B. Tech Semester-VII

CVE 563: QUANTITY SURVEYING AND COSTING

Course Objectives

- To understand the purpose and importance of estimates in construction projects, and the principles • and methods of estimating quantities of work.
- To learn about the different types of estimates, including plinth area rate, cubical content rate, • preliminary, original, revised, and supplementary estimates, and how to prepare them for different types of projects.
- To become familiar with rate analysis, including the factors involved in the rate of an item, material • and labor requirements, and the preparation of rates for important items of work.
- To understand the current schedule of rates and factors that affect the cost of work, such as overhead • charges, contingencies, and work charge establishment.
- To learn how to prepare detailed estimates for various types of buildings, R.C.C. works, earthwork • calculations for roads, and estimating of culverts services.
- To understand reinforcement bar bending and bar requirement schedules, and the different types of • contracts, contract documents, and conditions of contract.
- To learn about the purposes of valuation, depreciation, sinking fund, scrap value, year's purchase, • gross and net income, dual-rate interest, and methods of valuation, including rent fixation of buildings.

Course Outcomes (COs)

- 1. Understand the quantity surveying and will become familiar with modes of measurement and utility of various types of estimates.
- 2. Use current schedule of rates and quantitative resource allocation for the rate analysis.
- 3. Describe the knowledge of detailed estimate preparation for various civil engineering works.
- 4. Calculate the cost of works acknowledging overhead charges, contingencies, work charge establishment and percentage of various services.
- 5. Discuss the utility, purpose and concepts involved in the building valuation

CO/PO/	PO	PO	PO	PO	PO	РО	PO	PO	РО	PO	PO	PO	PS						
PSO	1	2	3	4	5	6	7	8	9	10	11	12	01	02	03	04	05	06	07
CO1	3	3	-	-	1	2	-	2	1	1	-	1	2	2	-	1	-	-	-
CO2	2	2	1	-	1	2	-	2	-	1	3	1	2	2	-	1	-	-	-
CO3	2	1	-	1	-	-	-	-	-	1	1	-	2	3	-	2	-	-	-
CO4	2	1	-	1	-	-	-	-	-	1	2	-	3	3	-	2	-	-	-
CO5	2	1	-	1	-	-	-	-	-	-	1	-	3	3	-	2	-	-	-

Articulation Matrix

High-3 Medium-2 Low-1

UNIT I: Introduction

Purpose and importance of estimates, principles of estimating, Methods of taking out quantities of items of work, Mode of measurement, measurement sheet and abstract sheet; bill of quantities, Types of estimates, plinth area rate, cubical content rate, preliminary original, revised and supplementary estimates for different projects.

UNIT II: Rate Analysis

Task for average artisan, various factors involved in the rate of an item, material and labor requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.), Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.

UNIT III: Detailed Estimates

Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services.

9 Hours

9 Hours

9 Hours

UNIT IV: Reinforcement Bar Bending

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract documents – Conditions of contract.

UNIT V: Valuation

Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

Total: 45 Hours

Reference(s)

- 1. B. N. Dutta, "Estimating and Costing", UBS publishers, 2000.
- 2. G. S. Birdie., "Estimating and Costing", DhanpatRai publications, 1988
- 3. Standard schedule of rates and standard data book by public works department, 2015.

4. I.S. 1200 (Parts I to XXV - 1974/method of measurement of building and Civil Engineering works – B.I.S)

- 5. M. Chakraborthi, "Estimation, costing and specifications", Laxmi publications, 1982.
- 6. National building code, 2015.

List of e-Learning Resources:

- 1. https://nptel.ac.in/
- 2. https://www.coursera.org/

9 Hours

9 Hours

L-2 T-1 P-2 C-4

B.Tech Civil Engineering Semester-VII

SUBJECT: ADVANCED STRUCTURAL DESIGN-I(RCC-II) (CVE-570)

Course Objectives

- To make them understand the design procedures of industrial buildings and industrial RCC structures.
- To identify and apply the applicable industry design codes relevant to the design of reinforced concrete member.
- To be familiar with professional and ethical issues and the importance of lifelong learning in structural engineering.

Course Outcomes (COs)

- 1. Apply IS13920 to design Shear walls and other bracing elements.
- 2. Apply method of Design Cantilever and counter fort types retaining walls.
- 3. Apply IS3370 to design water tank.
- 4. Apply IS4995 to design Bunkers & silo.
- 5. Apply IRC loading to design T-beam & Slab bridges-for highway.

CO/PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	2	2	3	1	1	2						2	2		3	1		2	2
CO2	2	2	3	1	1	2						2	2		3	1		2	2
CO3	2	2	3	1	1	2	2					2	2		3	1		2	2
CO4	2	2	3	1	1	2						2	2		3	1		2	2
CO5	2	2	3	1	1	2	2					2	2		3	1		2	2

Articulation Matrix

High-3 Medium-2 Low-1

UNIT I: Design of Multistory Buildings

Sway and Non-Sway buildings, Shear walls and other bracing elements as per IS13920.

UNIT II: Earth Retaining Structures:

Design of Cantilever and counter fort types retaining walls.

08 Hours

10 Hours

UNIT III: Water Tanks:

Design of Tanks on ground and underground tanks: Square, rectangular, circular tanks, Overhead tanks: square, rectangular, circular & intze tanks as per IS:3370

UNIT IV:

Design of Silos and Bunkers as per IS 4995.

UNIT V: IRC Loads

T-beam & Slab bridges-for highway loading (IRC Loads). Prestressing concepts materials, systems

of pre-stressing & losses.

PRACTICAL

Lab Work: Preparation of AutoCAD Drawings of Bunker, Silo, Retaining Wall, Water tank, etc.

REFERENCE BOOKS:

- 1. R.C.C. by O.P. Jain Vol. II,
- 2. R.C.C. by B.C. Punmia,
- 3. Essentials of Bridge engineering –D.J. Victor
- 4. Bridge Engineering –Ponnuswamy,
- 5. Advanced R.C.C. Design by N.K. RAJU, N.Krishna Raju,
- 6. Prestressed Concrete, Tata Mc Graw Hill, New Delhi, Pre stresses concrete –T.Y. Lin

LIST OF e-LEARNING RESOURCES:

- <u>https://onlinecourses.nptel.ac.in/noc22_ce65/preview</u>
- https://archive.nptel.ac.in/courses/105/105/105105105/

10 Hours

08Hours

Total: 46 Hours

B.Tech Civil Engineering Semester-VII

L-4 T-0 P-4C-6

CVE580: Environmental Engineering-II

Course Objectives

- To allow human and industrial effluents to be disposed of without danger to human health or unacceptable damage to the natural environment.
- To select and design of the most appropriate, cost-effective and sustainable wastewater or sanitation treatment system.
- To make them about the outline for collection, transport, treatment and disposal of Solid Waste.

Course Outcomes (COs)

- 1. Understand the composition and characteristics of domestic wastewater.
- 2. Apply the concept of waste water engineering to estimated domestic wastewater discharge using appropriate methods and Design a treatment units based on the given sewage flow rate and composition.
- 3. Analyze the efficiency of different secondary treatment methods such as activated sludge process, trickling filters, and sequencing batch reactors in wastewater treatment.
- 4. Analyze the effect of organic pollution on river water quality using DO sag curve.
- 5. Evaluate the design of sewerage systems based on the characteristics of sewage and hydraulics of flow in sewers.

Articulation Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	1	-	2	2	-	-	-	-	-
CO2	3	1	2	1	-	3	3	-	-	-	-	1
CO3	3	2	1	1	-	1	1	-	-	-	-	-
CO4	1	2	2	1	-	3	3	-	-	-	-	-
CO5	3	1	2	1	-	2	2	-	-	-	-	-

High-3 Medium-2 Low-1

CO/PO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	-	-	-	-	1	-
CO2	1	-	-	-	-	1	-
CO3	2	-	1	-	-	-	-
CO4	1	-	2	-	-	1	2
CO5	2	-	2	1	-	-	1

High-3 Medium-2 Low-1

Unit - I Waste Water Engineering:

Terminology used in wastewater engineering, Sources & classification of domestic & industrial Wastewater, Domestic wastewater characteristics - physical, chemical, biological, Estimating domestic wastewater discharge, Sewer system. Effect of organic pollution on river water quality, DO sag curve. B.O.D. and C.O.D. equations.

UNIT II:

DESIGN OF SEWERAGE SYSTEM Characteristics and composition of sewage – population equivalent -Sanitary sewage flow estimation – Sewer materials – Hydraulics of flow in sanitary sewers – Sewer design – Storm drainage-Storm runoff estimation – sewer appurtenances – corrosion in sewers – prevention and control – sewage pumping-drainage in buildings-plumbing systems for drainage – Rain Waterting.

Unit - III PRIMARY TREATMENT OF SEWAGE

Objectives – Unit Operations and Processes – Selection of treatment processes – Onsite sanitation – Septic tank- Grey water harvesting – Primary treatment – Principles, functions and design of

sewage treatment units – screens – grit chamber-primary sedimentation tanks – Construction, Operation and Maintenance aspects.

Unit - IV SECONDARY TREATMENT OF SEWAGE

Objectives – Selection of Treatment Methods – Principles, Functions, – Activated Sludge Process and Extended aeration systems -Trickling filters– Sequencing Batch Reactor(SBR) – Membrane Bioreactor – UASB – Waste Stabilization Ponds – Other treatment methods -Reclamation and Reuse of sewage – Recent Advances in Sewage Treatment – Construction, Operation and Maintenance aspects.

Unit – V SOLID WASTE MANAGEMENT:

Standards for– Disposal – Methods – dilution – Mass balance principle – Self purification of river-Oxygen sag curve – deoxygenation and reaeration – Streeter–Phelps model – Land disposal – Sewage farming – sodium hazards – Soil dispersion system.**SOLID WASTE MANAGEMENT:** Solid Waste Management - Municipal Solid Waste (MSW), Composition and various chemical and physical parameters of MSW. Types of MSW, MSW management: Collection, transport, treatment and disposal of MSW. Effects of solid waste on environment

PRACTICAL

- 1. Introduction to Standards, collection and preservation of samples, sampling techniques and laboratory equipment
- 2. Determination of Turbidity and Jar
- 3. Determination of dissolved oxygen
- 4. Determination of BOD
- 5. Determination of COD
- 6. Characterization of municipal solid waste (physical and chemical)
- 7. To design the sever system for a town/ Case study.
- 8. Design of Wastewater treatment units (Primary and Secondary units)/ Case study.

Total: 90 Hours

Reference(s)

- 1. S.K. Garg, "Environmental Engineering", Vol. I:, Khanna Publishers, 20th Edition, 2011.
- 2. Birdie, G.S. and Birdie, "Water Supply and Sanitary Engineering", Dhanpat Rai& Sons, 1992.
- 3. Duggal, K.N. "Elements of Environmental Engineering", S.Chand & Co, 2002.

4. Punmia B.C, Ashok Jain & Arun Jain, "Water Supply Engineering", Laxmi Publications, Pvt. Ltd., New Delhi, 2004.

- 5. Solid waste management shabana Yasmin, Global research publications, 1 st Edition, 2013.
- 6. Solid and Liquid waste management, Vasudevan Rajaram, Faisal Zia siddiqui, PHI Learing ,2013

List of e-Learning Resources:

- 1. https://nptel.ac.in/
- 2. https://www.coursera.org/