

# State Engineers Academy, Roorkee

## Proposed Training Schedule and Syllabus of Short Term Induction Course for Fresh Junior Engineers (Civil) of IRRIGATION DEPARTMENT

**Overall Duration:40 Days .**

01	Accounts	13 Days
02	General Engineering	11 Days
03	Humanities	04 Days
04	Personality Development	01 Day
05	Stress Management – General Medical Awareness	01 Day
06	Local Technical Tour	01 Day
07	Disaster Management	01 Day
08	Digital Survey	02 Days
09	Project work	03 Days
10	Assessment & Tests	02 Days
11	Examination	01 Day
<b>Overall Duration</b>		<b>40 Days</b>

### **Format of Examination**

- 1- No of question paper : 01
- 2- Time Duration : 03 Hrs.
- 3- Break up - Accounts : 90 Marks  
General Engineering : 70 Marks  
Humanities : 40 Marks
- 4- Total Marks : 200
- 5- Passing Marks : 100

# *State Engineers Academy, Roorkee*

## **Proposed Syllabus of Short Term Course for Fresh Junior Engineers (CIVIL) of Irrigation Department**

### **1.0 Accounts**

**Public works accounts rules, Formats, Procedure and their Practical Application:**

#### **1.01 Accounting Procedure**

1. Significance of Accounts for financial administration and control.
2. Concepts of P.W. accounts.
3. System of Accounts.
4. Classifications of transactions.
5. Financial Discipline & Reference Books, brief description of F.H.B., P.W.A. Form books.

#### **1.02 Powers and responsibilities.**

1. Report of losses and follow up actions.
2. Follow-up and consequential responsibilities for recovery of Advances paid to contractor, Misc. Advances and shortage of stock, T&P.

#### **1.03 Fundamental rules**

1. Definitions: General conditions of service.
2. Leave Rules.

#### **1.04 Estimates, Preparation and responsibilities from financial angle.**

1. Estimation concept and necessity.
2. Revised estimates and supplementary estimates.
3. Sanction of Estimates.
4. Closing of estimates.
5. Statement of sanctioned estimate & actual expenditure.
6. Power of various officers for sanctioning of L-Section.

#### **1.05 Technical sanction of Works (Para 317).**

#### **1.06 Contracts**

1. Notice inviting tender, quotations and pre-qualification.
2. Tenders, Work orders & supply orders, repair orders for vehicles.
3. Contract documents, Agreements.
4. Earnest Money & Security for performance of contract.
5. Comparative statements.
6. Variation statements- Extra items.
7. Scrutiny, acceptance & award of work.
8. Letter of acceptance.
9. Execution of orders, contracts & effective control on the quality.
10. Accountability of executing authority.
11. Registration of contractors.
12. Contractor's liability & officer's responsibilities.
13. Contractor's claim, factors responsible for claims, Extra items, basis & Justification.

#### **1.07 Execution of works**

1. Work order books.
2. Record of measurements.
3. Standard measurement books.
4. Bills and vouchers.
5. Sales Tax & Income tax deductions.
6. Aid to contractors.
7. Advances to contractors.
8. Procedures in regard to petty, minor & major works.

#### **1.08 Stock/Tools and plants**

1. Receipt & Issue.
2. Monthly – half yearly – annual returns.
3. Closing of registers.
4. Valuation of stock.

5. Survey report of T&P.

### **1.09 Non-Government works**

1. Deposit works.

### **1.10 Daily wages, work charged & contingent expenses.**

#### **1.11 Stationery forms and stamps**

1. Procurement procedures and powers.
2. Restrictions, Government sanctions.
3. Indenting procedures, Govt. Press.
4. Local purchases and printing procedures.
5. Procurement of Govt. Publications including gazette notification etc.

#### **1.12 Travelling allowance**

1. Definitions, Rules for special journeys.
2. Rules for ordinary journeys.
3. Conveyance allowance.
4. Leave travel concession.

## **2.0 GENERAL ENGINEERING**

### **2.01 Essential knowledge about the irrigation works and general problems arising their in and their remedies.**

1. Channels, Drains, Hill channels etc.
2. Bundies, Spurs, Afflux bunds and marginal embankment etc.
3. Head works and canal structures.
4. Barrages, Weirs.

### **2.02 Floods.**

1. Flood forecast and monitoring, Flood plain zoning-Implementation part.
2. Flood warnings, Liaison with district administration & accountability of field engineer.
3. Flood protection works – New IS: 8408
4. Preparation of flood projects.
5. River training and protection works/cross.
6. Discharge observations including instruments and methodology.
7. Sample collection for determining Silt factors, sediment inflow and evaluation processes.
8. Gauge discharge curves, observations, and instruments.
09. Rainfall recording methods, instruments.
10. Significance of maintaining rainfall, discharge data for project purposes. Role of I.M.D. organisation and their records.

### **2.03 Revenue.**

1. Irrigation terms, introduction to New Irrigation.
2. Preparation, completion and maintenance of shajra sheet, index map, rumal and shajara tracing etc.
3. Recording of irrigation, preparation of zamabandi and land revenue, duties of lekhpal's supervisor, kanungo & tehsildar in relation to irrigation deptt.
4. Fate of water, prevalent schedules and assessment. lekhpal's fees, charges for waste or unauthorised use of water, remissions.
5. Responsibilities of the department for the recovery of dues from the farmers.
6. powers, duties and accountability of officers and staff in respect of revenue matters and increasing irrigation.
7. Office inspection, maintenance of office records & field inspections.
  - i. Seench pal.
  - ii. Irrigation supervisor.
  - iii. Ziledar.
  - iv. D.R.O.
8. Checking of irrigation measurements.
9. Lease of land.

### **2.04 Formulation of projects**

1. Identification of scheme and projects.
  - i. Directions for investigations and preliminary assessment of potential.
  - ii. Preliminary surveys.
2. Formulation of preliminary feasibility report (F.R.) and their approval.
  - i. Geological & Geotechnical investigations - survey work.
  - ii. Importance of detailing to avoid time and cost over runs – socio economic impact- benefit cost ratio.
  - iii. Preparation of preliminary designs and estimates.

- iv. Liaison with outside authorities including D.M , District Agriculture officer. Uttarakhand Power Corporation Limited and land record authorities.
- v. Environmental, architectural and geological aspects including compensatory afforestation and catchment area plantation for sit control.
- vi. Preparation of DPR: PMGSY-NABARD-RMSA-District Plan Works.

### **2.05 Estimation**

- 1. Prerequisites for preparing an estimate.
- 2. Specifications, how to prepare, approving estimate.
- 3. Analysis of rates, basis and approving authority.
- 4. Delhi schedule of Rates for preparing projects of buildings.
- 5. PWD Schedule of Rates for preparing projects.
  - i. Access to website.
  - ii. How the Analysis of Rates have been prepared in the software.
  - iii. Getting Detailed Analysis of Rates from website.
- 6. Justification of quantities, basis prevalent practices and irregularities.
- 7. Recording and preparation of plans as executed drawings.
- 8. Sanction of L-Section.

### **2.06 Construction Techniques.**

- 1. Foundation of hydraulic structures, R.C.C. Structure, Roads, building etc.
  - i. Preparation and treatment
  - ii. Precautions in deep excavations.
  - iii. Precautions and measures in loose soils.
  - iv. Chemical treatment and grouting.
- 2. Concrete Technology
  - i. Mix design and analysis of quantities, workability of concrete, joints in concrete.
  - ii. non destructive core tests of concrete.
  - ii. R.C.C.
- 3. Quality control and specifications.
  - i. Purpose.
  - ii. Identification of items.
  - iii. Common field tests during execution.
  - iv. Post construction tests.
- 4. General items, Definitions, purpose, specification and construction methodology.
  - i. Filter.
  - ii. Pitching.
  - iii. Consolidation of embankments.
  - iv. Repairs of breaches.
  - v. Slope stabilisation protection and precautions.
  - vi. Earth work including earth filling and cuttings.
- 5. Channels/Canals
  - i. Water logging & anti-water logging measures.
  - ii. Lining of canals.
    - a. Prevalent techniques & their performance.
    - b. Type, method of construction.
    - c. Evaluation of seepage control/losses.

### **2.07 R.C.C. Framed Building Structures.**

- i. Earthquake resistance and rain water harvesting provision.
- ii. Maintenance - Renovation and fire safety measures - Solar power backup in public buildings.
- iii. Details of RCC structures- Form work/Shuttering – Reinforcement.

### **2.08 Design & Drawing.**

- i. Drafting: Size of standard drawings, blocks, letter size, scales, Dimensioning in drawings, Tender Drawings, Execution Drawings, North Direction etc.
- ii. Basics of MS Excel for small design/Computation and graph plotting.

## **3.0 HUMANITIES**

### **3.01 Irrigation department Uttarakhand: An Introduction.**

- 1. An overview of activities of department.
- 2. Administrative set up of department.

### **3.02 Administration:**

- 1. Administrative structure of the state.

- i. District administrative unit of development, overview, liaison, vis-a-vis duties and responsibilities of irrigation department.
- ii. Brief concept and functions concerning engineering organisation of treasury, registration, excise, collectorate, sales tax, income tax and octroi etc.

### **3.03 Personnel Administration:**

1. Government Servant.
  - i. Uttarakhand Service Conduct rules - 2002.
  - ii. C.C.A. rules.
  - iii. Welfare, workers participation, unions & staff associations.
  - iv. Pressure groups, agrarian tensions, their nature & impact on society.
  - v. Social responsibilities of a Govt. Servant.
2. Disciplinary proceedings.
  - i. Public grievances.
  - ii. Disposal of complaints, preliminary assessment, prima facie case.
  - iii. Enquiry, proceeding, rules & submission of enquiry reports.
  - iv. Charge sheet, punishment etc.
3. A.C.R. rules – Integrity of public servant.
4. Objectives and purposes of:
  - i. Vigilance organisation.
  - ii. Tribunals.

### **3.04 Personnel Management:**

1. Development of human resources.
  - i. Personality and motivation.
  - ii. Leadership, role functions and styles.
  - iii. Management of conflict & Management of change.
  - iv. Decision making evaluation of delays.
2. Psychology.
  - i. Interpersonal behaviour.
  - ii. Personality and behaviour motivation.
  - iii. Management policies & practices.

### **3.05 Communication, Behaviour & Presentation Skills.**

1. Inter personal communication, barriers and gate-ways to communication.
2. Methodology of presentation of a subject.

### **3.06 Necessity of learning computers – Application of Google Earth and Bhuvan .**

### **3.07 Laws, Acts & Rules**

1. RTI.
2. Indian Penal Code
  - i. Chapter iv, ix, xi.
  - ii. Forgery.
  - iii. Abetment attempt and preparations.
3. Criminal Procedure Code:
  - i. Bail.
  - ii. Investigations.
  - iii. Trials and appeals, procedures etc.
4. Civil procedure code
5. Laws & Acts
  - i. labour laws, minimum wages Act, Workmen's compensations Act.
  - ii. Land acquisition Act 1894 & forest land acquisition.
  - iii. U.P. Public premises Act 1972 (Eviction of Unauthorised occupants).
  - iv. Northern Indian canal and Drainage Act.
  - v. Water tax on electricity generation act of 2013.

### **3.08 Various commissions /Act against atrocities (Introductory Part).**

- i. Human Rights commission.
- ii. Woman commission.
- iii. Minorities Commission.
- iv. SC/ST Commission.
- v. Persons with disabilities Act.

### **3.09 Legal matters of department.**

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