



w.e.f. 2010-2011 academic year

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA-533003, Andhra Pradesh (India)

CIVIL ENGINEERING

COURSE STRUCTURE**I YEAR****I SEMESTER**

S. No.	Subject	T	P	Credits
1	English – I	3	-	2
2	Mathematics - I	3	-	2
3	Engineering Physics – I	3	-	2
4	Engineering Chemistry I	3	-	2
5	C Programming	3	-	2
6	Mathematical Methods	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -I	-	3	2
8	Engineering Workshop (Carpentry, Fitting, House wiring)	-	3	2
9	C Programming Lab	-	3	2
10	English Proficiency Lab	-	3	2
	Total			20

I YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	English – II	3	-	2
2	Mathematics – II	3	-	2
3	Engineering Physics – II	3	-	2
4	Engineering Chemistry-- II	3	-	2
5	Engineering Drawing	3	-	2
6	Environmental Studies	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -II	3	-	2
8	English - Communication Skills Lab	-	3	2
9	IT Workshop	-	3	2
	Total			18



w.e.f. 2010-2011 academic year

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CIVIL ENGINEERING

COURSE STRUCTURE

II YEAR		I SEMESTER		
S. No.	Subject	T	P	Credits
1	Mathematics – III	4	-	4
2	Electrical and Electronics Engineering	4	-	3
3	Mechanics of Materials	4	-	4
4	Construction Materials and Management	4	-	4
5	Surveying	4	-	4
6	Fluid Mechanics	4	-	4
7	Computer aided Engineering Drawing Practice	6	-	3
8	Strength of materials Lab	-	3	2
9	English communication Practice	-	2	1
10	Professional Ethics & Morals-I	2	-	-
Total				29

II YEAR		II SEMESTER		
S. No.	Subject	T	P	Credits
1	Probability & Statistics	4	-	4
2	Managerial Economics and Financial Analysis	4	-	4
3	Strength of Materials	4	-	4
4	Hydraulics and Hydraulic Machinery	4	-	4
5	Engineering Geology	4	-	4
6	Structural Analysis - I	4	-	4
7	Fluid Mechanics and Hydraulic Machinery Lab	-	3	2
8	Surveying Lab	-	3	2
9	English communication Practice	-	2	1
10	Professional Ethics & Morals-II	2	-	-
Total				29

Note: * Tutorial Class



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CIVIL ENGINEERING

COURSE STRUCTURE**III YEAR****I SEMESTER**

S. No.	Subject	T	P	Credits
1	Concrete Technology	4	--	4
2	Structural Analysis - II	4	--	4
3	Design & Drawing of Concrete Structures -I	4	--	4
4	Building Planning & Drawing	2	3	4
5	Water Resources Engineering -I	4	--	4
6	Transportation Engineering-I	4	--	4
7	Engineering Geology Lab	--	3	2
8	Concrete Technology Lab	--	3	2
9	IPR and Patents-1	2	--	-
Total				28

III YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Design & Drawing of Concrete Structures -II	4	--	4
2	Design & Drawing of Steel Structures	4	--	4
3	Geotechnical Engineering -I	4	--	4
4	Water Resources Engineering-II	4	--	4
5	Water and Wastewater Engineering	4	--	4
6	Transportation Engineering-II	4	--	4
7	Geotechnical Engineering Lab	--	3	2
8	Transportation Engineering Lab	--	3	2
9	IPR and Patents-2	2	---	-
Total				28



w.e.f. 2010-2011 academic year

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CIVIL ENGINEERING

COURSE STRUCTURE**IV YEAR****I SEMESTER**

S. No.	Subject	T	P	Credits
1	Geotechnical Engineering-II	4	--	4
2	Design & Drawing of Irrigation Structures	4	--	4
3	Environmental Engineering	4	--	4
4	Remote Sensing and GIS Applications	4	--	4
5	ELECTIVE – I a) Earthquake Resistant Design b) Ground Improvement Techniques c) Urban Transportation Planning	4	--	4
6	OPEN ELECTIVE a) Air Pollution and Control b) Disaster Management c) Industrial Water & Waste Water Management d) Architecture and Town Planning	4	--	4
7	GIS and CAD Lab	-	3	2
8	Water and Wastewater Engineering Lab	-	3	2
Total				28

IV YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Estimation, Specifications & Contracts	4	--	4
2	ELECTIVE – II a) Advanced Structural Design b) Ground Water Development and Management c) Environmental Impact Assessment and Management d) Quality Control and Quality Assurance	4	--	4
3	ELECTIVE – III a) Water Shed Management b) Finite Element Method c) Pavement Analysis and Design	4	--	4
4	ELECTIVE – IV a) Soil Dynamics and Machine Foundations b) Advanced Structural Analysis c) Water Resources System Planning and Management	4	--	4
5	Project Work	4	--	12
Total				28



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

CONCRETE TECHNOLOGY

UNIT I

CEMENTS & ADMIXTURES: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, plasticizers, super-plasticizers, fly ash and silica fume.

UNIT – II

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size.

UNIT – III

FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water, Ready mixed concrete, Shotcrete.

UNIT – IV

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gelspae ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

UNIT – V

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – VI

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – VII

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

UNIT – VIII

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Different

types of fibres – Factors affecting properties of F.R.C, Polymer concrete – Types of Polymer concrete – Properties of polymer concrete, High performance concrete – Self consolidating concrete – SIFCON, self healing concrete.

TEXT BOOKS:

1. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.; 2004
3. Properties of Concrete by A.M.Neville – PEARSON – 4th edition

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Text Book of Concrete Technology, Mahaboob Bhasha, Anuradha publications,

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

STRUCTURAL ANALYSIS – II

UNIT I

Three hinged arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

UNIT – II

Two hinged arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-III

Lateral load analysis using approximate methods: application to building frames. (i) Portal method (ii) Cantilever method.

UNIT – IV

Cable structures and Suspension bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

UNIT – V

Moment Distribution method – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT – VI

Kani's Method - Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

UNI – VII

Flexibility methods: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

UNIT – VIII

Stiffness method: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

TEXT BOOKS:

1. Structural Analysis by T.S.Thandavamoorthy, Oxford university press, India.
2. Structural Analysis by R.C. Hibbeler, Pearson Education, India
3. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

REFERENCES:

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill, India
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata Mc-graw hill, New Delhi.
4. Analysis of structures by Vazrani & Ratwani – Khanna Publications.
5. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal-Laxmi publications pvt. Ltd., New Delhi

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

DESIGN AND DRAWING OF CONCRETE STRUCTURES - I

UNIT –I

Introduction: Materials for reinforced concrete, Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, elastic theory, design constants, modular ratio, neutral axis depth and moment of resistance, balanced, under-reinforced and over-reinforced sections, working stress method of design of singly and doubly reinforced beams.

UNIT –II

Introduction of Limit State Design: Concepts of limit state design – Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance

UNIT –III

Design for flexure: Limit state analysis and design of singly reinforced, doubly reinforced and flanged (T and L) beam sections.

UNIT – IV

Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

UNIT – V

Design of compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

UNIT –VI

Footings: Different types of footings – Design of isolated and combined footings - rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

UNIT – VII

Slabs: Classification of slabs, design of one - way slabs, two - way slabs, and continuous slabs using IS Coefficients (conventional), design of waist-slab staircase.

UNIT –VIII

Limit state design for serviceability: deflection, cracking and codal provision, Design of formwork for beams and slabs.

NOTE: All the designs to taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement detailing of T-beams, L-beams and continuous beams.
2. Reinforcement detailing of columns and isolated footings.
4. Detailing of one-way, two-way and continuous slabs and waist-slab staircase.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS:

1. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
2. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers
3. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
4. Design of reinforced concrete foundations by P.C. Varghese, PHI Learning private limited

REFERENCES:

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill,3rd Edition, 2005.
4. Reinforced Concrete Structures by Park and Pauley, John Wiley and Sons.
5. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers
6. Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

**BUILDING PLANNING AND DRAWING
PART-A**

UNIT – I

BUILDING BYELAWS AND REGULATIONS:

Introduction – Terminology – Objectives of building byelaws – Floor Area Ratio (FAR) – Floor Space Index (FSI) – Principles underlying building byelaws – classification of buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT – II

RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III

PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV

PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart – CPM and PERT Network planning – Computation of times and floats – their significance.

PART-B

UNIT – V

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, and white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT - VI

DOORS WINDOWS, VENTILATORS AND ROOFS: Panelled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed ventilator-Couple roof – Collar roof – Kind Post truss – Queen post truss.

UNIT – VII

SLOPED AND FLAT ROOF BUILDINGS: Drawing plans, Elevations and Cross-sections of a given sloped roof buildings.

UNIT - VIII

PLANNING AND DESIGNING A BUILDING: Given line diagram with specification to draw, plan, sections section and elevation of a residential of public buildings.

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consist of five questions in planning portion out of Which three questions are to be answered. Part B should

consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 60% and Part- B is 40%.

TEXT BOOKS:

1. Construction Planning, Equipment and methods by R.L. Peurifoyetal. – Tata Mc. Graw Hill Publications.
2. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.
3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,

REFERENCE:

1. Building by laws by state and Central Governments and Municipal corporations.
2. Planning, Designing and scheduling – Girescharan Singh & Jagadish Singh.

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**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA****III Year B. Tech. Civil Engineering – I Sem.****WATER RESOURCES ENGINEERING-I****UNIT I**

Introduction: Engineering hydrology and its applications, Hydrologic cycle. Precipitation: Types and forms of precipitation, rainfall measurement, types of rain gauges, rain gauge network, average rainfall over a basin, consistency of rainfall data, frequency of rainfall, intensity-duration-frequency curves, probable maximum precipitation

UNIT-II

Abstractions: Evaporation, factors affecting evaporation, measurement of evaporation, evaporation reduction, evapotranspiration, factors affecting evapotranspiration, measurement of evapotranspiration - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-III

Runoff : Factors affecting runoff ,components of runoff, computation of runoff-rational and SCS methods, separation of base flow ,Unit Hydrograph, assumptions, derivation of Unit Hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of UH, Synthetic Unit Hydrograph,

UNIT-IV

Floods and Flood Routing: Stream gauging, direct and indirect methods, floods-causes and effects, flood frequency analysis-Gumbel's method, log Pearson type III method, flood control methods flood routing-hydrologic routing, channel and reservoir routing-Muskingum and Pulse method of routing.

UNIT-V

Ground water : Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

Irrigation**UNIT-VI**

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, water logging and drainage, standards of quality for Irrigation water, principal crops and crop seasons, crop rotation.

UNIT-VII

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture tension, consumptive use, estimation of consumptive use, duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VIII

Canals: Classification of canals, design of canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining, design of lined canal, economics of canal lining.

TEXT BOOKS:

1. Engineering Hydrology by K. Subramanya, TATA McGraw-HILL Education Private Limited.
2. Engineering Hydrology P. Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and water power engineering by B.C. Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Hand book of applied hydrology by Ven Te Chow, Tata-McGraw Hill.
2. Hydrology by HM Raghunath, New Age International Publishers.
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
4. Irrigation and Hydraulic structures by SK Garg, Khanna Publishers.

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III Year B. Tech. Civil Engineering – I Sem.

TRANSPORTATION ENGINEERING-I

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING:

Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Planning Surveys-Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II

HIGHWAY GEOMETIC DESIGN:

Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical alignment- Gradients- Vertical curves.

UNIT – III

TRAFFIC ENGINEERING AND MANAGEMENT:

Basic Parameters of Traffic- Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation- Speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents- Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams - Road Traffic Signs – Types and Specifications – Road markings- Need for Road Markings- Types of Road Markings.

UNIT – IV

INTERSECTION DESIGN:

Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives – Traffic Islands and Design criteria- Design of Traffic Signals – Webster Method – IRC Method.

Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – V

HIGHWAY MATERIALS:

Subgrade soil: classification – Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties – Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design.

UNIT – VI

DESIGN OF FLEXIBLE PAVEMENTS:

Objects & Requirements of pavements – Types – Functions of pavement components – Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

UNIT – VII

DESIGN OF RIGID PAVEMENTS:

Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

UNIT – VIII

HIGHWAY CONSTRUCTION:

Types of Highway Construction – Earthwork – Proportion of Subgrade – Construction of Earth Roads – Construction of Gravel Roads – Construction of Water Bound Macadam Roads – Construction of Bituminous Pavements – Construction of Cement Concrete Pavements.

TEXT BOOKS:

1. Khanna S.K., And Justo C.E.G - Highway Engineering – Nem Chand Bros., Roorkee.
2. Kadiyali L.R - Traffic Engineering and Transportation Planning - Khanna Publishers, New Delhi.
3. Most Publications - Specifications for Roads and Bridges - Manual for Maintenance of roads.
4. Nicholas J. Garber, Lester A. Hoel, Principles of Traffic and Highway Engineering.

REFERENCES:

1. Papacostas C.S. - Fundamentals of Transportation Engineering - Prentice Hall of India Pvt.Ltd; New Delhi.
2. Kadiyali LR, Principles of Highway Engineering; Khanna Publishers, New Delhi
3. Saxena, Traffic Planning and Design, Dhanpat Rai Publishers, New Delhi
4. Jotin Khisty C - Transportation Engineering - An Introduction, Prentice Hall, Englewood Cliffs, New Jersey.
5. Mc Shane, WR and RP Roess, Traffic Engineering, Prentice Hall
6. Yang H. Huang, Pavement Analysis & Design, Prentice Hall Inc.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

ENGINEERING GEOLOGY LAB.

1. Physical properties of minerals: Mega scopic identification of
 - a) Rock forming minerals – Quartz group, Feldspar group, garnet group, mica group & talc, chlorite, olivine, kyanite, asbestos, tourmelene, calcite, gypsum, etc...
 - b) Ore forming minerals – magnetite, hematite, pyrite, pyralusite, graphite, chromite, etc...
2. Megascopeic description and identification of rocks.
 - a) Igneous rocks – Types of granite, pegmatite, gabbro, dolerite, syenite, Granite porphyry, Basalt, etc...
 - b) Sedimentary rocks – sand stone, ferruginous sand stone, lime stone, shale, laterite, conglomerate, etc...
 - c) Metamorphic rocks – biotite – granite gneiss, slate, muscovite & biotiteschist, marble, khondalite, etc...
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Interpretation of a Geological map along with a geological section.
4. TWO Simple strike and Dip problems.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Civil Engineering – I Sem.

CONCRETE TECHNOLOGY LAB.

1. Normal Consistency and fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus, compressive strength, split tensile strength of concrete.
7. Sieve analysis, Specific gravity and Bulking of sand.
8. Tests on Coarse aggregate: Flakiness index, elongation index, specific Gravity and sieve analysis.
9. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:

1. Length and elongation gauges
2. Vicat's apparatus
3. Specific gravity bottle.
4. Lechatlier's apparatus.
5. Slump and compaction factor setups
6. Longitudinal compresso meter
7. Rebound hammer, Pulse velocity machine

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