

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA											
TEACHING AND EVALUATION SCHEME FOR 6 th SEMESTER DIPLOMA IN CIVIL ENGINEERING COURSE											
Sl No.	Subject Code	SUBJECT	PERIODS			EVALUATION SCHEME					
			L	T	P	SESSIONAL EXAM.			END SEM EXAM	PRACTICAL EXAM	TERM WORK
TA	CT	TOTAL									
THEORY											
1	BST-501 Or CET-601	ENVIRONMENTAL STUDIES OR CONSTRUCTION MANGEMENT	5	-	-	10	20	30	70		-
2	CET-602	STRUCTURAL DESIGN-II	4	-	-	10	20	30	70		-
3	CET-603	RAILWAY & BRIDGE ENGINEERING	4	-	-	10	20	30	70		-
4	CET-604	ESTIMATION& COST EVALUATION-II	4	-	-	10	20	30	70		-
5	CET-605	ELECTIVE (any One)	4	-	-	10	20	30	70		-
<i>TOTAL</i>			21			50	100	150	350		
PRACTICAL / TERM WORK											
6	CEP-601	STRUCTURAL DETAILING PRACTICE-II	-	-	3					-	50
7	CEP-602	ESTIMATING PRACTICE-II (COMPUTER-AIDED)	-	-	3					-	50
8	CEP-603	SURVEY PRACTICE-II	-	-	6					50	25
9	CEP-604	PROJECT AND SEMINAR & LIBRARY STUDY			6					50	25
<i>TOTAL</i>					18				-	100	150
GRAND TOTAL			21		18	50	100	150	350	100	150
Abbreviations: L- Lecture, T- Tutorial, P- Practical, TA- Teacher's Assessment, CT- Class Test											
Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50%											
ELECTIVE Subjects											
(i) DISASTER MANAGEMENT											
(ii) ARCHITECTURAL PRACTICES & INTERIOR DESIGN											
(iii) ADVANCED CONSTRUCTION TECHNIQUES AND EQUIPMENTS											

ENVIRONMENTAL STUDIES

(Common to all Branches of Engg.)

BST-501

Period/Week: 05

Total Periods: 75

Total Marks: 100

Theory End Exams: 70; CT (20) +IA (10)

Rationale:

Due to various aspects of human developments including the demand of different kinds of technological innovations, most people have been forgetting that, the Environment in which they are living is to be maintained under various living standards for the preservation of better health. The degradation of environment due to industrial growth is very much alarming due to environmental pollution beyond permissible limits in respect of air, water industrial waste, noise etc. Therefore, the subject of Environmental Studies to be learnt by every Engineering student in order to take care of the environmental aspect in each and every activity in the best possible manner.

OBJECTIVES:

After completion of study of environmental studies, the student will be able to:

1. Gather adequate knowledge of different pollutants, their sources and shall be aware of solid waste management systems and hazardous waste and their effects.
2. Develop awareness towards preservation of environment.

Unit 1: The Multidisciplinary nature of environmental studies (04 periods)

Definition, scope and importance, Need for public awareness.

Unit 2: Natural Resources (12 periods)

Renewable and non renewable resources:

- a) Natural resources and associated problems.
 - Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people.
 - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems.
 - Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources.
 - Food Resources: World food problems, changes caused by agriculture and over grazing, effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity, .
 - Energy Resources: Growing energy need, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
 - Land Resources: Land as a resource, land degradation, man induces land slides, soil erosion, and desertification.
- b) Role of individual in conservation of natural resources.
- c) Equitable use of resources for sustainable life styles.

Unit 3: Systems

(12 periods)

- Concept of an eco system.
- Structure and function of an eco system.
- Producers, consumers, decomposers.
- Energy flow in the eco systems.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following eco system:
- Forest ecosystem:
- Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit 4: Biodiversity and it's Conservation

(08 periods)

- Introduction-Definition: genetics, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values.
- Biodiversity at global, national and local level.
- Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts.

Unit 5: Environmental Pollution.

(18 periods)

Definition Causes, effects and control measures of:

- a) Air pollution.
- b) Water pollution.
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution.
- f) Thermal pollution
- g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Disaster management: Floods, earth quake, cyclone and land slides.

Unit 6: Social issues and the Environment

(12 periods)

- Form unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, water shed management.
- Resettlement and rehabilitation of people; its problems nd concern.
- Environmental ethics: issue and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Air (prevention and control of pollution) Act.
- Water (prevention and control of pollution) Act.
- Public awareness.

Unit 7: Human population and the environment

(09 periods)

- Population growth and variation among nations.
- Population explosion- family welfare program.

- Environment and human health.
- Human rights.
- Value education
- Role of information technology in environment and human health.

Recommended Books:

1. Textbook of Environmental studies, Erach Bharucha, #UGC
2. Fundamental concepts in Environmental Studies, D.D. Mishra, S.Chand & Co-Ltd,
3. Text book of Environmental Studies by K.Raghavan Nambiar, SCITECH Publication Pvt. Ltd.
4. Environmental Engineering by V.M.Domkundwar- Dhanpat Rai & Co.
5. Environmental Engineering & Safety by B.K.Mohapatra.

CONSTRUCTION MANAGEMENT (CET-601)

Period/Week: 05
Total Periods: 75

Total Marks: 100
Theory End Exams: 70; CT (20) +IA (10)

SCHEME OF TEACHING AND ASSESSMENT

Topic No.	Name of Topic	Periods
1	Introduction To Construction Management	3
2	Constructional Planning	4
3	Materials and Stores Management	6
4	Construction Site Management	15
5	Construction Organisation	6
6	Construction Labour and Labour Management:	8
7	Equipment Management	8
8	Quality Control	12
9	Monitoring Progress	7
10	Safety Management In Construction	6

RATIONALE:

The managerial Process involved in Construction Industries like management of Labour, material and equipment to minimize the project cost and project duration and also to optimize the quality of works.

TOPICS AND SUB TOPICS

1.0 Introduction To Construction Management

- 1.1 Aims and objectives of construction management.
- 1.2 Functions of construction management.
- 1.3 The construction team components-owner, engineer, architect, contractor-their functions and interrelationship and jurisdiction.
- 1.4 Resources for construction management-men, machines, materials, money

2.0 Constructional Planning

- 2.1 Importance of Construction Planning
- 2.2 Developing work breakdown structure for construction work
- 2.3 Construction Planning stages-Pre-tender stage, Post-tender stage.
- 2.4 Construction scheduling by Bar charts-preparation of Bar Charts for simple construction works.
- 2.5 Preparation of schedules for labour materials, machinery, finance for small works
- 2.6 Limitation of Bar charts
- 2.7 Construction scheduling by network techniques-definition of terms ,PERT and CPM techniques, advantages and disadvantages of two techniques, network analysis, estimation of time and critical path, application of PERT and CPM techniques in sample construction works.

3.0 Materials and Stores Management

- 3.1 Classification of Stores-storage of stock.
- 3.2 Issue of materials-indent , invoice, bin card
- 3.3. Stores Accounting Procedure
- 3.4 Inspection of stores, T&P account's register, procedure of write off

4.0 Construction Site Management

- 4.1 Job Lay out-Objectives, Review plans, specifications, Lay out of equipments.
- 4.2 Factors influencing selection, design and layout of temporary facilities and services at construction site.
- 4.3 Principles of storing material at site.

4.4 Location of equipment, organizing labour at site.

4.5 Job lay out for different construction sites.

5.0 Construction Organisation:

5.1 Introduction – Characteristics, Structure, importance.

5.2 Organization types-line and staff, functions and their characteristics

5.3 Principles of organization- meaning and significance of terms- control, authority, responsibility, job & task.

5.4 Leadership-necessity, styles of leadership, role of leader

5.5 Principles of effective supervision

5.6 Human relations-relations with subordinates, peers, Supervisors, characteristics of group behavior, mob psychology, handling of grievances, absenteeism, labour welfare.

5.7 Conflicts in organization-genesis of conflicts, types-intrapersonal, interpersonal, intergroup, resolving conflicts.

6.0 Construction Labour and Labour Management:

6.1 Preparing Labour schedule

6.2 Essential steps for optimum labour output

6.3 Labour characteristics

6.4 Wages & their payment

6.5 Labour incentives

6.6 Motivation- Classification of motives, different approaches to motivation.

6.7 Morale

6.8 Relevant labour laws and case studies related to labour disputes

7 Equipment Management

7.1 Preparing the equipment schedule

7.2 Identification of different alternative equipment

7.3 Importance of Owning & operating costs in making decisions for hiring & purchase of equipment

7.4 Inspection and testing of equipment

7.5 Equipment maintenance and minor repairs

8.0 Quality Control

8.1 Concept of quality in construction

8.2 Quality Standards- during construction, after construction, destructive & non destructive methods.

9.0 Monitoring Progress

9.1 Programme and progress of work

9.2 Work study

9.3 Analysis and control of physical and financial progress corrective measures.

10.0 Safety Management In Construction

10.1 Importance of safety

10.2 causes and effects of accidents in construction works

10.3 Safety measures in worksites for excavation, scaffolding, formwork, fabrication and erection, demolition.

10.4 Development of safety consciousness

10.5 Safety legislation- Workman's compensation act, contract labour act.

REFERENCES :

1. *Professional construction Management* Donald S Berry
2. *Construction planning and management* PS Gahlot & BM Dhir
3. *Construction Management and accounts* Harpalsingh Tata McGraw Hill
4. *A management guide to PERT/ CPM* Jerome D Weist
Ferdinand K Levy
5. *Construction equipment and its management* SC Sharma Khanna Publishers
6. *Management in Construction Industry* PP Dharwadker
7. *Construction Planning equipment and methods* Willium B Ledbetter Robert L Peurifoy &
8. *Construction Management Practice* VK Raina Tata McGraw Hill
9. *Construction Management* Roy Pilcher
10. *Construction Management and Planning* Sengupta & Guha Tata McGraw Hill
11. *Construction of Structures Management & works* S.C. Rangwala
12. *Building, planning, designing and scheduling* Gurucharan Singh
13. *Project planning by CPM & PERT* B.C. Punmia & Khandelwal
14. IS - 3696 (I) -1966 for Scaffolds
15. IS - 3696 (II) -1966 for Ladders
16. IS - 3764 -1966 for Execution
17. IS - 4130 -1976 for Demolition of buildings
18. IS -7205 -1974 for Erection of steel structures
19. IS - 5121 -1969 for Piling & other deep foundation
20. IS - 5916 -1970 for construction involving hot bituminous materials
21. IS - 8969 -1978 for Erection of concrete framed structures

**STRUCTURAL DESIGN– II
CET-602****Theory:**

L/wk:05 P/Wk

Total Periods:75,

Total Marks:100

Evaluation Scheme:
Theory: End Term Exam.70+ CT (20)+IA(10)

Topic wise Distribution of Periods:

Sl. No.	Topics	No. of Periods
1.	Introduction	03
2.	Structural steel fasteners and connections	08
3.	Design of Tension Members	08
4.	Design of Compression Members	10
5.	Design of Column Bases and Foundation	08
6.	Design of steel beams	08
7.	Design of Tubular Steel structures	06
8.	Design of timber structures	12
9.	Design Masonry Structures	12

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 and 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 Design of Tubular Steel structures

7.1 Round tubular sections, permissible stresses.

- 7.2 Tube columns and compression members, crinkling.
- 7.3 Tube tension members and tubular roof trusses.
- 7.4 Joints in tubular trusses
- 7.5 Design of tubular beams and purlins.

8.0 Design of Timber Structures:

- 8.1 Types of timber, grading of timber, defects, permissible stresses.
- 8.2 Design of axially loaded timber columns (solid, box & built up section except spaced columns).
- 8.3 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).

9.0 Design of Masonry Structures:

- 9.1 Design consideration for masonry walls
 - (a) Load bearing walls -Permissible stresses, Slenderness ratio, Effective length, Effective height, Effective thickness, Eccentricity of loads, Grade of mortar.
 - (b) Non-Load bearing walls – Panel walls, Curtain walls, Partition walls.
- 9.2 Design consideration for masonry columns, piers and buttresses.
- 9.3 Design considerations for masonry wall footings.

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. Code of Practice for General Construction in steel: I.S.800:2007.
- 6. Structural Engineers’ Handbook, Vol.-I, II, III; BIS, Publication.
- 7. Code of Practice for design of Structural timber in building-I.S:883-1970.
- 8. Hand book on timber engineering,BIS Publication-SP-33.
- 9. Steel Table -Samal & Panigrahi.
- 10. SP-20 Hand book on masonry design and construction- BIS Publication.
- 11. IS 806: 1968 Code of practice for use of steel tubes in general building construction.
- 12. IS 1161: 1998 Steel Tubes for Structural Purposes – Specification.

**RAILWAY & BRIDGE ENGINEERING
CET-603**

Period/Week: 04
Total Periods: 60

Total Marks: 100 Evaluation Scheme;
Theory End Exam: 70; CT (20) +IA (10)

TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
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Section – A : RAILWAYS		
01	Introduction	2
02	Permanent way	6
03	Track materials	6
04	Geometric for Broad gauge	10
05	Points and crossings	6
06	Laying & maintenance of track	6
Section – B: BRIDGES		
07	Introductions	2
08	Bridge Site investigation, hydrology & planning	5
09	Bridge foundation	7
10.	Bridge substructure and approaches	5
11.	Permanent bridges	3
12.	Culvert & cause ways	3

COURSE CONTENT

Section – A: RAILWAYS

1.0 Introduction :

- 1.1 Railway terminology
- 1.2 Advantages of railways
- 1.3 Classification of Indian Railways

2.0 Permanent way

- 2.1 Definition and components of a permanent way
- 2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges under different conditions

3.0 Track materials

- 3.1 Rails
 - 3.1.1 Functions and requirement of rails
 - 3.1.2 Types of rail sections, length of rails
 - 3.1.3 Rail joints – types, requirement of an ideal joint
 - 3.1.4 Purpose of welding of rails & its advantages
 - 3.1.5 Creep definition, cause & prevention
- 3.2 Sleepers
 - 3.2.1 Definition, function & requirements of sleepers
 - 3.2.2 Classification of sleepers
 - 3.2.3 Advantages & disadvantages of different types of sleepers
- 3.3 Ballast
 - 3.3.1 Functions & requirements of ballast
 - 3.3.2 Materials for ballast
- 3.4 Fixtures for Broad gauge
 - 3.4.1 Connection of rails to rail-fishplate, fish bolts
 - 3.4.2 Connection of rails to sleepers

4.0 Geometric for Broad gauge

- 4.1 Typical cross – sections of single & double broad gauge railway track in cutting and embankment
- 4.2 Permanent & temporary land width
- 4.3 Gradients for drainage
- 4.4 Super elevation – necessity & limiting valued

5.0 Points and crossings

- 5.1 Definition, necessity of Points and crossings
- 5.2 Types of points & crossings with tie diagrams

6.0 Laying & maintenance of track

- 6.1 Methods of Laying & maintenance of track
- 6.2 Details of a permanent way inspector

Section – B : BRIDGES

7.0 Introductions

- 7.1 Definitions
- 7.2 Components of a bridge
- 7.3 Classification of bridges
- 7.4 Requirements of an ideal bridge

8.0 Bridge Site investigation, hydrology & planning

- 8.1 Selection of bridge site
- 8.2 Bridge alignments
- 8.3 Determination of flood discharge
- 8.4 Waterway & economic span
- 8.5 Afflux, clearance & free board
- 8.6 Collection of bridge design data & sub surface investigation

9.0 Bridge foundation

- 9.1 Scour depth minimum depth of foundation
- 9.2 Types of bridge, foundations – spread foundation, pile foundation- pile driving, well foundation – sinking of wells, caisson foundation
- 9.3 Cofferdams

10.0 Bridge substructure and approaches

- 10.1 Types of piers
- 10.2 Types of abutments
- 10.3 Types of wing walls
- 10.4 Approaches

11.0 Permanent bridges

- 11.1 Masonry bridges
- 11.2 Steel bridges – classification with sketches
- 11.3 Concrete bridges – classification, brief description with sketches
- 11.4 IRC bridge loading

12.0 Culvert & cause ways

- 12.1 Types of culverts - brief description
- 12.2 Types of causeways - brief description

REFERENCE BOOKS:

1. A text book of transportation engineering - N.L. Arora
2. A text book of transportation engineering -S.P.Chandola,
- 3 Highway engineering - S.K. Khanna, C.E.G. Justo
- 4 Roads, railways, bridges and tunnel engineering -B.L. Gupta and Amit Gupta
- 5 Roads, railways, bridges and tunnel engineering - Ahuja and Birdi
8. Bridge Engineering - S.P. Bindra
- A Text book of Railway Engineering - S.C.Sexena&S.P.Arora,
- 9.

**ESTIMATION & COST EVALUATION – II
CET-604**

L/wk:04 P/Wk
Total Marks:100
Theory: End Term Exam.70,

Total Periods:60,
Evaluation Scheme:
CT :-20+10 IA

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

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 item 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.

DISASTER MANAGEMENT (ELECTIVE)
CET-605

Lecturer(Th.): P/Wk:04

Total Periods: 60,

Total Marks:100

Evaluation Scheme:

Theory: End Term Exam.70,

I.A :-20(Class Test)+10(I. 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 Disaster Management -Tej Singh
- 3.0 Towards Basics of Natural Disaster - D.K.Sinha
- 4.0 Disaster Reference: 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

ARCHITECTURAL PRACTICES AND INTERIOR DESIGN (ELECTIVE) **CET-605**

Periods per week-4

Total marks:100

Evaluation scheme:

Total periods:60

Theory: End term Exam:70,(CT):20+10(I.A.)

TOPIC WISE DISTRIBUTION OF PERIODS:

Sl. No.	Topics	Periods/week
1.	Architectural design	5
2.	Building Aesthetics	5
3.	Design of Projects	12

4.	Landscaping	6
5.	Elements and principle of interior design	5
6.	Anthropometric Data	2
7.	Interior materials	5
8.	Interior of residential building	12
9.	Interior of small commercial building	8

COURSE CONTENTS:

1.0 Architectural design.

1.1 Review of Architecture

1.2 Site selection, climatic conditions, sun control, orientation of building & site.

1.3 Building bye laws and its applications.

2.0 Building Aesthetics

2.1 Feeling for aesthetics and utility, composition, utility, mass composition, order, expression, proportion, scale, accentuation, order, expression, proportion, scale, accentuation & rhythm, contrast, balance, pattern.

2.2 Character of building.

3.0 Design of Projects

3.1 A case study of residential building.

3.2 A case study of public / commercial building.

3.3 Aspect of working Drawing – Plan , Elevation and Section.

4.0 Landscaping

4.1 Soft and hard landscaping

4.2 Basic principles of landscaping.

4.3 Assessment of land.

4.4 Design procedure.

4.5 A case study of landscaping for public / commercial building campus.

5.0 Elements & principle of Interior Design

5.1 Elements such as form, texture, light, colour, effect of light on colour and texture, organization of space in design, space pattern.

5.2 Importance of colour as art element, Various colour scheme. .

6.0 Anthropometrics Data

6.1 Relation of human measurement to furniture and movement to circulation patterns.

7.0 Interior materials

7.1 Different interior materials, paneling, partitions, finishing materials, furniture.

7.2 False ceiling, Flooring, Paints.

8.0 Interior of Residential Building

8.1 Use of space, circulation, standard size of furniture.

8.2 Plans and elevation of interior with furniture for living space, dining space, kitchen, bed room, guest room etc.

9.0 Interior of small commercial building

9.1 Planning of interior of small commercial units such as offices, consulting chambers, shops etc.

9.2 Furniture details such as executive table, architectures table etc. used in commercial units.

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.
7. Time saver standard for interior design and space saving – J.D. Chiara, J. Panch, M. Zelnik.
8. The use of Colours in Interiors - A.O. hales
9. NWTERT- architects- B. Baiche & N. Walliman

**Advanced Construction Techniques & Equipments (Elective)
CET-605**

L/wk:04 P/Wk
Total Marks:100

Theory: End Term Exam.70,

Total Periods:60,

Evaluation Scheme:

I.A :-20(Class Test)+10(Assignment)

S.No.	Topics		No. of Hours Allocated
1	Advanced construction materials & Prefabrication	PART A	15

2	Earthquake Resistant Construction & Retrofitting	PART B	15
3	Building Services	PART C	15
4	Construction equipments & Soil reinforcement	PART D	15

COURSE CONTENT

PART - A

1.0 Advanced construction materials

1.1 Fibers and Plastics-

- (a) Types of fibers- Steel, Carbon, glass fibers, Use of fibers as construction material, properties of Fibers.
- (b) Types of plastics- PVC, RPVC, HDPE, FRP, GRP etc. Colored plastic sheets. Use of plastic as construction material.

1.2 Artificial Timbers – Properties and uses of artificial timber. Types of artificial timber available in market, strength of artificial timber.

1.3 Miscellaneous materials – Properties and uses of acoustics materials, wall claddings, plaster boards, micro-silica, artificial sand, bonding agents, adhesives etc.

2.0 Prefabrication

2.1 Introduction, necessity and scope of prefabrication of buildings, history of prefabrication, current uses of prefabrication, the theory and process of prefabrication, types of prefabricated systems, classification of prefabrication, advantages and disadvantages of prefabrication, design principle of prefabricated systems, types of prefabricated elements, modular coordination, Indian standard recommendation for modular planning.

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

7.0 Soil reinforcing techniques

- 7.1 Necessity of soil reinforcing.
- 7.2 Use wire mesh and geo-synthetics.
- 7.3 Strengthening of embankments, Slope stabilization in cutting and embankments by soil reinforcing techniques.

References

- 1) Building Technology by –TTTI Chennai-113
- 2) A Text Book of R.C.C By – A.K. Jain Chand & Bro Publishers
- 3) Construction equipments by –Singh
- 4) Building services
- 5) Building Technology – N. Sreenivasulu
- 6) Basics of Electrical Engineering - B.L. Theraja
- 7) Construction planning & equipment - Peurifoy

ESTIMATING PRACTICE – II **(Computer -Aided) CEP-602**

Periods: 3P/Wk.

Total:45P.

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 using excel sheets.(Computer aided).

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.

SURVEY PRACTICE - II

CEP-603

Evaluation scheme:

End term examination:50marks

Sessional:25marks

Total :75marks

Period per week: 6P

Total periods (Practical):90

COURSE CONTENTS:

Field exercise on:

1.0 LEVELLING :

- 1.1 Study of essential features and parts of different types of levels
- 1.2 Study of essential features of different types of leveling staffs
- 1.3 Making temporary adjustments of Levels
- 1.4 Determining Reduced Levels of five given points taking staff readings with Levels.
- 1.5 Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings from single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)
- 1.6 Conduct Fly Levelling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)
- 1.7 Finding R. L. of (1) roof, (2) chaja or canopy with reference to the R.L. of given B.M. by taking inverted staff reading.
- 1.8 Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.
- 1.9 Plotting the profile of the alignment surveyed in Exercise 6.8 and drawing the grade of alignment desired (To be drawn during the class hours)
- 1.10 Setting out the given grades for a sewer along a given alignment

2.0 CONTOURING :

- 2.1 Locating contour points in the given area by direct method / indirect method
- 2.2 Conducting block level survey in the given area
- 2.3 Plotting and drawing contour map of a given area by radial method.

3.0 THEODOLITE :

- 3.1 Study of essential features and parts of transit theodolite, to describe the theodolite with neat sketches
- 3.2 Carry out temporary adjustment of a transit theodolite and read horizontal and vertical angles to 5 objects
- 3.3 Measurement of horizontal angles (3nos.) by repetition and reiteration method and compare two methods
- 3.4 Prolonging a given straight line with the help of a theodolite
- 3.5 Determination of magnetic bearing of 3 given straight lines
- 3.6

4.0 THEODOLITE TRAVERSING ;

- 4.1 Setting out a closed traverse with 6 sides and entering the field data
- 4.2 Plotting the traverse from exercise 4.1 and checking the error of closure
- 4.3 Setting out an open traverse with 5 sides and entering the field data
- 4.4 Plotting the traverse from exercise 4.3 and checking the error of closure

5.0 TRIGONOMETRICAL SURVEYING & TACHEOMETRY :

- 5.1 Determination of height of 3 objects whose bases are accessible
- 5.2 Determination of stadia constants
- 5.3 Determination of horizontal distance and elevation with Staff vertical , by stadia method

6.0 SETTING OUT CURVES :

- 6.1 Setting out a simple circular curve by offsets from long chord
- 6.2 Setting out a simple circular curve by offsets from the tangent
- 6.3 Setting out a simple circular curve by offsets from chords produces
- 6.4 Setting out a simple circular curve by Rankine's method of tangent angle (Deflection angles)

7.0 SITE SURVEYING :

- 7.1 Setting out a site the center line and foundation width of a building from the given plan
- 7.2 Setting out the foundation line for a culvert
- 7.3 Dividing an area into plots of given size

8.0 MODERN SURVEYING INSTRUMENTS :

- 8.1 Study of essential features of
 - (i) Microphonic theodolite / digital theodolite.
 - ii) Measure distance, elevation, horizontal and vertical angle of an object with modern theodolite. between two points with electronic distance meter
- 8.2 Total Station and Electronic Distance Meter
 - (I) Set up and use of Total Station/EDM for establishing control, detailing surveying, setting out and coordinate check
 - (II) Extract and relate coordinate information from drawings.
 - (III) Record angle and distance observations in the field.
 - (IV) Calculate rectangular coordinate information from the field observation.
 - (V) Calculate polar coordinate setting out information from drawings.
 - (VI) Maintain clear records of calculations.
 - (VII) Check for sources of errors with Total Station.
- 8.3 Measure distance between two points with Electronic Distance Meter

REFERENCE BOOKS :

1. Plane Surveying – by Alak. De; S. Chand & Co
2. Surveying Vol. I, II, III – by B. C. Punmia; Laxmi Publication, Delhi – 06
3. A text book of surveying and leveling – by R. Tagor; Khanna Publishers, Delhi-6
4. Surveying and Levelling – by Hussain and Nagraj; S. Chand & Co., Delhi
5. Surveying and Levelling – by S. C. Rangwala; Charotar Book Stall, Pune
6. Surveying and Levelling – by N. N. Basak; Tata Mcgrew Hill

PROJECT AND SEMINAR
CEP-604

Practical: 06 P/Wk ,

Total Periods:90P

Evaluation Scheme:

End Exam.50, Sessional:25

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 than 100 residential buildings.
- 10) Soil investigation at site and interpretation of results
 - a) Determination of SBC of soil by Plate load Test.
 - b) SPT for determination of SBC.
 - c) Sampling by using different samplers.
 - d) Sounding of different soil strata by SCPT and DCPT.

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