



**4-Year Bachelor of Technology (B.Tech) Curriculum and
Syllabus for Civil Engineering (CE)
Sixth Semester**

A. THEORY

Sl No.	Code Number	Subject	Contact Hours			Credit Point
			L	T	P Total	
1	TIU-UCE-T300	Career Advancement & Skill Development #	3	0	0	3
2	TIU-UMA-T304	Numerical Methods & Programming	3	0	0	3
3	TIU-UCE-T314	Water Resources Engineering – I	3	0	0	3
4	TIU-UCE-T316	Transportation Engineering – II	3	0	0	3
5	TIU-UCE-T318	Surveying – II	3	0	0	3
6	TIU-UCE-T320	Design of Steel Structures	3	1	0	4
Total Theory			19			19

B. PRACTICAL

7	TIU-UCE-L312	Concrete Technology Lab – II	0	0	3	3	2
8	TIU-UCE-L314	Transportation Engineering Lab	0	0	3	3	2
9	TIU-UCE-L316	Surveying Practice – II	0	0	3	3	2
10	TIU-UCS-L312	Numerical Methods & Programming Lab	0	0	3	3	2
Total Practical			12			8	

C. SESSIONAL

10	TIU-UCE-S312	Design & Detailing of Steel Structures	0	0	3	3	2
11	TIU-UES-S398	Entrepreneurship Skill Development	0	0	0	0	2
Total Sessional			3			4	

Total of Semester 34 31

External Expert	External Expert	HOD	Dean	Vice Chancellor

List of Departmental Career Advancement & Skill Development (CASD) Subjects

Sixth Semester

TIU-UCE-T300 - CASD (Risk and Reliability in Civil Engineering)



Sixth Semester

CAREER ADVANCEMENT & SKILL DEVELOPMENT (RISK AND RELIABILITY IN CIVIL ENGINEERING)

TIU-UCE-T300

L-T-P: 3-0-0

Credits: 3

Introduction: Introduction to structural safety and reliability concepts of uncertainty in reliability-based analysis and design.

Basics Statistics and probability: Definition of random variables, Axioms of probability, probability functions, conditional probability, direct and continuous random variables, probability distribution of random variables, random vectors and functions of random variables.

Simulation techniques: Monte Carlo method, Latin Hypercube simulations, Variation reduction techniques.

Basic reliability Method: Basic definition of reliability index, first order reliability method, Hasofer-Lind reliability index (Matrix Method), Rackwitz-Fiessler Procedure (Modified Matrix Procedure).

Reliability Based Design: Reliability based design code and its development load and resistance factor design format, calibration of partial safety for Level-I code, Uncertainty models for load and resistance parameters.

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WATER RESOURCES ENGINEERING-I

TIU-UCE-T314

L-T-P: 3-0-0

Credits: 3

Introduction to Hydrology: Definition of Hydrology, Hydrologic Cycle, Catchment Area or Watershed, Water Budget Equation.

Precipitation: Forms of precipitation, Measurement of rainfall and snowfall, Types of rain gauges, Rain gauge, Network, Adequacy of rain gauge stations, Estimation of missing rainfall data, Checking of consistency of precipitation data, Calculation of average rainfall over an area: Arithmetic Mean Method, Thiessen Polygon Method, Isohyetal Method, Rainfall Mass Curve, Frequency Analysis.

Abstractions from precipitation: Different types of losses from precipitation, Definition of evaporation, Factors affecting evaporation, Measurement of evaporation, Concept of vapour pressure, specific humidity, relative humidity, dew point temperature, Pan evaporation & Lake evaporation, Pan Coefficient, Water Budget method for calculation of evaporation, Meyer's Formula for calculation of evaporation, Definition of Transpiration and its measurement, Definition of Evapotranspiration and its measurement, Concepts of Actual Evapotranspiration, Potential Evaporation & Field capacity, Blaney-Cridle Formula for calculating Evapotranspiration, Definition of Infiltration, Factors affecting Infiltration, Concepts of Infiltration rate & Infiltration capacity, Horton's Infiltration Equation, Infiltration Indices: Phi- Index & W-Index.

Streamflow Measurement: Stream & Stage, Measurement of stage, Velocity Distribution, Measurement of velocity, Methods of estimation of discharge, Direct & Indirect Methods, Area-velocity method, Dilution technique: Sudden Injection & Constant Injection, Slope-Area Method, Flow measuring structures, Stage-discharge relationship, Permanent Control & Shifting Control.

Runoff: Definition of Runoff, Types of Runoff, Yield of a catchment, Rainfall-runoff correlation.

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Hydrograph: Flood hydrograph, Factors affecting hydrograph, Base flow separation methods, Direct runoff hydrograph & Effective Rainfall, Unit Hydrograph, Derivation of Unit hydrograph, Derivation of unit hydrographs of different durations: Method of Superposition, S-Curve Instantaneous Unit Hydrograph, Synthetic Unit Hydrograph.

Flood: Introduction, Time of Concentration, Runoff Co-efficient, Empirical formula for discharge calculation, Flood Frequency Studies, Gumbel's method.

Groundwater Hydrology: Forms of sub-surface water, Aquifer, aquitard, aquiclude & aquifuge, Water Table, Aquifer Properties: Porosity, Specific Yield, Coefficient of Permeability, Stratification, Wells & Types of wells, Discharge calculation for confined and unconfined flow, Open wells

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TRANSPORTATION ENGINEERING – II

TIU-UCE-T316

L-T-P: 3-0-0

Credits: 3

Railway Engineering: Introduction, classification of routes; railway gauge; Elements of permanent way (or track): rails, sleepers, fastenings, ballast and formation; Geometric design of track; Track stresses; Points and crossings, stations and yards, signalling and interlocking, Track Maintenance

Airport Engineering: Functional areas of airports: Runways, Taxiways, Aprons, Terminal buildings; Classification of Airports; Airport site selection; Design of Runway, Runway orientation, Wind Rose diagram; Design of Taxiway and Terminal Building

Port Engineering: Ports in India, layout of ports, port planning, harbour, harbour types, berthing, docks, cargo handling capacity of port, ships and size of ships in port.

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SURVEYING – II

TIU-UCE-T318

L-T-P: 3-0-0

Credits: 3

Theodolite Surveying: Components of a Transit Theodolite, Measurement of horizontal and vertical Angles, Co-ordinates and traverse Table

Tacheometry: Definition, Details of stadia System, Determination of horizontal and vertical distance with Tacheometer-Staff held vertically and normal to the line of sight

Simple & Transition Curves: Definition, Degree of Curve, Elements of Simple Curve, Setting out by Linear method and Rankine's tangential method, Transition Curves.

Introduction to Total Station with Field applications

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DESIGN OF STEEL STRUCTURES

TIU-UCE-T320

L-T-P: 3-0-0

Credits: 4

Introduction Advantages and disadvantages of steel as construction material: Use of steel table (SP6-Part1); Types of loads on steel structure and its I. S. code specification. Geometrical properties of gross and effective cross sections– Classification of Cross Sections as per IS:800-2007.

Plastic Analysis: Methods– Elastic, Plastic and Advanced method of analysis based on IS: 800-2007– Idealized Stress vs. Strain curve– Requirements and Assumptions of Plastic method of analysis– Shape Factors– Collapse load.

Limit State Design (L.S.M): Design of Tension Members by L.S.M, Design of Compression Members by L.S.M, Column Bases by L.S.M, Slab base and Gusseted base.

Design of Flexural Members by L.S.M: Effective span of Beams, Design strength of bending,(Flexure), Limiting deflection of beams–Design of laterally supported Simple beams using single / double rolled steel sections.

Design of Connections and Detailing: Types of connections– Bolted, Riveted and Welded connections– Rigid and Flexible connections. Bolted Connection– Types of bolts– Bearing type Bolts– Nominal and Design shear strengths of bolts– Reduction factors for Long joints, Large grip lengths-Nominal and Design bearing strengths of bolts– Reduction factors for oversized and slotted holes– Nominal and Design tensile strengths (tension capacity) of bolts.- Welded Connection- Types of welds– Fillet welds– Minimum and maximum sizes– Effective length of weld- Fillet welds on inclined faces–Design strengths of shop/site welds– Butt welds– Effective throat thickness and effective length of butt weld

Steel Roof Truss: Types of steel roof truss & its selection criteria, Calculation of panel point load for Dead load; Live load and wind load as per I.S. 875-1987 Analysis and Design of steel roof truss. Design of Angle purlin as per I. S. Arrangement of members at supports.

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CONCRETE TECHNOLOGY LAB – II

TIU-UCE-L312

L-T-P: 0-0-3

Credits: 2

1. Tests on Fresh Concrete: Workability: Slump, Vee-Bee, Compaction factor tests
2. Hardened Concrete: Compressive strength on Cubes, Split tensile strength, Static modulus of elasticity, Flexure tests, Nondestructive testing (Rebound hammer & Ultrasonic pulse velocity).
3. Mix Design of Concrete.

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TRANSPORTATION ENGINEERING LAB

TIU-UCE-L314

L-T-P: 0-0-3

Credits: 2

Tests on highway materials – Aggregates- Impact value, Los-Angeles Abrasion value water absorption, Elongation & Flakiness Index.

Bitumen & bituminous materials: Specific gravity, penetration value, softening point, loss on heating, Flash & Fire point test.

Stripping value test

Design of B.C. & S.D.B.C. Mix

CBR Test

Marshal Stability Test

Benkelman beam Test.

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SURVEYING PRACTICE – II

TIU-UCE-L316

L-T-P: 0-0-3

Credits: 2

1. Traversing by Using Theodolite: Preparation of Gales Table from field data
2. Traversing by using Total Station
3. Use of Total Station for leveling and Contouring
4. Setting out of Simple Curves

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DESIGN & DETAILING OF STEEL STRUCTURES

TIU-UCE-S312

L-T-P: 0-0-3

Credits: 2

Problems on general consideration and basic concepts

Discussion on different loads (i.e. Wind load, Dead load, Live load and others) as per IS875

Design & drawing of the following components of a roof truss:

1. Members of the roof truss.
2. Joints of the roof truss members
3. Purlins
4. Gable bracings
5. Column with bracings
6. Column base plate
7. Column foundation

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