# DEPARTMENT: CIVIL ENGINEERING

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Qualification</th>
<th>Designation</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. I. Ramesh Mithantaya</td>
<td>Ph.D</td>
<td>Prof/ Vice Principal/Dean(Aca)</td>
</tr>
<tr>
<td>2</td>
<td>Dr. N. Bhavani Shankar Rao</td>
<td>Ph.D</td>
<td>Professor</td>
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<tr>
<td>3</td>
<td>Dr. Udaya Kumar G.</td>
<td>Ph.D</td>
<td>Professor</td>
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<tr>
<td>4</td>
<td>Dr. Srinath Shetty K.</td>
<td>Ph.D</td>
<td>Prof. &amp; Head</td>
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<tr>
<td>5</td>
<td>Dr. Radhakrishnan K.</td>
<td>Ph.D</td>
<td>Professor</td>
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<tr>
<td>6</td>
<td>S.K. Mahadeve Gowda</td>
<td>M.Tech</td>
<td>Asso. Prof</td>
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<td>7</td>
<td>J.K. Lokesh</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
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<td>8</td>
<td>Y. Umashankar Shetty</td>
<td>M.Tech</td>
<td>Asst. Prof Gd III</td>
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<td>9</td>
<td>Y.R. Suresh</td>
<td>M.Tech</td>
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<td>10</td>
<td>Purushotham C.T.</td>
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<td>11</td>
<td>Sundip Shenoy R.</td>
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<td>12</td>
<td>Leeladhar Pammar</td>
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<td>13</td>
<td>Pushparaj</td>
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<td>T.N. Shridharan</td>
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<td>Prashanth Kumar</td>
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<td>Akshay N.K.</td>
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<td>Rakshith Kumar Shetty</td>
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<td>19</td>
<td>Manjunath M.</td>
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<td>Anil Kumar</td>
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<td>Thangamani R.</td>
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<td>Joel Santhosh</td>
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<td>24</td>
<td>Akshatha Shetty</td>
<td>M.Tech</td>
<td>Asst Prof Gd I</td>
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Department of Civil Engineering, NMAMIT, Nitte

Vision:
To uphold the Department as a leader in innovation and excellence in the field of Civil Engineering by offering world class curricula, training for students and research and consultancy services to meet the global challenges and market demands.

Mission:
The Department of Civil Engineering will strive hard to
- Provide the students a strong theoretical knowledge to understand the basic concept in each stream
- Highlight the significance of the Civil Engineering subjects through practical applications
- Prepare the students to face the scholastic competitions to upgrade their knowledge
- Encourage the students to develop professional ethics through discipline and principles

Programme Educational Objectives (PEO’s):
Students will be guided to
- Acquire both theoretical and practical knowledge to solve Civil Engineering problems
- Gain potentiality in the subjects to tackle the practical problems with enthusiasm
- Develop eagerness to learn more and more to face the challenges involved to meet the global demands

Programme Outcomes (PO’s):
Students will develop the
- Ability to achieve excellence in the professional career
- Ability to analyse and design the problems related to Civil Engineering
- Understanding of the practical applications of the theory learnt
# DEPARTMENT OF CIVIL ENGINEERING
## SCHEME OF TEACHING

### VII Semester

<table>
<thead>
<tr>
<th>Sub-Code</th>
<th>Title</th>
<th>Teaching Dept</th>
<th>Contact Hours/week</th>
<th>Duration of SEE</th>
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### LIST OF ELECTIVES

- CV711 Solid Waste Management
- CV712 Highway Geometric Design
- CV713 Advanced Concrete Technology
- CV714 Theory of Elasticity
- CV721 Design of Bridges
- CV722 Pavement Materials and Construction
- CV723 Numerical methods in Civil Engineering
- CV724 Open Channel Hydraulics
- CV725 Earth Retaining Structures
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<tr>
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<td>Design and Drawing of Steel Structures</td>
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### LIST OF ELECTIVES
- CV811 Reinforced Earth Structures
- CV812 Ground Water Recharge & Water
- CV813 Air Pollution & Control
- CV814 Pavement Design
- CV815 Applied Hydrology
- CV816 Earthquake Resistant Structures
- CV817 Valuation of Real Properties
- CV818 Finite Element Methods of Structural Analysis
- CV819 Design of Hydraulic Structures
- CV8X07 Environmental Impact Assessment
HYDROLOGY AND IRRIGATION ENGINEERING

Subject Code : CV701 Credits : 04
Hrs/Week : 4 Total Hours : 52

Objectives of the course-
1. To make the students to understand the concepts of hydrology and irrigation engineering and hydraulic structures.
2. At the end of the course student must be able to solve problems associated with the subject.

Pre-requisites of the course: - CV 305.

UNIT - I
INTRODUCTION: Definition of hydrology, importance of hydrology, global water availability, practical applications of hydrology, hydrologic cycle, concept of catchment and water budget equation.
PRECIPITATION: Definition, forms and types of precipitation, measurement of rain fall. recording and non recording type of rain gauges, consistency of rainfall data (double mass curve method), computation of mean rainfall (arithmetic average, Thiessen’s polygon and isohyetal methods), mass curve, rainfall hyetographs, intensity – duration - frequency curves.

UNIT - II
WATER LOSSES: Introduction, infiltration, factors affecting infiltration capacity, measurement (double ring infiltrometer), Horton’s infiltration equation, infiltration indices. evaporation-process, factors affecting evaporation, evapotranspiration, PET, AET, factors affecting ET, estimation of ET.
RUNOFF: Components of runoff, factors affecting runoff, stream flow measurements,area velocity method and slope area method, rainfall - runoff relationship, peak runoff estimation using rational method.

UNIT - III
IRRIGATION: Benefits and ill effects of irrigation, Water logging, need for drainage, sources of water for irrigation, Systems and Methods of irrigation, Reference crop evapotranspiration, crop coefficients, crop water requirements, irrigation water requirements, leaching requirements, irrigation efficiency, frequency of irrigation.
UNIT - IV
CANALS: Types of canal, alignment of canals, design of rigid and mobile boundary canals- Lacey’s and Kennedy’s methods, description of canal drops, canal regulators, cross drainage works.  **10 Hrs**

UNIT - V
RESERVOIRS: Types, investigation for reservoir sites, storage zones, determination of storage capacity and yield of a reservoir using mass inflow curve.
GRAVITY DAMS: Forces acting on gravity dam, modes of failure, elementary and practical profile, low and high gravity dams, simple design by single step method.
EARTHEN DAMS: Types of earthen dams, modes of failure of earthen dams.  **12 Hrs**

TEXT BOOKS:

REFERENCE BOOKS:
QUANTITY SURVEYING & ESTIMATION

Subject Code: CV702
Credits: 04
Hrs/Week: 4
Total Hours: 52

Objectives of the course: To estimate the quantities required and cost of different items of civil engineering works.

Prerequisite of the course: CV405, CV406

UNIT - I

ESTIMATES: Different type of estimates, study of various drawing attached with estimates, important terms, units of measurements, abstract, approximate methods of estimating buildings, cost from materials and labour, equations recommended by CBRI-examples.

BUILDING ESTIMATES: Methods of taking out quantities and cost, center line method, long and short wall method or crossing method, preparation of detailed and abstract estimates for the following - masonry structures and framed structures with flat sloped RCC roofs, beams, columns and column footings, RCC roof slabs.

20 Hrs

UNIT - II

ESTIMATES OF CIVIL ENGINEERING WORKS: Steel truss (Fink and Howe truss), RCC slab culverts manhole and septic tanks.

SPECIFICATION: Objective of writing specifications essentials in specifications, general and detail specifications of item of works in buildings, specifications of aluminum and wooden partitions, false ceiling, aluminum and fiber doors and windows, various types of claddings.

8 Hrs

UNIT - III

RATE ANALYSIS: Working out quantities and rates for following standard items of works-earth work in different types of soils, cement concrete of different mixes, bricks and stone masonry, flooring, plastering, RCC works, centering and form work for different RCC items, wood and steel works for doors, windows and ventilators.

8 Hrs

UNIT - IV

COMPUTATION OF EARTH WORK FOR ROADS: Methods for computation of earthwork, cross sections, mid section formula, trapezoidal formula, average end area or mean sectional area method, prismoidal formula, for different terrains.

8 Hrs
UNIT – V

CONTRACTS: Types of contract-essentials of contract agreement-legal aspects, penal provisions on breach of contract, definition of the terms: tender, earnest money deposit, security deposit, tender forms, documents and types, comparative statements, acceptance of contract documents and issue of work orders, duties and liabilities, termination of contract, completion certificate, quality control, right of contractor, refund of deposit, administrative approval, technical sanction, nominal muster roll, measurements-preparation of bills. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
5. Nanavati.J., “Professional Practice for Civil Engineers".
DESIGN OF STEEL STRUCTURES

Subject Code : CV703  
Credits : 04  
Hrs/ Week : 4  
Total Hours : 52

Objective: To understand the behaviour of Steel structures and designing as per IS800:2007.

Prerequisites: CV303, CV402, CV501

UNIT - I
INTRODUCTION: Advantages and disadvantages of steel structures, loads and load combinations, Design considerations, Limit State Method (LSM) of design, failure criteria for steel, IS code provisions, section classification, fire resistance and ductility of steel.
BOLTED CONNECTIONS: Advantages and disadvantages, Design strength of HSFG bolts, design of bolted connections, brackets connections.
WELDED CONNECTIONS: Advantages and disadvantages, Types of welds, defects in welds, strength of welds, design of welded connections, brackets connections.  

UNIT - II
DESIGN OF TENSION MEMBERS: Modes of failure, axially loaded tension members and their connections, concept of lug angles.
DESIGN OF COMPRESSION MEMBERS: Modes of failure, Design of single angle struts, compression members.

UNIT - III
DESIGN OF COMPRESSION MEMBERS: Design of built up compression members, Laced and battened systems, splicing.
COLUMN BASES: Design of simple slab base, gusseted base.

UNIT – IV
DESIGN OF FLEXURAL MEMBERS: Types of beams, Modes of failure, Design strength of laterally supported and unsupported beams in bending and shear, Maximum deflection, Design of laterally supported and unsupported beams.
UNIT – V
TYPES OF CONNECTIONS: Beam to beam, beam to column – bolted and welded, framed and seated, stiffened and unstiffened connections (moment resistant connections not included). 10 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
2. IS – 800: 2007, Steel tables (to be supplied in examination).

DESIGN OF PRE-STRESSED CONCRETE STRUCTURES
Subject Code : CV704 Credits : 03
Hrs/ Week : 3 Total Hours : 39

Objective of the course: At the end of the course students must be able to analyze and design various pre tensioned and post tensioned structural components using I S 1343-1980.

Pre-requisites of the course: CV 402, CV 405

UNIT - I
MATERIALS: High strength concrete and steel, stress-Strain characteristics and properties.
BASIC PRINCIPLES OF PRESTRESSING: Fundamentals, load balancing concept, Stress concept, centre of thrust. Pre-tensioning and post-tensioning systems, tensioning methods and end anchorages. 7 Hrs
UNIT - II
ANALYSIS OF SECTIONS FOR FLEXURE: Stresses in concrete due to pre-stress and loads, cable profiles.
LOSSES OF PRE-STRESS: Various losses encountered in pre-tensioning and post tensioning methods, determination of jacking force. 8 Hrs

UNIT - III
DEFLECTIONS: Deflection of a pre-stressed member – Short term and long term deflections, elastic deflections under transfer loads and due to different cable profiles, Deflection limits as per IS 1343, effect of creep on deflection, load verses deflection curve, methods of reducing deflection 8 Hrs

UNIT - IV
LIMIT STATE OF COLLAPSE: Flexural strength of sections, Shear- IS Code recommendations, shear resistance of sections, shear reinforcement, limit state of serviceability – control of deflections and cracking.

UNIT – V
DESIGN OF BEAMS: Design of pre-tensioned and post-tensioned symmetrical and asymmetrical sections. Permissible stress, design of prestressing force and eccentricity. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
3. IS: 1343: 1980
4. N. Rajgopalan, “Pre-stressed Concrete”.
CONCRETE AND HIGHWAY MATERIALS LABORATORY

Subject Code : CV705  
Credits : 02
Hrs/ Week : 03

1. Normal Consistency Test for cement paste.
2. Setting time test for cement
3. Compressive strength test for cement
4. Specific gravity test for cement
5. Slump test
6. Compaction factor test
7. Vee Bee test
8. Compressive strength on concrete cubes
9. Split tensile test on concrete cylinders
10. Flexural strength test on concrete beams
11. Aggregate Crushing value test
12. Los Angeles Abrasion test
13. Aggregate Impact value test
14. Shape tests (Flaky and Elongation)
15. Specific Gravity test of aggregate
16. Water absorption test
17. Specific gravity test on bitumen
18. Penetration test on bitumen
19. Ductility test on bitumen
20. Softening point test on bitumen
21. Flash and Fire point test on bitumen
22. Viscosity test on bitumen

Demonstration of
1. Soundness test for cement by autoclave method
2. Air permeability test for cement

REFERENCE BOOKS:
1. Highway material testing laboratory manual
3. Relevant IS Codes and IRC Codes
SOLID WASTE MANAGEMENT

Subject Code : CV711
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objectives of the course: To equip the students with the various elements of Solid waste management.

Pre-requisites of the course: CV 505, CV 604

UNIT - I
INTRODUCTION-Definition, land pollution- scope and importance of solid waste management, functional elements of solid waste management, sources - classification and characteristics- municipal, commercial & industrial, methods of quantification. 8 Hrs

UNIT - II
COLLECTION AND TRANSPORTATION: Systems of collection, collection equipment, garbage, chutes, transfer stations- bailing and compacting, route optimization techniques and problems.
TREATMENT/PROCESSING TECHNIQUES: Components separation, volume reduction, size reduction, chemical reduction and biological processing. 7 Hrs

UNIT - III
INCINERATION: Process- 3 T’s factors affecting incineration process, incinerators- types prevention. air pollution.
COMPOSTING: Aerobic and anaerobic composting; factors affecting composting; Indore and Bangalore processes; mechanical and semi mechanical composting processes; Vermi composting. 8 Hrs

UNIT – IV
SANITARY LAND FILLING: Different types, trench area, ramp and pit method, site selection, basic step involved, cell design, prevention of site pollution, leachate & gas collection and control methods, geosynthetic fabrics in sanitary land fill. 8 Hrs

UNIT - V
DISPOSAL METHODS: Open dumping –selection of site, ocean disposal, feeding to hogs, biomedical waste and disposal, pyrolysis
RECYCLE: Material and energy recovery operations, reuse in other industries, plastic wastes, environmental significance and reuse. 8 Hrs
TEXT BOOKS:
2. Bhide and Sunderashan, “Solid Waste Management in developing countries”. (chk name)

REFERENCE BOOKS:

HIGHWAY GEOMETRIC DESIGN
Subject Code : CV712
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objectives of the course: To study the different road geometrics and designing it as per IRC Standard.
Pre-requisite of the course: CV403, CV 504

UNIT - I
INTRODUCTION: Elements of geometric design control factors like topography-design speed, design vehicle, traffic capacity, volume, environment and other factors-IRC and AAHO standards and specification, PCU concept for design. 7 Hrs

UNIT - II
CROSS SECTION ELEMENTS: Pavement surface characteristics – friction, skid and skid resistance, pavement unevenness, light reflecting characteristics, camber and its shapes, providing camber in the field, pavement width computation, kerbs and its types, medians, shoulders, foot paths, parking lanes, service roads, cycle- tracks, driveways, guard rails, width of formation, right of way, design of road humps as per IRC Specification. 9 Hrs
UNIT - III
SIGHT DISTANCES: Stopping and over taking sight distances, sight distances at Intersections, set back distances at curves (single lane and multiple lane). 

UNIT - IV
HORIZONTAL ALIGNMENT: Design elements, super elevation, extra widening of pavements at curves transition curves types and ideal curve; vertical alignment: gradient, vertical curve design criteria, types of summit and valley curves, design of vertical curves, design standards for hill roads.

UNIT – V
INTERSECTION DESIGN: Elements of an intersection, maneuver area, speed lanes-various types of intersection, flyovers, grade separators, subways, under pass, suitability of each types and their design principles, grade separations, intersections at grade-islands, rotary and its design only.
HIGHWAY DRAINAGE: Importance, surface and subsurface drainage, design of cross sections.

TEXT BOOKS:

REFERENCE BOOKS:
2. Relevant IRC publications.
ADVANCED CONCRETE TECHNOLOGY

Subject Code : CV713
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objectives of the course:
01. Define various terminologies used in Advanced concrete technology.
02. Understand the concept and mechanism of chemical & mineral admixture used in concrete.
03. Understand the concept of concrete Mix design using IS 10262:2009
04. Design the nominal concrete mix.
05. Discuss the Durability concepts and advanced forms of concrete like Light weight concrete, SCC, FRC, HPC.
06. Know about the tests conducted on the hardened concrete.

Prerequisites: This subject requires the student to know about fundamentals of Concrete technology.

UNIT - I
INTRODUCTION: Importance of Bogue’s compounds, Structure of a Hydrated Cement Paste, Volume of hydrated product, porosity of paste and concrete.
CHEMICAL ADMIXTURES- Mechanism of chemical admixture, Plasticizers and super plasticizers and their effect on concrete property in fresh and hardened state, Marsh cone test for optimum dosage of super plasticizer, retarder, accelerator, Air-entraining admixtures, new generation superplasticiser.
MINERAL ADMIXTURE-Fly ash, Silica fume, GCBS, and their effect on concrete property in fresh state and hardened state. 8 Hrs

UNIT – II
MIX DESIGN - Factors affecting mix design, design of concrete mix by BIS method using IS10262 and current American (ACI)/ British (BS) methods. Provisions in revised IS: 10262-2009. 8 Hrs

UNIT - III
RMC concrete - manufacture, transporting, placing, precautions, Methods of concreting- Pumping, under water concreting, shotcrete, High volume fly ash concrete concept, properties, typical mix 7 Hrs
UNIT - IV
SELF COMPACTING CONCRETE: Concept, materials, tests, properties, application and typical mix.
FIBER REINFORCED CONCRETE - Fibers types and properties, Behavior of FRC in compression, tension including pre-cracking stage and post-cracking stages, behavior in flexure and shear, Ferro cement - materials, techniques of manufacture, properties and application. 8 Hrs

UNIT - V
LIGHT WEIGHT CONCRETE: Materials, properties and types, typical light weight concrete mix.
HIGH DENSITY CONCRETE AND HIGH PERFORMANCE CONCRETE: Materials, properties and applications, typical mix.
TEST ON HARDENED CONCRETE: Effect of end condition of specimen, capping, H/D ratio, rate of loading, moisture condition. Compression, tension and flexure tests. Tests on composition of hardened concrete-cement content, original w/c ratio. NDT tests concepts- Rebound hammer, pulse velocity methods. 8 Hrs

TEXT BOOKS:
2. M.S. Shetty, “Concrete Technology”.
3. P.K. Mehta, P J M Monteiro, “Concrete”, Prentice Hall, New Jersey (Special Student Edition by Indian Concrete Institute, Chennai)

REFERENCE BOOKS:
1. ACI Code for Mix Design
2. IS 10262-2009
3. N. Krishna Raju, “Concrete Mix Design”, Sehgal Publishers
THEORY OF ELASTICITY

Subject Code : CV714  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39

Objective: To learn the basic principles involved in elasticity and to solve problems related to civil engineering.

Pre-requisites: CV303, CV402

UNIT - I
Introduction to mathematical theory of elasticity, definition of continuum, stress and strain at a point, constitutive laws, Generalized Hooke’s law, Strain-displacement relations, Stress tensor, Stress transformation, Stress invariants, Strain tensor, Strain invariants, Plane stress and plane strain, Principal stresses and strains.  8 Hrs

UNIT - II
Measurement of surface strains, Strain rosettes, Mohr’s circle, Analytical method, Differential equations of equilibrium, Boundary conditions, Compatibility equations, Airy’s stress function, Stress polynomials, Saint Venant’s principle, Problems.  8 Hrs

UNIT – III
Two dimensional problems in Cartesian coordinates, Relationship between plane stress and plane strain, Stress function, Bending of a cantilever beam subjected to end load, Pure bending of beam, Effect of shear deformation in beams, Simply supported beam subjected to udl, Numerical problems.  7 Hrs

UNIT - IV
Two dimensional problems in polar coordinates, Strain-displacement relations, Equilibrium equations, Compatibility equations, Airy’s stress function, Axisymmetric problems, Rotating discs of uniform thickness, Lame’s problem- thick cylinder.  8 Hrs

UNIT - V
Effect of circular holes on stress distribution in plates subjected to tension, compression and shear, stress concentration factor. Torsion: General solution, Boundary conditions, torsion of circular and elliptical sections, Membrane analogy of rectangular sections.  8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:

DESIGN OF BRIDGES

Subject Code : CV721 Credits : 03
Hrs/ Week : 3 Total Hours : 39

Objectives of the course: To make the students familiar with the various types of bridges in civil engineering.
Pre-requisites of the course: CV 601

UNIT - I
BRIDGES : Types of Bridges, Components of Bridges, Selection of site for bridge, linear waterway.
LOADS AND STRESSES: Various loads to be considered while designing bridges, IRC loading standards, impact factor. 7 Hrs

UNIT - II
SLAB CULVERT: Design of slab culvert for IRC class AA and class-A loading, design of pipe culvert, empirical design of bank connections. 8 Hrs
UNIT - III
DESIGN OF T-BEAM BRIDGE: Design of T-beam bridge for class AA tracked vehicle, design of interior deck slab panel by Piegau's theory.
Design of longitudinal girder by Courbon's theory, approximate design of cross girder. 8 Hrs

UNIT – IV
DESIGN OF WELDED PLATE GIRDER BRIDGE: Design of main section, intermediate stiffener, bearing stiffener, cross bracings. 8 Hrs

UNIT - V
DESIGN OF PRESTRESSED BRIDGES : Design of girders only 8 Hrs

TEXT BOOKS:
2. Krishna Raju, “Design of Bridges”, Oxford IBH publications

REFERENCE BOOKS:
PAVEMENT MATERIALS AND CONSTRUCTION

Subject Code : CV 722  Credits : 03
Hrs/ Week : 3  Total Hours : 39

Objective: To equip the students to distinguish the different materials used, equipments utilized and methods adopted in the construction of different types of pavements.

Prerequisites: CV503, CV602

UNIT - I
AGGREGATES: Origin, classification, requirements, properties and tests on road aggregates. Concepts of size and gradation, design gradation. Maximum aggregate size, aggregate blending to meet the specification using Rothfutch’s method.
BITUMEN AND TAR: Origin, preparation, properties and chemical constituents of Bitumen and Tar, Requirements for pavement construction.  8 Hrs

UNIT – II
BITUMINOUS MIXES: Mechanical properties, dense and open textured mixes, flexibility and brittleness (excluding Hveem stabilometer & Hubbar – field tests). Bituminous mix design by Marshall method and specification using different criteria- voids in mineral aggregate, voids in total mix, density, flow, stability and voids filled with bitumen.  10 Hrs

UNIT – III
EQUIPMENT IN HIGHWAY CONSTRUCTION: Different types of equipment for excavation, grading and compaction, their working principle, advantages and limitations. Equipment for the construction of bituminous and cement concrete pavement and stabilized soil road.
SUB GRADE: Earthwork grading, construction of embankments and cuts for roads. Preparation of sub grade, quality control tests.  7 Hrs

UNIT - IV
FLEXIBLE PAVEMENTS: Specifications of materials, construction method and field control checks for different types of flexible pavement layers.  7 Hrs
UNIT - V
CEMENT CONCRETE PAVEMENTS: Specifications of materials and method of construction of cement concrete pavements, Quality control tests. Different types of joints used and their construction method.  7 Hrs

TEXT BOOKS:

REFERENCE BOOKS:

NUMERICAL METHODS IN CIVIL ENGINEERING

Subject Code : CV723  Credits : 03
Hrs/ Week : 3  Total Hours : 39

Objectives: To equip the students in solving civil engineering problems using the numerical techniques and to compare the results with classical approach.

Pre-requisites: CV404, CV501, CV505, CV604.

UNIT - 1
INTRODUCTION, SCOPE AND IMPORTANCE OF THE SUBJECT:
Solution of linear simultaneous equations by the following methods: (i) Gaussian elimination, (ii) Gauss-Jordan matrix inversion, (iii) Gauss-Siedel, (iv) Factorization.
Application of the above methods in solving problems by slope-deflection method applied to beams and frames, problems in construction planning.  8 Hrs
UNIT - II
Finding the roots of nonlinear algebraic and transcendental equations by (i) Bisection method, (ii) Newton-Raphson method.
Application of the above methods to solve problems in structural engineering, hydraulics, geotechnical engineering and environmental engineering.  
8 Hrs

UNIT – III
NUMERICAL INTEGRATION TECHNIQUES: (i) Trapezoidal rule, (ii) Simpson’s one third rule.
Application of the above methods for computing the area of BMD for statically determinate beams.
Computation of slope and deflection in statically determinate beams by New Marks method.  
8 Hrs

UNIT – IV
Solution of ordinary differential equations by (i) Euler’s method, (ii) 4th order Runge-Kutta method.
Application of the above methods to solve civil engineering problems.  
7 Hrs

UNIT - V
Finite difference techniques to solve problems in structural mechanics.
Analysis of statically determinate and indeterminate beams, buckling of columns.  
8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
OPEN CHANNEL HYDRAULICS

Subject Code : CV724  
Credits : 03
Hrs/ Week  : 3  
Total Hours : 39

UNIT - I
INTRODUCTION: Difference between pipe flow and open channel flow, classification of flow, energy equation, momentum equation, kinetic energy and momentum factors.
UNIFORM FLOW: Concepts, uniform flow equations, conveyance and hydraulic exponent for uniform flow, design of channels for uniform flow.  
8 Hrs

UNIT - II
CRITICAL FLOW: Concept of specific Energy – Classification of flow, Section Factor, Hydraulic exponent for critical flow, critical depth as a flow measurement.  
7 Hrs

UNIT - III
8 Hrs

UNIT - IV
RAPIDLY VARIED FLOW: Concepts, hydraulic jump in rectangular channels, classification of jumps, characteristics of jump – length location, height, application of hydraulic jump, Hydraulic jump in sloping channels, Jump in nonrectangular channels.  
8 Hrs

UNIT - V
SEDIMENT TRANSPORT: Sediment related problems, Sediment properties, Modes of sediment transport, Regimes of flow, Initiation of motion, Bed forms, Shield’s criteria, Sediment Load, Design of stable channels, Regime Channels, reservoir sedimentation, catchment sediment yield.  
8 Hrs

TEXT BOOKS:
REFERENCE BOOKS:

EARTH RETAINING STRUCTURES

Subject Code : CV725
Credits : 03
Hrs/Week : 3
Total Hours : 39

Objective: To make the students know the details about different types of earth retaining structures and to acquire sufficient knowledge about the design of these structures.

Expected outcome: At the end of the course students must be able to design any type of earth retaining structures considering the available data.

Pre requisite: Students should have studied 12CV 103, CV 303, CV503 and CV602.

UNIT – I

RETAINING WALLS: Types of retaining wall and forces on each type of wall. Modes of failure of retaining walls - sliding, overturning and bearing. Stability analysis and principles of the design of retaining walls – Gravity retaining walls, Cantilever retaining walls, counter fort retaining walls (no structural design). Drainage from the backfill.

8 Hrs

UNIT – II


7 Hrs
UNIT – III
BULK HEADS: Anchored Sheet Pile Walls: Anchored sheet pile with free earth support in cohesion-less and cohesive soil. Anchored sheet pile with fixed earth support method. Design problems using free earth and fixed earth support method. Types, locations and design of anchors. Description of Relieving platform, its use and advantages. 8 Hrs

UNIT – IV
BRACED CUTS: Introduction. Lateral earth pressure on sheeting, Different types of sheeting and bracing systems. Design of various components of bracings. 7 Hrs

UNIT - V

TEXT BOOKS:

REFERENCE BOOKS:
1. Soil Mechanics and Foundation Engineering,: Dr. B.C. Punmia, Laxmi Publications Ltd.,
ENVIRONMENTAL IMPACT ASSESSMENT

Subject Code : CV 8X07  Credits : 03
Hrs/ Week : 3  Total Hours : 39

Objectives of the course: To equip the students with the various key elements of EIA.

Pre-requisites of the course: CV 113

UNIT - I
Developmental activity and ecological factors; EIA, EIS, FONSI. Need for EIA studies, Baseline information, Procedure for conducting EIA, Limitation of EIA; Environmental Acts/policies.  8 Hrs

UNIT – II
Frame work of impact assessment in developmental projects; Environmental setting, EIA- Objective, content, methodologies, techniques, Rapid and comprehensive EIA.  9 Hrs

UNIT – III
Assessment and prediction of attributes: Air, Water, Noise, Land, Ecology, Soil, Socio-economic environment.  7 Hrs

UNIT - IV
Public participation in environment decision making, practical consideration in preparing EIA and EIS, salient features of the project activity, Environmental parameter – activity relationship matrices.  8 Hrs

UNIT - V
EIA for construction project, power projects, mining projects.  7 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
1. Guidelines for EIA of developmental projects, Ministry of Environment and Forest, GOI
ENGINEERING MANAGEMENT

Subject Code : CV801
Credits : 04
Hrs/ Week : 04
Total Hours : 52

Objectives of the course: To study the various concepts of Engineering management.

UNIT - I
INTRODUCTION TO ENGINEERING ECONOMICS- Basic Concepts of economic analysis, Micro and Macro analysis, project feasibility, economic and financial feasibility, benefit cost ratio, interest formula, present worth, future worth, Annual equivalent, Basis for comparison of alternatives, rate of return method, break even analysis, planning methods. 12 Hrs

UNIT – II
CONSTRUCTION INDUSTRY AND MANAGEMENT: Introduction, Value engineering, time management, labor and Material management, Contract and contractor, organization and administration, industrial financial management. 8 Hrs

UNIT – III
CONSTRUCTION PLANNING - Introduction, time estimates, planning methods of projects, Bar and Milestone charts, PERT and CPM network analysis, cost model, direct cost, indirect cost, total cost, optimum cost optimum duration of project problems, CPM network analysis, Line of Balance Technique, Resource Allocation and Updating. 11 Hrs

UNIT - IV
CONSTRUCTION EQUIPMENT- Introduction, various earth moving equipments, hoisting equipments, concrete mixer and plants, conveyors and rollers, trenching machines, equipment for Highway construction, factor for selecting equipment, special equipment, economic analysis. Work study in construction, safety measures, bidding. 11 Hrs

UNIT - V
OPTIMIZATION TECHNIQUES: Linear Programming: graphical method, standard form of linear programming, formulation, Simplex method, Transportation Problem: Introduction, mathematical formulation, methods for initial basic feasible solution, North West corner method. 10 Hrs
TEXT BOOKS:
3. B.C Punmia, “Pert and CPM”, Lakshmi publication. (Pub)

REFERENCE BOOKS:
1. Mahesh Varma , “Construction planning and management”, Metropolitan Book Co., Delhi

DESIGN AND DRAWING OF STEEL STRUCTURES
Subject Code : CV802  Credits : 03
Hrs/ Week : 02 (L) + 03 (D)  Total Hours : 52

Objectives of the course: To study the detailing of the Steel structures as per IS Standards.
Pre-requisites of the course: CV303, CV402, CV501, CV703

PART – A
(Drawings to be prepared for given structural details)

UNIT - 1
Connections: Bolted and welded, beam-beam, Beam-column, seated, stiffened and un-stiffened.

UNIT - II
Columns: Splices, Column-column of same and different sections. Lacing and battens.

UNIT – III
Column Bases: Slab base and gusseted base (bolted and welded) 22 Hrs
PART – B

UNIT - IV

Design and drawing of

i. Welded plate girder (with and without stiffeners)

ii. Roof Truss (Forces in the members to be given)

iii. Gantry girder

30 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
2. Raghupathi, “Design of Steel Structures”.
3. IS: 800-2007, SP 6 (1) – 1984 or Steel Table
5. N. Subramanian, “Design of Steel Structures”, Oxford University, Press.
PROJECT WORK

Subject Code : CV803  Credits : 09
Hrs/ Week : 15

The problem (analytical/ computational/ experimental / design oriented / statistical) shall be selected after detailed discussion with the guide and H.O.D. The project shall have following features:

i. Synopsis.
ii. Definition/Objective of the problem.
iii. Exhaustive literature survey.
iv. Analysis based on type of problem (as given above)
v. Conclusions, scope for further work.
vi. References.

The project shall be submitted in the prescribed standard format and two copies shall be submitted to the H.O.D, after certification by the concerned Guide and H.O.D.

REINFORCED EARTH STRUCTURES

Subject Code : CV811  Credits : 03
Hrs/ Week : 03  Total Hours : 39

Objective: To equip the students to know about the different types of materials used and methods adopted in the construction of different types of reinforced earth structures. Application of the concept of reinforced earth in design and construction of (i) Retaining walls (ii) Embankments and (iii) Foundations will be explained using typical problems.

UNIT - I

Historical background, principles of reinforced earth, mechanism of reinforced earth. Effect of reinforcement on soil. Application of reinforced earth, anchors, tiebacks, and soil nailing technique. Structural and economic advantages of reinforced earth structure over similar structures. 7 Hrs

UNIT – II

GEOSYNTHETICS: Introduction and an overview. Historical development. Classification based on material and method of manufacturing process. Types of Geosynthetics, their properties and determination. 6 Hrs
UNIT - III
FUNCTIONS OF GEOSYNTHETICS: Separation, reinforcement, filtration, drainage and containment. Two examples of application in the field (case histories) for each function are to be explained. 7 Hrs

UNIT - IV
REINFORCED EARTH RETAINING WALL:
Component materials: Soil, important properties governing the selection.
Reinforcement: requirements for the use, types of reinforcements, metallic and Geosynthetic in the form of bars, strips, mats and grids.
Facing elements: materials, types and important properties.
External and internal stability applied to Reinforced earth structures, Coherent gravity and Tieback wedge methods, design of typical reinforced earth retaining wall using Tieback wedge method. 10 Hrs

UNIT - V
REINFORCED EARTH EMBANKMENT AND SLOPES: Improving the stability of a typical earth embankment slope using Geo-fabric reinforcement, numerical examples.
REINFORCED EARTH FOUNDATION: Modes of failure, improvement of bearing capacity with the introduction of Geo-textile or Geo-grid reinforcements, typical example of a spread footing on reinforced earth.
SOIL NAILING SYSTEM: concept and principles, driven and grouted nail system, advantages and limitations. 9 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
GROUNDWATER RECHARGE AND WATER CONSERVATION

Subject Code : CV812        Credits : 03
Hrs/ Week  : 3           Total Hours : 39

Objective of the Course: Equip the students to understand the proper water management and water conservation techniques through rainwater harvesting, conservation and artificial recharging of groundwater.

Pre-requisites of the Course: CV306, CV 701

UNIT - I
INTRODUCTION: Water for life, rainwater harvesting and groundwater recharge: concepts, basics of groundwater geology and water conservation techniques, importance.  7 Hrs

UNIT – II
WELLS AND WELL INVENTORIES: Definition, types, aquifer parameters, well inventories, ground water quality, groundwater pollution, significance of geology in recharging.  8 Hrs

UNIT - III
GROUNDWATER RECHARGING: Objectives, recharge, water balance, traditional, artificial, induced methods, hydro fracturing, roof top harvesting, site selection for groundwater recharging, quality of recharging water, coastal aquifers and recharging, benefits and problems.  9 Hrs

UNIT – IV
WATER CONSERVATION AND MANAGEMENT: Water conservation for commercial and industrial facilities, water quality management, management of freshwater and wastewater, recycling and reuse of water, water conservation, need of ensuring quality and cost-effectiveness of water harvesting.  8 Hrs

UNIT – V
RS & GIS application in groundwater conservation, harvesting, artificial recharging and management of water resources.  7 Hrs

TEXT BOOKS:
REFERENCE BOOKS:


AIR POLLUTION AND CONTROL

Subject Code : CV813
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objectives of the course: To study the various elements of air pollution and their control measures.

Pre-requisites of the course: CV 113

UNIT - I
INTRODUCTION: Classification and characterization of air pollutants. Emission sources, behavior and fate of air pollutants, chemical reaction in atmosphere, photo chemical Smog, coal induced smog, examples: London smog, Los Angeles smog & Bhopal gas tragedy. 8 Hrs

UNIT – II
METEOROLOGY: Meteorological variables, primary and secondary lapse rate, inversions, stability conditions, wind rose diagrams, stack plumes - general characteristics and meteorological models. 8 Hrs

UNIT - III
SAMPLING, ANALYSIS AND CONTROL: Sampling and measurement of gaseous and particulate matter stack sampling, analysis of air pollutants, smoke and smoke measurement. 8 Hrs
UNIT - IV
CONTROL METHODS: Particulate, emission control, gravitational settling chambers, cyclone separators, fabric filters, electrostatic precipitators, wet scrubbers. selection of a particulate collecting Equipment, control of gaseous emission, adsorption by liquids, adsorption by solids, combustion odors and their control. 8 Hrs

UNIT - V
AIR POLLUTION DUE TO AUTOMOBILES: Effects, direct and indirect method of control, environmental issues: acid rain, global warming, ozone depletion in stratosphere, indoor air pollution, STANDARDS AND LEGISLATIONS: Air quality and emission standards, legislation and regulation, air pollution index. 7 Hrs

TEXT BOOKS:
2. “Air Pollution – Sampling and Analysis”, APHA

REFERENCE BOOKS:
1. Peavy and Tchobanoglous, “Environmental Engineering”
3. Biomedical waste handling rules - 2000

PAVEMENT DESIGN
Subject Code : CV814 Credits : 03
Hrs/ Week : 03 Total Hours : 39

Objective of the course: To design the highway and airport pavements by different design methods.

Pre-requisite of the course: CV504

UNIT - I
PAVEMENT DESIGN: Factors affecting design and performance of pavements. 8 Hrs
UNIT - II
STRESSES AND DEFLECTIONS IN FLEXIBLE PAVEMENTS:
Stresses and deflections in homogenous masses, wheel load stresses, various factors in traffic wheel loads; ESWL of multiple wheels, repeated loads and EWL factors. 8 Hrs

UNIT - III
FLEXIBLE PAVEMENT DESIGN: Methods for highways and airports - McLeod, Kansas, CBR method, development, principle, design steps, advantages and IRC methods of pavement design. 8 Hrs

UNIT - IV
STRESSES IN RIGID PAVEMENTS: Types of stresses and causes, factors influencing stresses, general considerations in rigid pavement analysis, EWL, wheel load stresses, warping stresses, frictional stresses, combined stresses. 7 Hrs

UNIT - V
RIGID PAVEMENT DESIGN: Design of CC pavements for roads and runways, types of joints in cement concrete pavements and their functions, joints details for longitudinal joints, contraction joints and expansion joints. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
2. Horenjeff, “Planning, Design of Airports”.
APPLIED HYDROLOGY

Subject Code : CV815  
Credits : 03
Hrs / Week : 3  
Total Hours : 39

Pre-Requisites: Basics of Hydrology, Fundamentals of Probability and Statistics (CV401, CV701)

Objectives:
- To understand the analysis of precipitation data to be useful in the design of water storage and water conservation systems
- To learn the basics of hydrographs and their derivation
- To study the different distributions used in the analysis of hydrological data

UNIT - I
3 Hrs

4 Hrs

UNIT - II
8 Hrs

UNIT - III
Unit Hydrograph – Assumptions, Derivation, Applications, Synthetic Unit Hydrographs, Unit Hydrographs for different rainfall durations –Related Problems.  
7 Hrs

UNIT - IV
9 Hrs

UNIT - V
8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:

EARTHQUAKE RESISTANT STRUCTURES
Subject Code : CV816 
Credits : 03
Hrs / Week : 3 
Total Hours : 39
Pre-Requisites: CV306, CV405, CV502

UNIT - I
Seismic Hazard Assessment
Engineering Seismology – Definitions, Classification of Earthquakes, Causes of Earthquakes, Internal structure of earth, Seismic waves, Theory of plate tectonics and seismic zoning of India, Intensity of earthquake and Magnitude of earthquake, Seismographs. 07 Hrs

UNIT - II
Lessons Learnt From Past Earthquakes on the Performance of the Buildings
Effect of Structural Irregularities on seismic performance of RC buildings. Vertical irregularity and plan configuration problems, Seismo resistant building architecture – lateral load resistant systems, building configuration, Continuous load path, Building characteristics, and other cause of damages. Local site effects on behavior of building
during earthquake, Response to ground acceleration – response analysis by mode superposition.  

08 Hrs

UNIT - III

Earthquake Resistant Design Concepts:
07 Hrs

UNIT - IV

Geotechnical Earthquake Engineering:

09 Hrs

UNIT - V

08 Hrs

TEXT BOOKS:
1. Jaikrishna et al., Elements of Earthquake Engineering, South Asia Publishers, New Delhi.
2. Pankaj Agarwal and Manish Shrikhande, Earthquake Resistant Design of Structures, PHI, India.

REFERENCE BOOKS:

**VALUATION OF REAL PROPERTIES**

<table>
<thead>
<tr>
<th>Subject Code : CV 821</th>
<th>Credits : 03</th>
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<td>Hrs/ Week : 3</td>
<td>Total Hours : 39</td>
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**Objective of the course:** To equip the students to understand the principles, methods and their applicability.

**Pre-requisites of the course:** CV 403, CV 405

**UNIT - I**
9 Hrs

**UNIT - II**
Sinking fund, amortization, depreciation and obsolescence, methods of depreciation-straight line method, constant percentage method, sum of years digit method, sinking fund method and declining balance method.  
9 Hrs

**UNIT - III**
VALUATION OF LAND: Comparative method, abstractive method, belting method, development method, flat rate technique and hypothetical building scheme or land residual method. Valuation for Land Acquisition.  
8 Hrs
UNIT - IV
RENT AND FORMS OF RENT: Outgoings, gross income and net income, year’s purchase, rate of interest, standard rent and its computation, estimating the future life of buildings. 8 Hrs

UNIT - V
VALUATION OF LAND WITH BUILDINGS: Direct comparison, land and building method, rental method, profit method, Valuation for Capital Gains. 8 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
FINITE ELEMENT METHODS OF STRUCTURAL ANALYSIS

Subject Code : CV822  Credits : 03
Hrs/ Week : 3  Total Hours : 39

Objective: To enlighten the students to learn the basics of finite element methods and their applications in analyzing simple structural problems.

Pre-requisites: CV303, CV402, CV501, CV511, CV714

UNIT - I

UNIT - II
FINITE ELEMENT METHOD: Fundamentals, Displacement function, Natural coordinates, Boundary conditions, Construction of displacement functions for 2 D truss and beam elements. Application of FEM for the analysis of plane truss and continuous beams. 8 Hrs

UNIT - III
ANALYSIS OF 2 D CONTINUUM PROBLEMS: elements and shape functions, Triangular, rectangular and quadrilateral elements, other types of elements, their characteristics and suitability for application.

UNIT - IV
Polynomial shape functions, Lagrange’s and Hermitian polynomials, compatibility and convergence requirements of shape functions. 7 Hrs

UNIT - IV
Isoparametric, sub-parametric and super-parametric elements, characteristics of isoparametric quadrilateral elements. Algorithm of computer program for Finite Element Analysis. 8 Hrs
TEXT BOOKS:

REFERENCE BOOKS:

DESIGN OF HYDRAULIC STRUCTURES
Subject Code : CV823 Credits : 03
Hrs/ Week : 3 Total Hours : 39

Objective: To study the various Hydraulic structures.
Pre-requisites: CV701

UNIT - I
CROSS DRAINAGE WORKS
Introduction, Types of cross drainage works. Design of an aqueduct – Design of waterway for the stream. Fluming of canal: Mitra’s hyperbolic transition formula. Design of protection works (hydraulic design only) 8 Hrs

UNIT - II
GRAVITY DAM
UNIT - III

EARTHEN DAM

8 Hrs

UNIT - IV

SPILLWAYS
Introduction, components of a spillway, types of spillway. Design of ogee spillway. Down stream and up stream profile of the crest of an Ogee spillway.

8 Hrs

UNIT - V

CANAL REGULATORY WORKS

7 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
Open Electives Offered in VIII Semester for the year 2014-15

MA8X 01 Graph Theory
MA8X 02 Linear Algebra
HU8X 03 Intellectual Property Rights
PH8X 04 Advanced Materials Technology for CV & ME
BT8X 05 Nano Technology
BT8X 06 Instrumental methods of Analysis for CV & ME
CV8X 07 Environmental Impact Assessment
ME8X 08 Industrial Pollution Control
ME8X 09 Management and Entrepreneurship
EE8X 10 Non-Conventional Energy Systems
EE8X 11 Linear Systems Theory
EC8X 12 Information and Electronic Communication Technology
EC8X 13 Robotics
CS8X 14 Object Oriented Prog. with C++
CS8X 15 Essentials of Information Technology
EC8X 18 Consumer Electronics
PH8X 19 Optoelectronic devices for EE, EC, CSE & ISE
HU8X 20 Value Education
CH8X 21 Natural Products Chemistry for Bio-Tech
CS8X 22 Essentials of IT Service Industry
MA8X 23 Statistical design and analysis of experiments
HU8X 24 Professional & Cognitive Communique
MA8X 25 Introduction to Topology

GRAPH THEORY

Subject code : MA8X01          Credits : 03
Hrs/Week : 3                 Total Hours : 39

UNIT - I
Introduction to graphs, digraphs, sub graphs-spanning and induced graphs, paths, cycles, connectivity, cut points, bridges,blocks.

8 Hrs.

UNIT – II
Trees, Eularian graphs, characterizations, Hamiltonian graphs.
UNIT – III
Planar graphs, outer planar graphs, Euler’s polyhedron formula, Colorability: chromatic number, Five colour theorem, four colour conjecture, Chromatic polynomial 8 Hrs.

UNIT – IV
Representations of graphs: The adjacency matrix and incidence matrix. Circuit matrix, cutest matrix, Shortest paths in weighted graphs, Dijkstra’s algorithm to find shortest paths. 8 Hrs

UNIT – V
Spanning trees: Algorithms to find a spanning tree A minimal spanning tree – Kruskal’s & Prims algorithm. Connectivity test: Warshall’s algorithm, algorithm to locate an Euler Circuit from Incidence matrix. Algorithm to locate an Euler Circuit from the adjacency matrix for an undirected graph. 8 Hrs.

Text Book:
1. F. Harary, Graph theory, Narosa Publishing House, 1988
2. Narsing Deo, Graph Theory with applications to Engg. and Comp. Sciences- PHI

Reference Books:
2. D.B.West, Introduction to Graph Theory, PHI

LINEAR ALGEBRA

Subject code : MA8X02 Credits : 03
Hrs/Week : 3 Total Hours : 39

UNIT - I
Linear equations: System of linear equations and its solution sets; elementar row operations and echelon forms; matrix operations; invertible matrices, LU-factorization. 7 Hrs
UNIT - II
Vector spaces: Vector spaces; subspaces; bases and dimension; coordinates; summary of row-equivalence; computations concerning subspaces. 7 Hrs

UNIT - III
Linear Transformations: Linear transformations; algebra of linear transformations; isomorphism; representation of transformations by matrices; linear functions; transpose of a linear transformation. Determinants and elementary properties. 10 Hrs

UNIT - IV
Canonical Forms: Characteristic values; similarity of matrices, Cayley Hamilton theorem, annihilating polynomials; invariant subspaces; direct --sum decompositions; invariant direct sums; diagonalization of symmetric matrices, iterative estimates of characteristic values. 8 Hrs

UNIT - V
Inner Product Spaces: Inner products; inner product spaces; orthogonal sets and projections; Gram-Schmidt process; QR-factorization; least-squares problems; symmetric and unitary operators. 7 Hrs

Text Books:
INTELLECTUAL PROPERTY RIGHTS (IPR)

Subject Code : HU8X03  
Credits : 03  
Hrs/week : 3  
Total hours : 39

UNIT - I
Introduction to Intellectual Property
Invention and Creativity - Intellectual Property (IP) – Importance, Jurisprudential definition and concept of property, rights, duties and their correlation; History and evaluation of IPR – like Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications  
8 Hrs

UNIT - II
Agreements and Treaties
8 Hrs

UNIT - III
Basics of Patents and Concept of Prior Art
Introduction to Patents; Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; Specifications: Provisional and complete; Forms and fees, Invention in context of “prior art”; Patent databases; Searching International Databases; Country-wise patent searches (USPTO, EPO, WIPO, IPO, etc.)  
8 Hrs

UNIT - IV
Patent filing procedures
National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Structure of Patent document, Precautions while patenting – disclosure/non-disclosure; Financial assistance for patenting – introduction to existing schemes, Patent licensing and Agreement, Patent infringement- meaning, scope, litigation  
8 Hrs
UNIT - V

Case Studies on Patents (Basumati rice, turmeric, Neem, etc.) non-biological cases may be included – Copyright and related rights – Trade Marks – Trade secrets - Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition Technology transfer and license agreement.  7 Hrs

References:
5. Intellectual Property Today : Volume 8, No. 5, May 2001,
   - Rachna Singh Puri
   - Arvind Vishwanathan
   I.K. International Publishing House Pvt. Ltd.,

Important Links:
http://www.w3.org/IPR/
http://www.wipo.int/portal/index.html.en
http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html
www.patentoffice.nic.in
www.iprlawindia.org/ - 31k - Cached - Similar page
ADVANCED MATERIALS TECHNOLOGY

Subject Code : PH8X04
Hrs/Week : 3
Credits : 03
Total Hours : 39

The objectives of the course:
1. To provide our students adequate education in materials technology to have a basis for a complete understanding of current and future scientific and technological developments.
2. To provide our students, adequate education regarding the material properties to handle the design problem involving materials, effectively.
3. To select a right material for a specified application from the thousands of available materials available.
4. To select a cost effective material to reduce the cost of finished product.

UNIT - I

Structures and Properties of Ceramics - Introduction, Ceramic structures: Crystal structures, Silicate Ceramics, Carbon, Imperfection in ceramics, ceramic phase diagram, Mechanical properties: Brittle Fracture of Ceramics, Stress-Strain Behavior, mechanisms of plastic deformation, Miscellaneous mechanical Considerations.
Types, processing and Applications of Ceramics - Glasses and Glass Ceramics, clay Products, Refractories, Abrasives, Cements, Advanced Ceramics, Fabrication and processing of Ceramics and applications, Fabrication and processing of Glasses and applications, Fabrication and processing of Clay Products, Powder Pressing, Tape casting 8Hrs

UNIT - II

Polymer Synthesis and Processing: Polymerization, polymer additives, Forming Techniques for Plastics, Fabrication of fibers and Films and applications 8 Hrs

UNIT - III

UNIT - IV
Shape memory alloys and Metallic glasses:
Introduction to shape memory alloys, Fundamental characteristics, shape memory effect (psuedoelasticity), Advantages and disadvantages of SMA, Methods of processing, Commercial shape memory alloys and applications.
Introduction to metallic glasses, principle, properties, processing, applications - bulk metallic glass in nanotechnology, metallic glasses for air craft structure. 7 Hrs.

UNIT - V
Introduction to Nano materials: Properties of individual nanoparticles, Semiconducting nanoparticles: optical properties, photofragmentation, coulombic explosion, Carbon clusters: small carbon clusters, C_{60} crystals, alkali doped C_{60}, larger and smaller fullerenes, other bucky balls, nanostructured crystals: natural nanocrystals, photonic crystals, nanostructured ferromagnetism: Dynamics of nanomagnets, nanopore containment of magnetic particles, ferrofluids. 8 hrs

Text books

REFERENCE BOOKS:
1. Van Vlack L.H. “Elements of Material Science” Addison-Wesley Publishers

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two Questions are to be set from each unit, carrying 20 marks each.
3) Students have to answer any one full question from each Unit.

NANOTECHNOLOGY

Subject Code : BT8X0
Hrs/Week : 3
Credits : 03
Total Hours : 39

OBJECTIVE
The objectives of this course includes introduction to nanotechnology, detailed study of MEMS, applications of nanotechnology. Beneficiary Branches of Engineering: EC, Mechanical, Civil.

UNIT - I

UNIT - II
NANOMATERIAL AND NANO TOOLS
Buckyballs (Fullerenes), Nanotubes, nanowire, Dendrimers, Nanoshells, magnetic nanoparticle, Quantum Dot (Nanocrystals), self assembled monolayers, Scanning probe microscopy (Scanning tunneling microscopy, Atomic force microscopy).  

UNIT - III
NANOTECHNOLOGY FOR DRUG DISCOVERY & DRUG DELIVERY

UNIT - IV
MICROFLUIDICS
Microflows (Laminar flow), Hagen-Pouiselle equation, micromixing, microvalves & micropumps, Need for the microfluidics, Fabrication of Soft Materials, application of microfluidics.  

UNIT - V
• MEMS & APPLICATIONS
Introduction and Overview, Design of MEMS, Sensors, Electromagnetic Transducers, Mechanical Transducers, Chemical Transducers, Optical Transducers - Applications of optical and chemical transducers. Recent Developments in MEMS and Nanochips. DNA based MEMS, application of MEMS.  

Text books:
2. Transducers and instrumentation, D.V.S. Murthy, Prentice Hall of India.
5. Micro fluidics for biotechnology by Jean Berthier Pascal Silberzan
INSTRUMENTAL METHODS OF ANALYSIS

Subject Code : BT8X06
Hrs / Week : 3
Credits : 03
Total Hours : 39

Beneficiary Branches of Engineering: Mechanical, Civil.

UNIT - I
INTRODUCTION
Types of analytical instrumental methods and their selection, role of computers in analytical methods, performance requirements of analytical instruments, and instrument calibration techniques. Principle of microscopy, light field microscopy, scanning electron microscopy, tunneling electron microscopy and applications 7 Hrs

UNIT - II
SPECTROSCOPIC TECHNIQUES
Basic principles and applications of UV-Visible spectrometry, infrared spectrometry, nuclear magnetic resonance spectrometry, molecular mass spectrometry. Surface spectroscopic techniques: electron spectroscopy and ion spectroscopy; atomic absorption spectroscopy.

UNIT - III
CHROMATOGRAPHIC TECHNIQUES
Introduction to chromatographic separations. Basic principles and theory. Gas chromatography and HPLC: principle, instrumentation, column, detector, mobile phase, sample preparation. Application of chromatographic techniques. 9 Hrs

UNIT - IV
THERMAL AND ELECTROCHEMICAL TECHNIQUES
Principles and applications of thermo-gravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC). Electrochemical methods for analysis, electrochemical cells, types of electrodes, electrode potentials. 8 Hrs

UNIT - V
ENVIRONMENTAL APPLICATIONS
Types and concentration of various gas pollutants, instrumental techniques and measurement range for carbon dioxide, sulfur dioxide, nitrogen oxides, hydrocarbons and ozone. Types of water pollutants and detection techniques. 6 Hrs
Text Book:

Reference Books:
1. R. S. Khandpur, Handbook of analytical instruments, TMH.

ENVIRONMENTAL IMPACT ASSESSMENT

Subject Code : CV 8X07
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Objective: To equip the students with the various key elements of EIA.
Pre-requisites of the course: CV 113

UNIT - I
Developmental activity and ecological factors; EIA, EIS, FONSI. Need for EIA studies, Baseline information, Procedure for conducting EIA, Limitation of EIA; EnvironmentalActs/policies. 8 Hrs

UNIT - II
Frame work of impact assessment in developmental projects; Environmental setting, EIA- Objective, content, methodologies, techniques, Rapid and comprehensive EIA.

UNIT - III
Assessment and prediction of attributes: Air, Water, Noise, Land, Ecology, Soil, Socio-economic environment. 7 Hrs
UNIT - IV
Public participation in environment decision making, practical consideration in preparing EIA and EIS, salient features of the project activity, Environmental parameter – activity relationship matrices 8 Hrs

UNIT - V
EIA for construction project, power projects, mining projects. 7 Hrs

TEXT BOOKS

REFERENCE BOOKS
1. Guidelines for EIA of developmental projects, Ministry of Environment and Forest, GOI

INDUSTRIAL POLLUTION CONTROL

Subject Code : ME 8X08  
Credits : 03  
Hrs/ Week : 3  
Total Hours : 39

UNIT - I
1. Introduction to Pollution
Man and the environment, environmental degradation due to energy generation, consequences of pollution, sustainable industrial growth, air water and soil pollution, carbon audit.Ill effects of pollutants, Photochemical Smog, permissible concentrations. 8 Hrs

UNIT - II
2. Meteorology
Meteorology, Wind rose, plume dispersion studies & Numerical problems 8 Hrs
UNIT - III

3. Separation techniques
Particulates and fly ash separation techniques. Sources of Particulates Matter, fly ash properties, theory of settling processes- (problems), Single & parallel plate ESP- (problems), Bag House, Cyclone separator, Spray Tower, Scrubbers & Venturi Scrubber, merits and demerits of each. 8 Hrs

UNIT - IV

4. Smoke and gaseous pollutants
Smoke and gaseous pollutants: formation, measurement and control techniques T.T.T.O principle-(Ringlemann Chart, Smokescope, Bosch smoke meter), Coal firing- Under feed and overfeed stocker, Domestic and Industrial Incinerators, Pollutant gaseous (So2, Co, UBHC & NOx) Their sources, measurement and control. So2-Colorimetric, scrubbing & lime stone injection method. CO-Colorimetric, IR CO analyzer & control by oxidation. UBHC- Gas chromatography, Control by after burning & floating tanks. NOx- Iso-kinetic sampling, colorimetric method, control methods in brief for Low peak combustion temperature. 7 Hrs

UNIT - V

Water, soil, noise, plastic and odor pollution, their control methods. Pollution control Acts, Legal aspects of pollution control. 8 Hrs

Reference Books:
2. "Air Pollution control", W. L. Faith, John Wiley
3. "Environmental Pollution Control Engineering, Wiley Eastern Ltd.,

Scheme Examination:
TWO questions to be set from each UNIT and Students shall answer FIVE full questions choosing at least ONE question from each UNIT.
MANAGEMENT & ENTREPRENEURSHIP

Subject Code : ME 8X09  
Credits : 03
Hrs/ Week : 3  
Total Hours : 39

UNIT - I


PLANNING: Nature, importance and purpose of planning process - Objectives - Types of plans (Meaning Only), Steps in planning & planning premises, Hierarchy of plans.  
9 Hrs

UNIT - II


DIRECTING & CONTROLLING: Meaning and nature of directing - Leadership styles Classification and meaning only), Motivation Theories (Meaning of motivation and Classification of theories; content, process and contemporary), Communication - Meaning and importance. Coordination - meaning, importance and Techniques of Coordination. Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control (inbrief).  
10 Hrs

UNIT - III

ENTREPRENEURSHIP: Concept of Entrepreneurship, Evolution of Entrepreneurship, Stages in entrepreneurial process; Role of entrepreneurs in Economic Development; Entrepreneurship in India; Entrepreneurship - its Barriers. Meaning of Entrepreneur; Functions of an Entrepreneur, Types of Entrepreneurs, Intrapreneur - an emerging Class.
Identification of business opportunities: Market Feasibility Study; Technical Feasibility Study; Financial Feasibility Study & Social Feasibility Study.  
8 Hrs
UNIT - IV

SMALL SCALE INDUSTRIES: Definition; Characteristics; Need and rationale; Objectives; Scope; role of SSI in Economic Development. Advantages of SSI, Steps to start and SSI, Government policy towards SSI; Different Policies of SSI, Impact of Liberalization, Privatization, Globalization on SSI. Effect of WTO/GATT on SSI, Supporting Agencies of Government for SSI, Ancillary Industry and Tiny Industry (Definition Only)

INSTITUTIONAL SUPPORT: Different Schemes; TECKSOK; KIADB; KSSIDC; KSIMC; DIC Single Window Agency; SISI; NSIC; SIDBI; KSFC.

UNIT - V

PREPARATION OF PROJECT: Meaning of Project; Project Identification; Project Selection; Project Report; Need and Significance of Report; Contents; Formulation; Guidelines by Planning Commission for Project report; Errors of Project Report; Project Appraisal, Network Analysis (Simple numerical problems to find early and late, start and finish times, critical path and total project duration).

TEXT BOOKS:
2. Dynamics of Entrepreneurial Development & Management - Vasant Desai - Himalaya Publishing House

REFERENCE BOOKS:
1. Management Fundamentals - Concepts, Application, Skill Development - Robers Lusier - Thomson -
NON CONVENTIONAL ENERGY SYSTEMS

Subject Code : EE8X10  Credits : 03
Hrs / Week : 3  Total Hours : 39

UNIT – I
Energy Sources: Introduction, Importance of Energy Consumption as Measure of Prosperity, Per Capita Energy Consumption, Classification of Energy Resources; Conventional Energy Resources - Availability and their limitations; Non-Conventional Energy Resources – Classification, Advantages, Limitations; Comparison of Conventional and Non-Conventional Energy Resources; World Energy Scenario; Indian Energy Scenario.  3 Hrs


Solar Thermal Systems: Principle of Conversion of Solar Radiation into Heat, Solar Water Heaters (Flat Plate Collectors), Solar Cookers – Box type, concentrating dish type, Solar driers, Solar Still, Solar Furnaces, Solar Green Houses  4 Hrs


UNIT – II

Output and Capacity Factor of WECS, Wind site selection consideration, Advantages and Disadvantages of WECS.  

5 Hrs


7 Hrs

UNIT – III

Energy from Ocean: Tidal Energy – Principle of Tidal Power, Components of Tidal Power Plant (TPP), Classification of Tidal Power Plants, Estimation of Energy – Single basin and Double basin type TPP (no derivations. Simple numerical problems), Advantages and Limitation of TPP. Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, Methods of OTEC power generation – Open Cycle (Claude cycle), Closed Cycle (Anderson cycle) and Hybrid cycle (block diagram description of OTEC); Site-selection criteria, Biofouling, Advantages & Limitation of OTEC.  

5 Hrs


TEXT BOOKS:

REFERENCE BOOKS:
LINEAR SYSTEMS THEORY

Subject Code : EE8X11
Credits : 03
Hrs / Week : 3
Total Hours : 39

UNIT - 1
State variable analysis & design: Introduction, concept of state, state variables & state model, state model of linear systems, linearization of state equations. 3 Hrs
State space representation using physical variables, phase variables & canonical variables. 6 Hrs
Derivation of transfer function from state model, diagonalisation, eigen values, Eigen vectors, generalized Eigen vectors. 6 Hrs

UNIT - 2
Solution of state equation, state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method, 8 Hrs
Concept of controllability & observability, methods of determining the same. 6 Hrs

UNIT - 3
Pole placement techniques: stability improvements by state feedback, necessary & sufficient conditions for arbitrary pole placement. 5 Hrs
Liapunov stability criteria, Liapunov functions, direct method of Liapunov & the linear system, Hurwitz criterion & Liapunov’s direct method 5 Hrs

Text Books:


Reference Books:

INFORMATION AND ELECTRONIC COMMUNICATION TECHNOLOGY

Subject Code : EC 8X12
Credits : 03
Hrs/ Week : 3
Total Hours : 39

Common elective from Electronics and Communication department - for the students of Other branches

UNIT - I

Introduction: measure of information, information content, symbols, entropy, communication channel, noise and channel capacity, discrete channels, error control, codes.
Noise & signal processing, AM/FM/PM..., sampling, PAM, TDM, PCM.,
Concept of spread spectrum, multiple access, cells, mobility, inter-cell handshake. 15 Hrs

UNIT - II

Microwaves: microwave devices, microwave systems and antennas, propagations, reflections and refractions terrestrial communications, ground and space components, SNR, FDMA, TDMA Etc, satellite systems and services.
Optical fiber: optical devices, transmission networks, multiplexing, WDM, OTDM, n/w management, lasers. 16 Hrs

UNIT - III

Computers communications: OSI, TCP/IP, languages, adhoc networks, security, multimedia, audio/video compression, 3G/4G N/Ws, latest trends. 8 Hrs

REFERENCE BOOKS:
R2. Kamilo Feher, "Wireless Communication &Application ", PHI.
ROBOTICS

Subject Code : EC 8X13  Credits : 03
Hrs/ Week : 3  Total Hours : 39

Common elective from Electronics and Communication department - for Students from other branches

UNIT - I
Introduction: Historical developments, arm kinematics and dynamics, manipulated trajectory, planning and control, sensing, robot languages, machine intelligence.
Robot arm kinematics: Direct kinematics problem and inverse kinematics solution.
Robot arm dynamics: Lagrange-Euler formulation, Newton -Euler formulation equation of motion.
Planning trajectories: General considerations, joint interpolated trajectories, planning Cartesian path trajectories. 16 Hrs

UNIT - II
Sensing: Range, proximity, touch, force and torque sensing.
Low level vision: Image acquisition, illumination, geometry preprocessing.
High level vision: Segmentation, description, 3D structure recognition, interpretation.
Robot programming languages: Characteristics of robot languages, task languages. 16 Hrs

UNIT - III
Robot intelligence: State space search, predicate logic, means-ends analysis, robot learning, task planning expert systems. 7 Hrs
TEXT BOOK:
T1. Fu K S. etal, "Robotics-control, sensing, machine and intelligence", McGraw Hill

REFERENCE BOOKS:
R2.Groover MP etal., "Industrial robotics", TMH

OBJECT ORIENTED PROGRAMMING with C++

Subject Code : CS 8X14  Credits : 03
Hrs/ Week : 03  Total Hours : 39

UNIT - I
Principles of object - oriented programming:
A look at Procedure Oriented Programming, object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object oriented languages ,Applications of OOP.

Beginning with C++:
What is c++, Applications of C++, Structure of C++ program, Basic Data types, derived data types, user defined data types, variables in c++, dynamic initialization of variables, reference variables, operators in c++, scope resolution operator, memory management operators, type cast operators,manipulators,namespace. 7 Hrs

UNIT - II
Functions in C++:
Function prototyping, Inline Functions, Default Arguments, Function Overloading
Classes and objects:
Introduction, C Structure Revisited, Specifying a Class, Defining Member Functions, Static Data Members, and Static Member Functions. Arrays of Objects, Objects as Functions Arguments, this pointer, Friend Functions, Returning Objects, Constant Member Functions. 8 Hrs

UNIT - III
Constructors and Destructors
Introduction, Constructors, Parameterised Constructors, Multiple Constructors in a Class. Constructors with Default Arguments, Copy Constructors, Dynamic Constructors, Constant Objects, Destructors.

Operator Overloading and Type Conversions
Introduction, Defining Operator Overloading, Overloading the Various Operators, Overloading the Increment and the Decrement Operators (Prefix and Postfix), Overloading the Unary Minus and the Unary Plus Operator, Overloading the Arithmetic Operators. Overloading the Relational Operators, Overloading the Assignment Operator, Overloading the Insertion and Extraction Operators, Rules for overloading operators. Type Conversions. 8 Hrs

UNIT - IV
Inheritance
Introduction, Defining Derived Classes, Single Inheritance, Protected Access Specifier, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes.

Pointers, Virtual Functions and Polymorphism
Introduction, Pointers, Pointers to Objects, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions. 8 Hrs

UNIT - V
Templates and Exception Handling
Working with files
Classes for Files Stream Operations, Opening and Closing a File, Error Handling during File Operations. 8 Hrs

Text Books:
1. E. Balagurusamy: Object - Oriented Programming with C++, Third Edition, Tata McGraw Hill. (Chapters 1.3 to 1.8, 2.1, 2.2, 2.6, 3.5 to 3.7, 3.10 to 3.18, 4.3, 4.6 to 4.9, 5, 6, 7, 8, 9, 11, and 12).

Reference:
1. Robert Lapore: Object - Oriented Programming in Turbo C++
3. K.R. Venugopal: Mastering C++

ESSENTIALS OF INFORMATION TECHNOLOGY

Subject Code : CS 8X15  Credits : 03
Hrs / Week : 03  Total Hours : 39

Introduction to Computer Systems (Self-Study)
Introduction to Computer Systems - Basics of computer systems - Various hardware components - Data storage and various Memory units - Central Processing Unit - Execution cycle - Introduce to software and its classifications.

UNIT - I
Operating Systems
Introduction - Memory management - Process management - Interprocess Communication - Deadlocks - File management - Device management. 6 Hrs

UNIT - II
Problem Solving Techniques
Introduction to problem solving - Computational problem and it's classification - Logic and its types - Introduction to algorithms -
Implementation of algorithms using flowchart - Flowcharts implementation through RAPTOR tool - Searching and sorting algorithms - Introduction and classification to Data Structures - Basic Data Structures - Advanced Data Structures. 7 Hrs

UNIT - III
Programming & Testing
- Structured Programming - Functions - Structures - File Handling - Introduction to Software Development Life Cycle - Industry Coding Standards and Best Practices - Testing and Debugging - Code Review. 8 Hrs

UNIT - IV

UNIT - V
RDBMS
- RDBMS- data processing - the database technology - data models
- ER modeling concept -notations - Extended ER features
- Logical database design - normalization
- SQL - DDL statements - DML statements - DCL statements
- Joins - Sub queries - Views
- Database design Issues 9 Hrs

Integrated Project:
Project based on C/C++/JAVA & RDBMS.

References:
4. Andrew Tanenbaum, Modern Operating Systems, Pearson Education
6. Charles Crowley, "Operating Systems: A Design-Oriented Approach"
7. Dromey, R.G., How to solve it by computers, Prentice Hall, 2005
14. Programming Pearls , by Jon Bentley, Pearson Education publication
16. Tharp Alan L, File Organization and Processing, John Willey and Sons.

Note:
1. Courseware for the subject (power point and the notes) is provided by the teacher. List of references is only for additional reading.
2. Project is a team work with 3 or 4 students in a team. Project need to be carried out offline (outside the lecture hours).
3. Project work includes implementation of some information system using the concepts of programming, testing and RDBMS. Following activities are involved in the project:
   - Preparation of High level design and Detailed design document.
   - Unit Test Plan and Integrated Test Plan.
   - Coding and Unit Testing, Integration Testing.

Students can use the following to implement the Project:
   - Programs using C/C++/JAVA Language
   - Embedded SQL can be used to connect the Front-End with the backend Database systems
   - Visual studio .NET 2005 (or Visual studio 6), RAPTOR tool and oracle 9i/10g to be used for the project.

4. CIE carries 50 Marks which includes Theory Assessment (40 Marks) and Project Work (10 marks). Theory Assessments will be conducted based on CAMP methodology. Project evaluation will be done using Rubrics methodology.

5. Number of hours listed for each unit are only for the class room teaching. Students are expected to give much more time to study each of the topics outside the class hours.

CONSUMER ELECTRONICS

Subject Code : EC 8X18  
Credits : 03
Hrs/ Week : 03  
Total Hourrs : 39

Common elective from Electronics and Communication department - for the students Of other branches

UNIT - I
FUNDAMENTALS: Electricity, Particle and Wave Motions, Conduction and Radiations, dielectrics, inductors, Vac. tubes, S.S. devices, IC's further advances, Power supply, Circuit functions.
SOUND: Transducers (Micro Phone, Loud Speakers), enclosures, Recordings - disc, Magnetic, Optical, mono-stereo, Amplifiers, Multiplexers, mixers, Synthesizers, Theatre Sound, Studios, Editing.

UNIT - II
VISION: B/W TV, CTV, Video tapes/discs, recording/ play back, Standards, Broad-casting, Video systems, Studios, editing, B/W, Displays, Filters, Cameras, Color displays.

UNIT - III

UTILITIES: - Fax, Xerox, Calculators, Microwave ovens, Washing Machines, A/C & refrigeration, Dishwashers, ATMS, Set -Top boxes, Auto Electronics, Industrial Electronics, Robotics, Electronics in health / Medicine, nano-technologies.

TEXT BOOK:

REFERENCES:
R2. Kamilo Feher, "Wireless Communication & Application", PHI

OPTO ELECTRONIC DEVICES

Subject Code  : PH 8X19  
Hrs/ Week     : 03  
Credits       : 03  
Total Hours   : 39

The objectives of the course:
* To know the basics of solid state Physics and understand the nature and characteristics of light
* To understand different methods of luminescence, display devices and laser types and applications
* To learn the principle of optical detection, mechanisms in different detection devices
* To understand different light modulation techniques and the concepts and applications optical switching
* To study the integration process and application of optoelectronic integrated circuits in transmitters and receivers.
PART-A
UNIT – I
Display Devices
Introduction- Fluorescence, Phosphorescence, Photo Luminescence, Cathode Luminescence, Electro Luminescence, LED, plasma displays, Liquid Crystal displays, Numeric displays. 7 Hrs

UNIT – II
Lasers & Fibre Optics
Optical fibre - Principle construction & working, Propagation of light, signal distortion and Attenuation 8 Hrs

PART-B
UNIT - III
Optical Detectors
Photo detector- thermal detectors, thermoelectric detectors-types, Photon Devices-types, Photoconductive detectors, Junction detectors-Photo diodes (PIN and APD), Photo Transistors, Detector Performance – characteristics, frequency response, noise aspect and sensitivity. 8Hrs

UNIT - IV
Optoelectronic Modulators
Introduction, Polarization, Birefringence, Optical activity, Electro-optic effect, Kerr modulators, scanning & switching,Magneto-optic devices, Acousto-optic effect 8 Hrs

UNIT - V
Optoelectronic Waveguides
Hybrid and Monolithic Integration, Applications of Optoelectronic wave guide devices, Construction and working of integrated transmitters and receivers-Front end photo receiver, PIN-HBT Photo receiver & OEIC transmitters 8 Hrs

TEXT BOOK:
References:
Bhattacharya “Semiconductor Optoelectronic Devices” Prentice Hall of India Pvt., Ltd., New Delhi
Ghatak and Thyagarajan, “Introduction to Opto Electronics” New Age International Publishers

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two questions carrying 20 marks each will be set from each unit and students have to answer any one.

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VALUE EDUCATION

Subject Code : HU 8X20 Credits : 03
Hrs/ Week : 3 Total Hours : 39

The Objectives of the course:
1. To make the students realize the significance of values in self-development.
2. To train the students in techniques of mind control, time management and stress management.
3. To make students use the fundamentals learnt in the course in solving
   a) The problems in their own lives like intoxication, gambling, extra marital relations, generation gap, ragging, peer pressure, addiction to social networking sites.
b) The problems pertaining to the society in general like corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse & animal cruelty.

4. To make students understand value of sustainable civilization, simple living and high thinking.

UNIT - I
Three components of human personality (IQ, EQ and SQ), separating men from animals, real problems of life, how to acquire knowledge.
Why sense gratification is opium of the masses, three kind of people and their symptoms, ethical degradation of the society today, how mind gets out of control, anger management, different levels of consciousness (bodily platform, sensual platform, mental and intellectual), regulative principles of freedom, difference between moderation and abstinence. 

UNIT - II
Intoxication, harmful effect of alcohol on liver, central nervous system, blood, gastro intestinal tract, muscles, etc. myths and facts regarding alcohol. Harmful effect of smoking on respiratory health, strokes and heart diseases, cognitive dysfunction, passive smoking myths and facts about smoking. Drug addiction, common neurological effects of drug addiction, physical effects.
Negative impacts of gambling, gambling vs. substance abuse, Forms of illicit sex, forms of animals cruelty, alternatives for animal experimentation.
Knowledge, attitudes and skills needed to achieve a sustainable value based global culture. 

UNIT - III
Generation gap, ragging, peer pressure, addiction to social networking sites, corruption, irresponsible media, distractions among youth, gender discrimination, westernization, child abuse, euthanasia, capital punishment, female feticide, terrorism.

Scheme:
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks.
2) Three questions from units 1&2 each and two questions from unit 3 shall be set, carrying 20 marks each.
3) Students have to answer 5 full questions, selecting at least two questions from units 1&2 each and one from unit 3.
4) Break Up of CIE (50 marks):
   - First Mid Semester Exam - 10 marks
   - Second Mid Semester Exam - 10 marks
   - Class Quiz - 05 marks
   - Students' solution of problems discussed in the form of video skits - 25 marks

NATURAL PRODUCTS CHEMISTRY

Subject Code : CH8X21  
Credits : 03
Hrs/Week : 3  
Total Hours : 39

UNIT - I
Terpenoids: Introduction and classification, isoprene rules, general methods of determination of structure of terpenoids. Structure elucidation, synthesis and biosynthesis of the following terpenoids; Monoterprenoids-Geraniol, α-pinene, and camphene. Sesquiterpenoids- Farnesol, and α-santonine, Diterpenoids- gibberillic acid. Triterpenoids-Squaline, Cyclisation of squalene into α-lanosterol and friedelene.

8 Hrs

UNIT - II
Sex hormones: Chemistry of estrogen, progesterone, androsterone and testosterone. Structure and synthesis of cortisone and aldosterone.

8 Hrs

UNIT - III
Prostaglandins: Introduction, nomenclature, classification and biological role of prostagladins. Structure elucidation and stereochemistry of PGE1, PGE2 and PGE3. Total synthesis of PGE1 (Corey’s method).

7 Hrs

UNIT - IV
Chemistry of Porphyrins: Introduction to porphyrins, structure and degradation products of haemoglobin and chlorophyll

8 Hrs.
UNIT - V

Alkaloids: Definition, Classification and isolation of alkaloids. General methods of structural determination of alkaloids. Detailed study of structure elucidation, rearrangement, synthesis and biogenesis of the following alkaloids- papaverine, cinchonine, and morphine.

8 Hrs

References:
ESSENTIALS OF IT SERVICE INDUSTRY
(SPAN TECHNOLOGIES)

Subject Code : CS8X22
Credits : 03
Hrs/week : 3
Total Hours : 39

UNIT - I
Fundamentals of Software Industry 3 Hrs
Introduction to SDLC Process; Life cycle models; Requirement
Gathering Techniques; Functional, Non Functional, Statutory and
Regulatory Requirements; Configuration Mgmt; Workshop on
Requirement Analysis.

UNIT - II
Relational Database 6 Hrs
Fundamentals of Relational Databases; Primary key, Unique Key,
Foreign keys and Indexes; Logical & Physical Databases; Simple
Queries.

UNIT - III
Basics of DOTNET & coding techniques 9 Hrs
Introduction to .NET framework 3.5 with additional features of .NET
4.0; Language construct C#; Visual Studio Developer environment
IDE; Coding Standards and General Coding guidelines.

UNIT - IV
ASP.NET 12 Hrs
Page life cycle; Web.config; types of apps, control structure; HTML
controls; Server controls; Custom controls; User controls; Form
validation; Master Pages, Themes, Skins, CSS, Passing data between
forms, Session object, view state, Request / Response; ADO.Net.

UNIT - V
Code Enabler 9 Hrs
Error/Exception handling; XML – Overview; Creating XML; XML
validation; XPATH; XML schema, attributes, XML in SQL; Usage of
Code Analysis Tools – Face, Style Cop; Jquery;IIS.

Note:
1. Courseware for the subject (Power Point Presentation) will be
   provided by the teacher. List of references is only for
   additional reading.
2. Assignment will be provided for each theory sessions. These assignments need to be carried out by each student (outside the lecture hours) independently and must be submitted within the timeframe specified by the instructor.

3. Tests will be conducted on each topics separately and test assignment score will be used for final evaluation.

4. Test score will carry a weightage of 20%, assignment 30% and rest 50% weightage would be given to the final examination.

STATISTICAL DESIGN AND ANALYSIS OF EXPERIMENTS

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<th>Subject code</th>
<th>MA8X23</th>
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<th>03</th>
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<tr>
<td>Hrs/Week</td>
<td>3</td>
<td>Total Hours</td>
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UNIT – I
Curve fitting and Regression: Least square principle, curve fitting of linear, quadratic and exponential. Correlation and properties, correlation coefficients, regression analysis. 8 Hrs

UNIT – II
Probability Theory: Review of pdf’s, expectation, variance, moment generating function and properties, Moment generating functions and their properties, random samples, sampling distributions, central limit theorem and applications. 10 Hrs

UNIT - III
Estimation and Testing of hypothesis: Consistency and unbiased statistics, point and interval estimation, mean and variance, tests of hypothesis concerning mean and variances. 8 Hrs

UNIT - IV
Functions of random variables, t, F and chi-square distributions 7 Hrs

UNIT - V
Analysis of variance of one-way, two-way classified data, experimental designs: CRD, RBD, LSD, factorial experiments. 6 Hrs
Syllabus of VII & VIII Semester B.E. / Civil Engg.

Text Books:
1. Irwin Miller, John E. Frund, “Probability and Statistics for Engineers” 3rd edition

Reference books:

PROFESSIONAL & COGNITIVE COMMUNIQUÉ

Subject Code : HU8X24  
Credits : 50  
Hrs/Week : 3  
Total Hours : 39

UNIT - I
Common sense: Understand the term ‘common sense’ & commonsensical consensus, unsettling commonsensical consensus. (Role of language in the growth of an individual)
Emotional Intelligence: Nature, function and types of intelligence; emotion, intelligence and creativity; Growth and development of emotional intelligence. 8 Hrs

UNIT - II
Manners and Etiquettes - work place etiquettes, Significance of Cross Cultural understanding; Cultural Sensitivity, Impact of social Media  Self-Presentation Skills.
Workplace: Physical and Psychological working conditions; Workplace Readiness Skills. 8 Hrs
UNIT - III
Writing: Creative Writing, Formal writings/Informal writing, Plagiarism.
Reading and Interpretation: Styles of reading, scanning, skimming, detailed reading. 8 Hrs

UNIT - IV
Presentation Skills: Event planners coordinate and manage conferences meetings and parties. 8 Hrs

UNIT - V
Diaspora: exile, migration, old and new diasporas, the heterogeneity of diasporas, groups, especially by gender, class, sexuality, caste, religion, the role of language and other cultural practices in migratory experiences; Films and Indian Diaspora. 7 Hrs

References:
Ray French : Cross Culture Management, Universities Press
Urmila Rai : Business Communication, Himalaya Publishing House
Neil Fiore; The Now Habit at Work: Perform Optimally, Maintain Focus, and Ignite Motivation in Yourself and Others ,Publisher: Wiley ISBN: 9780470593462
V. Geetha; Gender
http://writingexercises.co.uk/index.php
http://www.studyskills.soton.ac.uk/studytips/reading_skills.htm
http://pages.minot.k12.nd.us/votech/File/workplace.htm
INTRODUCTION TO TOPOLOGY

Subject code : MA8X25  
Credits : 03  
Hrs/Week : 3  
Total Hours : 39

UNIT – I
Basics of set theory and logic: Functions, relations, arbitrary cartesian products, principle of recursive definition, countable and uncountable sets, infinite sets and axiom of choice, well ordered set and maximum principle.  
8 Hrs.

UNIT - II
Topological spaces, basis for a topology, order topology, product topology on $X \times Y$, The subspace topology, closed sets and limit points, continuous functions.  
8 Hrs.

UNIT - III
Product topology, Metric topology, Examples.  
8 Hrs.

UNIT - IV
Connectedness and compactness: Connected spaces, connected sets in the real line, compact spaces, compact sets in the real line.  
8 Hrs.

UNIT - V
Countability and separation axioms. $T_1, T_2, T_3, T_4$ Spaces.  
7 Hrs

Reference books: