LNCT UNIVERSITY

Department of Civil Engineering

IIIrd Semester Syllabus

Subject Code	Subject Name
DCE301	Construction Technology
DCE302	Basic Surveying
DCE303	Mechanics of Material
DCE304	Building Planning and Drawing
DCE305	Hydraulics/ Fluid Mechanics
DCE306	Application of Basic Software

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Diploma Civil Engineering

III[rd] Semester Syllabus

DCE301 - Construction Technology

Subject Code	DCE301			
Subject Name	Construction Technology			
Max. Marks	100			
	L	T	P	TC
	3	1	-	4

COURSE OUTCOMES (COs):

After Completing the course student should be able to:

CO-1	Identify relevant construction materials.
CO-2	Identify relevant natural construction materials.
CO-3	Select relevant artificial construction materials.
CO-4	Select relevant special type of construction materials.
CO-5	Identify and use of processed construction materials.

COURSE CONTENTS:

UNIT-I Overview of Construction Technology

Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, Irrigation Engineering (applications only) Selection of materials for different civil engineering structures on the basis of strength, durability, Eco friendly and economy broad classification of materials–, Natural, Artificial, special, finishing and recycled.

UNIT –II Natural Construction Materials

Requirement of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction. Asphalt, bitumen and tar used in construction, properties and uses .properties of lime, its type sand uses Types of soil and its suitability in construction. Properties of sand and uses Classification of coarse aggregate according to size

UNIT-III Artificial Construction Materials

Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks–fly ash bricks, Characteristics of good brick, Classification of burnt clay brick sand their suitability, Manufacturing process of burnt clay brick, fly ash bricks, blocks Flooring tiles–Types, uses Manufacturing process of Cement - dry and wet (only flow chart), types of cement and its uses. Field tests on cement. Pre-cast concrete blocks-hollow, solid, pavement blocks, and their uses. Plywood, particle board, Veneers,

UNIT-IV Special Construction Materials

Types of material and suitability in construction works of following materials: Water Proofing, termite proofing. Fibers–Types–Jute, Glass, Plastic Asbestos Fibers,(only uses). Geo-polymer cement: Geo-Cement: properties, uses.

UNIT-V Processed Construction Materials

Constituents and uses of POP (Plaster of Paris),POP finishing boards, sizes and uses. Paints-whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses.(Situations where used).Industrial waste materials-Fly ash ,Blast furnace slag, Granite and marble polishing waste and their uses.

Reference Books: -

1. Ghose, D.N., Construction Materials, Tata Mc Graw Hill,NewDelhi.
2. S.K .Sharma, Civil Engineering Construction Materials ,Khanna Publishing House, Delhi
3. Varghese ,P.C., Building Materials ,PHI learning, New Delhi.
4. Rangwala ,S.C., Engineering Materials, Charator publisher, Ahmadabad.
5. Somay aji, Shan, Civil Engineering Materials ,Pearson education, New Delhi.
6. Rajput ,R.K ,Engineering Materials, S .Chand and Co .,New Delhi.
7. SoodH., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, New Delhi.
8. Sharma C.P.,Engineering Materials ,PHI Learning ,New Delhi.
9. Duggal ,S.K ,Building Materials, New International, New Delhi.

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LIST OF PRACTICAL TO BE PERFORMED:

1. Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report (60,40, 20,10 mm)
2. Prepare the lime putty by mixing lime (1 kg) with water in appropriate proportion and pre-pare report on slaking of lime.
3. Identify various layers and types of soil in foundation pit by visiting construction sites and prepare report consisting photographs and samples.
4. Select first class, second class and third-class bricks from the stake of bricks and prepare report on the basis of its properties
5. Measure dimensions of 10 bricks and find average dimension and weight. Perform field tests -dropping,strikingandscratchingbynailandcorrelatetheresultsobtained
6. Identify different types of flooring tiles such as vitrified tiles, ceramic tiles, glazed tiles, mosaic tiles, anti- skid tiles, chequered tiles, paving blocks and prepare report about the specifications
7. Apply two or more coats of selected paint on the prepared base of a given wall surface for the areaof1mx1musingsuitablebrush/roller sad opting safe practices
8. Prepare the cement mortar of proportion 1:3 or 1:6 using artificial sand as a special processed construction material.
9. Prepare mortar using cement and Fly ash or Granite/marble polishing waste in the proportion 1:6 or 1:3.
10. Determine Water Absorption on bricks per IS:3495 (part II), IS:1077 or tile IS:1237

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DCE302 - Basic Surveying

Subject Code	**DCE302**			
Subject Name	**Basic Surveying**			
Max. Marks	**150**			
	L	**T**	**P**	**TC**
	3	**1**	**2**	**6**

COURSE OUTCOMES (COs):

After Completing the course student should be able to:

CO-1	Classify types of surveys and explain their significance in different surveying scenarios.
CO-2	Conduct accurate chain and cross staff surveys, including measurement corrections and area computation.
CO-3	Perform compass surveys, calculate different types of bearings, and adjust for magnetic declination and local attraction.
CO-4	Apply levelling techniques to determine reduced levels and prepare leveling records using appropriate instruments.
CO-5	Develop contour maps from field data and use these maps for practical engineering calculations such as reservoir capacity.

COURSE CONTENTS:

UNIT-I Overview of survey

Types of survey: Definition. Objects of Surveying. Principles of Surveying. Uses of survey, Classification of surveying. Primary – Plain, Geodetic. Secondary – Based on Instruments, method, object, Nature of field.

UNIT-II Chain & Cross Staff Survey:

Principle of Chain Survey. Study and use of Instruments for linear measurements – chain, Tape, Ranging Rod, arrows, pegs, cross Staff, optical Square, line Ranger. Ranging –Direct and Indirect Ranging Chaining – Plain and sloping grounds. Chain Triangulation – Survey Station and their Selections, factors affecting selection of survey station. Survey lines, Check

lines, Tie lines, base line. Taking offsets. long and short offset, degree of offset. Obstacles in chaining. Chain & cross staff Survey for finding area of a field (Numerical problems) Errors in chain Surveying & applying Corrections for chain & Tape (Numerical problems).

UNIT-III Compass Survey

Principle of Compass Survey. Bearing of lines – Meridian –True, Magnetic, and Arbitrary. Bearing –fore bearing, Back bearing, Whole circle bearing, Quadrennial bearing system and Reduced bearing, Conversion of bearings, finding included angles from bearings. Prismatic Compass – Component, construction and use. Local attraction, Causes, precautions to be taken to avoid and correction of bearings affected due to local attraction, calculation of included angles. Traversing – traversing by chain and compass. open traverse, closed traverse, check on open and closed traverse. Graphical adjustment for closing error. Numerical problems on calculation of bearings, Angles and local attraction.

UNIT-IV Levelling

Definitions, meaning of various terms used in leveling – Level surface, Level line, horizontal line, Vertical line, Datum surface , Reduced level, Bench mark and its types. Dumpy level – Components, Construction, Line of sight, Line of Collimation, Bubble tube axis, leveling Staff – Telescopic and folding type. Foresight, back sight, Intermediate sight, Change point, Height of collimation. Fundamental axes and their relationship Recording in level book. Temporary adjustments of dumpy level. Method of Reduction of levels – Height of instrument method and Rise and fall method. Arithmetical checks, Numerical problems, Computation of missing readings. Classifications of leveling - simple, differential, profile, cross sectional, fly and check leveling. Study and use of tilting level & Auto level. Sources and errors in leveling, precautions and difficulties faced in leveling.

UNIT- V Contouring

Definitions – Contour, contour interval, Horizontal equivalent. Characteristics of contours. Method of locating contours. Interpolation of contours. Establishing grade contours. Uses of Contour Maps. Calculation of reservoir capacity by contour map by trapezoidal and prismoidal formula.

Reference Books: -

1. Surveying and Levelling by N.N. Basak, Tata Mc Graw-Hill
2. Surveying and Levelling, Vol. I And II, Dr. B. C. Punmiya Laxmi Plublication
3. Surveying And Levelling, Vol. I And II S. K. Duggal, Tata Mc Graw-Hill.
4. Surveying And Levelling, Part I And II T .P. Kanetkar & S. V.Kulkarni, Pune Vidhyarthi Griha Prakashan.

LIST OF PRACTICAL TO BE PERFORMED:

1. Measurement of distances with chain & tape on ground with direct or indirect ranging.
2. Construction and use of optical square and open cross staff for setting out perpendicular and running a survey line for locating details.
3. Measurement of Area by Chain and cross staff survey.
4. Use of prismatic compass and observing fore bearing and back bearing.
5. Measuring Fore bearing and Back bearing of 5-6 side closed polygon. Identifying stations affected by local attraction and calculation of corrected F.B. & B.B.
6. Measuring fore bearing and back bearing for an open traverse (5 to 6 sided). Calculate direct angles between successive lines.
7. Use of Dumpy level, temporary adjustments and taking reading on levelling staff.
8. Differential leveling practice, reduction of level by H.I. method.
9. Differential leveling practice, reduction of level by rise & fall method.
10. Measurement of Area of irregular figure by polar planimeter

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DCE303 - Mechanics of Materials

Subject Code	DCE 303			
Subject Name	Mechanics of Materials			
Max. Marks	150			
	L	T	P	TC
	3	1	2	6

COURSE OUTCOMES (COs):

On successful completion of the course, the student will be able to:

CO-1	Define and explain mechanical properties, stresses, strains, and elastic constants.
CO-2	Construct shear force and bending moment diagrams for various beam conditions.
CO-3	Calculate bending and shear stresses in different cross-sections.
CO-4	Determine slope and deflection of beams using moment area method.
CO-5	Solve problems on critical load and strength of columns and struts.

COURSE CONTENT:

Unit -I Simple Stresses & Strains

Mechanical properties of materials (Elasticity, Plasticity, Toughness, Hardness, etc.). Stress & strain – tensile, compressive, shear. Poisson's ratio, Hooke's law. Elastic constants: Young's modulus, shear modulus, bulk modulus, relations. Simple problems.

Unit -II Shear Force & Bending Moment:

Beams – types, supports, and loads (point load, UDL). Shear force (SF) & bending moment (BM) – definitions, sign conventions. Shear force diagrams (SFD) & bending moment diagrams (BMD) for cantilever and simply supported beams. Point of contraflexure. Simple problems.

Unit -III Bending & Shear Stresses

Simple bending theory, neutral axis. Bending equation, section modulus, flexural rigidity. Moment of resistance. Shear stress distribution in rectangular, I-section, and T-section beams. Simple problems.

Unit -IV Slopes & Deflections

Definition of slope and deflection. Standard cases by Moment Area Method: Cantilever with point load, UDL (full/partial). Simply supported with central point load, UDL. Numerical problems.

Unit -V Columns & Struts

Types: short column, long column, strut. Slenderness ratio, effective length, critical load. Euler's and Rankine's formulas (applications only). Factor of safety, design load. Simple problems.

Reference Books: -

1. Dr B.C.Punmia,Textbook of Strength of materials, 9 th edition, Lakshmi publications,
2. Er.R.K.Rajput, Textbook of Strength of materials, 6 th edition, S. Chand publications,
3. Dr R.S.Khurmi & N.Khurmi,Textbook of Strength of materials,26th edition, S. Chand publications ,
4. BC Punmia, Strength of Materials; Standard Publishers, Delhi

LIST OF PRACTICAL TO BE PERFORMED:

1. Determination of support reaction of beam.
2. Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of young's modulus on mild steel.
3. Determination of hardness of a metal plate by Rock Well Brinell hardness testing machine.
4. To perform impact test on Izod Impact testing machine
5. Testing of central deflection of a simply supported beam model (e.g., M.S. flat) with concentrated loading at the middle
6. Flexural test on Floor Tiles/Marble.
7. Determination of compressive strength of concrete cube by CTM.

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DCE304 - Building planning and Drawing

Subject Code	DCE304			
Subject Name	Building Planning and Drawing			
Max. Marks	150			
	L	T	P	TC
	3	1	2	6

COURSE OUTCOMES (COs):

After Completing the course student should be able to:

CO-1	Draw basic building elements such as doors, windows, arches, and staircases.
CO-2	Prepare drawings of shallow and deep foundations with different types of footings.
CO-3	Apply building codes and bye-laws to plan and design residential, institutional, and commercial buildings.
CO-4	Explain building services and integrate them into building design.
CO-5	Analyze town planning concepts and design energy-efficient buildings.

COURSE CONTENTS:

UNIT-I Drawing of Building Elements-

Drawing of various elements of buildings like , frames of doors, window, various types of door, window and ventilator, lintels and arches, stairs and staircase, etc

Unit -II Drawing of foundations

Drawing of shallow foundation and deep foundation, various types of footing, open foundation, raft, grillage, pile and well, cession foundation.

UNIT-III Building Planning-

Classification of buildings, Provisions of National Building Codes and Rules, Building bye-laws, Design concepts and philosophies, Preparing sketch plans and working drawings of

various types of buildings like residential building, institutional buildings and commercial buildings, site plans,

UNIT-IV Building Services

Introduction of Building Services like water supply, sewerage and drainage systems, sanitary fittings and fixtures, plumbing systems, ventilation and lightening and staircases, fire safety, thermal insulation, acoustics of buildings.

UNIT-V Energy efficient buildings

Concepts of master plan, structure plan, detailed town planning scheme and action plan,, estimating future needs - planning standards for different land use, allocation for commerce,, industries, public amenities, open areas etc.

Reference Books: -

1. Programming in C Balagurusamy, Tata Mc-Graw hill Publishing Company Ltd., New Delhi, IInd Edition 2000.
2. The Complete Reference 'C' Herbert Schildt,4 edition, McGraw-Hill Osborne Media.
3. Let us Learn 'C' Yashwant Kanetkar ,BPB Publications, B-14, Connaught Place, New Delhi, IIIrd Edition,2000.
4. The Spirit of C, Mullish Cooper, Jaico Publishing House, 121, N.G. Road, Mumbai.
5. Exploring C, Yashwant Kanetkar ,BPB Publications, B-14, Connaught Place New Delhi.

LIST OF PRACTICAL TO BE PERFORMED:

1. Prepare sketches of various building components.
2. Draw doors, windows, ventilators, lintels, arches, and staircases.
3. Draw different types of shallow and deep foundations.
4. Prepare drawings for water supply, drainage, sanitary fittings, and plumbing systems.
5. Draw lighting, ventilation, fire safety, and other building services layouts.
6. Prepare detailed drawings of a one/two-bedroom residential building
7. Prepare working drawings of residential and institutional buildings
8. Prepare site plan and layout as per building bye-laws.
9. Draw energy-efficient building features with thermal insulation and acoustics.
10. Use AutoCAD to prepare building drawings.

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DCE305 - Hydraulics / Fluid Mechanics

Subject Code	**DCE305**			
Subject Name	**Hydraulics / Fluid Mechanics**			
Max. Marks	**150**			
	L	**T**	**P**	**TC**
	3	**1**	**2**	**6**

COURSE OUTCOMES (COs):

After Completing the course student should be able to:

CO-1	Understand the basic properties of Fluids
CO-2	Determine the fluid pressure and use various devices for measuring fluid pressure.
CO-3	Calculate hydrostatic force and use of law of conservation mass to fluid flow.
CO-4	Apply Bernoulli's equation to fluid flow problems and boundary layer theory to determine lift and drag forces on a submerged body.
CO-5	Learn about the basics of Open Channel Flow

COURSE CONTENTS:

Unit-I Review of Fluid Properties

Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure.

Unit-II Fluid Static's

Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces. Buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

Unit-III Kinematics of Flow

Types of flow-ideal & real, steady & unsteady, uniform & non uniform, one, two and three dimensional flow, path lines, streak lines, streamlines and stream tubes; continuity equation for one two and three dimensional flow, rotational & irrotational flow,

Unit-IV Dynamics of Flow

Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, linear momentum equation for steady flow. The moment of momentum equation, Dimensional Analysis and use of Buckingham-pi theorem

Unit-V Uniform flow in open channels

Channel geometry and elements of channel section, velocity distribution, energy in open channel flow, specific energy, types of flow, critical flow and its computations, uniform flow and its computations.

Reference Books: -

1. Modi & Seth; Fluid Mechanics; Standard Book House, Delhi
2. Som and Biswas; Fluid Mechnics and machinery; TMH
3. Fluid Mechanics by RK Rajput, S Chand
4. A Text Book of fluid Mech. for Engg. Student by Franiss JRD
5. R Mohanty; Fluid Mechanics By; PHI
6. Fluid Mechanics; Gupta Pearson.

LIST OF PRACTICAL TO BE PERFORMED (EXPANDABLE):

1. To determine the local point pressure with the help of pitot tube.
2. To find out the terminal velocity of a spherical body in water.
3. Calibration of Venturimeter
4. Determination of Cc, Cv, Cd of Orifices
5. Calibration of Orifice Meter
6. Calibration of Nozzle meter and Mouth Piece
7. Reynolds experiment for demonstration of stream lines & turbulent flow
8. Determination of metacentric height
9. Determination of Friction Factor of a pipe
10. Verification of Impulse momentum principle

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DCE306 Application of Basic Software

Subject Code	**DCE306**			
Subject Name	Application of Basic Software			
Max. Marks	-			
	L	**T**	**P**	**TC**
	-	-	-	-

COURSE OUTCOMES (COs):

After Completing the course student should be able to:

CO-1	Use basic computer operations and file management.
CO-2	Create and format official documents using MS Word.
CO-3	Prepare spreadsheets and simple calculations in Excel.
CO-4	Design basic presentations in PowerPoint.
CO-5	Perform effective email and digital communication tasks.

COURSE CONTENTS:

Unit I – Computer Basics & File Management

- Introduction to computer hardware and operating systems
- File/folder creation, storage, sharing, and cloud backup
- Basic typing skills and shortcut keys

Unit II – MS Word for Office Documentation

- Creating letters, applications, reports, and notices
- Formatting tools, tables, headers/footers
- Converting documents to PDF

Unit III – MS Excel for Data Handling

- Basic formulas (sum, average, percentage)
- Creating tables, charts, and simple data sheets
- Using Excel for quantity and cost listing

Unit IV – MS PowerPoint for Presentations

- Preparing simple technical presentations
- Slide design, insertion of images/charts
- Presentation skills and formatting

Unit V – Email & Office Communication Tools

- Email creation, attachments, folder management
- Google Drive/OneDrive for file sharing
- Basics of online forms and document submission