

## STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

**TEACHING AND EVALUATION SCHEME FOR 6th Semester (Civil Engineering)(wef 2020-21)**

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
<b>Theory</b>									
Th.1		Land Survey-II	5		-	20	80	3	100
Th.2		Construction Management	4		-	20	80	3	100
Th.3		Advanced Construction Techniques & Equipment	4		-	20	80	3	100
Th.4		Electives: a. Concrete Technology, b. Disaster Management c. Architectural Practices & Interior Design	4			20	80	3	100
		<i>Total</i>	17			80	320	-	400
<b>Practical</b>									
Pr.1		Construction Workshop Practice & MS Project	-	-	5	25	25		50
Pr.2		Land Survey Practice -II	-	-	5	25	50		75
Pr.3		CADD Lab and Design & Detailing Practice	-	-	3	25	25		50
Pr.4		Project Phase-II			5	50	100		150
Pr.5		Life Skill			2	25	-		25
		Student Centred Activities(SCA)		-	2	-	-	-	-
		<i>Total</i>	-	-	22	150	200	-	350
		<b>Grand Total</b>	17		22	230	520	-	750

Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

**Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%**

**SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM/ Idea Tinkering and Innovation Lab Practice etc. ,Seminar and SCA shall be conducted in a section.**

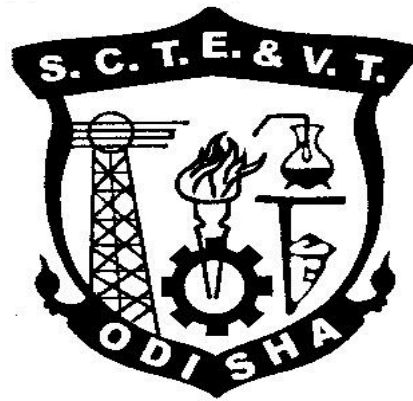
**There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester**

# **CURRICULLUM OF 6<sup>TH</sup> SEMESTER**

**For**

**DIPLOMA IN CIVIL ENGINEERING**

**(Effective FROM 2020-21 Sessions)**



**STATE COUNCIL FOR TECHNICAL EDUCATION  
& VOCATIONAL TRAINING, ODISHA,  
BHUBANESWAR**

## Th 1. LAND SURVEY– II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	75	Examination	3 hrs
Theory periods:	5P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

Modern survey techniques are heavily dependent on advanced instruments and image based data. The course enables students to acquaint themselves with necessary information and processing procedures.

### B. COURSE OBJECTIVES

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

1. Solve numerical problems in the segment off tacheometry
2. Comprehend concepts of curve ranging and solve simple numerical
3. Study and interpret maps
4. Acquaint themselves with modern surveying methods including use of digital theodolite and total station
5. Comprehend basics of GPS setup, data processing and export
6. Comprehend basics of GIS and prepare map using GIS data

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	TACHEOMETRY: (Only concepts; applications without derivation)	09
2	CURVES	08
3	BASICS ON SCALE AND BASICS OF MAP:	08
4	SURVEY OF INDIA MAP SERIES:	10
5	BASICS OF AERIAL PHOTOGRAPHY, PHOTOGRAMMETRY, DEM AND ORTHO IMAGE GENERATION:	10
6	MODERN SURVEYING METHODS :	10
7	BASICS ON GPS & DGPS AND ETS:	10
8	BASICS OF GIS AND MAP PREPARATION USING GIS	10

### D. COURSE CONTENTS:

- 1 TACHEOMETRY:**  
**(Only concepts; applications without derivation)**
  - 1.1 Principles, stadia constants determination
  - 1.2 Stadia tacheometry with staff held vertical and with line of collimation horizontal or inclined, numerical problems
  - 1.3 Elevations and distances of staff stations – numerical problems
- 2 CURVES :**
  - 2.1 compound, reverse and transition curve, Purpose & use of different types of curves in field

- 2.2 Elements of circular curves, numerical problems
- 2.3 Preparation of curve table for setting out
- 2.4 Setting out of circular curve by chain and tape and by instrument angular methods (i) offsets from long chord, (ii) successive bisection of arc, (iii) offsets from tangents, (iv) offsets from chord produced, (v) Rankine's method of tangent angles (No derivation)
- 2.5 Obstacles in curve ranging – point of intersection inaccessible

**3 BASICS ON SCALE AND BASICS OF MAP:**

- 3.1 Fractional or Ratio Scale, Linear Scale, Graphical Scale
- 3.2 What is Map, Map Scale and Map Projections
- 3.3 How Maps Convey Location and Extent
- 3.4 How Maps Convey characteristics of features
- 3.5 How Maps Convey Spatial Relationship
  - 3.5.1 Classification of Maps
    - 3.5.1 Physical Map
    - 3.5.2 Topographic Map
    - 3.5.3 Road Map
    - 3.5.4 Political Map
    - 3.5.5 Economic & Resources Map
    - 3.5.6 Thematic Map
    - 3.5.7 Climate Map

**4 SURVEY OF INDIA MAP SERIES:**

- 4.1 Open Series map
- 4.2 Defense Series Map
- 4.3 Map Nomenclature
  - 4.3.1 Quadrangle Name
  - 4.3.2 Latitude, Longitude, UTM's
  - 4.3.4 Contour Lines
  - 4.3.5 Magnetic Declination
  - 4.3.6 Public Land Survey System
  - 4.3.7 Field Notes

**5 BASICS OF AERIAL PHOTOGRAPHY, PHOTOGRAMMETRY, DEM AND ORTHO IMAGE GENERATION:**

- 5.1 Aerial Photography:
  - 5.1.1 Film, Focal Length, Scale
  - 5.1.2 Types of Aerial Photographs (Oblique, Straight)
- 5.2 Photogrammetry:
  - 5.2.1 Classification of Photogrammetry
  - 5.2.2 Aerial Photogrammetry
  - 5.2.3 Terrestrial Photogrammetry
- 5.3 Photogrammetry Process:
  - 5.3.1 Acquisition of Imagery using aerial and satellite platform
  - 5.3.2 Control Survey
  - 5.3.3 Geometric Distortion in Imagery
    - Application of Imagery and its support data
    - Orientation and Triangulation
    - Stereoscopic Measurement
      - 19.9.1 X-parallax
      - 19.2.2 Y-parallax

- 5.4 DTM/DEM Generation
- 5.5 Ortho Image Generation

**6 MODERN SURVEYING METHODS :**

- 6.1 Principles, features and use of (i) Micro-optic theodolite, digital theodolite
- 6.2 Working principles of a Total Station (Set up and use of total station to measure angles, distances of points under survey from total station and the co-ordinates (X,Y & Z or northing, easting, and elevation) of surveyed points relative to Total Station position using trigonometry and triangulation.

**7 BASICS ON GPS & DGPS AND ETS:**

- 7.1 GPS: - Global Positioning
  - 7.1.1 Working Principle of GPS,GPS Signals,
  - 7.1.2 Errors of GPS,Positioning Methods
  
- 7.2 DGPS: - Differential Global Positioning System
  - 7.2.1 Base Station Setup
  - 7.2.2 Rover GPS Set up
  - 7.2.3 Download, Post-Process and Export GPS data
  - 7.2.4 Sequence to download GPS data from flashcards
  - 7.2.5 Sequence to Post-Process GPS data
  - 7.2.6 Sequence to export post process GPS data
  - 7.2.7 Sequence to export GPS Time tags to file
  
- 7.3 ETS: - Electronic Total Station
  - 7.3.1 Distance Measurement
  - 7.3.2 Angle Measurement
  - 7.3.3 Leveling
  - 7.3.4 Determining position
  - 7.3.5 Reference networks
  - 7.3.6 Errors and Accuracy

**8 BASICS OF GIS AND MAP PREPARATION USING GIS**

- 8.1 Components of GIS, Integration of Spatial and Attribute Information
- 8.2 Three Views of Information System
  - 8.2.1 Database or Table View, Map View and Model View
- 8.3 Spatial Data Model
- 8.4 Attribute Data Management and Metadata Concept
- 8.5 Prepare data and adding to Arc Map.
- 8.6 Organizing data as layers.
- 8.7 Editing the layers.
- 8.8 Switching to Layout View.
- 8.9 Change page orientation.
- 8.10 Removing Borders.
- 8.11 Adding and editing map information.
- 8.12 Finalize the map

**E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT**

Chapters 1, 2, 3, 4, 5

## F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	D. Gaikwad	Advanced Surveying	S.Chand
2	B. C. Punmia	Surveying Vol. I, II, III	Laxmi Publication, Delhi – 06
3	R. Agor	A text book of surveying and leveling	Khanna Publishers, Delhi-6
4	N. N. Basak	Surveying and Levelling	Tata Mcgraw Hill

## REFERENCE Materials

1. <https://theconstructor.org/surveying/surveying-principles-methods-civil-engineering/13048/>
2. <https://www.novatel.com/an-introduction-to-gnss/chapter-2-basic-gnss-concepts/>
3. [http://gps.alaska.edu/jeff/Spatial\\_Reference/Freymueller\\_DOT\\_GPS.pdf](http://gps.alaska.edu/jeff/Spatial_Reference/Freymueller_DOT_GPS.pdf)
4. [https://drive.google.com/file/d/0B7srs19Fr4QdUzAzSIRwZnNRZ3M/view :-](https://drive.google.com/file/d/0B7srs19Fr4QdUzAzSIRwZnNRZ3M/view:-)
5. [Surveying and Levelling by N.N. Basak, 2nd Edition](#)
6. [https://2018.foss4g-na.org/sites/default/files/slides/survey\\_resurvey\\_cadastral\\_layer Odisha.pdf](https://2018.foss4g-na.org/sites/default/files/slides/survey_resurvey_cadastral_layer_Odisha.pdf)
7. <http://www.lawsofindia.org/pdf/orissa/2012/2012OR5.pdf>
8. [http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP\\_MRR\\_2016.pdf](http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP_MRR_2016.pdf)
9. [http://revenueodisha.gov.in/sites/default/files/document/Govt\\_Land/22958\\_4\\_8\\_14.pdf](http://revenueodisha.gov.in/sites/default/files/document/Govt_Land/22958_4_8_14.pdf)
10. <https://www.google.co.in/search?q=map+reading+and+interpretation+ppt&oq=Map+reading+and+&aqs=chrome.3.69i57j0l5.9755j0j7&sourceid=chrome&ie=UTF-8>
11. Map Use: Reading, Analysis and Interpretation by Juliana O. Muehrcke and Philip Muehrcke
12. <http://indiageospatialforum.org/2012/proceedings/ppt/P%20K%20parida.pdf>
13. <http://www.indiana.edu/~paleoind/Resources/Guide%20to%20Topographic%20Maps.pdf>
14. <http://www.dst.gov.in/sites/default/files/nationalmappolicy.pdf>
15. Remote sensing and GIS / BasudebBhatta, 2<sup>nd</sup> edition, New Delhi, India, Oxford University Press, - Oxford higher education.
16. [http://www.gisresources.com/basic-of-photogrammetry\\_2/](http://www.gisresources.com/basic-of-photogrammetry_2/)
17. [http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals of GIS Estoque.pdf](http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals_of_GIS_Estoque.pdf)
18. [Learning Material Approved by R&DM Deptt., Govt. of Odisha](#)

## Th 2. CONSTRUCTION MANAGEMENT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

The course aims to prepare students to be an effective team member in a construction organization setup. This necessitates managerial skills in managing materials, time and human resources. Also, the course helps the students to build concepts of disasters and explore about manmade disasters at national as well as international level with quality measuring indices and vulnerability atlas of India.. The course has been designed to cater to these needs.

### B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Develop schedules for construction project
2. Realize significance of organizational behavior towards successful functioning
3. Explain the important terminology related to materials management, site management, equipment management and labor management
4. Understand construction quality indicators and their measurement
5. Apply methods to measure and monitor progress of work
6. Realize significance of safety requirement and regulations at workplace
7. Understand the importance and usage of the Vulnerability Atlas of India in construction Projects.

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Introduction To Construction Management	04
2	Constructional Planning	07
3	Materials and Stores Management	04
4	Construction Site Management	05
5	Construction Organisation:	06
6	Construction Labour and Labour Management:	06
7	Equipment Management	06
8	Quality Control	05
9	Monitoring Progress	06
10	Safety Management In Construction	05
11	Role of Vulnerability Atlas of India in construction projects	06

### D. COURSE CONTENTS:

- 1 **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**            **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-defination 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**            **Materials and Stores Management**
  - 3.1    Classification of Stores-storage of stock.
  - 3.2    Issue of materials-indent , invoice, bin card
- 4**            **Construction Site Management**
  - 4.1    Job Lay out-Objectives, Review plans, specifications, Lay out of equipments.
  - 4.2    Location of equipment, organizing labour at site.
  - 4.3    Job lay out for different construction sites.
  - 4.4    Principle of storing material at site.
- 5**            **Construction Organization:**
  - 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    Human relations-relations with subordinates, peers, Supervisors, characteristics of group behavior, mob psychology, handling of grievances, absenteeism, labour welfare.
  - 5.6    Conflicts in organization-genesis of conflicts, types-intrapersonal, interpersonal, intergroup, resolving conflicts.
- 6**            **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.
- 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
- 8**            **Quality Control**
  - 8.1    Concept of quality in construction
  - 8.2    Quality Standards- during construction, after construction, destructive & non destructive methods.



- 9 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 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.
- 11 Role of Vulnerability Atlas of India in construction projects**
- 11.1 Introduction to Vulnerability Atlas of India, Concepts of natural hazards and disasters and vulnerability profile of India. Definition of disaster related terms.
- 11.2 Earthquake hazard and vulnerability, Magnitude and intensity scales of earthquake, seismic zones, earthquake hazard maps, types of structures and damage classification, effects in housing and resistant measures.
- 11.3 Wind / Cyclone hazard and vulnerability, wind speed and pressures, wind hazard and cyclone occurrence maps, storm surveys and cyclone resistant measures.
- 11.4 Flood hazard and vulnerability, Flood hazard and Flood prone areas of the country, General protection of habitants and flood resistant construction.
- 11.5 Landslides, Tsunamis and Thunderstorm hazards and vulnerability, Landslide & Thunderstorm incidence maps, Measures against Tsunami hazards.
- 11.6 Housing vulnerability risk tables and usage of vulnerability atlas of India, Inclusion of vulnerability atlas in Tender documents.

## E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

## F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M. R. Samal & R.L. Sahoo	Construction Management	Kalyani Publication
2	PS Gahlot & B M Dhir	Construction planning and management	New age international Publishers
3	Robert L Peurifoy & William B Ledbetter	Construction Planning equipment and methods	TMH Education
4	Dr. U K Shrivastava	Construction planning and management	Galgotia Publications
5	SC Sharma	Construction equipment and its management	Khanna Publishers
6	B Sengupta & H Guha	Construction management and planning	TMH Education
7	Vulnerability Atlas of India:- Published By BMTPC of India		

## Th 3. ADVANCED CONSTRUCTION TECHNIQUES & EQUIPMENT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

Current age construction industry is adopting state of art materials and technologies to improve aesthetics, strength, earthquake resistance, services relating to civil construction. The course will help the student to develop a general awareness on these advancements.

### B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Select proper material during construction in domain of advanced materials including fibers, artificial timbers etc.
2. Select appropriate prefabrications in pursuance of standard codes
3. Adopt structural requirements and possible retrofits to improve earthquake resistance
4. Comprehend requirement of various services need to be operational
5. Understand the role of different construction earth moving equipments and select during planning
6. Comprehend necessity of soil reinforcing and prescribe appropriate strategy

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Advanced construction materials	10
2	Prefabrication	08
3	Earthquake Resistant Construction	08
4	Retrofitting of Structures	08
5	Building Services	08
6	Construction and earth moving equipments	10
7	Soil reinforcing techniques	08

### D. COURSE CONTENT

#### 1 Advanced construction materials

##### 1.1 Fibers and Plastics-

Types of fibers- Steel, Carbon, glass fibers, Use of fibers as construction material, properties of Fibers.

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 Prefabrication**

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

## **3 Earthquake Resistant Construction**

- 3.1 Building Configuration
- 3.2 Lateral Load resisting structures
- 3.3 Building characteristics
- 3.4 Effect of structural irregularities-vertical irregularities, plan configuration problems.
- 3.5 Safety consideration during additional construction and alteration of existing Buildings.
- 3.6 Additional strengthening measures in masonry building-corner reinforcement, lintel band, sill band, plinth band, roof band, gable band etc.

## **4 Retrofitting of Structures**

- 4.1 Seismic retrofitting of reinforced concrete buildings :
- 4.2 -Sources of weakness in RC frame building
- 4.3 -Classification of retrofitting techniques and their uses

## **5 Building Services**

- 5.1 Cold Water Distribution in high rise building, lay out of installation
- 5.2 Hot water supply – General principles for central plants-layout

- 5.3 Sanitation –soil and waste water installation in high rise buildings
- 5.4 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
- 5.5 Lighting – Requirement of lighting, Measurement of light intensity
- 5.6 Ventilation - Methods of ventilation (Natural and artificial Systems of ventilation) problems on ventilation
- 5.7 Mechanical Services- Lifts, Escalator, Elevators – types and uses.

**6 Construction and earth moving equipments –**

- 6.1 Planning and selection of construction equipments
- 6.2 Study on earth moving equipments like drag line, tractor, bulldozer, Power shovel
- 6.3 Study and uses of compacting equipments like tamping rollers, Smooth wheel rollers, Pneumatic tired rollers and vibrating compactors
- 6.4 Owning and operating cost – problems

**7 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.

**E. Syllabus Coverage up to Internal Assessment: Chapters 1, 2, 3, 4**

**F. RECOMMENDED BOOKS**

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Agrawal & Shrikhande	Earthquake Resistant Design of Structures	Prentice-Hall of India Pvt. Ltd.
2	Swami Saran	Reinforced Soil and its Engineering applications	I.K.International Pvt. Ltd.
3	National building code of India_ BIS		
4	Fred & Greeno	Building Services Hand book	Routledge Publisher
5	B.L. Gupta & Amit Gupta	Construction Management & Machinery Limit	Standard Publishers
6	S.K. Duggal,	Earthquake resistant design of structures	Oxford
7	M.R. Samal	Advance Construction and Equipment	Platinum Publisher, Kolkata
8	Hand book on repair & rehabilitation of RCC buildings- CPWD		

## Th 4(a). CONCRETE TECHNOLOGY (ELECTIVE )

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

Concrete is said to be the second most consumed material and in construction plays a vital role. The knowledge in constituents, strength development process and deterioration mechanism helps the learner in designing and producing good quality concrete.

### B. COURSE OBJECTIVES

On completion of the course, the students will be able to

1. Describe functions and characteristics of the concrete constituents
2. Prescribe test requirements and methods for fresh and hardened concrete
3. Design concrete mix
4. Comprehend concrete production and inspection techniques
5. Acquaint themselves with special concrete preparation and application
6. Know the concrete deteriorating agencies and methods towards durability improvement and repair

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Concrete as a construction material	02
2	Cement	04
3	Aggregate, Water and Admixtures:	06
4	Properties of fresh concrete	06
5	Properties of hardened concrete	07
6	Concrete mix Design	05
7	Production of concrete	06
10	Inspection and Quality Control of Concrete	06
11	Special Concrete	06
12	Deterioration of concrete and its prevention:	06
13	Repair technology for concrete structures:	06

### D. COURSE CONTENTS:

#### 1 Concrete as a construction material:

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

#### 2 Cement:

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

#### 3 Aggregate, Water and Admixtures:

- 3.1 Classification and characteristics of aggregate, fineness modulus, grading of aggregate, I.S.383
- 3.2 Quality of water for mixing and curing.
- 3.3 Important functions, classification of admixtures, I.S 9103, accelerating admixtures, retarding admixtures, water reducing admixtures, air containing admixtures

#### **4 Properties of fresh concrete:**

4.1 Concept of fresh concrete, workability, slump test, compacting factor test, V-bee consistency test and flow test, requirement of workability, I.S. 1199.

#### **5 Properties of hardened concrete:**

5.1 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.

#### **6 Concrete mix Design**

6.1 a) Introduction

b) Data or input required for mix design.

6.2 Nominal mix concrete & design mix concrete.

6.3 Basic consideration for concrete mix design, Methods of proportioning concrete mix – I.S Code method of mix design (I.S. 10262)

#### **7 Production of concrete:**

7.1 Batching of materials, mixing of concrete materials, transportation, placing of concrete, compaction of concrete (vibrators), Curing of concrete, Formwork-requirements and types, stripping of forms. (Concepts only)

#### **10 Inspection and Quality Control of Concrete**

10.1 Quality control of Concrete as per I.S. 456, Factors causing the variations in the quality of concrete

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

10.3 Inspection and Testing as per Clause 17 of IS: 456.

10.4 Durability requirements of Concrete as per I.S: 456.

#### **11 Special Concrete**

11.1 Introduction to ready mix concrete, high performance concrete, silica fume concrete, shot-crete concrete or gunniting (Concepts only).

#### **12 Deterioration of concrete and its prevention:**

12.1 Types of deterioration, prevention of concrete deterioration, corrosion of reinforcement, effects and prevention

#### **13 Repair technology for concrete structures:**

13.1 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.

### **E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT**

Chapters 1,2,3,4,5,6

### **F. RECOMMENDED BOOKS**

<b>Sl. No</b>	<b>Name of Authors</b>	<b>Titles of Book</b>	<b>Name of Publisher</b>
1	M.S Shetty & A.K.Jain	Concrete technology	S.Chand
2	M.L.Gambhir	Concrete technology	Tata McGraw Hill.
3	A R Santhakumar.	Concrete technology	Oxford Publication
<b>CODE</b>			
4	BIS Codes:- I.S 383,10262,9103		

## Th 4(b). DISASTER MANAGEMENT (ELECTIVE )

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

The course helps students to build concepts of disasters and explore into the strategies and existing policies to mitigate challenges imposed by the natural and manmade disasters at national as well as international level.

### B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Comprehend the risk and social vulnerability in wake of disasters
2. Define the disasters and comprehend the scales of measuring the intensities associated
3. State the causes and basic science behind the disasters
4. Prescribe mitigating strategies
5. Prepare for possible effects in industry and society
6. Follow appropriate plans and policies formulated by government institutions and policy planning body
7. Develop awareness about application of remote sensing in Disaster Risk Management (DRM)

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Introduction	04
2	Earthquakes	06
3	Tsunami	05
4	Landslides.	05
5	Cyclones	06
6	Floods	06
7	Droughts	05
8	Forest Fire	05
9	Other type of Hazards and disasters	05
10	Policy, Planning and Institutions for disaster mitigation	05
11	Geospatial Application for Disaster Risk Management at Global and Local level	08

### D. COURSE CONTENTS

#### 1 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 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 Tsunami.**

- 3.1 Definition and concept.
- 3.2 Onset, Type and Cases.
- 3.3 Warning.
- 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 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 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 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 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 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 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 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.

## 11 Geospatial Application for Disaster Risk Management at Global and Local level

- 11.1 Overview of Disaster Risk Management (DRM) and relevance of geospatial technologies in DRM
- 11.2 Earth observation technologies and their application in disaster management.
- 11.3 Remote sensing and geospatial intelligence for disaster management.
- 11.4 Application of remote sensing in hydro metrological, geological and environmental disaster.
- 11.5 International systems for disaster risk management:- UN-SPIDER, International Charter for Space and Major Disasters, Copernicus Emergency Management Service & Sentinel Missions.

### E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1, 2, 3, 4, 5

### F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R. Subramanian	Disaster Management	Vikas Publication
2	Donald and David Hyndman	Natural hazards and Disasters	Books/Cole CENGAGE learning
3	D.K.Sinha	Towards Basics of Natural Disaster	Researchco Book Centre
4	S.B.Reed	Introduction to Hazards	Disaster Management Training Programme, 1997
5	Nigel Blundell	A Century of Man -Made Disaster	Pen & Sword Books Limited
6	<b>Website of “United Nation office for Outerspace Affairs” &amp; “charter space &amp; measure disasters”</b> <a href="http://www.unoosa.org">www.unoosa.org</a> <a href="http://www.disasterscharter.org">www.disasterscharter.org</a> <a href="http://www.un-spider.org">www.un-spider.org</a>		

## Th 4(c). ARCHITECTURAL PRACTICES AND INTERIOR DESIGN (Elective)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

### A. RATIONALE

The course helps students comprehend the important roles architects play in providing aesthetics and utility simultaneously. The course further exposes students to undertake designing activities considering anthropomorphic requirement and engineering challenges.

### B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Comprehend the role of architects in taking care of utility and aesthetics
2. Analyze case study relating to residential and commercial buildings
3. Understand and apply procedure of landscaping
4. Comprehend ergonomic requirement and adopt in the building and its components
5. Comprehend the characteristics of interior materials and prescribe accordingly
6. Formulate plans for residential and small commercial buildings in compliance of requirements

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Architectural design	06
2	Building Aesthetics	06
3	Design of Projects	07
4	Landscaping	07
5	Elements & principle of Interior Design	07
6	Anthropometrics Data	06
7	Interior materials	07
8	Interior of Residential Building	07
9	Interior of small commercial building	07

### D. COURSE CONTENTS:

#### 1 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 Building Aesthetics**

2.1 Feeling for aesthetics and utility, composition, utility, mass composition, order, expression,

2.2 Proportion, scale, accentuation, order, expression, proportion, scale, accentuation & rhythm, contrast, balance, pattern.

2.3 Character of building.

## **3 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 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.

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

4.7 Community based mitigation.

## **5 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 Anthropometrics Data**

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

## **7 Interior materials**

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

7.2 False ceiling, Flooring, Paints.

## **8 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 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.

### **E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT**

Chapters 1, 2, 3, 4, 5

### **F. RECOMMENDED BOOKS:**

<b>Sl. No</b>	<b>Name of Authors</b>	<b>Titles of Book</b>	<b>Name of Publisher</b>
1	David Van Dommalan	Designing and decorating interiors	Jhon Wiley Sons
2		National building code of India	B.I.S
3	P. Stharamamn	Interior Design and Decoration	CBS Publishers & Distributors
5	Julius panero	Human dimension &interior space	Whitney Library of Design
6	Frank D.K Ching	Interior design illustrated	Jhon Wiley Sons

# Pr 1. CONSTRUCTION WORKS PRACTICE & MS PROJECT

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6 <sup>th</sup>
Total Period:	75	Examination	3 hrs
Lab. periods:	5P/week	Term Work	25
Maximum marks:	50	End Semester Examination:	25

## A. RATIONALE

Construction works involve construction, fabrication, testing and proper management. The practical course aims at exposing students at all these tasks. The course aims at imbibing the skills and attitude required at construction industries.

Microsoft Project is professional software that can help project managers. Team members will have better usability and control over hours of work. The applications help in developing plans, assigning resources to tasks, tracking budget management, workload analysis and reporting.

## B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Know the construction tools and select as per requirement.
2. Construct brick walls and comprehend the challenges associated
3. Fabricate formworks and reinforcements
4. Evaluate compressive strength of concrete by conducting non-destructive tests
5. Know different plumbing tools and fixtures
6. Use MS Project to plan, schedule and report a project

## C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
<b>PART I: Construction work Practices</b>		
1	Tools for construction of masonry	06
2	Construction of brick walls	06
3	Formwork fabrication	08
4	Fabrication of reinforcements	10
5	Non-destructive tests for concrete	05
6	Pipe joints and Plumbing fixtures	05
<b>PART II: MS Project</b>		
1	Introduction to Microsoft Project	04
2	Creating a project plan	05
3	Basics of Microsoft Project	06
4	Tracking the project progress	06
5	Project Reporting	07
6	Custom views and field	07

## D. COURSE CONTENTS

### PART I: Construction work Practices

- 1 Study of tools required for construction of masonry.
- 2 Lay out Plan of a building.
- 3 Construction of 1 & 1 ½ Brick thick walls in English Bond in Mud

- mortar including a corner.
- 4 Construction of 1 & 1 ½ Brick thick Pillar in Mud mortar.
  - 5 Bar bending and fabrication of reinforcements for a beam.
  - 6 Bar bending and fabrication of reinforcements for a slab.
  - 7 Bar bending and fabrication of reinforcements for a lintel with chajja.
  - 8 Bar bending and fabrication of reinforcements for a column.
  - 9 Conducting a Non destructive compressive strength test on concrete beam using rebound Hammer as per I.S:1311(Part-2)-1992.
  - 10 Study of pipe joints and plumbing fixtures.
  - 11 **Field visits:**  
Visit to a construction site of a building where the following works are in progress.  
Excavation of foundation, b) Masonry works, c) Plumbing works d) Painting (interior/ exterior), e) Wood works, f) Fabrication & concreting works, g)Flooring

## **PART II: MS Project**

- 1 **Introduction to Microsoft Project**
  - 1.1 Project Management-Definition & concept
  - 1.2 Features of Microsoft project
  - 1.3 MS project scheduling for engineering
- 2 **Creating a project plan**
  - 2.1 Basic information for a new project
  - 2.2 Creating project from a blank
  - 2.3 Creating project from existing
- 3 **Basics of Microsoft Project**
  - 3.1 Estimating a project
  - 3.2 Project Task
  - 3.3 Project Resources
- 4 **Tracking the project progress**
- 5 **Project Reporting**
- 6 **Custom views and field**

### **E. RECOMMENDED BOOKS**

<b>Sl. No</b>	<b>Name of Authors</b>	<b>Titles of Book</b>	<b>Name of Publisher</b>
1	S.C.Rangawala.	Building Construction	Charotar Publishing

			House Pvt. Limited
2	S.S. Bhavikatti,	Building Construction	Vikas Publication
4	BIS Publication	Hand Book on Reinforcement Detailing (SP-34)	



## Pr 2. LAND SURVEY PRACTICE – II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6 <sup>th</sup>
Total Period:	75	Examination	3 hrs
Lab. periods:	5P/week	Term Work	25
Maximum marks:	75	End Semester Examination:	50

### A. RATIONALE

Current age Civil Engineering professionals are required to be conversant with traditional as well as modern equipments and techniques for creating accurate maps. The course trains the students in skill sets required to use traditional high-end equipments and modern tools.

### B. COURSE OBJECTIVES

On completion of the course students will be able to-

1. Conduct trigonometric leveling work in the field with the help of plane table surveying or geodetic surveying.
2. Prepare contoured maps or plans requiring both the horizontal as well as vertical control
3. Set out circular curve in the field.
4. Prepare survey map by conducting traverse survey with theodolite.
5. Lay out the construction plan of different types of structures at the site.
6. Study and use of modern electronic surveying instruments for its different applications.

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Trigonometrical surveying & Tacheometry	10
2	Setting out curves and site surveying	10
3	Study of map and map series	10
4	GPS & DGPS and ETS	25
5	GIS and map preparation using GIS	20

### D. COURSE CONTENTS

#### 1.0 TRIGONOMETRICAL SURVEYING & TACHEOMETRY:

- 1.1 Determination of height of 3 objects whose bases are accessible
- 1.2 Determination of stadia constants
- 1.3 Determination of horizontal distance and elevation with Staff vertical, by stadia method

#### 2.0 SETTING OUT CURVES AND SITE SURVEYING:

- 2.1 Setting out a simple circular curve by offsets from long chord
- 2.2 Setting out a simple circular curve by offsets from the tangent
- 2.3 Setting out a simple circular curve by offsets from chords produces
- 2.4 Setting out a simple circular curve by Rankine's method of tangent angle (Deflection angles)  
Setting out a site the center line and foundation width of a building from the given plan
- 2.5 Setting out the foundation line for a culvert

2.6 Dividing an area into plots of given size

**3. STUDY OF MAP AND MAP SERIES:**

- 3.1 Physical Map
- 3.2 Topographic Map
- 3.3 Road Map
- 3.4 Political Map
- 3.5 Economic & Resources Map
- 3.6 Thematic Map
- 3.7 Climate Map
- 3.8 Open Series map and Defense Series Map

**4. STUDY ON GPS & DGPS AND ETS:**

- 4.1 GPS: - Global Positioning, GPS Signals, Errors of GPS, Positioning Methods
- 4.2 DGPS: - Differential Global Positioning System
  - 4.2.1 Base Station Setup
  - 4.2.2 Rover GPS Set up
  - 4.2.3 Download, Post-Process and Export GPS data
  - 4.2.4 Sequence to download GPS data from flashcards
  - 4.2.5 Sequence to Post-Process GPS data
  - 4.2.6 Sequence to export post process GPS data
  - 4.2.7 Sequence to export GPS Time tags to file
- 4.3 ETS: - Electronic Total Station
  - 4.3.1 Distance Measurement
  - 4.3.2 Angle Measurement
  - 4.3.3 Leveling
  - 4.3.4 Determining position
  - 4.3.5 Reference networks
  - 4.3.6 Errors and Accuracy

**5. STUDY OF GIS AND MAP PREPARATION USING GIS**

- 5.1 Components of GIS, Integration of Spatial and Attribute Information
- 5.2 Three Views of Information System
  - 5.2.1 Database or Table View, Map View and Model View
- 5.3 Spatial Data Model
- 5.4 Attribute Data Management and Metadata Concept
- 5.5 Prepare data and adding to Arc Map.
- 5.6 Organizing data as layers.
- 5.7 Editing the layers.
- 5.8 Switching to Layout View.
- 5.9 Change page orientation.
- 5.10 Removing Borders.
- 5.11 Adding and editing map information.
- 5.12 Finalize the map

**E. RECOMMENDED BOOKS:**

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	R. Agor	A text book of surveying and leveling	Khanna Publishers,
2	B. C. Punmia	Surveying Vol. I, II, III	Laxmi Publication
3	D. Gaikwad, S. Chand & Co.	Advanced Surveying	
4	Bhatta	Remote sensing & GIS	Oxford Publication

## **REFERENCE Materials**

1. <https://theconstructor.org/surveying/surveying-principles-methods-civil-engineering/13048/>
2. <https://www.novatel.com/an-introduction-to-gnss/chapter-2-basic-gnss-concepts/>
3. [http://gps.alaska.edu/jeff/Spatial\\_Reference/Freymueller\\_DOT\\_GPS.pdf](http://gps.alaska.edu/jeff/Spatial_Reference/Freymueller_DOT_GPS.pdf)
4. <https://drive.google.com/file/d/0B7srsI9Fr4QdUzAzSIRwZnNRZ3M/view> :-
5. [Surveying and Levelling by N.N. Basak, 2nd Edition](#)
6. [https://2018.foss4g-na.org/sites/default/files/slides/survey\\_resurvey\\_cadastral\\_layer\\_Odisha.pdf](https://2018.foss4g-na.org/sites/default/files/slides/survey_resurvey_cadastral_layer_Odisha.pdf)
7. <http://www.lawsofindia.org/pdf/orissa/2012/2012OR5.pdf>
8. [http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP\\_MRR\\_2016.pdf](http://revenueodisha.gov.in/sites/default/files/document/DILRMP/SOP_MRR_2016.pdf)
9. [http://revenueodisha.gov.in/sites/default/files/document/Govt\\_Land/22958\\_4\\_8\\_14.pdf](http://revenueodisha.gov.in/sites/default/files/document/Govt_Land/22958_4_8_14.pdf)
10. <https://www.google.co.in/search?q=map+reading+and+interpretation+ppt&oq=Map+reading+and+&aqs=chrome.3.69i57j0l5.9755j0j7&sourceid=chrome&ie=UTF-8>
11. [Map Use: Reading, Analysis and Interpretation by Juliana O. Muehrcke and Philip Muehrcke](#)
12. <http://indiageospatialforum.org/2012/proceedings/ppt/P%20K%20parida.pdf>
13. <http://www.indiana.edu/~paleoind/Resources/Guide%20to%20Topographic%20Maps.pdf>
14. <http://www.dst.gov.in/sites/default/files/nationalmappolicy.pdf>
15. [Remote sensing and GIS / BasudebBhatta, 2<sup>nd</sup> edition, New Delhi, India, Oxford University Press, - Oxford higher education.](#)
16. [http://www.gisresources.com/basic-of-photogrammetry\\_2/](http://www.gisresources.com/basic-of-photogrammetry_2/)
17. [http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals\\_of\\_GIS\\_Estoque.pdf](http://giswin.geo.tsukuba.ac.jp/sis/tutorial/Fundamentals_of_GIS_Estoque.pdf)
18. [Learning Material Approved by R&DM Deptt., Govt. of Odisha](#)

## Pr 3. CADD Lab and Design & Detailing Practice

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	45	Examination	3 hrs
Practical periods:	3P/week	Sessional Examination:	25
Maximum marks:	50	Practical Examination:	25

### A. RATIONALE

The course intends to imbibe necessary skills in using software towards design and drafting.

### B. COURSE OBJECTIVES

On completion of the course students will be able to

1. Draw necessary detailing and schedule of bars for the various structural members
2. Draw important components of buildings using AutoCAD
3. Draw connectors using AutoCAD
4. Use STADD Pro in modeling structural members
5. Analyze the stress and deformation pattern in structural members
6. Design of buildings using STADD Pro software
7. Prepare building drawings suiting to approval needs prescribed by regulatory bodies

### C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Structural Detailing Practice	20
2	Use of STADD Pro Software	15
3	Revit Architecture Software	10

### D. COURSE CONTENTS

#### 1.0 Structural Detailing Practice:

Draw the following with necessary details and schedule of bars from supplied sketches or given references such as SP 34

- 1.1 Slab, beam and lintel with chajja as in a simple building (Help from Sections 8 & 9 of SP 34 may be taken ) (Plate I)
- 1.2 Columns, column-beam connections with & without splicing, isolated footing, staircase (Help from sections 6, 7, 10 of SP 34 may be taken)(Plate 2)
- 1.3 Different types of bolt connections, welded connections. (Plat3)
- 1.4 Details of Pile and Pile cap

#### 2.0 Use of STADD Pro Software:

- 2.1 2-D Modelling of structures, Use of Structure wizard, Geometry, Property, Support, Loads and combinations, Analysis
- 2.2 Analysis of a Continuous beam with more than two span subjected to udl and point load
- 2.3 3-D modeling of building structures ,dead load, live load, earthquake and wind load analysis, design of a 3 storeyed building and preparation of reinforcement drawing and detailing
- 2.4 Introduction to STADD foundation.

### **3.0 Revit Architecture Software:**

- 3.1 Basics- Modify, Wall, Door, Window, Component Room, Roof, Floor, Grid, Lines, Dimension, Section, Level, Text, View
- 3.2 Modelling- Ramp, Railing, Stair
- 3.3 Site- Topo surface- Parking Component, Site Component
- 3.4 Align, Split, Trim, offset, Match type, Line work, Paint, Scale, Unit
- 3.5 3D View
- 3.6 Preparation of approval drawing of a double storied residential building from given specifications with its 3D view using above commands

#### **SOFTWARES REQUIRED:**

- 1) STADD-Pro/V8i (latest Version) - Bentley
- 2) AutoCAD (Architecture) 2010 (Book) -William G. Wyatt

## Pr4. PROJECT Phase - II

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6 <sup>th</sup>
Total Period:	75	Examination	3 hrs
Lab. periods:	5 P / week	Sessional	50
Maximum marks:	150	End Sem Examination	100

### RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Civil engineering and practices in real life situations, so as to participate and manage a large Civil engineering projects, in future. Entire Project spreads over 5<sup>th</sup> and 6<sup>th</sup> Semester. Part of the Project covered in 5<sup>th</sup> Semester was named as *Project Phase-I* and balance portion to be covered in 6<sup>th</sup> Semester shall be named as *Project Phase-II*.

### OBJECTIVES

After undergoing the Project Work, the student will be able to:

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- To achieve real life experience in Project design.
- To develop the skill of writing Project Report

### Project Phase-I and Phase-II

The Project work duration covers 2 semesters(5<sup>th</sup> and 6<sup>th</sup> sem). The Grouping of students, selection of Project, assignment of Project Guide to the Group was done in the beginning of 5<sup>th</sup> semester under Project Phase-I. The students were allowed to study literature, any existing system and then define the Problem/objective of the Project. Preliminary work and Design of the system also have to be complete in Phase-I. Development may also begin in this phase. Project Milestones are to be set so that progress can be tracked .

In Phase-II Development, Testing, Documentation and Implementation have to be complete. Project Report have to be prepared and complete in Phase-II. All Project reports should be organized uniformly in proper order, irrespective of group. Teacher Guides can make suitable alteration in the components of Task and schedule.

At the end of Project Phase-II in 6<sup>th</sup> semester there shall be one presentation by each group on whole Project work undertaken by them.

A suggestive criterion for assessing student performance by the external (preferably person from industry) and internal (teacher) examiner is given in table below:

Sl. No.	Performance Criteria
1.	Selection of project assignment
2.	Planning and execution of considerations
3.	Quality of performance
4.	Providing solution of the problems or production of final product
5.	Sense of responsibility
6.	Self expression/ communication/ Presentation skills
7.	Interpersonal skills/human relations
8.	Report writing skills
9	Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations to such an exhibition.

The Project Report need to be prepared as per standard format and following is the indicative format. The Teacher Guide may make minor alteration keeping the sense in tact.

### Organization of Project Report

#### 1. Cover page:

It should contain the following ( in order)

- (i) Title of the Project
- (ii) “Submitted in partial fulfillment of the requirements for the Diploma in <Branch Name>”
- (iii) By Name of the Student(s)
- (iv) Logo of the Institution
- (v) Branch Name/Depart Name and Institution Name with Address
- (vi) Academic Year

#### 2. 1<sup>st</sup> Inner page

Certificate:

It should contain he following

“This is to certify that the work in this Project Report entitled <Project Title> by <Name of student(s)> has been carried out under my supervision in partial fulfillment of the requirements for the Diploma in <Branch Name>” during session <session > in <Branch /Department Name> of <Institute name> and this work is the original work of the above student(s).

Seal and signature of the Supervisor/Guide with date

#### 3. 2<sup>nd</sup> Inner Page

Acknowledgement by the Student(s)

#### 4. Contents.

#### 5. Chapter wise arrangement of Reports

#### 6. Last Chapter: Conclusion

It should contain

- (i) Conclusion
- (ii) Limitations
- (iii) Scope for further Improvement

## 7. References



## Pr-5 LIFE SKILL (Common to All Branches)

<b>Practical</b>	<b>2 Periods per week</b>	<b>Sessional</b>	<b>25 Marks</b>
<b>Total Periods</b>	<b>30 Periods</b>	<b>Total Marks</b>	<b>25 Marks</b>

**Objective:** After completion of this course the student will be able to:

- Develop team spirit i.e. concept of working in team
- Apply problem solving skills for a given situation
- Use effective presentation techniques
- Apply task management techniques for given projects
- Enhance leadership traits
- Resolve conflict by appropriate method
- Survive self in today's competitive world
- Face interview without fear

### DETAIL CONTENTS:

#### 1. SOCIAL SKILL

Society, Social Structure, Develop Sympathy and Empathy

Swot Analysis – Concept, How to make use of SWOT

Inter personal Relation: Sources of conflict, Resolution of conflict ,

Ways to enhance interpersonal relation

#### 2. PROBLEM SOLVING

Steps of Problem solving:

- Identify and clarify the problem,
- Information gathering related to problem,
- Evaluate the evidence,
- Consider alternative solutions and their implications,
- Choose and implement the best alternative,
- Review
- Problem solving techniques:

1) Trial and error, 2) Brain storming, 3) Lateral (Out of Box) thinking

#### 3. PRESENTATION SKILL

Body language , Dress like the audience

Posture, Gestures, Eye contact and facial expression. STAGE FRIGHT,

Voice and language – Volume, Pitch, Inflection, Speed, Pause

Pronunciation, Articulation, Language, Practice of speech.

Use of AV aids such as Laptop with LCD projector, white board etc.

#### 4. GROUP DISCUSSION AND INTERVIEW TECHNIQUES

*Group Discussion:*

Introduction to group discussion, Ways to carry out group discussion,

Parameters— Contact, body language, analytical and logical thinking, decision making

*Interview Technique :*

Dress, Posture, Gestures, facial expression, Approach

Tips for handling common questions.

#### 5. WORKING IN TEAM

Understand and work within the dynamics of a groups.

Tips to work effectively in teams,

Establish good rapport, interest with others and work effectively with them to meet common objectives,

Tips to provide and accept feedback in a constructive and considerate way ,

Leadership in teams, Handling frustrations in group.

## 6. TASK MANAGEMENT

Introduction, Task identification, Task planning ,  
organizing and execution, Closing the task

### PRACTICAL

**List of Assignment:** (Any Five to be performed including Mock Interview)

**a. SWOT analysis:-**

Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

- a) Your past experiences,
- b) Achievements,
- c) Failures,
- d) Feedback from others etc.

**b. Solve the True life problem assigned by the Teacher.**

### 3. Working in a Team

Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.( One activity per group where Team work shall be exhibited)

### 4. Mock Interview

### 5. Discuss a topic in a group and prepare minutes of discussion.

### 6. Deliver a seminar for 5 minutes using presentation aids on the topic given by your teacher.

### 7. Task Management

Decide any task to be completed in a stipulated time with the help of teacher. Write a report considering various steps in task management (with Break up into sub tasks and their interdependencies and Time)

**Note:** -1. Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic.

**Note:** -2. The following Topics may be considered for Seminar/GD in addition to other Topics at the discretion of the Teacher.

(Comparison with developed countries, Occupational Safety, Health Hazard, Accident & Safety, First-Aid, Traffic Rules, Global Warming, Pollution, Environment, Labour Welfare Legislation, Labour Welfare Acts, Child Labour Issues, Gender Sensitisation ,Harassment of Women at Workplace)

### METHODOLOGY:

*The Teacher is to explain the concepts prescribed in the contents of the syllabus and then assign different Exercises under Practical to the students to perform.*

### Books Recommended:-

SI.No	Name of Authors	Title of the Book	Name of the Publisher
01	E.H. Mc Grath , S.J	Basic Managerial Skills for All	PHI
02	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
03	Adair, J	Decision making & Problem Solving	Orient Longman
04	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
05	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.

## Equipment List

### LAND SURVEY PRACTICE II ( For Group Size-30 Students)

Sl No.	Name of Equipments	Quantity Required in Nos.
1	Substance bar	06
2	Photogrametry equipments and 3-D maps	06
3	Theodolite Traversing -Transit Vernier Theodolite-Telescope:Length 210mm, Magnification 30X, Resolving Power 1.3mm, Minimum focusing distance 1.5m, Stadia Multiplying Constant-100, Additive Constant-0(zero),Image-Erect, Accuracy-5mm/Km, Sensitivity of vertical circle-200seconds/2mm, Horizontal circle-100 to115mm, Graduation-20minutes, Vernier-20sec, Vertical Circle -100 to 115mm, Graduation-20 minutes, Vernier -20sec, /00With optical plummet, with telescope level and plate level supplied with all standard accessories as per BIS 2988-1965 including Tripod stand & Box	06
4	Digital Theodolite & EDM	06
5	Total Station (Auto Tracking & Auto Pointing) with all accessories: 1. Data transfer cable, 2. Aluminium Stand, 3. Both side display, 4. Detachable tribarch having following features, Focusing Mode, a)Auto focus mode, b) Power focus mode, c) Manual focus mode, d) Red dot appearing on the object where distance has to be measured, Graph of entire survey displayed on screen of total station. On board preloaded graphical software including are, perimeter, volume (cut/fill), 7500 points on board memory range, prism, single prism3000m (under normal condition) Three prism400m can measure distance without reflections up to 80m , Angle accuracy:5" (Seconds), Temperature, pressure sensor in built, Large LCD display screen 8 lines,20 characters,Battery12 hours continuous, angleony (angle + distance 6hrs.minimum) Charger with graphic display & discharge function.	06
6	DGPS (Dual frequency)	05
7	Electronic Total station	05
8	AutoCAD software	15 user
9	GIS software	Multiuser
10	Image processing software	multiuser

### CONSTRUCTION WORKS PRACTICE LABORATORY & MS PROJECT ( For Group Size-30 Students)

Sl No.	Name of Equipments	Quantity Required in Nos.
1	Masonry tools:  Steel wire brush, Mason's Trowel, Pointing Trowel, Hacking hammer, Trig square (300 x 600mm), Blaster Chisel, Hammer (2 lbs), Cold steel chisel, straight edge (1800 mm), straight edge (1200mm), plumb bob (250g) with thread, steel measuring tape (3m), mortar pan (350 dia), GI bucket (15 Ltr), spade, wheel barrow, sprit level (300mm), wooden float (1200mm), wooden float (600mm), steel towel, Gauge Box (1.25 ft), Sand screen, Water storage tank (500 ltr.) Plastic mug, PVC tube (5mm dia), 20m, Nylon thread bundle (100 ft), Cotton Thread bundle (100 ft)	5 each

2	Claw hammer (216), Ball pin hammer (2 lb), Hand saw (18"), Tenon saw (12"), Wooden making gauge, wooden mortise gauge, spirit level (12" long), Tri square (5") Drill machine with bits from 3mm to 25 mm, fammer chisel (1 ½ "), Mortise chisel (½ "), cutting plier (8"), Screw driver set, making knife / scribe, Hacksaw frame with blade (12"), spanner set, wire rail (1 ½ "-1 Kg), Wire nail (2 ½ "-1 kg), wire nail (3" – 1 kg), portable cutter with blade	5 each
3	Measuring steel tape (15m & 30m), binding hook, bending lenr (8mm, 10mm, 12mm, 16mm, 20mm, 25mm), rail piece (450-600mm long), cold chisel flat nose, Hammer (10lb), trysquare (300 x 600mm) Hacksaw frame, standard wire gauge, cutting blades for hacksaw, bar bending machine (36mm dia), Bar shearing machine (36mm dia), Hand shearing machine (upto 12mm dia), bending tables with support and sleeper, Bar Cutting Machine	5 each
4	Water supply plumbing fitting - (1" dia) GI & PVC – bend, draw, short piece, ripple, socket, plug, reducer socket, union tee, RS tee, Reducer socket etc	5 each
5	Sanitary plumbing fittings–(4" dia) GI & PVC- Bend, Door Bend, T-Junction, Y-Junction, Short piece- P,S,Q trap, vent pipe, cowl.	5 each
6	Fixtures – Wash basin, sink, Indian pan, European pan (Commode), Anglo Indian Pan, Videt, Showers(Overhead, Health, Hand), Bib-cocks with hot & cold water Mixture, Connection pipe, waste, Waste Pipe, Bibcock, Pillar cock, Angle cock, Stop cock, Valves – oneway (Reflux), full way	5 each
7	MS Project software	Multi user

**CIVIL ENGG. CAD LABORATORY (FOR A GROUP OF 30 STUDENTS)**

**(Can be used for Engg. Drawing/Civil Engg. Drawing-I & II /Estimation & Cost Evaluation Practice – I & II)**

**Gr. Size -30students**

<b>Sl. No.</b>	<b>Item with Specification-</b>	<b>QNTY in Nos.</b>
1	STAAD-Pro -V8i(Latest Educational Version) software	30 users
2	AutoCAD-2016 or lates Educational version	15 users
3	Desk Top Computer with following latest version configuration :	30
4	Laptop Computer with following latest version configuration :	1
5	Online UPS: 15KVA	
6	Laser Printer- Paper size:A4	1
7	Document Scanner A4/Legal size, Resolution: 600x600, Flat Bed size:A4	1
8	Plotter(44") with accessories in complete set	1
9	LCD projector 4000 ansi lumen with screen	1