-V

Recent Developments in Physical Modelling: Static behaviour of shallow and deep foundations, Piles subjected to lateral loading, behaviour of foundation subjected to earthquake loading, foundations subjected to cyclic loading, use of shaking table, behaviour of foundations on expansive soils.

REFERENCES:

1. David muir wood, Geotechnical Modelling, Spon Press, Taylor & Francis, 2004.
2. Madabhushi, G. - Centrifuge Modeling for Civil Engineers, CRC Press, Taylor and Francis Group, 2015.
3. Taylor, R.N. Geotechnical Centrifuge Technology, Taylor and Francis Publication, 1995.

4. Charles Ng, Zhang,L.M., and Wang, Y.H. (2006) : Proceedings of 6th International Conference on Physical Modeling in Geotechnics, Hong Kong.
5. S. Springman, J. Laue & L. Seward, Proceedings of the 7th International Conference on Physical Modelling in Geotechnics, Zurich, Switzerland, 2010.
6. Gaudin, C. & White, D. The Proceedings of the 8th international conference on Physical modeling in Geotechnics, Perth, Australia, 2014.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

ROCK MECHANICS & GEOSYNTHETICS LAB (Lab - III)

Course Objectives:

1. To determine properties of rock samples
2. To determine strength and Module of rock sample for the design purpose
3. To determine the strength and other properties required for geotextile.

Course Outcomes: At the end of the course, student will be able to understand the behavior of rocks and Geosynthetics for various loads, in order to use these properties in the design of geotechnical structures.

List of Experiments

1. Determination of basic properties of rock –
   a) Unit weight from mercury displacement method for irregular samples
   b) Determination of unit weight for core samples
   c) Void ratio, porosity and specific gravity of rock specimens
2. Determination of RQD
3. Determination of Slake Durability Index
4. Point Load Tests – Determination of point load index value, compressive strength and tensile strength for both core and irregular samples
5. Tensile strength of rock by Brazilian Test
6. Uniaxial compressive strength of rock and determination of modulus of elasticity
7. Determination of hardness of rock
   a)Rebound Hammer Test (insitu)
   b)Los Angeles abrasion test (Road materials)
8. Determination of toughness of rock material (road material)
9. Tests on Geotextiles
   a) Tensile Strength of Geotextiles
   b) Cone Drop Test on Geotextile
   c) Interface friction between Geotextile and soil
   d) In-Plane and Cross-Plane Permeability of Geotextiles

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- I YEAR- II SEMESTER
GEOTECHNICAL ENGINEERING

ADVANCED GEOTECHNICAL ENGINEERING LAB – II (Lab - IV)

Course Objectives:

1. To conduct Field & Model tests for interpretation of result and to understand the testing procedure
2. To determine the dynamic properties of Soils
3. To determine containment transport studies to understand various transport processes involved and the determination of parameters required for prediction of contamination

Course Outcomes: At the end of the course, student will be able to:

1. Conduct appropriate field tests on soil, so as to apply the obtained results for a specific Civil Engineering project.
2. Determine the dynamic soil properties of sub-soil
3. Determine the chemical properties present in the soil

List of Experiments:

1. Preparation of borelog & Soil Investigation Report for a) SPT b) DCPT
2. Model Plate Load Test.
3. Model Pile Load Test.
4. Pressure meter Test
5. Block Vibration Test
6. MASW Test
7. Pollutant Transport using column test
8. Determination of Chlorides in soils
9. Determination of Sulphates in soils
10. Study of pollutant transport under instant and continuous source
11. Batch tests

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- II YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

STABILITY ANALYSIS OF SLOPES (PE - V)

Course Objectives:

1. To study the basic concepts of stability.
2. To make the students aware of various causes of failures of slopes and study the remedial measure

Course Outcomes: At the end of the course, student will be able to:

1. Select suitable materials for earth and rockfill dams, causes of failures
2. Check the stability of earth dams,
3. Understand safety measures to be undertaken to prevent the instability of slopes, earthen dams and embankments

UNIT-I

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinometers, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long-term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Introduction to Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Slope Protection and Rockfill Dams: Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete). Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

REFERENCE:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley &. Sons. 1963.
2. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999.

3. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Willace, T.S. 1965.
4. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002).
5. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- II YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

PAVEMENT ANALYSIS AND DESIGN (PE - V)

Course Objectives:

1. To identify the type of pavement and to know the stress distribution
2. To learn the deflection criteria in soils for different pavements
3. To know the characteristics of the rigid pavements and flexible pavements
4. To carry out design and evaluation of flexible and rigid pavements in various field conditions.

Course Outcomes: At the end of the course, student will be able to:

1. Understand various pavement material characterization techniques
2. Estimate the stresses and strains in pavements under different wheel load configurations and other conditions
3. Design of flexible and rigid pavements as per specification such as Morth &IRC

UNIT-I

Introduction: Types and component parts of pavements, Factors affecting design and performance of pavements. Highway and airport pavements, field CBR, field plate load test, modulus of sub grade reaction, Resilient modulus, Suitability of soil, Compaction equipment and Compaction Control.

UNIT-II

Stresses and strains in flexible pavements: Stresses and strains in an infinite elastic half space use of Boussinesq's equations - Burmister's two layer and three-layer theories; Wheel load stresses, various factors in traffic wheel loads; Equivalent single wheel load of multiple wheels. Repeated loads and EWL factors.

UNIT-III

Flexible pavement design methods for highways and airports: Empirical, semi-empirical and theoretical approaches; Development, principle, design steps of the different pavement design methods including AASHTO, Asphalt Institute, Shell Methods. IRC method of pavement design.

UNIT-IV

Stresses in rigid pavements: Types of stresses and causes; Introduction to Westergaard's equations for calculation of stresses in rigid pavement due to the influence of traffic and temperature; Considerations in rigid pavement analysis, EWL; wheel load stresses, warping stresses, frictional stresses, combined stresses.

UNIT-V

Rigid pavement design: Design of cement concrete pavement for highways and runways; Design of joints, reinforcements, tie bars, dowel bars. IRC method of design; Design of continuously reinforced concrete pavements.

REFERENCES:

1. Atkins, N. Harold, Highway Materials, Soils and Concretes, Fourth Edition, 2002, Prentice-Hall.
2. Yang H Huang - Pavement Analysis and Design, 2nd Edition, Pearson Education
3. Yoder.J. & Witzorac Mathew, W. Principles of Pavement Design, John Wiley & Sons Inc
4. Kerbs Robert D. and Richard D. Walker, Highway Materials, McGraw-Hill, Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications

5. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
6. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
7. Pavement and Surfacing for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
8. IRC: 37 & 58 Codes for Flexible and Rigid Pavements Design.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH.- II YEAR- I SEMESTER
GEOTECHNICAL ENGINEERING

GEOTECHNICAL EARTHQUAKE ENGINEERING (PE - V)

Course Objectives:

1. To understand the dynamics of earth and its response, effect on earth structure and measures to mitigate the effects
2. To develop the design ground motion for a site by suitable response analysis
3. To analyze and design geotechnical structures.

Course Outcomes: At the end of the course, student will be able to

1. Understand the causes and quantification of earthquake.
2. Carryout ground response analysis
3. Find liquefaction susceptibility and remedial measures for seismic hazards
4. Design foundations considering earthquake loads

UNIT – I

Earthquake Seismology – Causes of earthquake, Plate tectonics, Earthquake fault sources, Seismic waves, Elastic rebound theory, Earthquake, Intensity and magnitudes, Effects of earthquake, Modified Mercalis intensity scale and seismic instruments.

UNIT – II

Earthquake Ground Motion – Characteristics of ground motion, Effect of local site conditions on ground motions, Design earthquake, Design spectra, Development of site specification and code-based design.

UNIT – III

Ground Response Analysis – One-dimensional ground response analysis: Linear approach, Nonlinear approach, Comparison of one-dimensional ground response analyses. Two-dimensional ground response analysis: Equivalent linear approach, Nonlinear approach, Comparison of two-dimensional ground response analyses.

UNIT – IV

Liquefaction and Lateral Spreading - Liquefaction related phenomena, Liquefaction susceptibility: Historical, Geological, Compositional and State criteria. Evaluation of liquefaction by cyclic stress and cyclic strain approaches, Lateral deformation and spreading, Soil improvement for remediation of seismic hazards.

UNIT – V

Seismic Design of Foundations, Retaining Walls & Slopes - Seismic design requirements for foundation, Seismic bearing capacity, Seismic settlement, Design loads. Seismic slope stability analysis - Internal stability and weakening instability, Seismic design of retaining walls: Dynamic response of retaining walls, Seismic displacement of retaining walls.

REFERENCE:

1. Kramer S. L - Geotechnical Earthquake Engineering, Prentice Hall, 1996.
2. Bharat Bushan Prasad- Advanced Soil Dynamics and Earthquake Engineering, PHI Learning Pvt. Ltd., New Delhi, 2011.
3. R. W. Day - Geotechnical Earthquake Engineering Handbook, McGraw-Hill, 2002.

4. Naeim, F. - The Seismic Design Handbook, Kluwer Academic Publication, 2nd Edition, 2001.
5. Bolt, B. A. - Earthquakes, W. H. Freeman and Company, 4th Edition, 1999.
6. Lourie, W. - Fundamentals of Geophysics, Cambridge University press, 1997.
7. Kamalesh Kumar - Basic Geotechnical Earthquake Engineering – New Age International Publishers, 1st Edition, 2008
8. Dowrick - Earthquake Resistant Design, John Wiley & Sons.(2009)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

ENGLISH FOR RESEARCH PAPER WRITING (Audit Course - I & II)

Prerequisite: None

Course objectives: Students will be able to:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

UNIT-I:

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT-II:

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticizing, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

UNIT-III:

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT-IV:

key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

UNIT-V:

skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions. useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

TEXT BOOKS/ REFERENCES:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

DISASTER MANAGEMENT (Audit Course - I & II)

Prerequisite: None

Course Objectives: Students will be able to

- learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- critically understand the strengths and weaknesses of disaster management approaches,
- planning and programming in different countries, particularly their home country or the countries they work in

UNIT-I:

Introduction:

Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Disaster Prone Areas in India:

Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

UNIT-II:

Repercussions of Disasters and Hazards:

Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.

UNIT-III:

Disaster Preparedness and Management:

Preparedness: Monitoring of Phenomena Triggering A Disaster or Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT-IV:

Risk Assessment Disaster Risk:

Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.

UNIT-V:

Disaster Mitigation:

Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

TEXT BOOKS/ REFERENCES:

1. R. Nishith, Singh AK, “Disaster Management in India: Perspectives, issues and strategies “’New Royal book Company.
2. Sahni, Pardeep Et. Al. (Eds.),” Disaster Mitigation Experiences and Reflections”, Prentice Hall of India, New Delhi.
3. Goel S. L., Disaster Administration and Management Text and Case Studies”, Deep &Deep Publication Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

SANSKRIT FOR TECHNICAL KNOWLEDGE (Audit Course - I & II)

Prerequisite: None

Course Objectives:

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Outcomes: Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

UNIT-I:
Alphabets in Sanskrit,

UNIT-II:
Past/Present/Future Tense, Simple Sentences

UNIT-III:
Order, Introduction of roots,

UNIT-IV:
Technical information about Sanskrit Literature

UNIT-V:
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

TEXT BOOKS/ REFERENCES:

1. “Abhyaspustakam” – Dr. Vishwas, Samskrita-Bharti Publication, New Delhi
2. “Teach Yourself Sanskrit” Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. “India’s Glorious Scientific Tradition” Suresh Soni, Ocean books (P) Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

VALUE EDUCATION (Audit Course - I & II)

Prerequisite: None

Course Objectives: Students will be able to

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course outcomes: Students will be able to

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality

UNIT-I:

Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. Moral and non- moral valuation. Standards and principles. Value judgements

UNIT-II:

Importance of cultivation of values. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. Honesty, Humanity. Power of faith, National Unity. Patriotism. Love for nature, Discipline

UNIT-III:

Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness.

UNIT-IV:

Avoid fault Thinking. Free from anger, Dignity of labour. Universal brotherhood and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits. Association and Cooperation. Doing best for saving nature

UNIT-V:

Character and Competence –Holy books vs Blind faith. Self-management and Good health. Science of reincarnation, Equality, Nonviolence, Humility, Role of Women. All religions and same message. Mind your Mind, Self-control. Honesty, Studying effectively

TEXT BOOKS/ REFERENCES:

1. Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

CONSTITUTION OF INDIA (Audit Course - I & II)

Prerequisite: None

Course Objectives: Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

UNIT-I:

History of Making of the Indian Constitution: History Drafting Committee, (Composition & Working), **Philosophy of the Indian Constitution:** Preamble**,** Salient Features.

UNIT-II:

Contours of Constitutional Rights & Duties: Fundamental Rights Right to Equality**,** Right to Freedom**,** Right against Exploitation**,** Right to Freedom of Religion**,** Cultural and Educational Rights**,** Right to Constitutional Remedies, Directive Principles of State Policy**,** Fundamental Duties.

UNIT-III:

Organs of Governance: Parliament**,** Composition**,** Qualifications and Disqualifications**,** Powers and Functions**,** Executive**,** President**,** Governor**,** Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualification, Powers and Functions.

UNIT-IV:

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: Zila Pachayat. Elected officials and their roles, CEO Zila Pachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy.

UNIT-V:

Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXT BOOKS/ REFERENCES:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

PEDAGOGY STUDIES (Audit Course - I & II)

Prerequisite: None

Course Objectives: Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes: Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

UNIT-I:

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.

UNIT-II:

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

UNIT-III:

Evidence on the effectiveness of pedagogical practices, Methodology for the indepth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the scho curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT-IV:

Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes

UNIT-V:

Research gaps and future directions: Research design**,** Contexts**,** Pedagogy**,** Teacher education**,** Curriculum and assessment**,** Dissemination and research impact.

TEXT BOOKS/ REFERENCES:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.

3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

STRESS MANAGEMENT BY YOGA (Audit Course - I & II)

Prerequisite: None

Course Objectives:

- To achieve overall health of body and mind
- To overcome stress

Course Outcomes: Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

UNIT-I:
Definitions of Eight parts of yog. (Ashtanga)

UNIT-II:
Yam and Niyam.

UNIT-III:
Do`s and Don't's in life.
i) Ahinsa, satya, astheya, bramhacharya and aparigraha
ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

UNIT-IV:
Asan and Pranayam

UNIT-V:
i) Various yog poses and their benefits for mind & body
ii) Regularization of breathing techniques and its effects-Types of pranayam

TEXT BOOKS/ REFERENCES:

1. 'Yogic Asanas for Group Tarining-Part-I": Janardan Swami Yogabhyasi Mandal, Nagpur
2. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech. (GEOTECHNICAL ENGINEERING)

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS
(Audit Course - I & II)

Prerequisite: None

Course Objectives:

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Outcomes: Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

UNIT-I:

Neetisatakam-Holistic development of personality

- Verses- 19,20,21,22 (wisdom)
- Verses- 29,31,32 (pride & heroism)
- Verses- 26,28,63,65 (virtue)

UNIT-II:

Neetisatakam-Holistic development of personality

- Verses- 52,53,59 (dont's)
- Verses- 71,73,75,78 (do's)

UNIT-III:

Approach to day to day work and duties.

- Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47,48,
- Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35,
- Chapter 18-Verses 45, 46, 48.

UNIT-IV:

Statements of basic knowledge.

- Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68
- Chapter 12 -Verses 13, 14, 15, 16,17, 18
- Personality of Role model. Shrimad Bhagwad Geeta:

UNIT-V:

- Chapter2-Verses 17, Chapter 3-Verses 36,37,42,
- Chapter 4-Verses 18, 38,39
- Chapter18 – Verses 37,38,63

TEXT BOOKS/ REFERENCES:

1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata.
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.