SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
CE-3401	Construction Material & Technology	3 Hours	3	1	0	4 + 0	70	22

A ~ Construction Material

UNIT - I :

Stones : Occurrence, varieties, Characteristics and their testing, uses, quarring and dressing of stones. **Timber :** Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment, need for wood substitutes, Alternate materials for shuttering doors/windows, Partitions and structural members etc. Brick and Tiles: Manufacturing, characteristics, Classification and uses, improved brick from inferior soils, Hand molding brick table, Clay-fly ash brick table, Flooring tiles and other tiles and their characteristics.

UNIT - II :

Advance Construction Materials : Use of fly ash in mortars, concrete, Fly ash bricks, stabilized mud blocks, non-erodible mud plinth, D.P.C. materials, Building materials made by Industrial & agricultural waste, clay products P.V.C. materials, advance materials for flooring, doors & windows, facia material, interiors materials for plumbing, sanitation & electrification.

B ~ Construction Techniques

UNIT - III :

Unit-III Foundation : Type of soils, bearing capacity, soil slablisation and improvement of bearing capacity, settlement and safe limits. Spread foundations, wall footings, grillage, foundations well foundation, causes of failure and remedial measures; under reamed piles, foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of foundations. Hyperbolic parabolied footing, Brick arch foundation. Simple methods of foundation design, Damp proof courses, Repairs Techniques for foundations.

UNIT - IV :

Masonry and Walls : Brick masonry, Bonds, Jointing, Stone masonry, casting and laying, masonry construction, Brick cavity walls, code provisions regarding load bearing and non load bearing walls. Common defects in construction and their effect on strength and performance of walls, designed Brick masonry, precast stone masonry block, Hollow concrete block, plastering and pointing, white and color washing, distempering, dampness and its protection, Design of hollow block masonry walls. Doors, Windows and Ventilators: Types based on material etc., size location, fittings, construction sunshades, sills and jambs, RCC doors/windows frames. Stairs types, rule of proportionality etc., Repairs techniques for masonry, walls, doors & windows.

UNIT - V :

Unit-V Floors and Roofs : Types, minimum thickness, construction, floor finishes, Flat roofs, RCC jack arch, reinforced brick concrete, solid slab and timber roofs, pitched roofs, false ceiling, roof coverings, Channel unit, cored unit, Waffle unit, Plank and Joist, Brick panel, L-Panel, Ferrocement roofing units, water proofing. Services : Water supply & Drainage, Electrification, Fire protection, thermal insulation, Air Conditioning, Acoustics & Sound insulation, Repairs to damaged & cracked buildings, techniques and materials for low cost housing., Repairs techniques for floors & roofs.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

Recommended Books :-

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction,
2. S.C. Rangwala; Engineering Materials.
3. Sushil Kumar; Building Construction.
4. B.C. Punmia; Building Construction.
5. Building Construction, Metchell
6. Construction Technology, Chudley R.
7. Civil Engineering Materials, N. Jackson.
8. Engineering Materials, Surendra Singh.

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Syllabus for Four Years Bachelor of Technology Degree Course as per NEP-2020

July-2024

SUBJECT		Exam	Contact Hours per Week			Credits	Max.	Min Pass
Code	Title	Duration	L	T	P		Marks	Marks
CE-3402	Engineering Geology	3 Hours	3	1	2	4 + 1	70	22

Course Objective : To familiarize the concept of minerals, crystals, rocks and geological time scale, geological work of different physical entities like river, glacier and sea. To classify different types of rocks and geological structures. Application of geology in different fields of civil engineering.

Course Outcomes :

* Outline the geological work of wind, river, glaciers, sea, volcanoes and earthquake.
* Apply their knowledge in understanding the importance of mineralogy and crystal systems.
* Classify various rocks based on their formation, structure and texture.
* Understand the importance of geological entities such as folds, faults, joints and unconformity in civil engineering application.
* Application of geology in civil engineering for construction of dams, reservoirs, roads, bridges, tunnels and water bearing strata.
* Understand the application of remote sensing for geological aspects in construction.

UNIT - I :

Introduction and General Geology : Objects and branches of geology. Origin of earth, age of earth and internal structure of earth, weathering of rocks, soil, soil formation, soil profile and types of Indian soils. Geological work of wind, geological of river, geological work of glaciers and geological work of sea, volcanoes and earthquake, concept of plate tectonics.

UNIT - II :

Mineralogy and Crystallography : Fundamentals of mineralogy, physical properties of minerals and study of common rock forming minerals, ores and minerals of economic importance. Elements of crystal, crystal symmetry and introduction to crystal systems.

UNIT - III :

Petrology and Geology of India : Study of igneous, sedimentary and metamorphic rocks, their formation, structures, textures and classification. Descriptive study of rocks. Rocks of civil engineering importance, physical features of India, Brief geological history of India, geological time scale, major geological groups of India and their economic importance.

UNIT - IV :

Structural Geology : Structural features of rocks, dip, strike and out croups, classification and detailed studies of geological structures i.e. folds, faults, joints, unconformity and their importance in civil Engineering.

UNIT - V :

Applied Geology : Introduction to applied geology and its use in Civil Engineering, Engineering properties of rocks. Selection of sites for construction of Dams, reservoirs, roads, bridges and tunnels, water bearing strata, use of remote sensing technique in selection of above sites.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

Recommended Books :-

1. Parbin Singh – "Engineering & General Geology".
2. P.K. Mukerjee – "A Text Book of Geology".
3. S.K. Garg – "A Text Book of Physical and Engineering Geology".
4. D. Venkat Reddy – "Engineering Geology".

Suggested List of Experiments :-

(1) Identification of simple rock forming minerals and important ores, their study and properties.
(2) Identification of rock, their physical and chemical properties.
(3) Study of geological maps and their interpretation.
(4) Folds and their interpretation.
(5) Faults and their interpretation.
(6) Unconformities and their interpretation.
(7) Field visit geological excursion.
(8) Study of various folds and types of folds.
(9) Study of various faults and types of faults.

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
CE-3403	Strength of Material	3 Hours	3	1	0	4 + 0	70	22

Course Objective : To familiarize the students with the stress, strains developed in the structural members such as beam and columns, methods to obtain shear force, bending moment and deflection under various loading.

Course Outcomes : After this course the students will able to :-
- To know the concepts of stresses, strains and Hooke's law and concept of principle stresses and evaluate shear force and bending moment and draw the respective diagrams of determinate beams for all types of loading.
- To Analyze bending stress and shear stress of the beams and To find the deflection and slope for beams using different methods.
- To Analyze Circular Shafts Subjected to Torsion and Thin Pressure Vessel.
- To analyze the compression members and concept of bukling and combined stress conditions.
- To Analyze Principal Stress and strain and Introduction to combined stresses.

UNIT - I :

Simple Stress and Strains : Concept of elastic body, stress and strain. Hooke's law, various types of stress and strains. Elastic constants. Stresses in compound bars, composite and tapering bars, Temperature stresses.
Complex Stress and Strains : Two dimensional dimensional stress system. Normal and tangential stresses, Principal planes, Principal Stresses and strains, Mohr's circle of stresses.

UNIT - II :

Shear Force & Bending Moment : For different types of beams for different loading.
Theory of Simple Bending : Concept of pure bending and bending stress, Equation of bending. Neutral axis, Section-Modulus, Determination of bending stresses in simply supported, cantilever and overhanging beams subjected to point load and uniformly distributed loading. Bending & shear stress distribution across a section in beams.

UNIT - III :

Deflection of beams : Double Integration method, Macaulay method, Area Moment method, Conjugate Beam method and Strain Energy method.

UNIT - IV :

Torsion of Shafts : Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow shafts,
Pressure Vessels : Thin walled cylinders and spheres, Stress due to internal pressure, Change in diameter and volume.
Spring : Open and closed coil springs, Leaf spring. Spiral spring.

UNIT - V :

Columns and Struts : Euler's buckling load for uniform section, various end conditions. Slenderness ratio. Stress in columns. Rankine formulae, Eccentric loading on columns. Combined Bending and Torsion, Theories of failure. Introduction and middle third rule.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

Recommended Books :-

1. Strength of Materials (Schaum Outlines Series), Nash, Tata McGraw-Hill Pub. Co. Ltd.
2. Strength of Materials, Timoshenko, Vol.I&II.
3. Strength of Materials, B.C. Punmia.
4. Strength of Materials, Ramamrutham.
5. Strength of Materials, by R.K. Bansal.
6. Strength of Materials by Bhavikatti.
7. Strength of Materials by Ryder.

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
CE-3404	Building Design & Drawing	3 Hours	3	1	2	4 + 1	70	22

Course Objective :

- To demonstrate the various the principles of building planning and relevant bye laws adopted in construction.
- To explain the students about the principles of architectural components and fundamentals of energy efficient buildings.
- To familiarize the students with different components of building and their types.
- To elaborate the classification of buildings and principles of design adopted in preparation of plans for different types of buildings.
- To demonstrate the development of perspective drawing.

Course Outcomes : On the completion of this course the students will be able to :-

- Apply the knowledge of building planning and byelaws in developing the building drawing.
- To apply the knowledge of architectural compositions and energy efficient building planning.
- To select suitable components based on building requirements and plan as per the norms.
- To develop plan, elevation and section for different types of buildings.
- To apply the provisions of National Building Code for planning of services such as lightning, ventilation, water supply, acoustics etc. & perspective drawings of simple problems.
- Utilize AutoCAD software and its command for drawing and detailing.

UNIT - I :

Principles of planning of building, building bye-laws, Orientation of building, Principle of architectural composition (Mass, Unity, Proportioning, Scale etc.), Energy efficient buildings.

UNIT – II & III :

Planning, designing & preparing drawings of residential & public buildings like primary school, office building, primary health center etc.

UNIT - IV :

Introduction of foundations, shallow and deep foundation, brick masonry, load bearing cavity and partition wall. Floor, damp proofing, water proofing, of Doors, Windows, Ventilators, Lintels, Staircases, & Roofs etc**.**

UNIT - V :

Provisions of National Building Codes (Lighting, Ventilation, Acoustics, Water Supply etc.), Elements of Perspective drawing involving simple problems.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

List of Experiments :-

1. Preparation of important signs & symbols sheets.
2. Drawing of doors, windows, and ventilators.
3. Drawing of lintels, stairs, and roofs etc.
4. Planning of Residential Building for medium class family.
5. Planning of Residential Building for high class family.
6. Planning of Primary School.
7. Planning of Primary Health Centre.
8. Perspective drawing of simple problems.

Recommended Books :-

1. Meo & Malik – Elements of Planning of Building Design.
2. Y.S. Sane – Planning of Building.
3. Gurucharan Singh – Elements of Building Design & Drawing.
4. Sushil Kumar – Building Construction, Standard Book House.
5. B.C. Punmia - Building Construction, Laxmi Publications.
6. Bindra & Arora - Building Construction

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
CE-3405	Fluid Mechanics – I	3 Hours	3	1	2	4 + 1	70	22

Course Objective :

- Understanding the basic properties of fluids and its pressure measurement.
- To understand fluid statics, Archimedes principal and concept of stability of bodies.
- Understanding fluid kinematics problems such as streamline and finding fluid particles path.
- To use important concepts of continuity equation and Bernoulli's equation.
- To study dimensional analysis and perform modelling and similarities studies between model and prototype

Course Outcomes : On the completion of this course the students will be able to :-

- Understand basic properties of fluids, measuring its pressure and stability of floating and submerged bodies.
- Apply the basic concepts of fluid kinematics.
- Apply the concepts of fluid dynamics and measure discharge of fluid flow with instruments like venturimeter, orificemeter, nozzle, mouthpiece and weir-notches.
- Analyze fluid flow problems and design its model by similarity studies.
- Interpret the types of flow in pipes and measure various losses in pipes.

UNIT - I :

Fluid Properties : Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, Newtonian, Non Newtonian, Ideal fluid.

Pressure & Its Measurement : Pressure & pressure head, Fluid pressure at a point, Pascal's law, Absolute and gauge pressure, pressure variation in static fluid, Measurement of pressure : manometers, Hydrostatic forces on surfaces : Total pressure & centre of pressure on horizontal, vertical, inclined & curved immersed surfaces and gates.

Buoyancy & Flotation : Buoyant force and its centre, metacentre and its height, stability of submerged bodies.

UNIT – II :

Fluid Kinematics : Description of fluid motions : Langrangian and Eulerian method, Types of fluid flow, types of flow lines, principles of fluid flow, continuity equation, velocity & acceleration, circulation and vorticity, velocity potential and stream function, flow net, potential flow and its cases.

UNIT - III :

Fluid Dynamics : Euler's equation of motion & Bernoulli's equation of motion along a stream line, their derivation and practical application, Pitot and Prandtl tube, Venturimeter, Orifice meter.

Linear momentum equation for steady flow, energy correction factor and momentum correction factor, moment of momentum equation,forces on fixed and moving vanes.

Flow measurement : Orifice, Nozzles, Mouth pieces, Weirs & Notches.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

UNIT - IV :

Dimensional & Model Analysis : Dimensional homogeneity, methods of dimensional analysis – Reyleigh's method, Buckingham's π method, model analysis, simulated, types of similarities, types of forces in moving fluid, dimension less numbers, model laws, model testing, classification of models, scale ratio.

UNIT - V :

Laminar or Viscous Flow : Introduction of Laminar & Turbulent flow with examples & characteristics, Reynolds experiment, Navier-Stoke equation of motion, relation between shear stress & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Loss of head due to friction in viscous flow, measurement of viscosity by rotating circular method, falling sphere method, capillary tube method and efflux viscometer.

List of Experiments :-

1. Pressure measurement by Differential Manometer.
2. Velocity measurement by Pitot / Prandtl Tube.
3. Verification of Bernoulli's equation.
4. Calibration of Venturimeter.
5. Determination of Cc, C_v, C_d of Orifices.
6. Calibration of Mouth Piece.
7. Calibration of Orifice Meter.
8. Reynolds experiment for demonstration of stream lines & turbulent flow.
9. Determination of metacentric height.
10. Determination of Friction Factor / Coefficient of friction of a pipe.

Suggested Books and Study Materials :-

1. Fluid Mechanics by Modi & Seth - Standard Book House, Delhi.
2. Fluid Mechanics by A.K. Jain - Khanna Publishers, Delhi.
3. Fluid Mechanics by Streeter - Mc Graw Hill.
4. Fluid Mechanics and Hydraulic Machines; Author, R.K. Rajput
   (Published by Africon Network & Scientific & Technical Instt. (ANSTI).
5. Fluid Mechanics and Hydraulic Machines. By R. K. Bansal

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SUBJECT		Contact Hours per Week			Credits
Code	Title	L	T	P	
CE-3406	Auto CAD	0	0	2	0 + 1

List of Experiments :-

1. Practice exercises on Working regular 2D & 3D Commands in Auto CAD software.

2. Detailing of building components like doors, windows, roof trusses etc. using CAD software's.

3. Drawing of plans of buildings using software Single Storeyed.

4. Drawing of plans of buildings using software Multi Storeyed.

5. Developing sections and elevations for Single Storeyed.

6. Developing sections and elevations for Multi Storeyed.

7. Exercises on development of working of buildings.

8. Drawing of plans of Office & Commercial buildings using software.

9. Drawing of Roof Truss & Industrial Shed.

10. To Development of 3D Elevation of Building Structure.

1 Hour Lecture (L) = 1 Credit   1 Hour Tutorial (T) = 1 Credit   2 Hours Practical (P) = 1 Credit

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