

DEVELOPMENT OF LIFE SKILL - II

L T P
1 0 2

Total Contact Hrs.: 45 Total Marks: 50

Theory: 15

Practical: 30

Prerequisite: Nil

Credit: 2

Curri. Ref. No.: G302

Theory:

End Exam : 0

P.A.: 0

Practical: 50

End Exam.: 50

P.A. : 0

RATIONALE/AIM:

Development of life skill is required to develop interpersonal skill. This course will also help students to apply knowledge to solve common problems by applying problem solving skills. Life skill also helps to improve communication and presentation skills.

COURSE OBJECTIVE:

After completion of the course, the students will be able to:

1. Describe Inter personal Relationship and its types
2. Explain the “problems and steps of solving the Problem.
3. Presentation Skill.
4. Differentiate Verbal & Non -verbal Communication.
5. Explain Writing skills.
6. Analysis Stress and Time management.

DETAIL COURSE CONTENTS:

THEORY:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
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1 Inter personal Relation

- 1.1 Importance, Interpersonal conflicts, Resolution of conflicts,
- 1.2 Developing effective interpersonal skills communication and conversational skills, Human Relation Skills (People Skills)

2 Problem Solving

- 2.1 Steps in Problem Solving (Who? What? Where? When? Why? How? How much?)
- 2.2 Identify, understand and clarify the problem
- 2.3 Information gathering related to problem
- 2.4 Evaluate the evidence
- 2.5 Consider feasible options and their implications
- 2.6 Choose and implement the best alternative
- 2.7 Problem solving Technique : Trial and error, Brain Storming, Thinking outside the Box.
- 2.8 Review

3 Presentation Skills

Concept, Purpose of effective presentations.

- 3.1 Components of Effective Presentations:
Understanding the topic, selecting the right information, organizing the process interestingly, Good attractive beginning, Summarising and concluding, adding impact to the ending,
- 3.2 Use of audio visual aids OHP, LCD projector, White board
- 3.3 Evaluating the presentation:
Before the presentation
During the presentation
After the presentation

4 Nonverbal Graphic Communication

- 4.1 Nonverbal codes : Kinesics, Proxemics, Haptic, Vocalic, Physical appearance, Chronemics, Artifacts Aspects of Body Language.
- 4.2 Nonverbal Communication :
Posture, Gestures, Eye contact and facial expression, Voice and Language Volume, pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language Handling questions, Respond, Answer, Check, Encourage and Return to presentation

5 Formal Written Skills:

- 5.1 Memos, Emails, Netiquettes, Business correspondence Letter of enquiry, Letter of placing orders, Letter of complaint

6 Time Management

7 Stress Management

9 INDUSTRIAL POLICY:	3
Current Industrial Policy. Monopoly Restricted Trade Practices Act (MRTP), Foreign Exchange Management Act (FEMA), Competitions Act	
10 PUBLIC FINANCE:	2
Meaning of Public Finance-Distinction Between Public and Private Finance. Sources of Public Revenue.	
11 BUSINESS TRANCTIONS AND ACCOUNTANCY:	5
Transactions and classifications, need and objectives of proper records including double entry system. Classification of accounts and its description (in respect of real accounts, personal accounts and nominal accounts) Debit and credit concepts: Golden rules of Debit and Credit. Objectives and Principals of Double Entry System of Book Keeping.	
12 BOOKS OF ACCOUNTS:	2
Journal and Ledger, their subdivisions; posting from journals to ledger. Balancing of Accounts	
13 CASH BOOK:	2
Objectives of Cash Book (in respect of all kinds of Cash Transactions). Single Column, Double Column and Triple Column Impress System of Petty Cash Book.	
14 TRIAL BALANCE:	2
Objectives, Preparation – Errors and Rectification (In respect of Balance of Accounts for the Total period)	
15 FINAL ACCOUNTS:	5
Steps of preparing accounts: Trading Accounts, Profit and Loss Accounts. Revenue and Depreciation Adjustment. Introduction to Balance Sheet	
16 CAPITAL AND REVENUE EXPENDITURE DISTRIBUTION:	3
Receipt and Payments Income and Expenditure differences	
17 MEANIING AND PURPOSE OF COSTING:	3

Element of Cost Analysis and Classification of expenditure for Cost Accounts.
Cost Control: Prime Cost, Overhead Cost and Indirect Material and Tools.

TOTAL HRS: 45

TEXT / REFERENCE BOOKS:

1. Elements of Economics – K.K. Dewett & J.D. Verma
2. An Introduction to Economics Theory – H.L.Ahuja
3. Double Entry Book Keeping – Mohan, Juneja, Chawla & Saxena
4. Double Entry System of Book Keeping – J.R. Batliboy

CIVIL ENGINEERING DRAWING - II

L T P

CE403

1 0 3

Total Contact Hrs.: Total Marks: 100

Theory:

Practical: 45

Pre-requisite: CE402

Credit : 3

Curri. Ref. No.:

Practical:

End Exam : 50

P.A.: 50

2.2 Plan, elevation, section of a box culvert and hume pipe, culvert, RCC slab culvert, Drawing and Models may be shown (Plate No. 3)

3.0 ROADS AND RAILWAYS:: 06 + 04 =10

3.1 Cross Section of (i) National highway/ state highway (ii) Major district road (iii) Minor district road (Plate NO. 4)

3.2 Cross-section of Railway for B.G., M.G. and N.G. (Plate No. 5)

4.0 DRAWING OF A SINGLE STORIED BUILDING 09

4.1 Plan, elevation, and section of a single storied RCC Building from a given plan. Details of chajja, lintel and beams should be shown (Plate No. 6)

5.0 AIRPORT:: 10

5.1 Components of an airport, general layout of an airport showing different components.

Class Test 3

TOTA 60

L:

RATIONALE

This subject deals with drawing to be made for different components of sanitary engineering, bridges & culverts, roads & railways and blue prints to be made of the drawings. This also relates to preparation of working drawing as required for actual drawing.

AIM:

To prepare the students to draw working drawing for different items pertaining to sanitary & water supply, bridges & culverts, roads & railways, plan, elevation & sections of RCC building etc. and to introduce the skill of computer aided drafting.

DETAIL COURSE CONTENT

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 SANITARY ENGINEERING	08
1.1 Plan, Sectional elevation of sanitary latrine with septic tanks, inspection chambers, manholes, soak pits, showing soil pipe connection. (Plate No. 1)	
2.0 BRIDGE AND CULVERTS:	10+10 =20
2.1 Plan, elevation, section of simple (i) timber bridge (ii) RCC bridge either freely supported hollow circular type (single span) or RC balanced cantilever (single span) as constructed by the local PWD. Drawings may be shown(from the existing blue-print) (Plate No. 2)	

REFERENCE BOOKS:

1. IS: 696-1972 - Bureau of Indian Standards
2. N.D. Bhatt. - Elementary Engineering Drawing - Charotar Publishing House
3. S.C. Sharma - Engineering Drawing
4. Dharam Gupta - Engineering Drawing
5. Fraderik Egnisecks and other - Engineering Graphics
6. Warren J. Luzadder - Graphics for Engineers - Prentice Hall of India (Pvt. ltd.)
7. K.L. Narang - A Text Book of Engineering Drawing
8. G.R. Nagpal - Geometrical Drawing - Khanna Publishers
9. W. Abbott - Practical Geometry and Engineering Graphics - Blackie & Son (India) Ltd.
10. I.H. Morris - Geometrical Drawing for Art Students - Orient Longman
11. A.C. Parkinson - General Engineering Drawing - Sir Isaac Pitman and Sons Ltd., London
12. Auto CAD-14 for Windows Bible- By Shyam Tickoo, Santosh Tickoo and Renu Muthoo- galgotia Publications Pvt. Ltd.
13. A Text book Of Bridge Construction by Prof. C. H. Khadilkar- Allied Publishers, Bombay, New Delhi and Calcutta.

SURVEYING-II

L T P

CE503

3 0 3

Total Contact Hrs.:

Total Marks: 150

Theory: 45

Practical: 60

Theory Class Duration

45 Classes for 1hr. or

60 Classes for 45 mins.

Pre-requisite: CE404

Credit : 4

Curri. Ref. No.:

Theory:

End Exam : 70

P.A.: 30

Practical:

End Exam.: 25

P.A. : 25

RATIONALE

Surveying- II is the sequential course following Surveying-I. The course covers the technique of preparing survey map by plotting the observed data on the map at the field itself, using the method of Plane Table Surveying. It also covers the technique of handling and use of theodolite, a versatile instrument, in surveying for horizontal and vertical angular measurement, traversing, horizontal linear measurement, setting out curves and layout of different types of structures in the site. The course also gives an exposure to the students about the modern surveying instruments. The theory course is supplemented with practical course in Surveying Practice-II.

AIM:

The course content of Surveying -II has been designed to provide adequate information to develop competency in a learner to- comprehend the concepts of plane table surveying,

1. Conduct plane table survey work in field using horizontal linear measurements,
2. Plot the profile map and contour map from the recorded data,
3. Interpret the plotted contour map and compute data from it.
4. Prepare survey map by conducting traverse survey with theodolite
5. Measure height of objects with the help of theodolite
6. Determine horizontal distance by tacheometry

7. Set out circular curve in the field
8. Lay out the construction plan of different types of structures at the site
9. Use modern electronic surveying instruments

COURSE CONTENTS

THEORY:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 PLANE TABLE SURVEYING:	5
1.1 Objectives of plane table surveying, comparison with chain & compass surveying, use of plane table surveying	
1.2 Principles of plane table surveying	
1.3 Instruments & accessories in plane table surveying-features and uses	
1.4 Setting up plane table-centering, leveling, orientation	
1.5 Methods of plane table surveying- (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection.	
1.6 Statements of TWO POINT and THREE POINT PROBLEM and their applications	
1.7 Errors in plane table surveying and their corrections, precautions in plane table surveying.	
2.0 CONTOURING:	4
2.1 Definitions of related terms, concepts of contours, characteristics of contours	
2.2 Methods of contouring, plotting contour maps	
2.3 Interpretation of contour maps, toposheets	
2.4 Use of contour maps in engineering projects – drawing cross-sections from contour maps, locating proposed routes of roads/railway/canal on a contour map, computation of volume of earthwork from contour map for simple structures	
3.0 PRINCIPLES OF THEODOLITE SURVEYING:	4
3.1 Purpose, definition of terms	
3.2 Description of features, component parts of a transit theodolite	
3.3 Fundamental axes of a theodolite, concept of vernier, reading a vernier	
3.4 Temporary adjustments of theodolite	
3.5 Concept of transiting-swinging, face left , face right, changing face	

- 3.6 Measurement of horizontal angles with theodolite by repetition and reiteration method
- 3.7 Measurement of vertical angles with theodolite
- 3.8 Determination of magnetic bearings with theodolite
- 3.9 Measurement of deflection angle, direct angle, setting out angles, prolonging a straight line with theodolite
- 3.10 Errors in theodolite observations

4.0 THEODOLITE TRAVERSING:

6

- 4.1 Methods of traversing with theodolite- included angle method, deflection angle method, bearing method
- 4.2 Plotting the traverse by coordinate method
- 4.3 Checks for open and closed traverse
- 4.4 Traverse Computation - consecutive coordinates, latitude and departure, Gale's traverse table, Numerical problems on omitted measurements of lengths & bearings
- 4.5 Closing error- adjustment of angular errors, adjustment of bearings, numerical problems
- 4.6 Balancing of traverse- bowditch's method, transit method, graphical method, axis method
- 4.7 Calculation of area of closed traverse

5.0 TRIGONOMETRICAL SURVEYING & TACHEOMETRY:

8

- 5.1 Determination of elevation and distances of objects whose base is accessible, numerical problems
- 5.2 Determination of elevation and distances of objects whose base is inaccessible and the object and the instrument station (i)are in the same plane, (ii) are not in the same plane numerical problems
- 5.3 Principles of stadia tacheometry, stadia constants determination
- 5.4 Elevations and distances of staff stations-numerical problems

6.0 CURVES:

6

- 6.1 Definitions, degree and radius of curve, types of curves - simple, compound, reverse and transition curve, Purpose & use of different types of curves in field
- 6.2 Elements of circular curves, numerical problems
- 6.3 Preparation of curve table for setting out

- 6.4 Setting out of circular curve by chain and tape and by instrumental angular methods (i) offsets from long chord; (ii) successive bisection of arc (iii) offsets from tangents (iv) offsets from chords produced (v) Rankine's method of tangential angles
- 6.5 Transition curves -description and their characteristics (numerical problems not required)
- 7.0 SETTING OUT WORKS: 2**
- 7.1 Methods of setting out layouts of structures from construction plans of (i) buildings, (ii) culverts, (iii) bridge piers
- 8.0 MINOR SURVEYING INSTRUMENTS: 2**
- 8.1 Essential features and use of - (i) Hand Level, (ii) Abney's Level, (iii) Pantograph, (iv) Ceylone Ghat Tracer, (v) Box Sextant
- 9.0 MODERN SURVEYING METHODS: 5**
- 9.1 Features and use of Total station
- 9.2 Working principles of a Total Station
- 9.3 Setting out traverses with Total Station, Determination of elevations of points, building heights
- 9.4 Introduction to GPS

CLASS TEST & REVISION

03

**TOTAL:
45**

REFERENCE BOOKS :

1. Surveying & Levelling Vol.I - by T.P.Kanetkar & S.V.Kulkarni; Griha Prakash, Pune
2. Surveying Vol.I - by B.C.Punmia; Laxmi Publications, Delhi-6
3. A text book of surveying and levelling - by R.agor; Khanna Publishers, Delhi-6
4. Surveying and Levelling - by Hussain and Nagraj; S.Chand & Co, Delhi-
5. Surveying & Levelling - by S.C.Rangawala; Charotar Book Stall, Pune
6. Surveying & Levelling - by N.N. Basak; Tata Mc. Graw Hill
7. Plane Surveying - by A. De; S. Chand & Co.

PRACTICAL:

RATIONALE:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
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Surveying being a practice oriented subject, the theoretical instruction has to be supplemented with practical instructions in the field. This course will give the students the opportunity for intensive hands-on -experience in the handling and use of various equipment and accessories used in surveying. The course will also lead to development of skills in the students of making appropriate recording of data in the field and of plotting the observed data.

The course content of surveying-II practical includes the handling and use of theodolite in traversing, trigonometrical surveying, application of tacheometry, setting out of curves and civil engineering works at the site. The course also gives an exposure to modern surveying techniques including the instruments used.

AIM:

The course content of surveying-I practical has been designed to provide adequate hands-on experience to develop the competency in a learner to-

1. Prepare survey map using plane table surveying
2. Use the transit theodolite for measurement of horizontal and vertical angles
3. Use the transit theodolite to carry out open and closed traverse survey
4. Determine with theodolite horizontal distances and heights of accessible and inaccessible objects
5. Use tacheometry to determine distances and differences of levels
6. Prepare curve tables for setting out curves
7. Setout simple circular curve using chain & tape and theodolite
8. Perform permanent adjustment of transit theodolite
9. Setout center line and width of foundation for civil engineering works
10. Divide an area into plots of lands
11. Use modern surveying instruments, Survey by Total station.

COURSE CONTENT:

Field exercises on:

1.0 PLANE TABLE SURVEYING:

- 1.1 Setting up of Plane Table and plotting five points by radiation method and five inaccessible points by intersection method. 2
- 1.2 Conducting Plane Table surveying in a given plot of area by traversing (at least a 5-sided traverse and locating the objects) 4

2.0 CONTOURING:

- 2.1 Locating contour points in the given area by direct method/ indirect method
2
- 2.2 Conducting block level survey in the given area 2
- 2.3 Plotting and drawing contour lines of the block level survey in Exercise 2.2 2
- 2.4 Preparing the contour map of a given area by radial method 2

3.0 THEODOLITE:

- 3.1 Study of essential features and parts of transit theodolite, to describe the theodolite with neat sketches 2
- 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 2
- 3.5 Determination of magnetic bearing of 3 given straight lines

4.0 THEODOLITE TRAVERSING:

- 4.1 Setting out a closed traverse with 6 sides and entering the field data 2
- 4.2 Plotting the traverse from exercise 4.1 and checking the error of closure 2
- 4.3 Setting out an open traverse with 5 sides and entering the field data 2
- 4.4 Plotting the traverse from exercise 4.3 and checking the error of closure. 2

5.0 TRIGONOMETRICAL SURVEYING & TACHEOMETRY:

5.1 Determination of height of 3 objects whose bases are accessible 2

5.2 Determination of stadia constants
2

5.3 Determination of horizontal distance and elevation with Staff vertical , by stadia method. 2

6.0 SETTING OUT CURVES:

6.1 Setting out a simple circular curve by offsets from long chord
2

6.2 Setting out a simple circular curve by Rankine's method of tangential angle (Deflection angles)
4

7.0 SITE SURVEYING:

7.1 Setting out at site the center line and foundation width of a building from the given plan
2

7.2 Setting out the foundation line for a culvert
2

7.3 Dividing an area into plots of given size
2

8.0 MODERN SURVEYING INSTRUMENTS:

8.1 Total Station with EDM and GPS
2

8.2 Measure distance between two points with electronic distance meter

8.3 Measure distance, elevation, horizontal and vertical angle of an object with modern theodolite
2

8.4 Typical site layout by using Total Station.
4

**TOTAL:
60**

Note: Grouping for each exercise will be two students per group unless mentioned otherwise.

HYDRAULICS

L T P
CE407
3 0 2

Total Contact Hrs.:

Theory: 45
Practical: 30

Theory Class Duration
45 Classes of 1Hr. or
60 Classes of 45 minutes

Pre-requisite: Nil
Credit : 4

RATIONALE:

The subject of Hydraulics deals with behaviour of fluid at rest and in motion. The Civil Engineering profession is much concerned with subjects like water supply, Sanitary Engineering and Irrigation Engineering, which need a sound knowledge of Hydraulics. Therefore, hydraulics is a very important basic subject for students of civil engineering.

Curri. Ref. No.:

Theory:
End Exam : 70
P.A.: 30
Practical:
End Term Exam: 25
P.A.: 25

AIM:

To aim of the subject Hydraulics is to develop basic concepts regarding behaviour of fluid, specially water, at rest and in motion.

DETAILED COURSE CONTENTS

THEORY: 45 Hrs.

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 Hydrostatics	1
2	
1.1 Properties of fluids, density, specific gravity, surface tension, capillarity, viscosity and their uses.	
1.2 Pressure and its measurements: Definitions- intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; Relation between atmospheric pressure, absolute pressure and gauge pressure, pressure head, pressure gauges.	
1.3 Pressure exerted on an immersed surface; Definitions- total pressure, resultant pressure, expression of equation for total pressure exerted on horizontal, vertical and inclined immersed surface (No deduction); Center of pressure and its expression.	
1.4 Floatation and buoyancy: Archimedes principle-buoyancy & center of buoyancy, center of pressure, metacenter, metacentric height, determination of metacentric height by experimental method, equilibrium of floating bodies- stable, unstable & neutral equilibrium.	
2.0 Kinematics of fluid flow:	2
7	
2.1 Basic equations of fluid flow and their application (No deduction): rate of discharge, equation of continuity of a liquid flow, total energy of a liquid in motion-potential, kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation.	
2.2 Flow through Orifices: orifices, types of orifices, venacontracta, hydraulic coefficients and their relations, determination of hydraulic coefficients, discharge formulae for different types of orifices and their application (No deduction).	

- 2.3 Flow through mouthpieces: mouthpieces, types of mouthpieces, discharge formulae for different types of mouthpieces and their application (No deduction).
- 2.4 Flow over Notches: notch, types of notches, discharge formulae for different types of notches and their application (No deduction).
- 2.5 Flow over Weirs: weir and its difference with notches, types of weirs, discharge formulae for different types of weirs and their application (No deduction).
- 2.6 Types of Flow through pipes: uniform & non-uniform; laminar & turbulent; steady & unsteady; Reynold's number and its implication.
- 2.7 Losses of head of a liquid flowing through pipes: due to friction (statement of Darcy's equation), sudden enlargement, sudden contraction, change of direction of flow, loss at inlet & exit (No deduction, only statement of formulae and their application), total energy lines and hydraulic gradient lines.
- 2.8 Flow through Open Channels: types of channel sections-rectangular, trapezoidal & circular, Discharge formulae- Chazy's and Manning's equation, best economical section, phenomenon of hydraulic jump (only description and no deduction).

3.0 Pumps:**03**

- 3.1 Types of pumps
- 3.2 Centrifugal pumps- basic principles, discharge, horse power of pump, efficiency of centrifugal pump, simple numerical problems.
- 3.3 Reciprocating pumps: types, operation, discharge, calculation of horse power, efficiency, simple numerical problems.

Class Test: **03**
TOTAL : **45**

PRACTICAL:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
4.0 Hydraulic Lab Practical	30
4.1 Determination of metacentric height of a floating body	
4.2 Verification of Bernoulli's theorem.	
4.3 Determination of the co-efficients of discharge, contraction and velocity of an orifice.	
4.4 Determination of coefficient of discharge of a rectangular notch fitted in an open channel	
4.5 Determination of coefficient of discharge of a V- notch fitted in an open channel.	
4.6 Determination of coefficient of discharge of a venturimeter, orificemeter fitted in a pipe.	
4.7 Determination of head loss due to friction and coefficient of friction for flow through pipes.	
4.8 Study of the parts of a centrifugal pump.	
4.9 Study of the parts of a reciprocating pump.	
4.10 Demonstration of discharge measurement by a currentmeter.	
TOTAL:	30

REFERENCE BOOKS:

1. Hydraulics - by Jagdish Lal; Metro Publishing Books Limited
2. Hydraulics, Fluid Mechanics and Fluid Machines - by S. Ramamrutham; Dhanpat Rai & Sons, Delhi
3. Hydraulics - By R.S.Khurmi
4. Hydraulics - By Priyany
5. Hydraulics - By S.K.Lakhi
6. Hydraulics - By Dr.P.N.Modi &S.M.Seth
7. Hydraulics and Hydraulic Machinery – V. Thanikachalam, Tata McGraw-hill Publishing Company Limited, Tata McGraw Hills.

THEORY OF STRUCTURES

L	T	P	Curri. Ref. No.:
CE409			
3	0	0	
Total Contact Hrs.:	Total Marks: 100		Theory:
Theory: 45			End Exam : 70
Theory Class Duration			P.A.: 30
Prerequisite: CE401			Practical:
Credit: 3			End Exam.: Nil
			P.A. : Nil

RATIONALE :

Theory of structures is a very important subject for diploma holders in Civil Engineering. Many of them are entrusted with the responsibility to supervise

constructions, make minor remedial changes in maintenance work, analyze simple structures etc. An adequate knowledge of behaviour of structures is very essential for developing self-confidence among the diplomats for delivering quality service of work. An understanding of ‘why’ part of structural behaviour and failures enables them to give adequate comparative weightage of their attention to different components of construction supervision jobs.

The course content has been designed with a view to enabling students to solve problems of beams related to permissible stresses in bending and shear, check the stability of dams and retaining walls, explain and apply the principle of superposition, analyze the determinate trusses, apply the formulae for deflection to solve the problems of propped cantilever, understand and draw qualitatively the deflected shapes of beams and frames to identify the positions of main reinforcements and apply the concept of principal stresses and strains to explain and identify different types of cracks in reinforced concrete beams.

While teaching the deformation of indeterminate structures without going into theory and analysis, a teacher of the subject is advised to make use of indigenous flexible elastic models*.

AIM:

The course content of ‘Theory of Structures’ aims at knowledge, concepts, and understanding of principles and behaviour of Civil Engineering Structures with related assumptions but without going into much theoretical derivation. In complicated cases, qualitative understanding is emphasized instead of quantitative analysis and evaluation rather than disregarding them as in the past.

**DETAIL COURSE CONTENTS:
THEORY/PRACTICAL:**

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.0	<p>BENDING AND SHEAR STRESSES IN BEAMS:</p> <p>1.1 Overview of shear force and bending moments in beams</p> <p>1.2 Application to steel and timber beams – Calculate bending stresses in steel & timber beams, evaluate moment of resistance, solve numerical problems by applying the equations of bending, draw distribution of bending stress.</p> <p>1.3 Flitched beams – solve numerical problems on finding safe load of flitched beams, draw distribution of stresses, and find the moment of resistance given sections.</p> <p>1.4 Shear stress in beams—calculate shear stresses at different layers of a given beam, draw the distribution of shear stress for different structural sections (only application of formula).</p>	12
Class Test:		1
2.0	<p>DAMS AND RETAINING WALLS:</p> <p>2.1 Introduction – distinguish between dams and retaining walls, uses of dams and retaining walls.</p> <p>2.2 Stability of Concrete and masonry dams -- Distinguish between concrete & masonry dams, check the stability of rectangular and trapezoidal dams with water face vertical, solve numerical problems.</p>	16

- 2.3 Detailed applications -- Solve numerical problems on stability of cantilever retaining walls having vertical face to the earth with level earth and (b) surcharged earth, draw deflected shapes & positions of main reinforcements in different components of reinforced concrete cantilever retaining walls.
- 2.4 Superposition of stresses and its applications-- Explain the principal of superposition of bending and axial stresses, state and explain the middle-third rule. Solve problems to calculate maximum and minimum pressures /stresses at the base of dams & retaining walls.

Class Test: 1

3.0 FRAMED STRUCTURES :

11

- 3.1 Introduction – Define and explain statically determinate frames, distinguish between beams and determinate framed structures, state the important uses of determinate frames.
- 3.2 Methods of analysis -- Explain the method of joints, method of sections and graphical method to solve determinate frames.
- 3.3 Applications -- Find the forces in the members of simple trusses by methods of joint, section and graphical methods.

4.0* DEFLECTION OF BEAMS:

18

- 4.1 Introduction -- Explain why the beams deflect. Explain why the knowledge of beam slope and deflection is important from the structural point of view, shape and nature of elastic curve (deflection curve).
- 4.2 Formulae and their applications -- State and explain the formulae for deflection and rotation of simply supported beams and cantilevers under concentrated, uniformly distributed loads and end moments.
Principle of superposition to solve propped cantilever beams for reactions, bending moments and shear force. Sketch the deflected shapes of determinate beams.
- 4.3 Problems on simply supported and cantilever beams for determination of slope and deflection under different types of loadings by integration method (Macaulay's method).
- 4.4 Moment area method, conjugate Beam method- basic principles and simple problems.

Class Test: 1

5.0* COMPLEX STRESSES AND STRAINS :

15

- 5.1 Principal stresses and Principal planes --Explain the occurrence and concept of normal and tangential stresses, define & explain the concept of principal stresses and principal planes and their orientation. State and explain the formulae with assumptions (no proof) for major and minor principal stresses and their orientation. Solve numerical problems on complex stresses.
- 5.2 Stresses on a given plane -- State and explain formulae (with no proof) for shear and normal stress components on any inclined plane. Solve numerical problems.
- 5.3 Use of Mohr's circle -- Explain with assumptions the alternative graphical solution procedure (sketch only) by using Mohr's circle without proof. Supplement the solution of numerical problems by Mohr's circle method.
- 5.4 Application to reinforced concrete beams – Give explanation to cracking of concrete beams from the concept of principal tensile stress and strain, explain the orientation of shear cracks, flexural cracks and cracks due to combined bending and shear stresses in R.C. beams.

Class Test: 1

*A short course should be conducted by TTTI, Calcutta to explain how the subject, specially items 4.3 to 4.6 and all items 5.1 to 5.4 under Complex Stresses and Strains, be taught to the students of Polytechnic.

REFERENCE BOOKS :

1. Theory of Structure - by S. Ramamrutham
2. Theory of Structure - by R. S. Khurmi & J. K. Gui
3. Theory of Structure - by V. Rajaraman
4. Programmed Text in Strength of Materials -by TTTI, Chandigarh.
5. Analysis of structures, Vol. I - by V.N.Vazirani and M.M.Ratwani
6. Introduction to Mechanics of Solids -by E. P. Popov
7. Reinforced Concrete - by H. J. Shah
8. Strength of Materials - by R. S. Khurmi
9. Elements of Strength of Materials - by S. P. Timoshenko and D. H. Young
10. Strength of Materials - by Surendra Singh

ESTIMATING - I

L T P
CE504

2 0 4

Total Contact Hrs.:

Total Marks: 50

Theory: 30

Practical: 60

Pre-requisite: Nil

Credit : 4

Curri. Ref. No.:

Theory:

End Exam : 70

P.A. : 30

Practical:25

P.A.:25

RATIONALE:

The subject of estimating is very important for the diploma holders in Civil Engineering. In order to construct any item, pertaining to Civil Engineering, one should have knowledge of resource required for the works as also the money required for completion of the job.

AIM:

To identify the schedule of works and make a correct estimate.

DETAIL COURSE CONTENT

THEORY:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1. Introduction	3
1.1 What is estimating, uses of standard estimating forms, use of schedule of rates (procedure of taking out quantities) and mode of measurement as per IS:1200	
1.2 Preparation of standard proforma of estimate and abstract of various engineering works.	
1.3 Unit of measurement and rate of payment.	
2. Earth Work	3
2.1 Method of calculating quantity of earth, mid-sectional area method, prismoidal formula method, lead and lift,	
3. Road Work	2
3.1 Unit of measurement and method of estimating various items of work	

- 4. Concrete Work** **3**
 - 4.1 Method of estimating and costing mass concrete, reinforced concrete work and centering and shuttering work, preparation of bar bending schedule and taking out quantities of steel reinforcement in RCC for load bearing wall type buildings, RCC framed structures, RCC slab culverts, RCC retaining walls etc.
- 5. Flooring** **2**
 - 5.1 Method of estimating and costing of floor, floor finishing and DPC.
- 6. Finishing and Decoration** **2**
 - 6.1 Unit of measurement and method of estimating plastering and pointing
 - 6.2 Method of estimating white washing, colour and painting.
- 7. Sanitary and Plumbing** **2**
 - 7.1 Unit of measurement, method of estimating and costing of sanitary fittings and plumbing work in residential buildings.
- 8. Steel Work and Timber Work** **3**
 - 8.1 Unit of measurement and method of estimating and costing of a simple steel structure
 - 8.2 Unit of measurement, method of estimating and costing of timber work like roof trusses, timber bridges etc.
- 9. Estimating, abstracting and billing of complete items of works.** **7**
 - 9.1 Double room/single storied building with wall foundation
 - 9.2 Double roomed single storied with front verandah, with wall foundation
 - 9.3 Three roomed single storied RCC framed building with front and back verandah
 - 9.4 Timber roof and steel roof trusses
 - 9.5 Bituminous road with cross slope

Class Test: 3

TOTAL: 30

10 PRACTICALS

10.1 To estimate the volume of earthwork required for excavation and filling of the trench for road construction	10
10.2 To prepare an estimate for sanitary & plumbing as required in a building.	8
10.3 To prepare an estimate for timber works for a roof trussed building.	10
10.4 To prepare an estimate for flooring items including finishing and decorating works	8
10.5 To prepare an estimate of a double storied R.C. building	24

L:

**TOTAL
60**

REFERENCE BOOKS:

1. Estimating and costing - by B.N. Dutta & R.C. Rangwala
2. A Text Book of Estimating Costing and Accounts - by D.D. Kohli & R.C. Kar
3. Estimating, Costing and Specification - by M. Chakraborty
4. Estimating & Costing - by S. Ramamrutham; Charoathar Publishing Co.

COMPUTER AIDED DRAWING

L T P

No.:CE508

0 0 3

Total Contact Hrs.: 45 Total Marks: 100

Practical: 45

Pre-requisite: CE402

Credit : 2

Curri. Ref.

Practical:

P.A.: 50

RATIONALE :-

Drawing is very important for diploma holders in Civil Engineering as this subject provides an input to the students to draw the different structural elements accurately to a chosen scale as required for construction. Now-a-days different software are available for efficient drawing. Actually almost all drawings are carried out by using this software. The students should have basic understandings about computer aided drawing.

AIM :

The subject aims to introduce the students to standard drawing software, which are required for drawing the geometric figures as well as components of different types of structures.

1.0 COMPUTER AIDED DRAWING:

(To use the Auto-CAD or any other similar drafting package to produce Civil engineering drawings such as, Plan Elevation, Section, etc. The use of commands will enable the students to perform different activities as listed below.)

- 1.1 Making of RC or masonry building and Culvert drawings.
- 1.2 Editing /modifying of existing drawing.
- 1.3 Dimensioning, drawing section lines and hashed section lines.
- 1.4 Writing texts on Drawings.
- 1.5 Display of drawings on Computer screens
- 1.6 Making use of different settings of drawings related to scale

- unit, co-ordinate system.
- 1.7 Creating and editing layers
- 1.8 Creating and editing blocks
- 1.9 Object dimensioning

2.0 PLOTTING DRAWING

CE WORKSHOP

L T P

No.:CE408

0 0 3

Total Contact Hrs.: 45 Total Marks: 75

Practical: 45

Credit : 2

Curri. Ref.

Practical:

P.A.: 75

UNIT	TOPIC / SUB-TOPIC	Lecture Hrs.
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WELDING SHOP

1. Shop Talk:

2

- 1.1 What is welding and its engineering importance
- 1.2 Safety precautions to be observed during welding
- 1.3 Types of welding – Gas and Arc.
- 1.4 Equipment and accessories required for high and low pressure gas welding, their functions with demonstration. Adjustment of flame and their characteristics, use of flux, filler rod and their specifications.
- 1.5 Arc welding tools and equipment, their functions with demonstrations, selection and specification of electrodes.
- 1.6 Common welding joints and their edge preparation
- 1.7 Welding defects and maintenance of arc and gas welding equipment
- 1.8 Demonstration of cutting by Gas.

2. Shop Practice.

3

- 2.1 Practice on gas welding, setting of flame carbonizing, neutral and oxidizing, metal depositing using filler rod on 4 mm. Thick flat or sheet and running a single bead.

- 2.2 Practice on arc welding fusion run on M.S. flat bar 6mm.thick both left ward and right ward for hand balancing.
- 2.3 Single Vee-Belt joint on M.S. flat 4 to 6 mm. thick with at least two runs.

PLUMBING SHOP

4

3. Shop Talk:

3

- 3.1 Role of plumbing in our day to day life
- 3.2 Description and use of plumbing tools and equipment
- 3.3 Plumbing materials and fitting e.g. various types of valves, taps etc. with demonstrations.
- 3.4 Pipe threading with die set
- 3.5 G. I. Pipe joints (flange, union, nipple sockets) C.P.A.C. and polyethylene pipe joints (with practical demonstration of at least two pipe joints)
- 3.6 Study and demonstration of various types of water supply and sanitary fittings with layout.
- 3.7 Study of simple hand pumps and centrifugal pumps
- 3.8 Estimation of water supply and sanitary fittings for a domestic Building.

4. Shop Practice

15

- 4.1 Practice of thread cutting on G. I. Pipes with adjustable click (making a short nipple)
- 4.2 Practice of thread cutting on both ends and bending of G.I. pipe pieces (making a G.I. bend)
- 4.3 Practice on cast iron to cast iron pipe joint using lead.
- 4.4 Practice on joining two A.C. Pipes with cement mortar
- 4.5 Practice on water pipe line connection for water tap, shower, wash basin and water closet (group task)

R.C.C AND MASONRYSHOP

5. Shop Talk:

4

- 5.1 Role of R.C.C. and Masonry work in the field of construction
- 5.2 Demonstration of various tools and equipment used in various R.C.C. and masonry work.
- 5.3 Common materials used for R.C.C. and Masonry works

- 5.4 Various brick bonds and use of closer, plastering, flooring
- 5.5 Bending and binding M.S. rods for RCC structure (Lap, hook, crank-up bar)
- 5.6 Lay-out of building plinth in the field
- 5.7 White washing and distempering preparation and demonstration
- 5.8 Form work of RCC structure-column, beam and slab.
- 5.9 Method of inspection of a job.

- 8.1 Wiring with single and twin core cable connecting main switch and D.F.B., pendent lamp, bracket lamp, socket outlet, switch, installation of earth wire.
- 8.2 Testing of electrical installation as per IE Rules, Trouble shooting of minor faults house or workshop wiring with some fault.
- 8.3 Study of drawing for wiring of a two-storied building.

Test and Viva Voce
(Jointly with all Workshops)

6

6. Shop Practice:

15

- 6.1 Preparation of cement Mortar at a given proportion for plastering
- 6.2 Practice on brick bond - (i) English bond (ii) Flemish bond for a corner wall and a Tee-joint
- 6.3 Casting of Reinforced cement concrete beam/slab with given proportion (a) preparation of M.S. reinforcement including stirrups (b) study and provision of cover and form work (c) preparation of dry mixture and its calculation (d) methods of mixing and casting of the beam/slab (e) curing.
- 6.4 Lay-out of a simple building (single storeyed)
- 6.5 Making of mosaic tiles (size about 150 mm. x 150mm. x 20 mm. thick)

ELECTRICAL SHOP

7. Shop Talk:

2

- 7.1 Electrical shop work and their utility in day to day life
- 7.2 Safety precautions to be observed during handling and operating electrical equipment, electrical shock treatment procedure.
- 7.3 Common conductors and insulators (with display)
- 7.4 Various types of cable and materials for earthing
- 7.5 Common types of house wiring surface and concealed wiring
- 7.6 Various types of domestic wiring, fitting and their positions
- 7.7 Testing of installations (demonstration)

8. Shop Practice:

9

PROFFESIONAL PRACTICE - II

L T P
CE514
0 0 2

Curri. Ref. No.:

Total Contact Hrs.: 30 Total Marks: 50
Practical:30
Credit : 1

Practical:
P.A. : 50

UNIT	TOPIC / SUB-TOPIC	Lecture Hrs.
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1.0 INTRODUCTION:

0

2

- 1.1 Aims & 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
- 1.5 Collecting an estimate from P.W.D.

2.0 CONSTRUCTION

PLANNING:

0

6

- 2.1 Importance of constructional planning
- 2.2 Developing work break down structure for construction works
- 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 Limitations of bar charts	
2.7 Construction scheduling by network techniques- definitions of terms, PERT and CPM techniques, advantages and disadvantages of two techniques, network analysis, estimation of time and critical path, application of PERT & CPM techniques in simple construction works	
3.0 SITE MANAGEMENT:	0
3	
3.1 Factors influencing selection, design and layout of temporary facilities and services at construction site	
3.2 Principles of storing materials at site	
3.3 Location of equipment Organizing labour at site	
4.0 CONSTRUCTION ORGANIZATION:	0
5	
4.1 Organization types-line and staff, functions and their characteristics	
4.2 Principles of organization-meaning and significance of terms-control, authority, responsibility, command, accountability, job and task	
4.3 Leadership-necessity, styles of leadership, role of leader	
4.4 Principles of effective supervision	
4.5 Motivation-classification of motives, different approaches to motivation	
4.6 Human relations- relations with subordinates, peers, Supervisors, characteristics of group behaviour, mob psychology, handling of grievances, absenteeism. Labour Welfare	
4.7 Conflicts in organization- genesis of conflicts, types - Intrapersonal, interpersonal, inter group, resolving conflicts, team building	

5.0 SAFETY IN CONSTRUCTION WORKS:	0
3	
5.1 Importance of safety	
5.2 Causes and effects of accidents in construction works	
5.3 Safety measures in work sites for-excavation, scaffolding, formwork, fabrication and erection, demolition	
5.4 Development of safety consciousness	
5.5 Safety legislation-workmen's compensation act, contract labour act	
6.0 DISPUTES:	0
2	
6.1 Nature of disputes between contractor and owner. Causes of disputes and claims Arbitration-procedure, criterion for arbitrator, conditions for arbitration.	
7.0 QUALITY CONTROL:	0
3	
7.1 Concept of quality in construction	
7.2 Quality standards – during construction, after construction	
7.3 Methods of testing-during construction, after construction. Destructive & non-destructive methods	

**Class Test :
01
TOTAL :
30**

Sample path for Term IV in Civil Engineering.

S l. N o	Code	Course	Study Scheme			Evaluation Scheme								Total Marks	Credit
			Pre-requisite	Contact Hours / Week			Theory			Practical					
				L	T	P	End Exam	Progressive Assessment			End Exam	Progressive Assessment			
								Class Test	Assign ment	Attend ance		Sessi onal	Viva voce		
1	G303 G307	Soft Core-I (Engineering Economics & Accountancy)		3	0	0	70	15	10	5	0	0	0	100	3
2	CE403	Civil Engg. Drawing II	CE402	1	0	3	0	0	0	0	50	25	25	100	3
3	CE503	Surveying II	CE404	3	0	3	70	15	10	5	25	25	0	150	4
4	CE407	Hydraulics	NIL	3	0	2	70	15	10	5	25	25	0	150	4
5	CE409	Theory of Structures	CE401	3	0	0	70	15	10	5	0	0	0	100	3
6	CE504	Estimating - I		2	0	4	70	15	10	5	0	25	0	125	4
7	CE508	Computer Aided Drawing	CE402	0	0	3	0	0	0	0	0	50	0	50	2
8	CE408	CE Workshop		0	0	3	0	0	0	0	0	75	0	75	2
9	CE514	Professional Practice-III		0	0	2	0	0	0	0	0	50	0	50	1
TOTAL				15	0	15	350	75	50	25	100	275	25	900	26