LNCT UNIVERSITY

Department of Civil Engineering

Diploma Civil Engineering

VIthSemester Syllabus

Subject Code	Subject Name
DCE601	Structural Design and Drafting-II/ Steel
DCE602	Construction Planning and Management
DCE603	Public Health Engineering
DCE604	Major Project
DCE 605	Professional Activity

LNCT UNIVERSITY
Department of Civil Engineering

Diploma Civil Engineering

VIthSemester Syllabus

DCE601- Structural Design and Drafting -II / Steel

Subject Code	DCE 601			
Subject Name	DCE 601- Structural Design and Drafting -II / Steel			
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	Identify steel sections, grades, and their applications using IS codes.
CO-2	Design riveted, bolted and welded joints for axially and eccentrically loaded members.
CO-3	Analyze and design steel tension and compression members as per IS:800-2007.
CO-4	Evaluate buckling behavior of columns and explain types of bases and beam connections
CO-5	Design simple roof trusses and timber structural elements under various loads

COURSE CONTENTS:

UNIT-IIntroduction to Structural Steel and Sections

Properties and Types of sections used as per IS handbook and IS:800-2007. Grades of steel and strength characteristics; advantages and disadvantages of steel as construction material; Use of steel table and relevant I. S. code; Types of loads on steel structure and its I. S. code specification.

UNIT -II Connections

Riveted connections, Types of rivets and their use, Nominal dia, Gross dia. Unwin's formula, Pitch of rivets, Edge distance, permissible stress in rivet riveted joint and its failure. Design of riveted joint for axially loaded member. Eccentric riveted connection. Types of bolts and

bolted joints, specifications for bolted joints as per IS: 800 – 2007. Welded connection, Permissible stress in weld, strength of weld, advantages and disadvantages of welded joint. Types of weld and their symbols. Design of fillet weld and butt weld subjected to axial load.

UNIT-III Tension member and Compression Member

Analysis and design of single and double angle section tension members and their riveted and welded connections with gusset plate as per IS:800-2007, Analysis and design of single and double angle sections compression members (struts) and their welded connections with gusset plate as per IS:800-2007

UNIT-IVColumn Bases and Steel Beams

Concept of buckling of columns, effective length and slenderness ratio, permissible stresses in compression as per IS: 800 for different end conditions. Analysis and Design of axially loaded single section steel column Types of column bases (Descriptive only) Beam and column, frame and seated connections (descriptive only, no design)

UNIT-V Roof Truss and Timber Structures

Types of steel roof truss & its selection criteria. span and slope, Rise and pitch, loads acting on the Roof. Dead load; Live load and wind load as per I.S. 875-1987. Grades of Timber – stress in timber. Factors affecting stress/ strength of timber. Design of Timber column & Timber Beam.

Reference Books: -

1. Gambhir M. L., Fundamentals of Structural Steel Design, McGraw Hill Education., Firstedition, 2017.
2. Dayaratnam P., Design of Steel Structures, A. H. Wheeler & Co. Ltd., Allahabad, 2008
3. Arya and Ajmani, Design of Steel Structures, NemChand Brothers, Roorkee, 2007
4. Punmia B.C., Ashok Kumar Jain and Arun Kumar Jain, Design of Steel Structures, Arihant
   Publications, Bombay, 2008
5. Shiyekar M. R., Limit State Design in Structural Steel, Prentice Hall of India Pvt. Ltd, Learning Pvt. Ltd., 2nd Edition, 2013.
6. Subramanian N, Design of Steel Structures, Oxford University Press, New Delhi, 2013.
7. Narayanan R.et.al., Teaching Resource on Structural Steel Design, INSDAG, Ministry of

Steel Publications, 2002

8. Duggal S. K., Limit State Design of Steel Structures, Tata McGraw Hill Publishing Company, Third edition, 2019.
9. Bhavikatti S. S, Design of Steel Structures by Limit State Method as per IS:800-2007, IK International Publishing House Pvt. Ltd., 2009
10. IS 800: latest version, General Construction in Steel - Code of Practice, Bureau of Indian Standards, New Delhi.
11. IS 875 (Part 1-5): latest version, Indian Standard Code of Practice for Design Loads (Otherthan Earthquake) for Buildings and Structures Part 1 Dead Loads - Unit Weights of BuildingMaterials and Stored Materials, Bureau of Indian Standards, New Delhi.

LIST OF PRACTICAL TO BE PERFORMED:

1. Sketching of different types of riveted joints and welded joints. Typical sketches of sections of tension member, determination of net effective cross-sectional area of tension member for angle section
2. Typical sketches of sections of compression member, lacing and battening
3. Graphical solution of frames to find out the stress in the member. Type of trusses for different spans.
4. Working drawing of steel truss with the details of joint
5. Detailed drawing of slab base and gusseted base.
6. Important information of clauses of IS800-1984 and IS875 (Part1,2 & 3)
7. Term work shall consist of sketch book and design report of steel roof truss for an industrial building.

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DCE 602- Construction planning and management

Subject Code	DCE 602			
Subject Name	DCE 602- Construction planning and management			
Max. Marks	100			
	L	T	P	TC
	3	1	-	4

COURSE OUTCOMES(COs):

After Completing the course student should be able to:

CO-1	Explain investigation methods, methods of construction, and the use of formwork and centering.
CO-2	Prepare construction schedules, job layouts, and apply modern construction management techniques such as CPM/PERT.
CO-3	Select suitable construction equipment, analyze their costs and outputs, and identify equipment required for different construction activities.
CO-4	Interpret different types of contracts, tendering procedures, contract documents, and apply principles of arbitration and approvals.
CO-5	Prepare specifications for engineering works, maintain public works accounts, and manage construction records and bills.

COURSE CONTENTS:

UNIT-IPreliminary and Detailed Investigation Methods

Preliminary and detailed investigation methods: Methods of construction, form work and centering.

UNIT-IIConstruction Scheduling and Management

Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis.

UNIT-IIIConstruction Equipment

Construction equipments: Factors affecting selection, investment and operating cost, output of various equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.

UNIT-IV Contracts and Tendering

Contracts: Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, security deposit and earnest money, conditions of contract, arbitration, administrative approval, technical sanction.

UNIT-VSpecifications & Public Works Accounts

Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works. Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

Reference Books: -

1. Construction Equipment by Purify
2. CPM by L.S. Srinath
3. Construction Management by S. Seetharaman
4. CPM & PERT by Weist & Levy
5. Construction, Management & Accounts by Harpal Singh
6. Tendering & Contracts by T.A. Talpasai

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DCE 603- Public Health Engineering

Subject Code	DCE 603			
Subject Name	DCE 603- Public Health Engineering			
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	Know the procedure to identify the sources of surface and sub surface water
CO-2	Estimate the quantity of drinking water required for a population
CO-3	Draw labeled layout for water supply scheme.
CO-4	Device suitable water treatment technique.
CO-5	Evaluate the characteristics and suggest treatment of sewage.

COURSE CONTENTS:

Unit–I Sources, Demand and Quality of water

Sources of water; Surface and Subsurface sources of water.

Demand of water: Factors affecting rate of demand, Forecasting of population, Methods of forecasting of population, Design period, Estimating of quantity of water supply required for city or town.

Quality of water **:**Need for analysis of water ,Characteristics of water- Physical ,Chemicaland Biological, Testing of water for Total solids ,hardness ,chlorides , dissolved Oxygen, pH, Fluoride, Nitrogen and itcompound Bacteriological tests Ecoli ,Bcoliindex ,MPN Sampling of water, Water quality standards as per IS 10500.

UNIT-II Purification of water

Purification of Water: Objectives of water treatment, Aeration-objects and methods of aeration, Plain sedimentation, Sedimentation with coagulation, principles of coagulation, Filtration - classification of filters: slow sand filter, rapid sand filter, pressure filter. Construction and working of slows and filter and rapids and filter. Disinfection: Objects, methods of disinfection, Chlorination- Application of chlorine, forms of chlorination, types of chlorination practices, residualchlorine and its importance.

UNIT- III Conveyance and Distribution of water

Conveyance: Types of Pipes used for conveyance of water, choice of pipe material, Types of joints & Types of valves - their use,location and function on a pipeline.

Distribution of water:Methods of distribution of water- Gravity,pumping,and combinedsystem, Servicer reservoirs'-functions and types, Layouts of distribution of Water-Dead-end system, grid ironsystem, circularsystem, radial system; their suitability,advantages and disadvantages.

UNIT -IV Domestics waste and System of Sewerages

Building Sanitation: - Necessityof sanitation,Necessity to treat domestic sewage, Definitions–Sewage, sullage, types of sewage. Definition of the terms related to Building Sanitation. Systems of Sewerage and Sewer Appurtenances:Types of Sewers,Systems of sewerage, self-cleansing velocity and non-scouring velocity, Laying, Testing and maintenance of sewer Manholes and Drop Manhole-component parts, location, spacing,construction details, Sewer Inlets, Street Inlets.

UNIT V Characteristics and treatment of Sewage

Analysis of sewage: Characteristics of sewage, B.O.D, C.O.D and its significance. Central Pollution Control Board Norms for discharge of treated sewage, Objects of sewage treatment. Treatment ofSewage:Screening, Types of screens, Grit removal, Skimming, Sedimentation of sewage, Aerobic and anaerobic process, Sludgedigestion, tricklingfilters, Activated sludge process, Disposal of sewage, Oxidation Pond,Oxidation ditch. Septic tank, Recycling and Reuse of domestic waste.

Reference Books: -

1. Sharma S.C, Environmental Engineering, Khanna PublishingHouse, NewDelhi
2. Garg,S.K.,Environmental EngineeringVol.IandVol.II ,KhannaPublishers
3. Birdie ,G.S. and Birdie,J .S.Water Supply and Sanitary Engineering, DhanpatRai
4. Gupta,O.P.,Elements of Environmental Pollution Control ,Khanna Publishing House ,Delhi
5. Rao ,C.S.,Environmental Pollution Control Engineering, New Age International
6. Punmia ,BC ,EnvironmentalEngineering, vol.IandII ,LaxmiPublishers
7. Peavy HS, Rowe DR, and TchobanoglousG ,Environmental Engineering, McGraw
8. BasakN N, Environmental Engineering ,McGraw Hill Publishers.

PUBLIC HEALTH ENGINEERING LAB

LIST OF PRACTICAL TO BE PERFORMED:

1. To determine the pH of the given water sample.
2. To measure the turbidity of the given water sample.
3. To estimate the residual chlorine in the given water sample.
4. To determine the suspended, dissolved, and total solids in the given water sample.
5. To determine the dissolved oxygen (DO) in the given water sample.
6. To find the optimum dose of coagulant in a given raw water sample by jar test.
7. To determine the Biochemical Oxygen Demand (BOD) of the given sewage sample.
8. To determine the Chemical Oxygen Demand (COD) of the given sewage sample.
9. To determine the pH of the given sewage sample.
10. To determine the suspended, dissolved, and total solids in the given sewage sample.

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DCE 604- Major Project

Subject Code	DCE 604			
Subject Name	DCE 604- Major Project			
Max. Marks	200			
	L	T	P	TC
	-	-	2	2

COURSE OUTCOMES(COs):

Execute a field-oriented civil engineering project by collecting site data, performing technical analysis, preparing drawings and estimates, and presenting a comprehensive professional report

COURSE CONTENTS:

Students shall undertake a comprehensive civil engineering project that involves real-field data collection, technical analysis, drawings, estimation, and practical problem-solving to develop job-ready skills for construction and site work. Example of Major Project Topics

- Detailed estimate and costing of a G+1 residential building
- Complete survey and contour mapping of a land parcel
- Structural design of RCC components (slab–beam–column–footing) of a small building
- Water supply and drainage system design for a residential area
- Pavement design and traffic analysis for a local road
- Soil investigation report for a proposed building site
- Wastewater treatment layout for a small community
- 3D building modeling and quantity takeoff using AutoCAD/SketchUp
- Planning and scheduling of a construction project using MS Project/Primavera
- Rainwater harvesting and groundwater recharge plan for an institution

A standard job-ready project report should include:

1. Title Page & Certificate
2. Abstract
3. Introduction, Need & Scope of Project
4. Site Selection / Data Collection / Survey Details
5. Design / Drawings / Calculations
6. Estimation & Costing (BOQ)
7. Planning & Scheduling (if applicable)
8. Results, Discussion & Practical Applications
9. Conclusion & Field Recommendations
10. References & Annexures.