

Over viewing of synthesis, properties and applications of nanomaterials.

Scheme of examination :

Two full questions (with a maximum of four sub questions) of twenty marks each to be set from each module. Each question should cover all contents of the respective module.

Students have to answer five full questions choosing one full question from each module.

Text Books :

B.S.Jai Prakash, R.Venugopal, Sivakumaraiah & Pushpa Iyengar., "Chemistry for Engineering Students", Subhash Publications, Bangalore.

R.V.Gadag & A.Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi.

P.C.Jain & Monica Jain., "Engineering Chemistry", Dhanpat Rai Publications, New Delhi.

Reference Books :

O.G.Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint.

G.A.Ozin & A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials", RSC publishing, 2005.

"Wiley Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi. Second Edition.

V.R.Gowarikar, N.V.Viswanathan & J.Sreedhar., "Polymer Science", Wiley-Eastern Ltd.

M.G.Fontana., "Corrosion Engineering", Tata McGraw Hill Publishing Pvt. Ltd. New Delhi.

ELEMENTS OF CIVIL ENGINEERING AND MECHANICS

Subject Code : 14CV13/23

Hours/Week : 04

Total Hours : 50

IA Marks : 25

Exam. Hours : 03

Exam. Marks : 100

Course Objectives :

The objectives of this course is to make students to learn basics of civil engineering concepts and infrastructure development, solve problems involving Forces, loads & moments and know their applications in allied subjects. It is a pre-requisite for several course involving Forces, Moments, Centroids moments, Centroids, Moment of inertia & Kinematics.

Module – 1

Introduction to Civil Engineering & Engineering Mechanics :

Introduction to Civil Engineering,

Scope of different fields of Civil Engineering - Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.

Infrastructure: Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country.

Roads: Classification of Roads and their functions, Comparison of Flexible and Rigid Pavements (Advantages and Limitations)

Bridges: Types of Bridges and Culverts, RCC, Steel and Composite Bridges

Dams: Different types of Dams based on Material, Structural behavior and functionality with simple sketches.

Introduction to Engineering Mechanics :

Basic idealizations - Particle, Continuum and Rigid body; Force and its characteristics, types of forces, Classification of force systems; Principle of physical independence of forces, Principle of superposition of forces, Principle of transmissibility of forces; Newton's laws of motion, Introduction to SI units. Couple, Moment of a couple, Characteristics of couple, Moment of a force, Equivalent force - Couple system; Numerical problems on moment of forces and couples, on equivalent force - couple system.

10 Hours

Module – 2

Analysis of Force Systems- Concurrent & Non Concurrent System :

Concurrent Force System :

Composition of forces - Definition of Resultant; Composition of coplanar - concurrent force system, Parallelogram Law of forces, Principle of resolved parts; Numerical problems on composition of coplanar concurrent force systems.

1 Concurrent Force System :

Composition of coplanar - non-concurrent force system, Varignon's principle of moments; Numerical problems on composition of coplanar non-concurrent force system.

10 Hours

Module – 3

Equilibrium of Forces and Friction :

Equilibrium of Concurrent and Non-concurrent Forces :

Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar - concurrent and non-concurrent force systems.

Support Reaction :

Types of Loads and Supports, statically determinate beams, Numerical problems on support reactions for statically determinate beams with Point Load (Normal and inclined) and uniformly distributed loads.

Friction :

Definitions: Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; Impending motion on horizontal and inclined planes;

Numerical Problems on single and two blocks on inclined planes. Numerical problems on Ladder and Wedge friction.

10 Hours

Module – 4

Centroid and Moment of Inertia of Engineering Sections Centroids :

Introduction to the concept, centroid of line and area, centroid of basic geometrical figures, computing centroid for composite lines and Engineering composite sections – T, L, I and Z & full quadrant Circular sections and their built up sections, Numerical problems

Moment of Inertia :

Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of basic planar figures,

computing moment of Inertia for Engineering composite sections – T, L, I and Z & full quadrant Circular sections and their built up sections, Numerical problems

10 Hours

Module – 5

Kinematics :

Definitions – Displacement – Average velocity – Instantaneous velocity – Speed – Acceleration – Average acceleration – Variable acceleration – Acceleration due to gravity – Newton's Laws of Motion, Rectilinear Motion– Numerical problems.

Curvilinear Motion – Super elevation – Projectile Motion – Relative motion – Numerical problems.

Motion under gravity – Numerical problems.

10 Hours

Course Outcomes :

After successful completion of the course, the student will be able to,

- Know basics of Civil Engineering, its scope of study, knowledge about Roads, Bridges and Dams.
- Comprehend the action of Forces, Moments and other loads on systems of rigid bodies
- Compute the reactive forces and the effects that develop as a result of the external loads
- Express the relationship between the motion of bodies and
- Equipped to pursue studies in allied courses in Mechanics.

Scheme of examination :

- Two full questions (with a maximum of four sub questions) of twenty marks each to be set from each module. Each question should cover all contents of the respective module.
- Students have to answer five full questions choosing one full question from each module.

Text Books :


1. M.N.Shesha Prakash and Ganesh.B.Mogaveer, "Elements of Civil Engineering and Engineering Mechanics", PHI Learning, 3rd Revised edition (2014)
2. A.Nelson, "Engineering Mechanics-Statics and Dynamics", Tata McGraw Hill Education Private Ltd, New Delhi, 2009

Reference Books :

S.Timoshenko, D.H.Young and J.V.Rao, "Engineering Mechanics", TATA McGraw-Hill Book Company, New Delhi

Beer FP and Johnston ER, "Mechanics for Engineers- Dynamics and Statics", 3rd SI Metric edition, Tata McGraw Hill. - 2008

Shames IH, "Engineering Mechanics-Statics & Dynamics", PHI-2009


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PROGRAMMING IN C AND DATA STRUCTURES

Subject Code : 14PCD13/14PCD23

IA Marks : 25

Hours/Week : 04

Exam. Hours : 03

Total Hours : 50

Exam. Marks : 100

Course Objectives :

The objectives of this course are to make students to learn basic principles of Problem solving, implementing through C programming language and to design & develop programming skills, and to know about data structures and their applications.

Module – 1

Introduction To C Language : Pseudo code solution to problem, Basic concepts in a C program, Declaration, Assignment & Print statements, Types of operators and expressions etc, Programming examples and exercise.

Text 1: Chapter 2. Text 2: 1.1, 1.2, 1.3.

10 Hours

Module – 2

Branching and Looping : Two way selection (if, if-else, nested if-else, cascaded if-else), switch statement, ternary operator? Go to, Loops (For, while-do, do-while) in C, break and continue, Programming examples and exercises. Text 1: Chapter 3. Text 2: 4.4.

10 Hours

Module – 3

Functions, Arrays and Strings:

Arrays and Strings : Using an array, Using arrays with Functions, Multi-Dimensional arrays. String: Declaring, Initializing, Printing and reading strings, string manipulation functions, String input and output functions, array of strings, Programming examples and Exercises.

Text 1: 5.7, Text 2: 7.3, 7.4, chapter 9

Functions : Functions in C, Argument Passing – call by value, call by reference, Functions and program structure, location of functions, void and parameter less Functions, Recursion, Programming examples and exercises.

Text 1: 1.7, 1.8, Chapter 4. Text 2: 5.1 to 5.4.

10 Hours