

**CE- 501 (IRRIGATION ENGINEERING)**

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**UNIT-I**

**INTRODUCTION**

Definition – Irrigation and irrigation engineering, advantages of irrigation, types of irrigation project, Methods of irrigation. Analyze data for irrigation project, supervision of reservoir and canal structure, weir and barrages, lift irrigation scheme, its suitability, advantages and limitations Capacity of reservoir ,Principle of Hydrology Relation between water and crop Rainfall, Crops, Dams Weir, Barrages, Area Capacity curve Capacity Canal Concept of runoff duty delta and base period

**UNIT-II**

**HYDROLOGY**

Hydrological cycle, Definition of rainfall , rain gauge and rain gauge station , types of rain gauges (names only) average annual rain fall and its calculation , definition of run off, factor affecting run off, calculation of run off by run off coefficient, English formula , Stranges and Binnie’s tables and curves. Maximum flood discharge and methods of calculation. Unit hydrograph Yield and Dependable yield and methods calculation.

**UNIT-III**

**INVESTIGATION AND RESERVOIR PLANNING**

Survey for irrigation project data collected for irrigation project. Area capacity curve, silting of reservoir, rate of silting, factors affecting silting, methods to control levels and respective storage in reservoir. Fixing control levels

**UNIT-IV**

**DIVERSION HEAD WORKS**

Weirs – components parts, unction and types, layout of diversion head works wits its components and their function, canal head regular, silt excluders and silt ejectors. Barrages – components and their function. Difference between weir and barrage irrigation department standard design and specifications.

**UNIT-V**

**CANALS**

Classification of canals according to alignment and position in the canal network. Design of most economical canal section. Canal lining – Definition, purpose, types of canal lining advantages of canal lining properties of good canal lining material. CD. works- different C.D. works, canal falls, escapes, cross regulators and canal outlets.

**REFERENCE BOOKS-**

- 1.Irrigation and water power Engineering B.C. PUNAMIYA
2. Introductory Irrigation Engineering B.C. PUNAMIYA
3. Fundamental principle of Irrigation Engineering V.B. Priyani
4. Fundamental principles of Irrigation Engineering Bharat Singh
5. Irrigation Engineering. & Hydraulic structures S.K. Garg

**DCE- 502 (QUANTITATIVE SURVEYING ESTIMATING & COSTING – I)**

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**UNIT-I**

**Overview Of Estimating & Costing**

Meaning of the terms estimating, costing. Purpose of estimating and costing . Types of estimate - Approximate, Detailed. Approximate estimate Types- Plinth area rate method, Cubic Content method, Service Unit method, Type method, Approximate Quantity method , Problems on Plinth area rate method & application of Service Unit method. Types of estimate Detailed estimate for new work.

**UNIT-II**

**Detailed Estimate**

Unit quantity method, Total quantity method, Data required for detailed estimate. Factors to be considered during estimate, Specification, Quantity availability of material, Location of site, Labour Component. Steps in preparing detailed estimate. Taking out quantities, squaring, abstracting. Preparing check list – by adoption of Sequence of execution. drafting Brief Specification of items, contents Abstract sheet , face sheet

**UNIT-III**

**Mode of Measurements**

General Rules for fixing units of Measurements for different– items of work as per IS 1200 & As per PWD Hand Book  
Desired accuracy in taking measurements of various items of work & rules for deductions as per IS 1200 & P.W.D. handbook.

**UNIT-IV**

**Procedure for Preparing Detailed Estimate**

Procedure for taking out quantities for various items of works by P.W.D & IS 1200 for.  
a) for Load bearing Structure –Long Wall and short wall method , Center line method .  
b) Framed Structure building. --  
- By using thumb rules for reinforcement quantity calculation  
- By preparing bar bending Schedule  
Provisions in detailed estimate for contingencies, work charged establishment, Provisional items, Provisional Sum,  
Provision for water Supply & Sanitary works, Electrical wiring & installations, centage charges, Tools & Plants,Prime cost, Day work.

**UNIT-V**

**Rate analysis**

Meaning of term Rate analysis –Factors affecting rate analysis, lead, lift, task work, materials and labour component, Market Rate and labour rate.

Transportation of Materials, load factor for different materials. Standard lead , extra lead, Transportation Charges , Labour - Categories of labours, labour rates, overheads contractor's profit, water charges, taking out quantities of materials for different items of works.

Preparing rate analysis of different items of work

Standard Schedule of rates, full rates & labour rates.

**REFERENCE BOOKS-**

1. Estimating & costing in Civil Engineering B.N. Dutta UBS Publishers Distributors Pvt Ltd New Delhi.
2. Estimating & costing, Specification and Valuation in Civil Engineering M. Chakraborti M. Chakraborti , Calcutta
3. Estimating & costing S.C. Rangwala Charotar Publication Anand
4. Civil Engineering Estimating, Contracts and accounts Vol . I B.S. Patil Orient Longman, Mumbai
5. Estimating & costing G. S. Birdie Dhanpat Rai and Sons Delhi.

**DCE-503 (WORK ORGANIZATION & MANAGEMENT )**

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**UNIT-I**

**Procedure Of Execution Of Work By P.W.D-**

Organization of P.W.D. functions of their personnel. P.W.D. procedure of initiating the work administrative approval, technical sanction, budget provision. Method used in P.W.D. for carrying out works contract method and departmental method, Rate list method, piece work method, day's work method, department method.

**UNIT-II**

**Contract-**

Definition of contract, objects of contract, requirements of valid contract. Types of engineering contract- Lump sum contract, item rate contract, percentage rate contract, cost plus percentage, cost plus fixed fee, cost plus variable percentage and cost plus variable fee contract, labor contract, demolition contract , fee contract, target contract, negotiated contract. Class of contractor, Registration of contractor. BOT Project.

**UNIT-III**

**Tender and Tender Document-**

Tender-Definition & its necessity , Types of Local & Global .Tender Notice-points to be included while drafting Tender Notice & Drafting.

Meaning of terms: Earnest money, security deposit, validity period, right to reject one or all tenders, corrigendum to tender notice and its necessary.

Tender documents – List & scheduled. Terms related to Tender documents. Filling the tender by contractor and points to be observed by him. Procedure- submitting filled in Tender document & opening tender.

**UNIT-IV**

**Accounts of P.W.D.-**

Various Accounts Forms and their uses – measurement, Books, Nominal Muster Roll, Imprest Cash, indent, Invoice, Bills, Vouchers, Cash Book, Temporary advance

**UNIT-V**

**Payment to Contractors**

Mode of payment to the contractor : Interim payment and its necessity, Advance payment, secured advance, on account payment, Final payment, first and final payment, retention money, reduced rate payment, petty advance, mobilization advance.

**REFERENCES :-**

1. A.B.C. of PWD Accounts C.M. Kaul
2. Overseer accounts & Duties Kumar
3. PWD Managements, Accounts & Labour Relation H.S. Pandit
4. Construction Management & PWD Accounts Agrawal & Arora
5. MPPWD Manual Vol.-I & Vol.-II

6. Manual of Labour Relations R.C. Shrivastava
7. Civil Engineering management O.N. Wakhle, D.K. Publisher
8. Estimating & costing in civil Engineering B.N. Datta USB Publisher
9. Estimating & costing G.S. Birdie Dhanpat rai & son

**LIST OF EXPERIMENTS :**

1. Collecting old set of tender document and writing a report on it.
2. Collection of tender notices published in newspapers for various items of civil engineering works (At least 5) write salient features of them.
3. Drafting Tender Notice for construction of a Civil Engineering work (W.B.M. Road, Residential Building)
4. Preparation of Tender Document for the building. (Detailed Estimate prepared for R.C.C. building in estimating and costing shall be used)
5. Collection of various account forms from PWD & wiring report on in it.
6. Writing a report on store procedure and account producer of PWD. For it A – a) Guest Lecture of PWD Official may be arranged.
7. Writing detailed specifications for one item from each of following :  
A) Building construction system. B) Irrigation engineering system. C) Transportation engineering system.  
D) Environment engineering system.
8. Solving CPM and Net work problems
9. Preparation a ' E' Tendering of a particular project .

**VISITS :**

1. Visit to public sector/Govt. Industry/ Organization.like PWD ,RES,
2. Visit to private sector Industry.

## DCE-504 TRANSPORTATION ENGINEERING-II

### UNIT-I

#### **Road Engineering-**

Importance of road in India. Classification of roads according to Nagpur plan (Location and function), and third road development plan. Traffic and tonnage, Classification of urban roads. different road yojana , like pradhan mantra gram sadak yojana ,Mukhya mantri sadak yojna .

### UNIT-II

#### **Investigation For Road Project -**

Reconnaissance survey, Preliminary survey and Location survey for a road project. Detailed survey for cross drainage- L-section and C/S sections. Fixing the alignment of road, factors affecting alignment of road. Drawings required for road project- Key map, Index map, Preliminary survey plan and detailed location survey plan, L section and C/S sections cross drainage work, land acquisition plan. Survey for availability of construction material, location plan of quarries

### UNIT-III

#### **Ideal Requirement, Component Parts geometric Design of Highways-**

Camber- definition, purpose, types, IRC – specifications. Kerbs , road margin, road formation, right of way. Design speed. Gradient , Sight distance. Curves–Necessity, types. Widening of roads on curves. Super Elevation and methods of providing super elevation. Sketching of standard C/S of national highway in embankment and cutting. Simple problems on geometric design of road.

### UNIT-IV

#### **Construction of Roads Pavements and Materials-**

Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade, Aggregate & bitumen. Pavement – objective, structure & function of pavement components, types of pavement. Construction of earthen road – general terms used- borrows pits, spoil bank, lead and lift, balancing of earthwork. Soil stabilized roads – necessity, methods of soil stabilization. Water bound macadam roads construction procedure. Construction of bituminous roads & Terms used in it. Types of bituminous surface, Bitumen/Tar carpets – procedure of construction. Cement concrete pavements- Construction procedure and equipment, Construction joints, joint filler & sealer.

### UNIT-V

#### **Drainage of Roads-**

Surface drainage – side gutter, catch water drains, surface drainage. Sub-surface drainage –Longitudinal drains and cross drains.

#### **Maintenance and Repairs of Roads –**

Necessity of maintenance of roads, Classification of maintenance operation – ordinary, routine and periodic maintenance. Maintenance of W.B.M., bituminous and cement concrete roads.

### **REFERENCE BOOKS-**

1. Highway Engineering Khanna & Justo Khanna Pub.
2. Transportation Engineering N.L.Arora,S.P.Luthara I.P.H. New Delhi
3. Transportation Engineering Vazarani & Chandola Khanna Pub.
4. Road, Railway, Bridges Biridi & Ahuja. S.B.H.New Delhi

5. Transportation Engineering Kamala T.M.H. New Delhi

**LIST OF EXPERIMENTS:**

1. Road project for a road of minimum 0.5 km. length having at least one small cross drainage work.
2. Visit to a road under construction/constructed to study the construction of (a) WBM road (b) flexible pavement (c) Rigid pavement roads for observing the type of construction and construction equipments.
3. Preparing drawings of detailed cross sections of (a) major district road (b) state Highway (c) National highway (d) Express Highway in cutting and banking showing details and dimensions with proper scale. (Any two)
4. Traffic volume study and its representation of an important road intersection in your city.
5. Visit to a W.B.M. and Bituminous road for observing the different types of defects in roads.
6. Prepare a visit report. Which should consist of (a) List of various defects observed b) Suggestions regarding the possible remedial measure.
7. Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test.
8. Study of Different Highway software. Road SOR , MOST  
1- Geometrics 2- Pythagoras 3- C-Lx

## DCE-505 (STRUCTURAL DESIGN AND DRAFTING)

### UNIT - I.

**Basic Principles of Structural Design :** Assumptions, Mechanism of load transfer, Various properties of concrete and reinforcing steel, Introduction to working stress method and limit state methods of design, partial safety factor for load and material. Calculation of various loads for structural design of singly reinforced beam, Partial load factors.

### UNIT - II.

**Design of Beams:** Doubly reinforced rectangular & Flanged Beams, Lintel, Cantilever, simply supported and continuous beams, Beams with compression reinforcement: Redistribution of moments in continuous beams, Circular girders: Deep beams. Design of beam for shear and bond.

### UNIT-III.

**Design of Slabs:** Slabs spanning in one direction. Cantilever, Simply supported and Continuous slabs, Slabs spanning in two directions, Circular slabs, Waffle slabs, Flat slabs, Yield line theory.

### UNIT -IV.

**Columns & Footings:** Effective length of columns, Short and long columns- Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing, Columns subjected to axial loads and bending moments (sections with no tension), Raft foundation.

### UNIT -V.

**Staircases:** Staircases with waist slab having equal and unequal flights with different support conditions, Slabless tread-riser staircase.

NOTE :- All the designs for strength and serviceability should strictly be as per the latest version of IS:456. Use of SP-16 (Design aids)

### REFERENCE BOOKS: -

1. Plain & Reinforced Concrete Vol. I & II – O.P. Jain & Jay Krishna
  2. Limit State Design by P.C.Varghese ; Prentice Hall of India, New Delhi
  3. Design of Reinforced Concrete Elements by Purushothman; Tata McGraw Hill, New Delhi
  4. Plain & reinforced concrete - Rammuttham
  5. Plain & reinforced concrete – B.C. Punnia
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### Sketch book : (LIST OF EXPERIMENTS)

Sketch book consists of approximately ten plates from R.C.C. Design shall include important information of clauses of IS 456-2000 code. Typical sketches of components members/stress distribution & strain distribution diagrams R.C.C. section / detailing of reinforcement in joints / members. Design of R.C.C. structural components by LSM.

Introduction to RCC design software STRUUDS

The students should make detailed simple design and drawing of reinforcement detailing on two full imperial size sheets finished in pencil on any five of the following R.C.C. components members of a two-storied building with detailing of reinforcement (G+1) at the joints as per requirements & IS 13920.



1. One-way simply supported slab.
2. Two-way simply supported slab.
3. Cantilever slab/chajja.
4. T-Beam
5. Column and column footing.
6. Dog-legged staircase.

**1. FIELD VISITS –**

- a) Visit to a construction site where the RCC work is in progress.
- b) Visit to a construction site where the irrigation work is in progress.
- c) Visit to a bridge site. Batching plant for cement concrete and bituminous road
- d) Visit to water treatment plant.
- e) Visit to a dam site Canal site.
- f) Visit for a power plant site.
- g) Visit for a construction site where multistoried mal /shoping complex i

**2. SEMINAR –**

Seminar on low cost housing ,  
Inter linking of rivers & irrigation structure rain water harvesting  
Cement concrete roads & joints in cement concrete roads .  
Traffic engineering .  
Ductile detailing ,  
use of different ISI codes for civil engineers ,releted to RCC & Earth quake resistant structure  
Earthquake resistant structure ,design concepts for buildings