TECHNO INDIA UNIVERSITY
W E S T B E N G A L

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

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

A. THEORY

Sl No.	Code Number	Subject	L	T	P	Total	Credit Point
1	TIU-UEN-T200	Career Advancement & Skill Development	3	0	0	3	3
2	TIU-UMA-T202	Probability & Statistics	3	0	0	3	3
3	TIU-UCE-T212	Building Materials and Construction	3	0	0	3	3
4	TIU-UCE-T214	Analysis of Structures – I	3	1	0	4	4
5	TIU-UCE-T216	Geotechnical Engineering – I	3	1	0	4	4
6	TIU-UCE-T218	Fluid Mechanics – II	3	0	0	3	3
		Total Theory				20	20

B. PRACTICAL

Sl No.	Code Number	Subject	L	T	P	Total	Credit Point
7	TIU-UCE-L212	Fluid Mechanics Lab	0	0	3	3	2
8	TIU-UCE-L214	Surveying Practice – I	0	0	3	3	2
		Total Practical				6	4

C. SESSIONAL

Sl No.	Code Number	Subject	L	T	P	Total	Credit Point
10	TIU-UCE-S202	Quantity Survey, Specification and Valuation	1	0	3	4	2
11	TIU-UES-S298	Entrepreneurship Skill Development	0	0	0	0	2
		Total Sessional				4	4

Total of Semester	30	28

External Expert	External Expert	HOD	Dean	Vice Chancellor

Fourth Semester

PROBABILITY & STATISTICS
TIU-UMA-T202

L-T-P: 3-0-0   **Credits: 3**

Probability: Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence.

Random Variables: Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, moment generating function, Chebyshev's inequality.

Special Distributions: Discrete uniform, Binomial, Geometric, Poisson, Exponential, Gamma, Normal distributions. Functions of a Random Variable.

Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation, independence of random variables, bivariate normal distribution.

Sampling Distributions: The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions.

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

BUILDING MATERIALS AND CONSTRUCTION
TIU-UCE-T212

L-T-P: 3-0-0   **Credits: 3**

Bricks: Classification, characteristics of good bricks, different forms of brickworks, testing of bricks as per BIS.

Aggregates: Classification, characteristics, fine aggregates, coarse aggregates, testing of aggregates.

Cement: Composition and constituents of cement, types of cement, hydration, setting time.

Concrete: Types, ingredients, W/C ratio, workability, different grades in cement concrete, tests on cement concrete.

Brick masonry: Definitions, Rules for bonding, Type of bonds – stretcher bond, Header bond, English bond, Flemish Bond.

Mortar: Classification, Uses, Characteristics of good mortar, Ingredients. Cement mortar, Lime mortar, Lime cement mortar, special mortars.

Timber and Timber Products: Classification of Timber, Structure, Characteristics of good timber, Seasoning of timber, Defects in Timber.

Paints and Varnishes: Composition of oil paint, characteristic of an ideal paint, preparation of paint, types of paints and varnishes.

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

TECHNO INDIA UNIVERSITY

W E S T B E N G A L

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

ANALYSIS OF STRUCTURES – I

TIU-UCE-T214

L-T-P: 3-1-0   **Credits: 4**

Stability and Determinacy of Structures, Deflection analysis of Trusses by graphical method- Williot Mohr Diagram,Complex trusses by Heneberg's bar exchange method, Theorem of Three moments: Fixed, Propped and Continuous beams. Two hinged and fixed, Arches. Three Hinged Arch. Beams Curved in plan. Slope-Deflection method and Moment distribution method: Beams and Portal frame problems. Influence line analysis for determinate beams, trusses and three hinged arches.

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

TECHNO INDIA UNIVERSITY

W E S T B E N G A L

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

GEOTECHNICAL ENGINEERING-I

TIU-UCE-T216

L-T-P: 3-1-0   **Credits: 4**

Introduction to Soil Mechanics.

Soil Formation and Characterization: Formation of Soils, General Types of Soils, Soil Particle Size and Shape.

Soil Phase Relationships, Index Properties and Classification: Weight and volume relationships, Consistency limits, particle size distribution, identification and classification of soil.

Compaction: Soil compaction, Proctor and modified compaction, field control of compaction.

Effective Stress and Pore Water Pressure: Effective stress, soil-water-system - surface tension and capillarity.

Soil Permeability and Seepage: Darcy's law, Permeability of soils, methods of determining coefficient of permeability, permeability of stratified deposits, Seepage analysis, flow nets, piping, quick sand condition.

Compressibility and Consolidation: Compressibility and consolidation of soils, Normally and over consolidated soil, determination of over consolidation pressure, time rate of consolidation, determination of coefficient of consolidation.

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

FLUID MECHANICS-II

TIU-UCE-T218

L-T-P: 3-0-0   **Credits: 3**

Dimensional Analysis & Model Studies: Dimensions and dimensional homogeneity, Importance and use of dimensional analysis, Buckingham's Pi theorem with applications, Geometric, Kinematic and Dynamic similarity, Non-Dimensional Numbers.

Notches & Weirs: Definition & Classification of Notches & Weirs, Discharge over a Rectangular Notch or Weir, Discharge over a Triangular Notch or Weir, Discharge over a Trapezoidal Notch or Weir, Discharge over a Stepped Notch, Time required for emptying a reservoir or tank with a Rectangular & Triangular Notch.

Flow through Pipes: Introduction, Loss due to friction, Darcy-Weisbach Factor, Minor Losses in Pipe Flow.

Open Channel Flow: Introduction, Characteristics of Open Channel Flow, Geometry of Channel Cross-section, Uniform Flow through an open channel, Chezy's& Manning's Formula, Geometrically Efficient Cross-sections: Rectangular, Trapezoidal & Circular, Continuity Equation, Conservation of Momentum, Specific Force, Equation of motion along a straight line, Specific Energy, Specific Energy Curve, Critical, Sub-critical & Super-critical Flows, Channel Transitions: Raised Bed & Constricted Width, Hydraulic Jump, Metering Flumes: Venturi-flume & Parshall Flume.

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

TECHNO INDIA UNIVERSITY
WESTBENGAL

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

FLUID MECHANICS LAB

TIU-UCE-L212

L-T-P: 0-0-3   **Credits: 2**

1.   Determination of Orifice co-efficient
2.   Calibration of Orifice meter
3.   Calibration of V- Notch
4.   Measurement of velocity of water in an open channel using a pitot tube
5.   Measurement of water surface profile for flow over Broad crested weir
6.   Preparation of discharge rating curve for a sluice
7.   Measurement of water surface profile for a hydraulic jump
8.   Determination of efficiency of a Centrifugal pump
9.   Determination of efficiency of a Reciprocating pump
10.   Determination of efficiency of a Pelton wheel Turbine
11.   Determination of efficiency of a Francis Turbine
12.   Determination of efficiency of a Hydraulic Ram

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

TECHNO INDIA UNIVERSITY

W E S T B E N G A L

EM 4, Sector V, Salt Lake, Kolkata-700091, West Bengal, India
Phone: +91 9836544416/17/18/19, Fax: +91 33 2357 1097

SURVEYING PRACTICE – I

TIU-UCE-L214

L-T-P: 0-0-3   **Credits: 2**

Chain surveying: Preparing index plans, Location sketches, Ranging, Preparation of map, Heights of objects using chain and ranging rods, getting outline of the structures by enclosing themin triangles/quadrilaterals, Distance between inaccessible points, Obstacles in chain survey.

Compass surveying: Measurement of bearings, Preparation of map, Distance between two inaccessible points by chain and compass, Chain and compass traverse

Plane Table survey: Temporary adjustments of plane table and Radiation method, Intersection, Traversing and Resection methods of plane tabling, Three-point problem

Leveling: Temporary adjustment of Dumpy level, Differential leveling, Profile leveling and plotting the profile, Longitudinal and cross sectioning, Gradient of line and setting out grades, Sensitiveness of Bubble tube

Contouring: Direct contouring, Indirect contouring – Block leveling, Indirect contouring – Radial contouring, Demonstration of minor instruments

Offered to Civil Engineering Semester 4:

External Expert	External Expert	HOD	Dean	Vice Chancellor

QUANTITY SURVEY, SPECIFICATION AND VALUATION
TIU-UCE-S202

L-T-P: 1-0-3   **Credits: 2**

Quantity Surveying: Types of estimates, approximate estimates, items of work, unit of measurement, unit rate of payment.

Quantity estimate of a single storied building, Bar bending schedule, Details of measurement and calculation of quantities with cost, bill of quantities, abstract of quantities.

Estimate of quantities of road, Underground reservoir, Surface drain, Septic tank.

Analysis and schedule of rates: Earthwork, brick flat soling, DPC, PCC and RCC, brick work, plastering, flooring and finishing,

Specification of materials: Brick, cement, fine and coarse aggregates

Specification of works: Plain cement concrete, reinforced cement concrete, first class brickwork, cement plastering, pointing, white washing, colour washing, distempering, lime punning, painting and varnishing.

Valuation: Values and cost, gross income, outgoing, net income, scrap value, salvage value, market value, Book Value, sinking fund, capitalised value, Y. P., depreciation, obsolescence, deferred income, freehold and leasehold property, mortgage, rent fixation, valuation table.

Offered to Civil Engineering Semester 5:

External Expert	External Expert	HOD	Dean	Vice Chancellor