

**TEACHING & EVALUATION SCHEME**

**DISCIPLINE: CIVIL ENGINEERING**

**SIXTH SEMESTER**

Sl.No.	SUBJECT	Evaluation Scheme								Total Marks
		L	T	P	THEORY			PRACTICAL		
					END EXAM	INTERNAL ASSESSMENT		End Examination	Sessional	
<b>THEORY</b>										
						Class Test	Assignment			
1.	Structural Design-II	4	1	--	80	15	5	--	--	100
2.	Estimating - II	4	1	--	80	15	5	--	--	100
3.	Advanced Construction Technology	4	1	--	80	15	5	--	--	100
4.	Elective(Any One)									
	i). Disaster Management.									
	ii)Concrete Technology									
	iii)Low cost Housing									
	iv)Environmental Engineering									
	v) Elements Of Interior Design	4	1	--	80	15	5	--	--	100
<b>PRACTICAL/SESSIONAL</b>										
1.	Structural Detailing Practice-II	--		3	--	--	--	--	50	50
2.	Estimating Practice- II	--		3	--	--	--	-	50	50
3.	CAD Lab.	--		7	--	--	--	50	50	100
4.	Project and Seminar	--		6	--	--	--	100	50	150
		16	4	19	320	60	20	150	200	<b>750</b>

NOTE: Evaluation for I.A.(Theory)& Sessional /Practical to be made as per guidelines of SCTE&VT.

## STRUCTURAL DESIGN– II (Th- 1)

### Theory:

L/wk:04 P/Wk

Total Periods:60,

Total Marks:100

Evaluation Scheme:

Theory: End Term Exam.80,

I.A :-15(Class Test)+5(Assignment)

Topic wise Distribution of Periods:

Sl. No.	Topics	No. of Periods
1.	(Group – A) Introduction	02
2.	Structural steel fasteners and connections	06
3.	Design of Tension Members	06
4.	Design of Compression Members	10
5.	Design of Column Bases and Foundation	06
6.	Design of steel beams	06
7.	Design of timber structures	04
8.	(Group – B) Stair case (RCC-LSM)	10
9.	Design of footings (RCC-LSM)	10

### **RATIONALE:**

Safety and durability of a structure depend on appropriate design, proper detailing and construction as per detailed drawing and specification. For this reason, 'Design & Detailing – II' is an important subject of Civil Engineering Diploma holders. They are most often asked to act as a supervisor in construction projects. In addition to this they may also require to work as a draftsman responsible for preparing detailed drawing for construction sites. Diploma holders are also called upon to assist designers, suggest modifications for repair and renovation works and also to design simple structural elements. The subject attempts to cover the above aspects of Civil Engineering profession.

### **OBJECTIVES :**

On completion of the subject a student will be able to —

- i) Design simple steel structure such as tension members, compression members and simple beams.
- ii) Design timber structural elements
- iii) Design staircase, footings by limit method of design.
- iv) Draw the details of a steel roof truss.
- v) Draw the reinforcement details of an underground RCC water tank and RCC footings.

### **COURSE CONTENTS:**

#### **Group – A : Design of Steel & Timber structures(Limit State)**

**( 50 marks )**

##### **1.0 Introduction:**

- 1.1 Common steel structures, Advantages & disadvantages of steel structures.
- 1.2 Types of steel, properties of structural steel.
- 1.3 Rolled steel sections, special considerations in steel design.
- 1.4 Loads and load combinations.
- 1.5 Structural analysis and design philosophy.
- 1.6 Brief review of Principles of Limit State design.

## **2.0 Structural Steel Fasteners and Connections.**

### 2.1 Bolted Connections.

2.1.1 Classification of bolts, advantages and disadvantages of bolted connections.

2.1.2 Different terminology, spacing and edge distance of bolt holes.

2.1.3 Types of bolted connections.

2.1.4 Types of action of fasteners, assumptions and principles of design.

2.1.5 Strength of plates in a joint, strength of bearing type bolts (shear capacity & bearing capacity), reduction factors, and shear capacity of HSFG bolts.

2.1.6 Analysis & design of Joints using bearing type and HSFG bolts (except eccentric load and prying forces)

2.1.7 Efficiency of a joint.

### 2.2 Welded Connections:

2.2.1 Advantages and Disadvantages of welded connection.

2.2.2 Types of welded joints and specifications for welding.

2.2.3 Design stresses in welds.

2.2.4 Strength of welded joints.

2.2.5 Reduction of design stresses for long joints.

## **3.0 Design of Steel tension Members**

3.1 Common shapes of tension members.

3.2 Design strength of tension members, yielding of gross cross section, rupture of critical section and the concept of block shear.

3.3 Maximum values of effective slenderness ratio.

3.4 Analysis and Design of tension members.

## **4.0 Design of Steel Compression members.**

4.1 Common shapes of compression members.

4.2 Bulking class of cross sections and slenderness ratio.

4.3 Design compressive stress and strength of compression members.

4.4 Analysis and Design of compression members (axial load only).

## **5.0 Steel Column bases and foundations:**

5.1 Types of column bases and their suitability.

5.2 Design of slab base (subjected to axial loading) with concrete footing.

5.3 Design of gusseted base (subjected to axial loading) with concrete footing.

## **6.0 Design of Steel beams:**

6.1 Common cross sections and their classification.

6.2 Plastic moment capacity of sections, moment capacity and shear resistance.

6.3 Deflection limits, web buckling and web crippling.

- 6.4 Design of laterally supported beams against bending and shear.
- 6.5 Types of built up sections and design of simple built up sections using flange plates with I-sections or web plates.

**7.0 Timber Structures:**

- 7.1 Types of timber, grading of timber, defects, permissible stresses.
- 7.2 Design of axially loaded timber columns (solid, box & built up section except spaced columns).
- 7.3 Design of simple timber structural elements in flexure (Solid sections & flitched beams, form factor and moment of resistance of built-up sections, check for shear, bearing and deflection).

**Group – B : Design of R.C.C structures(Limit State) (30 Marks)**

**8.0 Stair case**

- 8.1 State & draw important types of stair case, explain effective span & principles of design
- 8.2 Design of dog legged stair case and show the details of reinforcement.
- 8.3 Design of stairs constructed out of structural independent cantilever steps.
- 8.4 Tread –riser staircase (only detailing of reinforcement, no design calculation)

**9.0 Design of footings**

- 9.1 State and sketch different types of footings
- 9.2 Explain design loads for foundation design, basis of design of independent footings, checking for development lengths, procedure for design of footings
- 9.3 Design simple masonry foundation and R.C. slab foundation for a masonry wall
- 9.4 Design of isolated reinforced concrete square & rectangular footings for given data & draw detailed drawings.

**Recommended Books:**

- |  |                     |
|--|---------------------|
| 1. Design of Steel Structures  | - B.N.Duggal        |
| 2. Design of Steel Structures  | -S.S. Bhavikatti.   |
| 3. Design of steel structure   | -N. Subramanian.    |
| 4. Elements of Steel & Timber Design   | -Samal & Panigrahi. |
| 5. Reinforced Concrete: Limit State Design                                     | - A. K.Jain.        |
| 6. Reinforced Concrete   | - H.J.Saha          |
| 7. Limit State design (R.C.C)  | -P.C.Varghese.      |
| 8. Design Aids for reinforced concrete to I.S 456, BIS Publication, S.P-16.    |                     |
| 9. Handbook on concrete Reinforcement and detailing, BIS Publication, S.P-34   |                     |
| 10. Code of Practice for General Construction in steel: I.S.800:2007.          |                     |
| 11. Structural Engineers' Handbook, Vol.-I, II, III; BIS, Publication.         |                     |
| 12. Code of Practice for design of Structural timber in building-I.S:883-1970. |                     |
| 13. Hand book on timber engineering, BIS Publication-SP-33.                    |                     |
| 14. Steel Table  | -Samal & Panigrahi. |

## ESTIMATING – II (Th- 2)

L/wk:04 P/Wk

Total Marks:100

Theory: End Term Exam.80,

Total Periods:60,

Evaluation Scheme:

I.A :-15(Class Test)+5(Assignment)

Topic wise Distribution of Periods:

Sl. No.	Topics	No. of Periods
1.	Detailed estimate of culverts and bridges	20
2.	Estimate of irrigation structures	24
3.	Detailed estimate of roads	10
4.	PWD accounts works	06

### RATIONALE :

The subject of estimating is very important for Civil Engineering Diploma students. The students are required to know the various aspects of rates analysis, types of estimates, details of specifications for deriving a correct estimate of a construction unit.

### OBJECTIVES :

On completion of the subject a student will be able to –

- i) The different components of estimate like simple culverts and bridges
- ii) Take measurement of structures like culverts, bridges and RCC structures
- iii) Estimate the quantity of dry materials required for each items of work
- iv) Undertake the analysis of rates of each item of work
- v) Understand the working of engineering department

### COURSE CONTENTS:

#### 1.0 Detailed estimate of culverts and bridges

- 1.1 Detailed estimate of a simple Hume pipe culvert with right angled wing walls
- 1.2 RCC deck slab culvert with right angled wing wall
- 1.3 RCC deck slab culvert with splayed wing wall
- 1.4 Quantity of steel for deck slab with bar bending schedule of the above jobs

#### 2.0 Estimate of irrigation structures

- 2.1 Detailed estimate of simple type of vertical fall to given specification
- 2.2 Detailed estimate of siphon well drop to given specification.

#### 3.0 Detailed estimate of roads

- 3.1 Detail estimate of a water bound macadam road
- 3.2 Detailed estimate of a National Highway in cutting / filling

#### 4.0 PWD accounts works

- 4.1 Works
  - 4.1.1 Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair
  - 4.1.2 Method of execution of works through the contractors, departmentally, contract and agreement, work order, item rate contract, lump sum contract, labour contract and daily labour, piece work agreement, scheduled contract, cost plus percentage contract
- 4.2 Accounts of works

- 4.2.1 Explanation of various terms  
Administrative approval, technical sanction, contingency budget, tender, preparation of notice inviting tender, receiving of quotations, earnest money, security deposit, advance payment, on account payment, intermediate payment, final payment, running bill, final, regular and temporary establishment, cash, major & subhead of account, temporary advance, issue rate, storage, supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts .
- 4.2.2 Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity
- 4.2.3 Master roll : Its preparation & use for making payment of pay & wages
- 4.2.4 Acquittance Roll : Its preparation & use for making payment of pay & wages
- 4.2.5 Labour & labour report, method of labour payment, use of forms and necessity of submission
- 4.2.6 Classification of stores, receipt / issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks, shortage and excess

**RECOMMENDED BOOKS:**

- 1. Estimating, Costing, specification & Valuation in Civil Engineering -M.Chakraborty.
- 2. A text Book of Estimating & Costing -D.Kohli &R.C Kohli.
- 3. Estimating & Costing -B.N.Dutta.
- 4. Estimating & Costing -Birdi & Ahuja.
- 5. Latest Orissa PWD Schedule of Rates & Analysis of rates.

## **Subject: Advanced Construction Technology (Th- 3)**

L/wk:04 P/Wk  
Total Marks:100  
Theory: End Term Exam.80,

Total Periods:60,  
Evaluation Scheme:  
I.A :-15(Class Test)+5(Assignment)

S.No.	Topics		No. of Hours Allocated
1	Concrete mix Design	PART A	10
2	Handling and Transporting of Concrete		05
3	Earthquake Resistant Construction	PART B	15
4	Building Services	PART C	15
5	Construction and earth moving equipments	PART D	15

### **PART A**

#### **COURSE CONTENT**

##### **1.0 Concrete mix Design**

- a) Introduction
- b) Properties of Concrete
- c) Data or input required for mix design.
- d) Nominal mix concrete & design mix concrete.
- e) Methods of proportioning concrete mix – I.S Code method of mix design(I.S.10262)  
Outline of B.S. method and ACI method. Durability requirements of Concrete as per I.S:456.

2.0 Mixing, Transporting, Placing & curing requirements of Concrete as per I.S.456.

3.0 Quality control of Concrete as per I.S.456.

### **PART B**

##### **3.0 Earthquake Resistant Construction**

- i) Building Configuration
- ii) Lateral Load resisting structures
- iii) Building characteristics
  
- iv) Effect of structural irregularities-vertical irregularities, plan configuration problems.
- v) Safety consideration during additional construction and alteration of existing Buildings.
- vi) Additional strengthening measures in masonry building-corner reinforcement, lintel band, sill band, plinth band, roof band, gable band etc.

##### **4.0 Retrofitting of Structures**

Seismic retrofitting of reinforced concrete buildings :

- i) Sources of weakness in RC frame building
- ii) Classification of retrofitting techniques and their uses.

## PART -C

### 5.0 Building Services

- a) Cold Water Distribution in high rise building, lay out of installation
- b) Hot water supply – General principles for central plants-layout
- c) Sanitation –soil and waste water installation in high rise buildings
- d) Electrical services –
  - i) requirements in high rise buildings
  - ii) Layout of wiring - types of wiring
  - iii) Fuses and their types
  - iv) Earthing and their uses
- e) Lighting – Requirement of lighting, Measurement of light intensity
- f) Ventilation
  - i) Methods of ventilation – Natural and artificial
  - ii) Systems of ventilation, problems on ventilation
- g) Mechanical Services- Lifts, Escalator, Elevators – types and uses

## PART- D

### 6.0 Construction and earth moving equipments -

- a) Planning and selection of construction equipments
- b) Study on earth moving equipments like drag line, tractor, bulldozer, Power shovel
- c) Study and uses of compacting equipments like tamping rollers, Smooth wheel rollers, Pneumatic tired rollers and vibrating compactors
- d) Owning and operating cost – problems

### Reference Books

- a) Building Technology by –TTTI Chennai-113
- b) A Text Book of R.C.C By – A.K. Jain Chand & Bro Publishers
- c) Construction equipments by –Singh
- d) Building services
- e) Building Technology – N. Sreenivasulu
- f) Basics of Electrical Engineering - B.L. Theraja
- g) Construction planning & equipment - Peurifoy



## DISASTER MANAGEMENT (ELECTIVE)

Lecturer(Th.): P/Wk:04      Total Periods: 60, Total Marks:100  
Evaluation Scheme:

Theory: End Term Exam.80,      I.A :-15(Class Test)+5(Assignment)

### Topic wise Distribution of Periods:

Sl. No.	Topics	No. of Periods
1.	INTRODUCTION	04
2.	EARTHQUAKES	04
3.	TSUNAMI	04
4.	LANDSLIDES	04
5.	CYCLONE	04
6.	FLOODS	04
7.	DROUGHT	04
8.	FOREST FIRE	04
9.	OTHER TYPE OF HAZARDS	04
10.	POLICY, PLANNING AND INSTITUTIONS FOR DISASTER MITIGATION	24

### Course Contents:

#### **1.0-Introduction**

- 1.1- Definition of hazards, disasters. Explain the difference between hazard and disaster.
- 1.2 – Concept of risk and vulnerability. Risk reduction: preparedness and mitigation.
- 1.3 – Disaster management cycle.
- 1.4- Personal and community awareness.
- 1.5- Types of disasters, earthquake, Tsunami, Landslide, cyclone ,flood,drought,forest fire, Chemical and industrial accidents.

#### **2.0-Earthquakes.**

- 2.1- definition and concept ,intensity, Richter’s scale.
- 2.2- Element of risk.
- 2.3- Hazard Zones in India.
- 2.4- Typical effects.
- 2.5- Main mitigation strategies, safe Engineering practice,Indian Standard code and enforcement Bye-Laws.

#### **3.0- Tsunami.**

- 3.1- Definition concept.
- 3.2- Onset, type and cases.
- 3.3- Warming.
- 3.4- Elements at risk.
- 3.5-Typical effects :Physical damage, environmental damage ,casualties and Public

health.

3.6-Specific preparedness: Hazard mapping, early warning systems, Community preparedness.

3.7- Main mitigation strategies: Site planning and land management, Engineering structures. Flood management.

#### **4.0- Landslides.**

4.1-Definition, concept.

4.2- Onset time and warning.

4.3- Causes.

4.4-Elements at risk.

4.5-Hazard zones and Indian landslides.

4.6-Typical effects: Physical damage, casualties.

4.7- Main mitigation strategies: Hazard mapping, Landslide practice, retaining walls, Surface drainage control works, Engineering structures.

4.8- Community based mitigation.

#### **5.0-Cyclones.**

5.1-Definition, concept.

5.2-Onset type, Warning.

5.3-Elements at risk.

5.4-Typical effects.

5.5-Indian Hazard Zones.

5.6- Main mitigation strategies: Hazard mapping, Land use control , Engineering Structures, Flood management, improving vegetation cover.

5.7- community based mitigation.

#### **6.0- Floods.**

6.1- Definition, concept, Onset type.

6.2- Warning.

6.3- Elements at risk.

6.4- Hazard zones and Indian floods.

6.5- Typical effects: Physical damage, Casualties and Public health ,Crops and flood.

6.6- Main mitigation strategies: Mapping of the flood prone areas, land use control, Flood control and management.

6.7- Community based mitigation.

#### **7.0- Droughts.**

7.1- Definition, concept.

7.2- Onset type and warning.

7.3- Elements at risk.

7.4- Typical effects.

7.5- Main mitigation strategies: drought monitoring, water supply augmentation and conservation.

7.6- Drought Planning.

### **8.0- Forest Fire.**

8.1- Definition and concept.

8.2- Forest fire damages in India.

8.3- Operational fire management systems and organizations.

8.4- Community involvement.

8.5-Public policies concerning fire.

8.6- the needs of fire management.

### **9.0- Other type of Hazards and disasters.**

9.1- Chemical and Industrial disasters: brief description, effects, preparedness.

9.2- Epidemic: Onset type, warning, causes and effects, risk reduction measures.

9.3- Heat waves: definition, dangers and effects, Forecasts and warning, awareness.

### **10.0- Policy, Planning and Institutions for disaster mitigation.**

10.1-Role of policy makers in disaster risk reduction, course for specific action.

10.2-Institutional arrangement in India: Central level, State Level, District and Block level.

10.3- Major institutions in National and State level.

### **REFERENCE BOOKS**

- |   |                               |
|---|-------------------------------|
| 1.0 Natural hazards and Disasters                   | -Donald and david Hyndman 2.0 |
| Distaster Management                                | -Tej Singh                    |
| 3.0 Towards Basics of Natural Disaster              | - D.K.Sinha                   |
| 4.0 Disaster Referense: A Hand Book for Emergencies | - Babu Thomas                 |
| 5.0 Introduction to Hazards                         | -S.B.Reed                     |
| 6.0 Man Made Disaster                               | - B.A. Turner                 |
| 7.0 BIS Codes:- I.S 1893 ,I.S.4326,I.S.13920,NBC    |                               |

## **ENVIRONMENTAL ENGINEERING (ELECTIVE)**

*Periods per week-04      Total marks:100    Evaluation scheme:*

*Total periods: 60                                  Theory: End term Exam:80,I.A:15+5(assignment)*

### **TOPIC WISE DISTRIBUTION OF PERIODS:**

<b>Sl. No.</b>	<b>Topics</b>	<b>Lecturer in periods</b>
<b>1.</b>	<b>Introduction</b>	<b>04</b>
<b>2.</b>	<b>Ecology</b>	<b>10</b>
<b>3.</b>	<b>Environmental pollution</b>	<b>20</b>
<b>4.</b>	<b>Pollution survey</b>	<b>06</b>
<b>5.</b>	<b>Solid waste management</b>	<b>10</b>
<b>6.</b>	<b>Environmental management</b>	<b>10</b>

### **RATIONALE:**

The construction activities taken up by the technical personnel, Civil engineering technicians in particular, are also to some extent responsible for the environmental degradation. The Civil engineers are also responsible for adopting the remedial measures. As such, a Civil engineering Diploma holder should have adequate knowledge about the types of pollution caused by various construction activities for adopting preventive and remedial measures. They should also be aware of the various environmental laws for effective control of environmental pollution.

### **OBJECTIVES:**

On completion of study of the subject, the student will be able to:-

1. Explain the different aspects of environmental engineering.
2. Relate the various components of ecosystem.
3. Identify the sources and effects of environmental Pollution.
4. Analyze the polluted water, air and soil by using appropriate.
5. Describe the role of various agencies in environmental pollution under the environmental laws.

### **COURSE CONTENT:**

- 1.0 Introduction:
  - 1.1 Definition of environment and components of Environment and related terms.
  - 1.2 Aims and objectives of environmental engineering.
  - 1.3 Impact of population growth, industrialization & urbanization and energy growth on environment.
  - 1.4 Current issues of environmental concern like global warming. acid rain, Ozone depletion-features, causes and impacts on living being.
- 2.0 Ecology:
  - 2.1 Concepts of ecosystem and its component
  - 2.2 Energy flow through an ecosystem
  - 2.3 Biochemical cycles-C,N,P
  - 2.4 Interrelationships between communities in an ecosystem.
  - 2.5 Sustainable development.
- 3.0 Environmental Pollution:
  - 3.1 Definition of terms,parameters of pollution,types of pollution
  - 3.2 Water Pollution:- types of pollutants &their characteristics,sources of pollutants,effects of water pollution,standards of Industrial effluents,remedial measures for control.

- 3.3 Air Pollution:-Types of pollutants&their characteristics, sources of pollutants,effects of pollutants on human,plants&vegetation,structures etc.,permissible limits as per Indian and International Standard,remedial measures for control.
- 3.4 Noise pollution:-Definition and measure of noise,types ,sources of Pollution,effects of noise pollution,prevention and control measures.
- 3.5 Land Pollution:- Causes, Effects of pesticides &fertilizers used in agricultural practice,impacts of blasting &open cast mining,degradation due to deforestation and due to natural disaster like land subsidence,case studies on mining;blasting and deforestation,soil pollution management-land conservation and land reclamation.
- 4.0 Pollution Survey:
  - 4.1 Planning survey,sampling locations,criterion,equipment and techniques for water and air pollution survey.
  - 4.2 Analysis of water and air pollutants-Principles&methods.
- 5.0 Solid Waste Management:
  - 5.1 Definition of related terms and purpose.
  - 5.2 Sources of solid wastes, characteristics of wastes-urban and rural communities,sampling methods.
  - 5.3 Storage and collection- storage methods,frequency of collection,methods of collection,comparision.
  - 5.4 Disposal of solid wastes- Principles,description of process,planning,operation,maintenance & suitability of different methods of disposal-sanitary land fill,Composting,incineration.
- 6.0 Environmental management:
  - 6.1 Environmental:- legislation, salient features of different environment protection acts in India.
  - 6.2 Roles of pollution control boards,local bodies and city environmental pollution management.
  - 6.3 Environmental impact assessment-requirements and definition,related terms,method of assessment.
  - 6.4 Environmental Ethics.

#### RECOMMENDED BOOKS:

1. Text Book of Environmental Studies -Dave and Katewa
2. Environmental Engineering – Duggal
3. Water supply and Sewage - Steel
4. Environmental engineering: - A. K. Chatterjee.
5. A text Book of Environmental Engineering - Peavy,et.al
6. Water supply and pollution control –by Clark
7. Air Pollution-by Rao
8. Environmental protection-by Chanlett.
9. Fundamentals of ecology-by Odum.
10. Concept of ecology- by Koromondy
11. Ecology and environment – by P.D Sharama.
12. Chemistry for environmental engineers-by Sawyer &Macarty.
13. Standard methods of examination of water and wasyt water-by ALPHA.
14. Water and waste water analysis a course Manual-by NEERI.
15. Environmental science and engineering-by Aloka Debi ,an Universities Press Publication.

## CONCRETE TECHNOLOGY (ELECTIVE)

*Periods per week-4      Total marks:100    Evaluation scheme:*

*Total periods:60*

*Theory: End term Exam:80,I.A:15+5(assignment)*

### TOPIC WISE DISTRIBUTION OF PERIODS:

Sl. No.	Topics	Lecturer in periods
1.	Concrete as a construction material:	2
2.	Cement:	4
3.	Aggregate:	4
4.	Water:	2
5.	Admixtures:	4
6.	Properties of fresh concrete:	4
7.	Properties of hardened concrete:	6
8.	Quality control of concrete:	6
9.	Proportioning of concrete mixes:	16
10.	Production of concrete	6
11.	Inspection and testing	6
12.	Special concrete	5
13.	Deterioration of concrete and its prevention	4
14.	Repair technology for concrete structures.	06

### RATIONALE:

The use of cement concrete in modern construction work has established its importance. The Diploma students during their course of studies acquire only working knowledge on the development and research on cement concrete the elective subject has been introduced as a elective paper.

### OBJECTIVE:

After completion of study of the students will be able to:-

- i) Explain the properties of cement concrete.
- ii) State the quality control measures to be undertaken.
- iii) Inspect and undertake the testing of cement concrete.

### COURSE CONTENTS:

1.0 Concrete as a construction material:

- 1.1 Grades of concrete.
- 1.2 Advantages and disadvantages of concrete.

2.0 Cement:

- 2.1 composition, hydration of cement, water cement ratio and compressive strength, fineness of cement, setting time, soundness, types of cement.

3.0 Aggregate:

- 3.1 Classification and characteristics of aggregate, deleterious substances in aggregates, fineness modulus, grading of aggregate, I.S.383

4.0 Water:

- 4.1 Quality of water for mixing and curing.

5.0 Admixtures:

- 5.1 Important functions, classification of admixtures, I.S 9103, accelerating admixtures, retarding admixtures, water reducing admixtures, air containing admixtures.

6.0 Properties of fresh concrete:

- 6.1 concept of fresh concrete, workability, slump test, compacting factor test, Ve-bee consistency test and flow test, requirement of workability, I.S.1199.

- 7.0 Properties of hardened concrete:
  - 7.1 Cube and cylinder compressive strengths, flexural strength of concrete, stress-strain and elasticity, phenomena of creep and shrinkage, permeability, durability of concrete, sulphate, Chloride and acid attack on concrete, efflorescence.
- 8.0 Quality and control of Concrete:
  - 8.1 Factors causing the variations in the quality of concrete, field quality control, Sampling & acceptance criteria as per Clause 15 & 16 of IS:456.
- 9.0 Proportioning of concrete mixtures:
  - 9.1 Basic consideration for concrete mix design, I.S method of Mix design as per IS10262.
- 10.0 Production of concrete:
  - 10.1 Batching of materials, mixing of concrete materials, transportation, placing of concrete, compaction of concrete, compaction methods, vibrators, curing, when to start and time of curing, formwork-requirements and types, stripping of forms.
- 11.0 Inspection and testing:
  - 11.1 As per Clause 17 of I.S :456.
- 12.0 Special concrete:
  - 12.1 Introduction to silica fume concrete, mass concrete, shot-crete concrete or gunniting, ferrocement, and its applications. Fibre reinforced concrete and its application. Polymer concrete-types and application, Fly ash Concrete.
- 13.0 Deterioration of concrete and its prevention:
  - 13.1 Types of deterioration, prevention of concrete deterioration, corrosion of reinforcement, effects and prevention.
- 14.0 Repair technology for concrete structures:
  - 14.1 Symptom, cause and prevention and remedy of defects during construction, cracking of concrete due to different reasons. repair of cracks for different purposes, selection of techniques, polymer based repairs, common types of repairs.

RECOMMENDED BOOKS:

1. Concrete technology- M.L.Gambhir; Tata McGraw Hill.
2. Concrete technology- M.S Shetty, S.Chand & Company Limited, New Delhi.
3. Concrete technology- A.M.Neville; ELBS.
4. Concrete Mix design- Krishna Raju.
5. Concrete technology- A.M.Neville & J.J.Brook
6. BIS Codes:- I.S 383, 10262, 9103

## LOW COST HOUSING WITH APPROPRIATE TECHNOLOGY (ELECTIVE)

Periods per week-4      Total marks:100      Evaluation scheme:

Total periods:60

Theory: End term Exam:80,I.A:15+5(assignment)

### TOPIC WISE DISTRIBUTION OF PERIODS:

Sl. No.	Topics	Lecturer in periods
1.	Introduction	4
2.	Necessary	4
3.	Planning of low cost housing project	6
4.	materials	8
5.	permissible stress	6
6.	specifications	8
7.	Estimation e3conomic aspects	8
8.	construction	8
9.	maintenance	8
	Total	60

### RATIONALE:

The Civil Diploma engineering students after his studies can take up low cost housing projects for his own sustenance and substance of the poor community of the country.

### OBJECTIVE:

On completion of study of the subject the students will be able to:

- i) Design a low cost house adopting appropriate technology.
- ii) Supervise the construction of low cost houses.

### COURSE CONTENTS:

#### 1.0 INTRODUCTION:

1.1 Definition of technical terms.

1.0 **NECESSITY:** Village housing, Urban Housing.

#### 2.0 PLANNING OF LOW COST HOUSING PROJECT:

2.1 Need for planning.

2.2 Aspects of Planning.

2.3 Principle of Planning & criteria.

#### 3.0 MATERIALS:

3.1 Types of materials, factors affecting selection of materials.

#### 4.0 DESIGN:

4.1 Principle.

4.2 Structural Components.

4.3 Design Structural Components.

#### 5.0 SPECIFICATIONS:

5.1 Specification for Foundation, Masonry, Plastering, surface treatment on walls, floors, roofs, Doors, windows other Building construction items.



**6.0 ESTIMATION, ECONOMIC ASPECTS:**

**7.0 CONSTRUCTION:**

7.1 Principle.

7.2 Method.

7.3 Equipment and machinery.

7.4 Quality control.

**8.0 MAINTENANCE:**

8.1 Principles.

8.2 Probable maintenance and safety problem.

8.3 Preventive and remedial measures.

**RECOMMENDED BOOKS:**

1. Low Cost Housing - Jayadeva, Yadavan,
2. Impediments to Rural Technology - Malgaonkar & Panandiker,
3. Transfer of Technology among developing countries - T. N. Chatruvedi,
4. Appropriate Technology-Problems & Promises - Nicolas Je'quier.

## ELEMENTS OF INTERIOR DESIGN (ELECTIVE)

*Periods per week-4      Total marks:100    Evaluation scheme:*

*Total periods:60                                  Theory: End term Exam:80,I.A:15+5(assignment)*

### TOPIC WISE DISTRIBUTION OF PERIODS:

Sl. No.	Topics	Lecturer in periods
1.	<b>Introduction to interior design:</b>	<b>10</b>
2.	<b>Elements of interior design</b>	<b>15</b>
3.	<b>Lighting</b>	<b>14</b>
4.	<b>Finishes and decorative accessories</b>	<b>16</b>
5.	<b>Furniture</b>	<b>05</b>

#### COURSE CONTENTS:

##### 0.0 Introduction to interior design:

- 0.1 History of interior design.
- 0.2 Definition of interior design.
- 0.3 Elements and principles.
- 0.4 Interior design typologies- their function with activities,example:Living,Bed room,kitchen.
- 0.5 Office,Reception,workstation,executive showroom etc.
- 0.6 Themes and concepts.
- 0.7 Colour.
- 0.8 Anthropometrics details.

##### 1.0 ELEMENTS OF INTERIOR DESIGN- enclosing elements:

- 1.1 Ceiling-Walls,Flooring-Feestrations-Openings doors and windows access-Corridor,staircase enclosing, fenestration and access elements their function,character aesthetic and psychological.Their composition in terms of scale proportion,texture,colouretc. With various method of treatment in terms of material and construction to express functional aesthetics and psychological effects.

##### 2.0 ILLUMINATION:

- 2.1 Study of interior lighting.
- 2.2 Artificial and natural lighting
- 2.3 Requirement of light for specific purpose.
- 2.4 Different types of lighting and their effects.
- 2.5 Locating lighting points in interiors and planning electrical layouts.

##### 4.0 ACOUSTICS:

- 4.1 Basic Principles.
- 4.2 Requirement for different purposes.
- 4.3 Measures for maintaining internal Acoustics.
- 4.4 Measures for preventing external influences.
- 4.5 Effect of improper acoustics.

##### 5.0 FINISHES AND DECORATIVE ACCESSORIES:

- 5.1 Carpets
- 5.2 Rugs
- 5.3 Wallpapers
- 5.4 Valances.
- 5.5 Painting.
- 5.6 Murals.

- 5.7 Sculpture.
- 5.8 Plants.
- 5.9 Fountains
- 5.10 Wall hanging.
- 5.11 Venetian blinds.
- 6. FURNITURE:
  - 6.1 Study of relationship of furnitures to space human movements.
  - 6.2 Furniture design as related to human comfort,functions.
  - 6.3 Materials.
  - 6.4 Methods of construction.
  - 6.5 Innovations and design ideas.
  - 6.6 Study on furniture for specific function of interior, like Office furniture, residential furniture.
  - 6.7 Display systems etc., cabinet, ward robes, Curio shelves,room dividers.

**RECOMMENDED BOOKS:**

1. Designing and decorating interiors by David Van Dommalan.
2. National building code of India- B.I.S
3. Time saver standard building types- by Callender.
4. Architectural graphic standards – by Ramsay & Sleeper.
5. Human dimension &interior space- by Julius panero
6. Interior design illustrated-Frank D.K Ching.

## PRACTICALS

### STRUCTURAL DETAILING – II (PRACTICE) (Pr – 1)

3P/Wk.            Total:    45Weeks, Evaluation Scheme: Sessional-50Marks

#### **1.0 Structural Detailing**

1.1 Draw details of the following steel structures from the given line diagrams :

A steel roof truss with details of bolted and welded joints and connections including that of the steel column at base level with foundation (Plate I)

1.2 Details of an underground RCC water tank (such as Sheet No. 19 of SP34 or any other ) – (Plate II)

1.3 Combination detailed drawing of a two storeyed building i) load – bearing wall spread footing and ii) R.C. frames with isolated column footing. (Plate III)

#### **Recommended Books:**

- |  |                            |
|--|----------------------------|
| 1.Design of Steel Structure  | -P.Dayaratnam.             |
| 2.Design of steel structure  | -B.N.Duggal.               |
| 3. Design of Steel Structure   | -T Segui, Cengage Learning |
| 4. Design of steel structure   | -Kazmi&Zindal.             |
| 5. Analysis,Design&Detailing<br>of Structures;Vol-III,Steel Structures&Timber Structures | -V.N.Vazirani & Rathwani.  |
| 6. Design of steel structure   | -S.Ramamutham.             |
| 7. Limit State design  | -P.C.varghese.             |
| 8. Reinforced Concrete:Limit State Design  | -A.k.Jain.                 |
| 9. Design Aids for reinforced concrete to I.S 456-1978,BIS Publication,S.P-16.           |                            |
| 10. Handbook on concrete Reinforcement and detailing,BIS Publication,S.P-34              |                            |
| 11.Code of Practice for General Construction in steel:I.S.800:2008.                      |                            |
| 12.Structural Engineers' Handbook,Vol-I,II,III;BIS,Publication.                          |                            |
| 13.Code of Practice for design of Structural timber in building-I.S:883-1970             |                            |

## **ESTIMATING – II PRACTICE (Pr- 2)**

3P/Wk. Total:45P/Wk. , Evaluation Scheme :  
Sessional Marks:50

Detailed estimate from working drawings / standard drawings as mentioned at Sl. No. 1, 2 & 3 of theory – 2 (Estimating-II) are to be taken in the practical classes.

### **RECOMMENDED BOOKS:**

1. Estimating, Costing, specification & Valuation in Civil Engineering -M.Chakraborty.
2. A text Book of Estimating & Costing -D.Kohli &R.C Kohli.
3. Estimating & Costing -B.N.Dutta.
4. Estimating & Costing -Birdi &Ahuja.
5. Latest Orissa PWD Schedule of Rates & Analysis of rates.

## **COMPUTER AIDED DESIGN AND DRAFTING LABORATORY (Pr – 3)**

*Period per week:7 Total Marks:100 Evaluation scheme:*

*Total periods:105 End Exam- 50 marks*

*Sessional-50marks*

### **1.0 Revit Architecture Software: **40****

- 1.1 Basics- Modify, Wall, Door, Window, Component, Room, Roof, Floor, Grid, Lines, Dimension, Section, Level, Text, View
- 1.2 Modelling- Ramp, Railing, Stair
- 1.3 Site- Topo surface- Parking Component, Site Component,
- 1.4 Align, Split, Trim, offset, Match type, Line work, Paint
- 1.5 Scale, Unit
- 1.6 3D View
- 1.7 Preparation of approval drawing of a double storied residential building from given specifications with its 3D view using above commands

### **2.0 Introduction to STADD Pro Software: **20****

- 1.1 2-D Modelling of structures, Use of Structure wizard, Geometry, Property, Support, Loads and combinations, Analysis
- 1.2 Analysis of a Continuous beam with more than two span subjected to udl and point load

### **Softwares Required:**

- 1) AutoCAD Revit Architecture Suite(latest Version) -15 user license
- 2) STADD-Pro/V8i(latest Version) -15 user license
- 3) AutoCAD (Architecture) 2010 (Book) -William G. Wyatt

## PROJECT AND SEMINAR (Pr - 4)

Practical:

06 P/Wk , Total Periods:105P/Wk,

### Evaluation Scheme:

End Exam.100,

Sessional:50

### **RATIONALE :**

The diploma holders in Civil Engineering, many times, are involved with project work on designs and drawings in offices. The major works involve making survey, planning of buildings with preparation of plan and sections, collection of data, organization and analysis of data, estimation and elementary design of structures or their components. They are also expected to have some knowledge of actual practice in construction work. The course "Project Work" should therefore be very important to the diploma students of Civil Engineering to make them professionally sound and valuable.

### **OBJECTIVES:**

On completion of the project work the students will be able to:-

- i) Apply Knowledge gained in different subjects through solving real life problems in Civil engineering.
- ii) Develop self-confidence for working in Civil Engineering Projects.
- iii) Prepare necessary drawings, estimates and project reports.
- iv) Develop an idea of the state of art of construction practices through Industrial Visits.

### **SUGGESTED PROJECTS:-**

- 1) Planning of an Educational Institution Campus.
- 2) Industrial Complex- Industrial Sheds/workshop for small scale Industries.
- 3) Irrigation Projects;-a Canal/Fall/Syphons.
- 4) Rural water Supply Scheme for villages./Colony.
- 5) Water Supply and sanitary Engineering Schemes- Sewage disposal of a cluster of houses.
- 6) Culvert/small Bridges.
- 7) Low cost housing scheme by adopting appropriate technology.
- 8) Design of Framed structure type building with software package.
- 9) A plotted scheme comprising more than100 residential buildings.

### **NOTE:**

Students shall be divided in to suitable groups.Each group shall be assigned a problem that calls for application of knowledge acquired in the course of and also which involves some extra study of reference materials.any individual student can also take up a suitable project of his/her choice.

# **SYLLABUS**

## **OF**

### **SIXTH SEMESTER CIVIL ENGINEERING**

#### **SCTE & VT, ORISSA, CUTTACK**

**FINALISED IN SYLLABUS COMMITTEE MEETING  
HELD ON 27.09.2010 AT WOMEN'S  
POLYTECHNIC, CHANDRA SEKHARPUR,  
BHUBANESWAR**

#### **SUBJECT EXPERTS:**

1. Dr. J J MANDAL :Prof. Civil Engg., NITTR, Kolkata
2. Dr. M R Samal :Sr. Lecturer(Civil), B.O.S.E, Cuttack
3. Mr. B.C Sahoo :Lecturer(Civil), B.O.S.E, Cuttack

#### **FACULTY/GUEST FACULTY INVOLVED:**

1. Dr. H K Dash :Reader(Civil) CET, Bhubaneswar
2. Dr. R K Panigrahi :Lecturer(Civil), CET, Bhubaneswar
3. Mr. G R Ray :Deputy Director(B & M), DTE&T, Orissa, Cuttack
4. Dr. M R Samal :Sr. Lecturer(Civil), B.O.S.E, Cuttack
5. Mr S P Mallick :Sr. Lecturer(Civil), B.O.S.E, Cuttack
6. Mr. P K Muduli :Lecturer(Civil), B.O.S.E, Cuttack
7. Mr. A K Rout :Lecturer(Civil), Women's Polytechnic,  
BBSR
8. Mr. B.C Sahoo :Lecturer(Civil), B.O.S.E, Cuttack
9. Mr. Prabir Mohanty :Lecturer(Civil), Women's Polytechnic,  
BBSR

