

MECHANICS OF MATERIALS

L T P
3 0 2

Curri. Ref. No.: CE401

Total Contact Hrs.: **Total Marks: 125**

Theory/Lecture: 45

Practical: 30

Theory Class duration:

45 classes of 1 Hr. or

60 classes of 45 minutes

Pre-requisite: G206

Credit : 4

Theory:

End Exam : 70

P.A.: 30

Practical:

End Term Exam:

P.A. : 0

RATIONALE:

Mechanics of Materials deals with the internal behaviour of variously loaded solid bodies, such as – shafts, bars, beams, plates, columns, as well as structures and machines that are assemblies of these components.

Mechanics of Materials focuses primarily on mechanical properties of materials, analysis of stress, strain and evaluation of deformations. The subjects like structural analysis, design of structures as well as machines are based on adequate knowledge and understanding of Mechanics of Materials. Therefore, it is an important basic subject for Diploma students in Civil and Mechanical Engineering.

AIM :

The aim of the subject Mechanics of Materials is to develop background preparation of students for taking up engineering subjects like Theory and Design of Structures. Design of Machines mostly through the followings:

- Describe the Mechanical properties of important Engineering materials
- Determine stresses, strains and deformations in elastic bodies of different shapes under different loading conditions for engineering applications.
- Determine load carrying capacity of different types of members.

DETAIL COURSE CONTENT

THEORY: 45 Hours

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 Introduction:	2
1.1 Scope of the subject : Uses of structures, Importance of knowledge of: stress, strain, and deformation in a structure, permissible stresses in a material, Safety and Economy. Contents and importance of the subject.	
1.2 Engineering Materials : Elastic material, linearly elastic material, ductile material, brittle material, composite material, isotropic material, orthotropic material. (Definition, examples, and application). <ul style="list-style-type: none">• Identify different engineering materials in specific application.	
2.0 Stress and Strain :	12
2.1 Introduction : Definitions of stress; types of stress-tensile, compressive and shear.	
2.2 Stress-strain Diagram: Principle of tensile testing in Universal Testing Machine, Dimensions of a tensile test specimen, tensile test, elastic limit, elastic range, proportional limit, point of fracture, plastic range, strain hardening, ultimate stress, necking, ductility, yield strength, 0.2% proof stress, allowable stress of ductile and brittle materials, factor of safety. <ul style="list-style-type: none">• Identify the different parts of universal Testing Machine.• Draw the stress strain diagram for mild steel and indicate the different parts of the curve.	

2.3	Stress-strain Relations: Hooke's law, Young's modulus, Shear modulus of rigidity, Poisson's ratio, generalized Hooke's law for two dimensional stress, relation among the elastic constants for an isotropic material. • Distinguish among different elastic constants for a Material.	
2.4	Riveted or Bolted Joints: Single riveted/bolted lap joint, double riveted/bolted lap joint, triple riveted/bolted lap joint, single riveted/bolted double cover butt joint, double riveted/bolted double cover butt joint (no design). • Determine stresses in rivets/bolts and plates. • Determine size of rivet/bolt for given load.	
2.5	Stresses in Welded Joints: butt weld, fillet weld. • Determine stresses in butt weld and fillet weld.	
2.6	Stresses, strains, and Deformations of Axially Loaded Members: Temperature stresses, composite bars/sections. • Solve simple problems on determination of stresses and shortening of axially loaded members.	
3.0	Analysis of beams:	14
3.1	Beam: definition, types of beams: Simply supported and cantilever beams, propped cantilever, fixed-ended and continuous beams. • Identify different types of beams and loading conditions. • Determine the support reactions and draw the free body diagram of a determinate beam.	
3.2	Shearing force and Bending Moment in Beams: Sign conventions and relationships among load, shearing force and bending moment.	
3.3	Shear Force and Bending Moment Diagrams: Cantilever beam with concentrated and uniformly distributed load, simply supported beam with uniformly distributed and varying loads. • Draw the <i>shear</i> force and bending moment diagrams of a beam with given loads on it.	
4.0	Simple Bending of Beams:	5
4.1	Centroid of an area, moment of inertia of beam cross-sections, parallel axis theorem, principal moments of inertia	
4.2	Assumptions in simple bending, neutral surface, neutral axis determination of bending stresses in beams with simple cross sections and standard sections used in industry. • Determine the moment of inertia, section modulus and moment of resistance of a beam cross-section. • Determine the bending stresses in a beam under pure bending.	
5.0	Torsion	4
5.1	Basic assumptions for pure torsion, torsion of circular shafts (hollow and solid, no proof) – polar moment of inertia, torsional shearing stress, angle of twist, torsional rigidity. • Determine the maximum shear stress and angle of twist in shafts transmitting given torque.	
5.2	Applications: Horse power transmitted by a shaft, Torque transmitted by a flange coupling and corresponding forces acting on coupling bolts, formula for stiffness of closed coil helical spring (no proof). • Apply the torsion formula in determination of (a) safe power transmitted by a flange coupling (b) stiffness of helical springs.	
6.0	Columns and Struts:	5
6.1	Definition of columns and struts; Buckling load (critical or crippling load); Slenderness ratio, Classification of columns as long and short columns.	
6.2	Euler's Theory – Basic assumptions made in Euler's theory for column buckling, Effective lengths for different end conditions-- both ends pinned, one end fixed and the other end free, both ends fixed, one end fixed and other end pinned.	
6.3	Other Formulae – Practical deviations from ideal column, Rankine's formula, factor of safety for different column materials, IS - 800-code formula for column design. • Determine the critical buckling load for a given column as per known formulae. • Determine factor of safety for a given column with known end conditions and loading.	
	Class Test	3

PRACTICAL: 30 Hours

UNIT	TOPIC / SUB-TOPIC	Lecture Hrs.
8.0	SHEAR TEST:	3
	8.1 Determination of Shear Modulus (Modulus of Rigidity) of a soft material	
9.0	TENSILE TEST	3
	9.1 Determination of Young's Modulus of a material in a tensile testing machine.	
10.0	HARDNESS TEST:	3
	10.1 Determination of hardness of a material by a Brinell or Rockwell testing machine.	
11.0	IMPACT TEST:	3
	11.1 Testing of Cast Iron (C.I.) and Mild Steel (M. S.) test pieces by Impact testing machine.	
12.0	FATIGUE TEST:	3
	12.1 Testing of a Mild Steel (M. S.) test piece for fatigue.	
13.0	DEFLECTION OF BEAMS	3
	13.1 Central Deflections (with the help of a dial gauge) of simple supported beam models (e.g., M. S. flat) with concentrated loads at the middle.	
	13.2 Determination of Young's Modulus (E) for the material of a beam model by load deflection method.	
14.0	VIVA - VOCE:	12

REFERENCE BOOKS:

1. Elements of Strength of materials - by S. P. Timoshenko, D. H. Young; Affiliated East – West Press Private Limited.
2. Engineering Mechanics and Strength of materials - by R. K. Bansal; LaxmiPublications, New Delhi
3. Strength of Materials - by Surendra Singh; Vikas Publishing House Pvt. Ltd.

4. Strength of materials - by Ferdinand L. Singer; Harper & Row and John Weatherbill.
5. Theory and Problems of Strength of Materials - by William A. Nash; Shaum's outline of - Shaum's Outline Series, Mc. Graw Hill. Inc.
6. Engineering Mechanics of Solids - by Egor P. Popov; Prentice Hall of India Private Limited, New Delhi.
7. Strength of Materials - by R.S. Khurmi
8. Strength of Materials - by Dr. Sadhu Singh; Khanna Publishers, Delhi-110 006.
9. Engineering Mechanics & Strength of Materials - by S. Ramamrutham; Dhanpat Rai Publishing Co., Delhi – 110 006.
10. Mechanics of Materials - by A. C. Ugural; Mc. Graw Hill. Inc
11. Strength of Materials - by D.R. Malhotra and H.C. Gupta; Satya Prakashan, New Delhi – 110 005.
12. Strength of Materials Through Problems - by B. K. Sarkar; Allied Publishers Limited, New Delhi – 110 002

CIVIL ENGINEERING DRAWING - I

L T P
1 0 3

Curri. Ref. No.: CE402

Total Contact Hrs.: **Total Marks: 100**

Practical:

Theory: 15

End Exam : 70

Practical: 45

P.A.: 30

Pre-requisite: G201, G202

Credit : 3

RATIONALE

This subject 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. The students are required to make working drawings showing all different components of a structure so that the same may be easily read and the construction of different units of structures can be done once the working drawings are made available to the constructors.

AIM:

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

DETAIL COURSE CONTENT

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 INTRODUCTION:	3
1.1 Introduction of civil engineering drawing – foundation plinth, conventional signs of brick masonry, stone masonry, concrete, use of scales (Plate No. 1)	
2.0 DOORS AND WINDOWS:	9
2.1 Different types of doors and windows with their parts (Plate No. 2)	

3.0 ROOF TRUSSES: **12**

3.1 Different types of roof trusses such as king post trusses, queen post trusses (Plate No. 3)

4.0 STAIR CASE: **09**

4.1 Conventional sign of staircase, introduction of quarter turn, newel, dog legged, open well newel, open well geometrical, bifurcated, half turn geometrical staircases - only plan (Plate No. 4)

Plan and elevation of newel & dog-legged staircase (Plate No. 5)

5.0 BUILDING DRAWING: **24**

5.1 Plan, elevation and section of simple single-storeyed building with masonry wall with:

- Sloped roof with steel trusses
- RCC roof slabs with lintel
- Assam type building (Plate No. 6, 7, 8)

5.2 Development of two-storeyed building from line plans and specifications with details:

- Site Plan
- Plan
- Elevation
- Foundation plan
- Sectional elevations (Plate No. 9)

Class Test **3**

TOTAL: **60**

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. R.B. Gupta - Machine drawing
6. Fraderik Egnisecks and other - Engineering Graphics
7. Warren J. Luzadder - Graphics for Engineers - Prentice Hall of India (Pvt. ltd.)
8. K.L. Narang - A Text Book of Engineering Drawing
9. G.R. Nagpal - Geometrical Drawing - Khanna Publishers
10. W. Abbott - Practical Geometry and Engineering Graphics - Blackie & Son (India) Ltd.
11. I.H. Morris - Geometrical Drawing for Art Students - Orient Longman
12. A.C. Parkinson - General Engineering Drawing - Sir Isaac Pitman and Sons Ltd., London
13. Succeeding with Auto CAD - a full course on 2D drafting and 3D modeling – by Berry Hawkes; Mc. Graw Hill Inc., New York
14. Civil Engg. Drawing - by D.N. Ghosh
15. Civil Engg. Drawing - by Shah Kale
16. Civil Engg. Drawing - by TTTI, Bhopal, Work Book

SURVEYING-I

L	T	P
3	0	4

Total Contact Hrs.:

Theory: 45

Practical: 60

Theory Class Duration

45 Classes for 1hr. or

60 Classes for 45 mins.

Pre-requisite: Nil

Credit : 3

Total Marks: 150

Curri. Ref. No.: CE404

Theory:

End Exam : 70

P.A.: 30

Practical:

End Exam.: 25

P.A. : 25

RATIONALE

Surveying is an essential component of the day to day work of a Civil Engineering Technician. The job includes conducting detailed surveying, plotting of survey data, preparation of survey maps etc. In view of its importance the course content has been divided into two parts and introduced sequentially as Surveying-I. Each theory course is accompanied by practical course work to provide hands on experience.

The course content of Surveying-I includes the basic concept of surveying, horizontal linear and angular measurements and conducting surveys involving horizontal linear and angular measurements with stress on familiarization with various equipment used. It also includes vertical linear measurements to indicate the profile of the land surface by levelling has also been covered in details.

AIM:

The course content of Surveying -I has been designed to provide adequate information to develop competency in a learner to-

1. Comprehend the concepts of surveying,
2. Carry out horizontal linear and angular measurements using appropriate equipment.

3. Conduct survey work in field using horizontal linear and angular measurements.
4. Record the data observed during the survey work.
5. Plot the survey map from the recorded data.
6. Compute the data required for plotting.
7. Interpret the plotted survey map and compute data from it.
8. Determination of elevations of points on the earth surface, using appropriate equipment.
9. Record the data observed during leveling.
10. Compute the data required for plotting.

DETAILED COURSE CONTENTS

THEORY:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 INTRODUCTION:	02
1.1 Definition of surveying and related terms	
1.2 Aims and objectives of surveying	
1.3 Primary division of surveying with their purposes	
1.4 Classification of surveying	
1.5 Principles of surveying	
1.6 Field work-essential features and organization	
1.7 Office work-features, plotting, scales, effect of erroneous scale	
1.8 Maintenance and adjustments of instruments	
2.0 LINEAR MEASUREMENT:	02
2.1 Methods of measuring distance, their merits and demerits, Suitability	
2.2 Instruments for measuring distance:	
a) Tapes-types, description (demonstration in class/lab), purposes, suitability.	
b) Chains- types, description (demonstration in class/ lab), purposes, suitability, merits and demerits.	
3.0 CHAINING:	06

- 3.1 Equipment and accessories for chaining-description (demonstration in class/lab), purpose
- 3.2 Use of chain- unfolding & folding, use of arrows, reading a chain, testing and adjustment of chain (demonstration in class/lab).
- 3.3 Ranging- Purpose, signaling, direct and indirect ranging, Line ranger-features and use, error due to incorrect ranging.
- 3.4 Method of chaining- Role of leader and follower, Chaining on flat ground, Chaining on sloping ground- stepping method, Clinometer- features and use, slope correction. (demonstration in field)
- 3.5 Field problems- Setting perpendicular with chain & tape, Chaining across different types of obstacles-
 - (a) Chaining around obstacle possible: Vision free but chaining obstructed, both vision and chaining obstructed.
 - (b) Chaining around obstacle not possible: Vision free but chaining obstructed, chaining free but vision obstructed.
 Numerical problems on chaining across obstacles
- 3.6 Errors and mistakes in linear measurement - classification, Sources of errors and remedies.
- 3.7 Correction to measured lengths due to incorrect length, temperature variation, pull, sag, numerical problem applying corrections.

4.0 CHAIN SURVEYING:	06
4.1 Purpose of chain surveying, Principles of chain surveying-well conditioned and ill conditioned triangles	
4.2 Field books- single line & double line entry, field book recording (detailed description to be covered in practical)	
4.3 Reconnaissance survey- method, index map, reference sketch	
4.4 Selection of survey stations, Base line, Tie lines, Check lines	
4.5 Offsets- Types & necessity	
4.6 Method of chain surveying, locating objects, recording entry in field book.	
4.7 Plotting- selection of scale, conventional signs, plotting on drawing sheet from field book data.	
5.0 ANGULAR MEASUREMENT:	08
5.1 Measurement of angles, with compass	
5.2 Compass-types - Surveyors' compass, Prismatic compass, features, parts.	

5.3	Designation of angles – concept of meridians - Magnetic, True, Arbitrary Concept of bearings-Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application, numerical problems on conversion of bearings.	
5.4	Use of compasses -setting in field-centering, leveling, taking readings (demonstration in field), concepts of Fore-bearing, Back bearing, Numerical problems on computation of interior & exterior angles from bearings.	
5.5	Effect of earth's magnetism- dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.	
5.6	Errors in angle measurement with compass- sources & remedies, precaution during use of compass.	
6.0	CHAIN AND COMPASS SURVEYING :	06
6.1	Principles of traversing- open & closed traverse, advantages & disadvantages over chain surveying.	
6.2	Methods of traversing- locating objects, field book entry.	
6.3	Local attraction -causes, detection, errors, corrections, Numerical problems on application of correction due to local attraction.	
6.4	Plotting of traverse- check of closing error in closed & open traverse, Bowditch's correction.	
6.5	Computation of area from plotted survey map-planimeter, features, use of mensuration techniques-average ordinate rule, trapezoidal rule, Simpson's rule.	
7.0	LEVELLING:	12
7.1	Purpose of levelling	
7.2	Definition of terms used in levelling-concepts of level surface, Horizontal surface, vertical surface, datum, R.L., B.M.	
7.3	Description of essential features and uses of different types of levelling instruments	
7.4	Concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis	
7.5	Levelling staff- types, features and use	
7.6	Temporary adjustments of level, taking reading with level	
7.7	Concept of bench mark, BS, IS, FS, CP, HI	
7.8	Principles of levelling-Simple levelling, Differential levelling	
7.9	Field data entry- level Book-Height of Collimation method and Rise & Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic checks	

7.10	Different types of levelling, uses and methods – Fly levelling, Check levelling, Profile leveling - longitudinal sections and cross-sections
7.11	Plotting of profiles
7.12	Effects of curvature and refraction, numerical problems on application of correction
7.13	Reciprocal levelling-principles, methods, numerical problems, Precise levelling
7.14	Difficulties in levelling, errors in levelling and pre-cautions
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:

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-I practical includes the use and handling of various equipment for horizontal linear and angular measurements and conducting surveys to prepare maps from horizontal linear and angular measurements and for determination of elevation of various points with the help of vertical measurements.

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 of a given plot of area by chain surveying using only horizontal linear measurements.
2. Prepare survey maps of a given plot of area by chain & compass traverse surveying using horizontal linear and angular measurements
3. Determine the reduced levels of various points using the dumpy level and tilting level
4. Prepare longitudinal sections and cross sections profile of road/canal
5. Find the difference of level between two points using the method of reciprocal-levelling.
6. Carry out permanent adjustments of dumpy level/ tilting level
7. Establish grades for sewer/ canal in the field.

COURSE CONTENT:

Field exercises on:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 LINEAR MEASUREMENTS:	02
1.1 Study of the essential features of different types of chains and tapes, to describe the chains & tapes with neat sketches.	
2.0 CHAINING:	04
2.1 Testing and adjusting of a metric chain	
2.2 Measurement of distance between two points (more than 2 chain lengths apart) with chain including direct ranging	
2.3 Setting out different types of triangles, given the lengths of sides with chain & tape	
2.4 Measurement of distance between two points by chaining across a sloping ground using- stepping method & a clinometers	
3.0 CHAIN SURVEYING:	02
3.1 Setting perpendicular offsets to various objects (at least 3) from a chain line using-(1) tape,(2) cross-staff,(3) optical square and comparing the accuracy of the 3 methods.	
3.2 Setting oblique offsets to objects (at least 3) from a chain line using tape.	
4.0 ANGULAR MEASUREMENT:	04
4.1 Study of features and parts of a Prismatic compass and a Surveyor's compass to describe the compasses by drawing neat sketches.	
4.2 Measurement of bearings of lines (at least 3 lines) and determination of included angles using Prismatic compass and Surveyor's compass.	
5.0 CHAIN AND COMPASS SURVEYING:	
5.1 Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.	02
5.2 Conducting chain & compass traverse surveying in a given plot of area (2 plots) and recording data in the field book.	04
(5 to 6 students/group)	04
5.3 Preparation of survey map by plotting, individually, the field book data from exercise 5.2 and computation of the plotted area.	04
<i>(Plotting should be done during class hours)</i>	04

6.0	LEVELLING:	
6.1	Study of essential features and parts of different types of levels	02
6.2	Study of essential features of different types of levelling staves	02
6.3	Making temporary adjustments of Levels	02
6.4	Determining Reduced levels of five given points taking staff readings with Levels	02
6.5	Determining the difference of levels between two points (3 pairs of points/ group) by taking staff readings from a single set up of level, recording the readings in level book and application of Arithmetic check.	02
6.6	Conduct Fly levelling (Compound) between two distant points with respect to the R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check.(At least 3 change points must be covered)	02
6.7	Finding R.L of (1) roof, (2) chajja or canopy with reference to the R.L. of given B.M. by taking inverted staff reading	04
6.8	Conduct profile levelling along the given alignment for a road/ canal for 150m length, taking L.S at every 15m and C.S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.	04
6.9	Plotting the profile of the alignment surveyed in Exercise 6.8 and drawing the grade of alignment desired (To be drawn during the class hours)	02
6.10	Computation of volume of earthwork, cutting and filling, required to obtain the desired grade from the plotting in Exercise 6.9	
6.11	Setting out the given grades for a sewer along a given alignment	
	TOTAL:	60

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

BUILDING CONSTRUCTION

L	T	P
3	1	0

Curri. Ref. No.: CE405

Total Contact Hrs.: **Total Marks: 100**

Theory: 45

Practical: 0

Theory Class Duration

45 Classes of 1Hr. or

60 Classes of 45 minutes

Pre-requisite: Nil

Credit : 4

RATIONALE:

The subject of building construction is very important for the diploma holders in Civil Engineering. The course material has been designed for the students to know the properties of the building construction as well as the strength of the material as per IS code of practice. Further, practical input has been given for augmenting the learning by the students.

AIM:

To know the properties of different materials for use, and quality control in construction works.

DETAILED COURSE CONTENTS

THEORY: 45 Hrs.

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1.0 INTRODUCTION	04
1.1 Classification of building bases on occupancy.	
1.2 Different parts of building and their requirements.	
2.0 SITE INVESTIGATION:	06
2.1 Object of site investigation (exploration)	
2.2 Method of site investigation. Brief description of site reconnaissance (Inspection of site), boring methods.	
2.3 Bearing capacity method of testing bearing capacity of soil.	
3.0 FOUNDATIONS:	08
3.1 Definitions and purpose of foundation.	
3.2 Essential requirements of foundations.	

3.3	Type of foundation – deep foundations and shallow foundations and their classifications.		
3.4	Shallow foundation- constructional and details of spread foundations for walls, combined footings, raft foundation (with sketches).		
3.5	Deep foundations-pile foundation-types, classification and their relative merits and demerits, pier or well foundations.		
4.0	BRICK MASONRY:	05	
4.1	Definition: Materials used in brick masonry, general principles to be observed in brick masonry.		
4.2	Definition of term-Mostar, bond, head, stretcher, bed, bat, closer, bull nose, frogs, cross joints, quoin, facing.		
5.0	STONE MASONRY	05	
5.1	Uses, comparison between stone masonry and brick masonry.		
5.2	Materials used in brick masonry.		
5.3	Technical terms used in stone masonry.		
5.4	Types of stone masonry - Rubble masonry and ashlar masonry, their description with classification.		
6.0	PARTITION WALLS & CAVITY WALLS	03	
6.1	Definition of partition and cavity wall.		
6.2	Advantage of cavity wall.		
6.3	Types of partition walls-Brief description of brick partitions, concrete partitions only		
7.0	ARCHES AND LINTELS	03	
7.1	Meaning and use of arches and lintels.		
7.2	Technical terms in arches and lintel		
7.3	Classification of lintels.		
8.0	DOORS AND WINDOWS	0	
5			
8.1	Glossary of terms used in doors and windows.		
8.2	Door-use, types of doors(description with sketches)		
8.3	Window-use, types of windows (description with sketches)		
9.0	DAMP PROOFING	04	
9.1	Definition of dampness, defects of dampness, causes of Dampness.		
9.2	Sources of dampness, prevention of dampness,		
9.3	Materials used for damp proofing.		
10.0	FLOORS	04	
10.1	Ground floor-definition, types of ground floors (name) description of concrete flooring, Mosaic flooring, terrazzo flooring		
10.2	Selection of a suitable type of floor		
11.0	STAIRS:	04	
11.1	Definition, location of stairs.		
11.2	Common technical terms used in stairs construction.		
11.3	Requirements of good stairs.		
11.4	Classification of stairs (brief description with diagram)		
12.0	ROOFS	02	
12.1	Types of roofs, description of sloping roofs, flat roofs.		
12.2	King post and Queen post truss.		
13.0	SURFACE FINISH	04	
13.1	Plastering –definition, materials used for plastering, application of plaster, defects in plastering		
13.2	Pointing- definition, types of pointing, preparation of surface Mortar used		
	<u>REFERENCE OF BOOKS:</u>		
1.	Materials of Construction- by D.N.Ghosh, :Tata Mc-Grew Hills		
2.	Text book of materials- by Rangawala.		
3.	Building Materials - by Shri S.K. Basu and Shri A.K. Ray: S.K. Lahiri & Co.(P) Ltd.		
4.	Civil Engineering Materials- T.T.T.I,Chandigarh, Tata McGraw Hills.		

CONCRETE TECHNOLOGY

L **T** **P**
3 0 2

Curri. Ref. No.: CE406

Total Contact Hrs.: **Total Marks: 100**

Theory: 45

Theory Class Duration

45 classes of 1hr. or

60 classes of 45 mins.

Prerequisite: Nil

Credit: 4

Theory:

End Exam : 70

P.A.: 30

Practical:

End Exam.: 25

P.A. : 25

DETAIL COURSE CONTENTS:

THEORY/PRACTICAL:

UNIT	TOPIC/SUB-TOPIC	Total hrs.
1.0	Concrete as a construction material:	1
	1.1 Grades of concrete	
	1.2 Advantage and disadvantages of concrete Concept of quality control of concrete	
	1.3 Concept of quality control of concrete	
2.0	Cement:	2
	2.1 Composition, hydration of cement, water-cement ratio and compressive strength, fineness of cement, setting time, soundness, types of cement.	
3.0	Aggregate:	2
	3.1 Classification and characteristics of aggregate, Deleterious substances in aggregates, fineness modulus, grading of aggregate.	

4.0	Water	1
	4.1 Quality of mixing water, curing water	
5.0	Admixers	2
	3.1 Classification and characteristics of aggregate, deleterious substances in aggregates, fineness modulus, grading of aggregate.	
6.0	Properties of fresh concrete:	3
	6.1 Concept of fresh concrete, Workability, slump test, compacting factor test, Ve-bee consistency test and flow test, requirement of workability.	
7.0	Properties of hardened concrete:	3
	7.1 Role of w/c on strength, cube and cylinder compressive strengths, flexural strength of concrete, stress-strain and elasticity, phenomena of creep and shrinkage, permeability, durability of concrete, sulphate and acid attack on concrete, efflorescence.	
8.0	Quality and control of concrete:	3
	8.1 Materials, workmanship etc. as per IS: 456, Acceptance criteria as per IS: 456, Quality management in concrete construction.	
9.0	Proportioning of concrete mixes:	6
	9.1 Basic consideration for concrete mix design, choice of ingredients of the mix, mix proportioning as per IS: 10262 – 2009, grade designation, type of cement, maximum nominal size of coarse aggregate, grading of combined aggregate (IS : 483-1963 limits), analytical method, water-cement ratio, workability, durability.	
10.0	Production of concrete:	4
	10.1 Batching of materials, mixing of concrete materials, transportation, placing of concrete, compaction of concrete compaction methods, vibrators, precautions for compaction by vibrators, curing of concrete, effects of delayed curing, form work-requirements and types, stripping of forms.	

11.0 Inspection and testing:	4
11.1 Inspection testing of fresh concrete, workability tests, acceptance testing of hardened concrete, surface hardness method, pulse velocity method, core test method.	
12.0 High performance concrete:	3
12.1 Definition of HPC, Introduction to Silica fume concrete, common types of HPC Definitions & fundamental principles.	
13.0 Deterioration of concrete and its prevention:	2
13.1 Types of deterioration, corrosion of reinforcement, effects and prevention.	
14.0 Repair & rehabilitation technology for concrete structures:	6
14.1 Symptom, cause, prevention and remedy of defects during construction, cracking of concrete due to different reasons, repair of cracks for different purposes, selection of techniques, grouting, common types of repairs, shot-crete concrete or gunniting.	
TOTAL:	45

PRACTICAL: 30hrs.

1. Determination of normal consistency of cement
2. Determination of Initial & Final Setting time of cement (sample of Hardened ring marks after final setting to be shown to the students)
3. Determination of fineness of cement by sieving and soundness of cement by Le Chatelier apparatus
4. Determination of compressive strength of cement
5. Grading analysis of fine and coarse aggregates by sieving
6. Determination of bulking of sand
7. Determination of bulk density of coarse aggregate
8. Determination of water absorption of brick
9. Determination of compressive strength of brick
10. Determination of Air content, Slump, Ve-bee and compaction factor of fresh concrete

11. Determination of compressive strength of concrete
12. Tensile testing of reinforcing rod
13. Demonstration of the following non-destructive tests on concrete:
 - (i) Ultrasonic testing
 - (ii) Rebound hammer testing

REFERENCE BOOKS:

1. Concrete Technology -by M. L. Gambhir; Tata McGraw Hill
2. Concrete Technology - by A. M. Neville & J. J. Brook
3. Properties of concrete - by A. M. Neville; ELBS
4. Concrete Mix design -by Krishna Raju

IS Codes – IS : 456 – 2000
 : 10262 – 2009
 : 383
 : 1199

SUGGESTED LEARNING RESOURCES

Reference Books and Standards:

1. SP 46: Engineering Drawing Practice for School & Colleges – *Published by Bureau of Indian Standard*
2. Elementary Engineering Drawing - N.D. Bhatt. *Charotar Publisher, Anand*
3. Engineering Drawing - Shah/Rana. *published by Pearson*
4. Engineering Drawing – Agarwal & Agarwal. *TMH.*
5. Engineering Drawing – Gujral and Shinde. *Khanna Publisher, N.Delhi.*
6. Engineering Drawing – R.B.Gupta. *Satya Prakashan, Delhi.*
7. Engineering Drawing: With an Introduction to CAD – *D.Jolhe. TMH.*
8. Computer Aided Drawing – Annaih & Patil. *Newage International.*
9. Engineering Graphics with AutoCAD 2013 – Bethune James D. *PHI Learning.*
10. AutoCAD in Easy steps – Whelan. *Wiley Eastern.*
11. AutoCAD 2010 in simple steps – Kogent. *Wiley Eastern.*

DEVELOPMENT OF LIFE SKILL - II

L T P
1 0 3

Curri. Ref. No.: G302

Total Contact Hrs.: **Total Marks: 50**

Theory: 15

Tutorial: 0

Practical: 30

Pre-requisite:

Credit : 3

Theory:

End Exam : 0

P.A. : 0

Practical:50

End Term Exam:0

P.A.:50

Aim:-This subject is kept to

- Conduct different session to develop students interpersonal skills
- Conduct different session to improve problem solving skills
- Conduct different session to improve communication and presentation skills

Objective: - This course will enable the students to:

- Develop interpersonal skill
- Develop problem solving skill.
- Develop presentation skill
- Enhance creativity skills.
- Develop communication skills.
- Prepare for interviews

DETAIL COURSE CONTENT

THEORY:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1. INTER-PERSONAL RELATION	1
Importance, Interpersonal conflicts, Resolution of conflicts, Developing effective interpersonal skills communication and conversational skills, Human Relation Skills (People Skills).	
2 PROBLEM SOLVING	2
I) Steps in Problem Solving (Who? What? Where? When? Why? How? How much?)	
1. Identify, understand and clarify the problem	
2. Information gathering related to problem	
3. Evaluate the evidence	
4. Consider feasible options and their implications	
5. Choose and implement the best alternative	
6. Review	
II) Problem Solving Technique	
1. Trial and Error	
2. Brain Storming	
3. Thinking outside the Box	
3. PRESENTATION SKILLS	4
Concept, Purpose of effective presentations.	
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.	
Use of audio visual aids OHP, LCD projector, White board.	
Non verbal 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, Return to presentation.	
Evaluating the presentation:	
Before the presentation, During the presentation, After the presentation.	

4. LOOKING FOR A JOB	2
Identifying different sources announcing Job vacancies, Skim, scan and read advertisements in detail, write efficacious CVs, write covering letters to a company CVs, write Job Application Letters in response to advertisements and self-applications	
5. JOB INTERVIEWS	4
<i>Prepare for Interviews:</i> Intelligently anticipating possible questions and framing appropriate answers, Do's and don'ts of an interview(both verbal and non verbal).	
<i>Group Discussion:</i> Use of Non verbal behavior in Group Discussion, Appropriate use of language in group interaction, Do's and don'ts for a successful Group Discussion.	
6. NON VERBAL GRAPHIC COMMUNICATION	1
Nonverbal codes: A. Kinesics. B. Proxemics. C. Haptics. D. Vocalics. E. Physical appearance, F. Chronemics, G. Artifacts Aspects of Body Language	
7. FORMAL WRITTEN SKILLS	1
Memos, Emails, Netiquettes, Business correspondence Letter of enquiry, Letter of Placing Orders, Letter of Complaint.	

TOTAL: 15

PRACTICAL **30 Hrs.**

Unit 1 Inter-personal Relationship	2
<i>Case Studies:</i> 1. From books. 2. From real life situations. 3. From students' experiences. Group discussions on the above and step by step write of any one or more of these in the sessional copies.	

Unit 2 Problem Solving	4
<i>Case Studies:</i> 1. From books 2. From real life situations 3. From students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies.	
Unit 3 Presentation Skills	8
Prepare a Presentation (with the help of a Power point) on a Particular topic. The students may refer to the Sessional activity (sl.No.8) of the Computer Fundamental syllabus of Semester1. For engineering subject oriented technical topics the cooperation of a subject teacher may be sought. Attach hand out of PPT in the sessional copy.	
Unit 4 Looking for a job	4
Write an effective CV and covering letter for it. Write a Job Application letter in response to an advertisement and a Self-Application Letter for a job.	
Unit 5 Job Interviews & Group Discussions	8
Write down the anticipated possible questions for personal interview (HR) along with their appropriate responses. Face mock interviews. The cooperation of HR personnels of industries may be sought if possible. Videos of Mock Group Discussions and Interviews may be shown.	
Unit 7 Formal Written Skills	4
Write a memo, Write an effective official e-mail, write a letter of enquiry, letter of placing orders, and letter of complaint.	

PROFFESIONAL PRACTICE - II

L T P
0 0 2

Curri. Ref. No.: CE513

Total Contact Hrs.: 30 Total Marks: 50

Credit : 1

Practical:

P.A. : 30

Aim:

- Development and evaluation of individual skills
- Enhancement in soft skills through innovation.

Objective: Student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

DETAIL COURSE CONTENT

Unit 1: Industrial Visits

Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. Industrial visits may be arranged in the following areas / industries:

- Building construction site

Unit 2: Lectures by Professional / Industrial Expert

To be organized from ANY ONE of the following areas:

- Batching plant
- Different types of construction machineries and equipment

Unit 3: Individual Assignments:

Any two from the list suggested OR Conduct ANY ONE of the following activities through active participation of students and write report.

- Preparation of drawing of an existing structure
- Plot measurement
- Study of building rules – in panchayat, municipality and corporation areas
- Study of different fitting and fixtures and components of different types of shuttering

APPLIED MATHEMATICS

L T P
3 1 0

Curri. Ref. No.:G105

Total Contact Hrs.: Total Marks: 100

Theory: 45

Tutorial: 15

Credit : 4

Theory:

End Exam.: 70

P.A. : 30

RATIONALE :-

Mathematics is an important tool to solve wide variety of engineering problems. Most of the technological processes in industry are described effectively by using mathematical framework. Mathematics has played an important role in the development of mechanical, civil, aeronautical and chemical engineering through its contribution to mechanics of rigid bodies, hydrodynamics, aero-dynamics and heat transfer etc. It has become of great interest to electrical engineers through its application to information theory, and design of digital computer etc.

AIM :

Through this syllabus we aim to give students a strong foundation in Matrix and Vector with their applications. We also aim to give detail idea of Numerical Solution of Algebraic Equation, Partial Differentiation, Ordinary Differential Equations, Laplace Transform and Fourier Series.

Course Objective:-

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

1. Solve algebraic basic equations using Numerical Methods
2. Differentiate multi-variable functions using partial differentiation principle.
3. Find Complementary Function and Particular Integral of second order differential equation.
4. Solve differential equation using Laplace and Inverse Laplace Transformation.
5. Analyze non sinusoidal signals using Fourier's Series.

DETAIL COURSE CONTENT:

UNIT TOPIC / SUB-TOPIC	Lecture Hrs.
1. Numerical Solution of Algebraic Equations.	6
1.1 Bisection method.	
1.2 <i>Regula-falsi</i> method /method of false position.	
1.3 Newton-raphson method.	
1.4 Problems on the above methods.	
2. Partial Differentiation.	8
2.1 Introduction to functions of two or more variables.	
2.2 Geometrical Interpretation of a function of two variables.	
2.3 Partial derivatives.	
2.4 Second order partial derivative.	
2.5 Homogeneous function.	
2.6 Euler's theorem.	
2.7 Problems	
3. Differential Equations (ordinary):	10
3.1 Linear differential equations of second order with constant coefficients.	
3.2 Complete solution = Complementary function + Particular integral.	
3.3 Method of finding particular integral.	
3.4 Applications of differential equations to electrical circuit problems.	
3.5 Problems related to other physical systems.	
4. Laplace Transform (LT):	10
4.1 Piece-wise or sectional continuity.	
4.2 Functions of exponential order.	
4.3 Definition of function and the transform concept.	
4.4 Definition and notation of Laplace Transform.	
4.5 Linearity property.	
4.6 First shifting theorem (first translation).	
4.7 Second shifting theorem (second translation).	
4.8 Change of scale property.	
4.9 Laplace transform of derivatives.	
4.10 Laplace transform of integral	
4.11 Solution of problems using LT	
4.12 Solution of ordinary differential equation up to second order using LT.	

5. Concept of Inverse Laplace Transform & its properties	5
5.1 Definition of inverse Laplace Transform and null function.	
5.2 Linearity property.	
5.3 First shifting property.	
5.4 Second shifting property.	
5.5 Change of scale property.	
5.6 Inverse Laplace Transform of derivatives.	
5.7 Convolution theorem.	
5.8 Problems.	
5.9 Solution of differential equations using Laplace Transform.	
6. Fourier Series.	8
6.1 Periodic function.	
6.2 Trigonometric series.	
6.3 Fourier series and Fourier coefficients theorem.	
6.4 Finite discontinuity, Even functions and Odd functions.	
6.5 Change of interval and Change of period.	
6.6 Complex form of Fourier series, half range series	
6.7 Parseval's identity for Fourier series.	
6.8 Problems using Fourier series.	

SUGGESTED LEARNING RESOURCE:**Reference Books:**

1. Integral Calculus, B.C. Das
2. Diploma Engineering Mathematics (Vol. II), B.K. Pal
3. Applied Mathematics, Dr. J.S. Bindra & K.S. Gill
4. Applied Mathematics - I, Dr. J.S. Bindra & K.S. Gill
5. Applied Mathematics -III, Dr. J.S. Bindra.
6. Engineering Mathematics Vol. I, II, and III, S.Arumugam, A.Thangapandi ISSAC, and Somsundaram.

Any Suggested Assignment/Micro Project:

Sample path for Term III 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	CE401	Mechanics of Material	G206A	3	0	2	70	15	10	5	0	50	0	150	4
2	CE402	Civil Engg. Drawing I	G201 G201	1	0	3	0	0	0	0	50	25	25	100	3
3	CE404	Surveying I	NIL	3	0	4	70	15	10	5	25	25	0	150	5
4	CE405	Building Construction	NIL	3	1	0	70	15	10	5	0	0	0	100	4
5	CE406	Concrete Technology	NIL	3	0	2	70	15	10	5	25	25	0	150	4
6	G105	Applied Mathematics	G103 G104	3	1	0	70	15	10	5	0	0	0	100	4
7	G302	Development of Life Skill-Ii	NIL	1	0	2	0	0	0	0	0	25	25	50	2
9	CE513	Professional Practices – II		0	0	2	0	0	0	0	0	50	0	50	1
TOTAL				17	2	15	350	75	50	25	100	200	50	850	27