Appendix "M" Item No. 24

B. Tech. CIVIL ENGINEERING

SCHEME AND SYLLABI : (with effect from 2022-23)B.Tech & B.Tech. + M.Tech

I Year - I Semester

Course code	Category	Course Title	Hours per week L	T	Internal Marks	External Marks	Total Marks	Credits
CV1101	BS	Mathematics – I	4	0	30	70	100	3
CV1102	BS	Physics	4	0	30	70	100	3
CV1103	ES	Engineering Graphics	2	3	30	70	100	3
CV1104	ES	Civil Engineering Materials	4	0	30	70	100	3
CV1105	ES	Engineering Mechanics	4	0	30	70	100	3
CV1106	ES	Workshop Lab	0	3	50	50	100	1.5
CV1107	BS	Physics Lab	0	3	50	50	100	1.5
CV1108	ES	Engineering Geology Lab	0	3	50	50	100	1.5
		Total Credits						19.5
I Year - II Semester								
CV1201	BS	Mathematics – II	4	0	30	70	100	3
CV1202	BS	Green Chemistry	4	0	30	70	100	3
CV1203	HSS	English	4	0	30	70	100	3
CV1204	ES	Computer Programming and Numerical Methods	4	0	30	70	100	3
CV1205	ES	Surveying and Geomatics	4	0	30	70	100	3
CV1206	HSS	English Language Lab	0	3	50	50	100	1.5
CV1207	PC	Survey Field Work	0	3	50	50	100	1.5
CV1208	ES	Computer Programming and Numerical Methods Lab	0	3	50	50	100	1.5
		Total Credits						19.5
II Year - I Semester								
CV2101	ES	Python Programming	4	0	30	70	100	3
CV2102	PC	Mechanics of Solids	4	0	30	70	100	3
CV2103	PC	Fluid Mechanics-I	4	0	30	70	100	3
CV2104	PC	Structural Analysis-I	4	0	30	70	100	3
CV2105	HSS	Managerial Economics	4	0	30	70	100	3
CV2106	PC	Mechanics of Solids Lab	0	3	50	50	100	1.5
CV2107	PC	Fluid Mechanics -I Lab	0	3	50	50	100	1.5
CV2108	ES	Python Programming Lab	0	3	50	50	100	1.5

CV2109	SC	Computer Aided Drafting	1	2	50	50	100	2
CV2110	MC	Professional Ethics & Universal Human Values	0	0	00	100	100	0
CV2111	MC	NCC/NSS	0	2	-	-	-	0
		Total Credits						21.5

II Year - II Semester

CV2201	ES	Water Supply Engineering	4	0	30	70	100	3
CV2202	BS/PC	Fluid Mechanics-II	4	0	30	70	100	3
CV2203	PC	Hydrology and Water Resources Engineering	4	0	30	70	100	3
CV2204	PC	Geotechnical Engineering-I	4	0	30	70	100	3
CV2205	PC	Concrete Technology	4	0	30	70	100	3
CV2206	PC	Geotechnical Engineering-I Lab	0	3	50	50	100	1.5
CV2207	PC	Building Materials Lab	0	3	50	50	100	1.5
CV2208	SC	Building Planning and Computer Aided Drawing	1	2	50	50	100	2
CV2209	MC	Environmental Science	0	0	00	100	100	0
		Total Credits						20

Internship - I

B.Tech I Year - I Semester

CV-1101 : MATHEMATICS-I

Course Objectives:

* To transmit the knowledge of Partial differentiation.

* To know of getting maxima and minima of function of two variables and finding errors and approximations.

* To evaluate double and triple integrals, volumes of solids and area of curved surfaces.

* To expand a periodical function as Fourier series and half-range Fourier series.

Course Outcomes:

The students will be able to

* Find the partial derivatives of functions of two or more variables.

* Evaluate maxima and minima, errors and approximations.

* Evaluate double and triple integrals, volumes of solids and area of curved surfaces.

* Expand a periodical function as Fourier series and half-range Fourier series.

* Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.

SYLLABUS

Partial Differentiation: Introduction - Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative - Change of variables – Jacobins. Mean value Theorems (without proofs)

Applications of Partial Differentiation: Geometrical interpretation -Tangent plane and Normal to a surface -Taylor's theorem for functions of two variables - Errors and approximations -Total differential. Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign - Leibnitz's rule.

Multiple Integrals: Introduction - Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates - Triple Integrals - Change of Variables.

Multiple Integrals-Applications: Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of Mass - Center of gravity - Moment of inertia - product of inertia – principal axes- Beta Function - Gamma Function - Relation between Beta and Gamma Functions. Error Function or Probability Integral.

Fourier Series: Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula. Practical Harmonic analysis.

Text Books:

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.

Reference Books:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.

2. Advanced Engineering Mathematics by Erwin Kreyszig.

3. A Text Book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.

4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.

5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

6. Higher Engineering Mathematics by Dr. M.K.Venkataraman.

CV-1102 : PHYSICS

Course Objectives:

* To impart knowledge in basic concept of physics of Thermodynamics relevant to engineering applications.

* To grasp the concepts of physics for electromagnetism and its application to engineering. Learn production of Ultrasonics and their applications in engineering.

* To Develop understanding of interference, diffraction and polarization: connect it to a few engineering applications.

* To Learn basics of lasers and optical fibers and their use in some applications.

* To Understand concepts and principles in quantum mechanics and Nanopahse Materials. Relate them to some applications.

Course Outcomes:

The students will be able to

* Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.

* Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications .

* Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit

* Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fiber. Realize their role in optical fiber communication.

* Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one Dimensional Schrodinger's wave equation. Understand the fundamentals and synthesis processes of Nanophase materials.

SYLLABUS

Thermodynamics: Introduction, Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Second law in terms of entropy, Entropy and disorder, Third law of thermodynamics (statement only).

Electromagnetism: Concept of electric flux, Gauss's law - some applications, Magnetic field - Magnetic force on current, torque on current loop, The Biot-Savart's Law, B near a long wire, B for a circular Current loop,Ampere's law, B for a solenoid, Hall effect, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation), Magnetic materials: Classification of magnetic materials and properties.

Ultrasonics: Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, acoustic grating, applications of ultrasonics.

OpticsInterference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films (reflected light), Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Introduction, Differences between interference and diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit (Qualitative and quantitative treatment).

Polarisation: Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization.

Lasers and Fibre Optics: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser, applications of lasers. Introduction to optical fibers, principle of propagation of light in optical fibers, Acceptance Angle and cone of a fibre, Numerical aperture, , classification of fibers, Fibre optics in communications, Application of optical fibers.

Modern Physics: Introduction, De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids, Classification of materials into conductors, semi-conductors and insulators.

Nanophase Materials: Introduction, properties, Top-down and bottom up approaches, Synthesis - Ball milling, Chemical vapour deposition method , sol-gel methods, Applications of nano materials.

Text Books:

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.

2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand

3. Engineering Physics by R.K. Gaur and S.L. Gupta –Dhanpat Rai

Reference Books**:**

1. Modern Engineering Physics by A.S. Vadudeva
2. University Physics by Young and Freedman

CV-1103 : ENGINEERING GRAPHICS

Course Objectives:

* Understand the basics of Engineering Graphics and BIS conventions.

* Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings

* Demonstrate and practice the various profiles/curves used in engineering practice through standard procedures.

* Demonstrate and practice the orthographic projections of points, lines, planes, solids and section of solids

* Demonstrate and practice the development of surfaces of simple solids Familiarize the basic concept of isometric views clearly.

Course Outcomes:

The students will be able to

* Develop simple engineering drawings by considering BIS standards.

* Draw different engineering curves with standard Procedures.

* Comprehend the basics of orthographic projections and deduce orthographic projections of points, lines, planes and solids at different orientations in real life environment.

* Visualize clearly the sections of solids.

* Apply the concepts of development of surfaces while designing/analyzing any product.

* Recognize the significance of isometric drawing to relate 2D environment with 3D environment.

SYLLABUS

Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions, and Scales.

Curves: Conic sections: General construction of ellipse, parabola and hyperbola. Construction of involutes of circle and polygons only. Normal and tangent to curves.

Projections of Points: Principal or Reference Planes, Projections of a point situated in any one of the four quadrants.

Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane.

Projections of Straight Line inclined to both the Reference Planes: Projections of Planes: Projection of Perpendicular planes: Perpendicular to both reference planes, perpendicular to one reference plane and parallel to other reference plane and perpendicular to one reference plane and inclined to other reference plane. Projection of Oblique planes. Introduction to Auxiliary Planes.

Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to other and axes inclined to both the reference planes.

Sections of Solids: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids (Prism, Pyramid, Cylinder and Cone) in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid and cone.

Isometric Views: Isometric projection, Isometric scale and Isometric view. Isometric view of Prisms, Pyramids, cylinder, cone, and their combinations.

Text Books:

1. Elementary Engineering Drawing by N.D.Bhatt, Charotar Publishing House.

Reference Books:

1. Engineering Graphics by K.L. Narayana and P. Kannaiah, Tata McGraw Hill

CV1104 : CIVIL ENGINEERING MATERIALS

Course Objectives:

* Student can enlisting the various materials of different types of stones, cement, bricks, timber, lime products, tar, bitumen, metal, sand, paints, admixtures, etc...used in building construction

* Student will have the capability of understanding the different processes of brick and cement manufacturing, and their types and uses.

Course Outcomes:

* Student will have the capability of testing of building construction materials like cement, bricks, aggregate, etc to find various properties of them.

* Student will have the capability of preservation of building construction materials like cement, bricks, aggregate, etc.... from the external agencies. weather, etc

* Students will understand the design concepts of different types of windows, Doors and stair cases etc

SYLLABUS

Masonry: Different Types of Stone Masonry – Plan, Elevation, Sections of Stone Masonry Works – Brick Masonry – Different Types of Bonds – Plan, Elevation and Section of Brick Bonds up to Two-Brick Wall Thickness – Partition walls – Different Types of Block Masonry – Hollow Concrete Blocks – FAL-G Blocks, Hollow Clay Blocks.

Paints, Varnishes: Constituents and Characteristics of Paints, Types of Paint, their uses and preparation on Different Surfaces, Painting Defects, Causes and Remedies. Constituents of Varnishes, Uses of Varnishes, Different Kinds of Varnishes, Polishes. Painting of Interior Walls, Exterior Walls, Wooden Doors and Windows – Steel Windows – Various Types of Paints (Chemistry of Paints not included) Including Distempers; Emulsion Paints etc., Varnishes Wood Work Finishing Types.

Asbestos, Asphalt Bitumen and Tar: Availability and uses of Asbestos, Properties of Asbestos, Various Types of Asbestos, Difference Between Asphalt and Bitumen, Types, Uses and Properties of Asphalt and Bitumen, Composition of Coal Tar, Wood Tar, Mineral Tar and Naphtha.

Roofing: Mangalore Tiled Roof, RCC Roof, Madras Terrace, Hollow Tiled Roof, Asbestos Cement, Fibre Glass, Aluminium, G.I. Sheet Roofings.

Trusses: King Post and Queen Post Trusses – Steel Roof Truss for 12 m Span with details.

Wooden Doors and Windows: Parallel – Glazed – Flush Shutters, Plywood, Particle Board Shutters – Aluminum, PVC, Steel Doors, Windows and Ventilators, various types of Windows, Glazing – Different Varieties.

Stair Cases: Stair Cases or Stairway Design (Architectural Design or Planning only) various types such as, Straight Flight, Dog-legged, Quarter Landing, Open Spiral, Spiral Stairs etc.

Text Books

1. Engineering Materials [Material Science] by Rangwala, Charotar Publications.

2. Building Construction by B.C. Punmia,.Laxmi Publications.

3. Civil Engineering Construction Materials, S.K. Sharma, KBP House.

Reference Books

1. Concrete: Microstructure, Properties & Materials, PK Mehta, Tata McGra-Hill Publications.

2. Building Construction, Vol.II& III By W.B. Mckay, E.L.B.S. and Longman, UK.

3. Building Materials by S.K. Duggal, New Age International Publishers.

CV-1105 ENGINEERING MECHANICS

Course Objectives:

* To provide students with practise in applying their knowledge of mathematics, science, and engineering, as well as to broaden this knowledge into the vast field of “rigid body Mechanics.”

* To prepare students for advanced courses such as Mechanics of Solids and Structural Analysis.

* To educate about distributed force systems, the centroid/center of gravity, how to locate centroids, moment of inertia, and how to find moment of inertia of composite figures and bodies.

* To know frame types and analyse forces in truss members using the method of joints and the method of sections.

* To understand the kinetics and kinematics of rigid bodies and use the work-energy technique to solve simple problems.

* To discuss the implementation of work-energy and impulse-momentum to dynamic systems.

Course Outcomes:

The student will be able to:

* Understand the Effect of forces and its components, the principle of Moments on wide variety of practical situations that are encountered by Engineers.

* Analyse forces in statically determinate structures using scalar and vector analytical techniques.

* Identify the significance of the centroid/center of gravity and locate the centroids of composite figures and bodies.

* Recognize the moment of inertia and the method for determining the moment of inertia of areas and bodies.

* Understand the dynamics of rigid bodies and how to solve simple problems using the work-energy approach and the virtual work method.

SYLLABUS

Basic concepts : Introduction to Engineering Mechanics – Scalar and Vector quantities – Forces – Characteristics of a force – Definitions and examples of various types of force systems – Definition of resultant – Composition and resolution of forces – Moment of a force – Principles of moments of force – Couples – characteristics of a couple – on Transformations of a couple – Resolution of a force into a force and couple. Resultants of Force Systems, Possible resultants of different types of force systems – Resultant of a concurrent, coplanar force system – Resultant of a non-concurrent coplanar force

system – Resultant of a concurrent non-coplanar force system – Resultant of a parallel, non-coplanar force system – Resultant of a system of couples in space – Resultant of non-concurrent, non-coplanar, non-parallel force system – screw of Wrench.

Equilibrium: Free body diagrams – Equations of equilibrium for a concurrent coplanar force system – Equilibrium of Bodies acted on by two or three forces – Equilibrium of bodies acted on by non-concurrent coplanar force system – Equilibrium of bodies acted on by parallel, non-coplanar force system – Equilibrium of non-concurrent, non-coplanar non-parallel force system. Draw a free body diagram (FBD) and evaluate the equilibrium of different force systems.

Centroids and Centres of Gravity: Centre of gravity of parallel forces in a plane – Centre of gravity of parallel forces in space – centroids and centres of gravity of composite bodies – Theorems of Pappus – Distributed Loads on Beams.

Moments of inertia, Definition – Parallel axis theorm for areas – Second moments of areas by integration – Radius of gyration of areas – Moments of inertia of composite areas – Parallel axis and parallel plane theorems for masses – Moments of inertia of masses by integration – Radius of gyration of mass – Moments of inertia of composite masses.

Friction : Nature of friction – Laws of friction – Coefficient of friction – Angle of friction – Cone of friction – Problems involving frictional forces – Frictional forces on flexible bands and belts – Rolling friction.

Method of Virtual Work: Principle of virtual work – Equilibrium of ideal system – Stability of equilibrium.

Kinematics : Absolute Motion : Introduction – Recapitulation of basic terminology of mechanics – Newton's Laws – Introduction to Kinematics of Absolute Motion – Rectilinear motion of a particle – Angular motion of a line – Curvilinear motion of a particle using rectangular components – Motion of projectiles – Curvilinear motion using Radial and Transverse Components – (Simple Problems only) – basics of simple harmonic motion (Simple problems) – Motion of rigid bodies.

Kinematics: Relative Motion: Introduction to kinematics of relative motion – Relative displacement – Relative velocity – Instantaneous centre – Relative acceleration.

Kinetics: Introduction to Kinetics – Force, Mass and Acceleration approach – Newton's Laws of motion – Equation of motion for a particle. Motion of the mass centre of a system of particles – D Alembert's principle – Rectilinear translation of a rigid body – Curvilinear translation of a rigid body – Rotation of a rigid body – Plane motion of a rigid body – Reserved effective forces and couples and their use in Dynamic Equilibrium method.

Kinetics : Work and Energy approach – Work done by a force – Work done by a couple – Work done by a force system – Energy: Potential energy – Kinetic energy of a particle – Kinetic energy of a rigid body – Principle of Work and kinetic energy – Conservation of energy – Power and efficiency.

Impulse – Momentum approach – Linear impulse – Linear momentum – Principle of linear impulse and linear momentum – Conservation of linear momentum – Elastic impact – Angular impulse – Angular momentum – Principles of angular impulse and angular momentum.

Text Books

1. Engineering Mechanics by Fredinand Leon Singer, B.S.Publications.
2. Applied Mechanics by I.B. Prasad, Khanna Publishers.

ReferenceBooks

1. Engineering Mechanics by S.Timoshenko and D.H. Young, Tata McGraw-Hill Publishing Co. Ltd. India.
2. Engineering Mechanics Vol. I and Vol. II by J.L.Meriam and L.G.Kraige, Wiley Publications.
3. Mechanics for Engineers Statics and Dynamics by F.B. Beer and E.R. Johnston.
4. Engineering Mechanics by R.S.Kurmi, S.Chand Publishing.

CV-1106 WORKSHOP LAB

Course Objectives:

* Get hands on experience with the working skills in Carpentry trade.
* Know how to work with Sheet Metal tools.
* Get familiar with the working skills of Metal Fitting operations.
* Get hands on experience with house hold electrical wiring.

Course Outcomes:

The student will be able

* To work with Wood Materials in real time applications.
* To build various parts with Sheet Metal in day-to-day life.
* To apply Metal Fitting skills in various applications.
* To apply this knowledge to basic house electrical wiring and repairs.

SYLLABUS

Carpentry: Any three jobs from – Half lap joint, Mortise and Tenon joint, Half – lap Dovetail joint, Corner Dovetail joint, Central Bridle joint.

Sheet Metal: Any three jobs from – Square tray, Taper tray(sides), Funnel, Elbow pipe joint.

Fitting: Any three jobs from – Square, Hexagon, Rectangular fit, Circular fit and Triangular fit.

House Wiring: Any three jobs from – Tube light wiring, Ceiling fan wiring, Stair-case wiring, Corridor wiring.

Reference Books:

1. Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.

CV-1107PHYSICS LAB

Course Objectives:

* To enable the students to acquire skill, technique and utilization of the Instruments

* Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.

* To impart the practical knowledge in basic concepts of Wave optics, Lasers and Fiber optics.

* To familiarize the handling of basic physical apparatus like Vernier callipers, screw gauge,

* spectrometers, travelling microscope, laser device, optical fibre, etc.

Course Outcomes:

The student will be able to

* Design and conduct experiments as well as to analyze and interpret

* Apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics

* Draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.

LIST OF EXPERIMENTS

1. Determination of Radius of Curvature of a given Convex Lens by forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray m_o and Extraordinary m_e ray.
6. Determination of Thickness of Given Paper Strip by Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.
10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.
11. Carey Foster's Bridge – Verification of laws of Resistance and Determination Of Specific Resistance.
12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.
13. Photoelectric cell-Characteristics.
14. Planks Constants.
15. Laser- Diffraction.

CV-1108ENGINEERING GEOLOGY LAB

Course Objectives:

* To enable the students to know different types of soils.

* To enable the students to know different properties of different soils.

* To enable the students to know the application of Remote Sensing and Geo Physical Methods.

* Understand weathering process and mass movement

Course Outcomes:

* Students can identify different types of rocks and their mineral composition.

* Students will study the physical properties of minerals by conducting laboratory tests.

* Students can study the models of folds, faults, joints and tunnels.

* Students can study the satellite data and evaluate the terrain through integrated approach.

SYLLABUS

1. General study of topo sheet
2. Physical properties of minerals
3. Physical properties of 3 types of rocks
4. Study of folds, faults and joints (Models)
5. Study of tunnels (models)

6. General observation of satellite data for abstraction of data

7. Integrated approach of Terrain evaluation.

Text Books

1. Principles of Engineering Geology by K.V.G.K.Gokhale. B.S. Publications-2005

2. Engineering Geology by N.Chennakesavalu, Mc-Millan, Indian Ltd-2005

3. A text book of Geology by P.K.Mukherjee, World Press

4. Engineering and General Geology by Parbin Singh, Katson Publishing House

5. Fundamentals of Remote Sensing by George Jospeh, University Press (India) Private Ltd.

B.Tech I Year - II Semester

CV-1201 MATHEMATICS – II

Course Objectives:

* The way of obtaining rank, Eigen values and eigen vectors of a matrix.

* To know the importance of Cayley-Hamilton theorem and getting canonical form from a given quadratic form.

* To solve the system of equations by using direct and indirect methods.

* To solve first order and higher order differential equations by various methods.

* To obtain the Laplace transforms and inverse Laplace transforms for a given functions and their applications.

Course Outcomes:

* Find rank, Eigen values and Eigen vectors of a matrix and understand the importance of Cayley-Hamilton theorem.

* Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.

* Demonstrate solutions to first order differential equations by various methods and solve basic applications problems related to electrical circuits, orthogonal trajectories and Newton's law of cooling

* Discriminate among the structure and procedure of solving higher order differential equations with constant and variable coefficients.

* Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.

SYLLABUS

Linear Algebra: Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Direct & Indirect Methods: Gauss elimination method, LU Factorization method, Gauss Seidal Method. Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties

Eigen Values and Eigen Vectors: Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications. Diagonalization of a Matrix –Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form.

Ordinary Differential Equations of First Order and its Applications: Formation of ordinary differential equations (ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations - Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

Differential Equations of Higher Order: Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters - Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

Laplace Transforms: Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by t^n - Division by t – Evaluation of integrals by Laplace Transforms - Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations - Simultaneous Linear Differential Equations with Constant Coefficients - Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

Text Books:

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43r^d edition, Khanna publishers.

Reference Books:

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.

2. Advanced Engineering Mathematics by Erwin Kreyszig.

3. A Text Books of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.

4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.

5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

CV-1202 GREEN CHEMISTRY

SYLLABUS

Unit 1: Water Technology : Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electro-dialysis.

Unit 2: Batteries : Primary batteries: The chemistry - Types: Zinc-carbon (Leclanche type), zinc alkaline (Duracell), zinc/air batteries; Lithium primary cells – liquid cathode, solid cathode and lithium-ferrous sulphide cells. Secondary batteries: Lead acid and VRLA (valve regulated (sealed) lead acid), nickel-cadmium, nickel-zinc, nickel-metal hydride batteries, lithium ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles, requirements of the battery – sodium-beta and redox batteries.

Unit 3: Fuel Cells : Fuel Cells: Description, working principle, anodic, cathodic and cell reactions, fabrication of electrodes and other components, applications, advantages, disadvantages and environmental aspects of the following types of fuel cells: Proton Exchange Membrane Fuel Cells, alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate, direct methanol fuel cells- Membranes and Fuels

Unit 4: Corrosion : Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion. Corrosion Controlling Methods, Protective Coatings, Metallic Coatings, Electroplating and Electroless Plating.

Unit 5: Green Chemistry and Technology : Introduction and significance of green chemistry, Goals of green chemistry, 12 principles of green chemistry, toxicity of chemicals, material safety data sheet (MSDS), concept of zero pollution technologies, atom economy, functional toxicity vs non-functional toxicity, functional group approaches to green chemistry, Elimination of toxic functional group, optimization of frameworks for the design of greener synthetic pathways, Applications of green chemistry - Green solvents, green fuels and propellants, biocatalysis.

Text Books

1. Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.

2. A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.

3. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing.

CV-1203 ENGLISH

Course Objectives:

* To make students understand the explicit and implicit meanings of a text/topic;

* To give exposure to new words and phrases, and aid to use them in different contexts;

* To apply relevant writing formats to draft essays, letters, emails and presentations; and

* To adapt oneself to a given situation and develop a functional approach to finding solutions: adaptability and problem solving.

Course Outcomes:

* Students will be able to analyse a given text and discover the various aspects related to language and literature;

* Learn the various language structures, parts of speech and figures of speech;

* Develop one's reading and writing abilities for enhanced communication; and

* Learn to apply the topics in real-life situations for creative and critical use.

SYLLABUS

On the conduct of life: William Hazlitt

Life skills: Values and Ethics

If: Rudyard Kipling

The Brook: Alfred Tennyson

Life skills: Self-Improvement

How I Became a Public Speaker: George Bernard Shaw

The Death Trap: Saki

Life skills: Time Management

On saving Time: Seneca

ChinduYellama

Life skills: Innovation

Muhammad Yunus

Politics and the English Language: George Orwell

Life skills: Motivation

Dancer with a White Parasol: Ranjana Dave

Grammar: Prepositions – Articles – Noun-Pronoun Agreement, Subject-Verb Agreement – Misplaced Modifiers – Clichés, Redundancies.

Vocabulary: Introduction to Word Formation – Root Words from other Languages – Prefixes and Suffixes – Synonyms, Antonyms – Common Abbreviations

Writing: Clauses and Sentences – Punctuation – Principals of Good Writing – Essay Writing – Writing a Summary

Writing: Essay Writing

Life skills: Innovation

Muhammad Yunus

Text Books:

1. Language and Life: A Skills Approach Board of Editors, Orient Blackswan Publishers, India. 2018.

Reference Books:

1. Practical English Usage, Michael Swan. OUP. 1995.
2. Remedial English Grammar, F.T. Wood. Macmillan.2007
3. On Writing Well, William Zinsser. Harper Resource Book. 2001
4. Study Writing, Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills, Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English, Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

CV-1204COMPUTER PROGRAMING AND NUMERICAL METHODS

Course Objec tives:

* The course is designed to provide complete knowledge of C language.

* To provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.

* To provide knowledge to the Students to develop logics which will help them to create programs, applications in C.

* This course aims to identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

* This course provides the fundamental knowledge which is useful in understanding the other programming languages.

Course Outcomes:

The student will be able to

* Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and Apply them in problem solving.

* Apply various operations on derived data types like arrays and strings in problem solving.

* Design and Implement of modular Programming and memory management using Functions, pointers.

* Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.

* Apply Numerical methods to Solve the complex Engineering problems.

SYLLABUS

Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.

Decision Making, Branching, Looping, Arrays & Strings: Decision making with if statement, Simple if statement, the if…else statement, Nesting of if…else statement, the else. If ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, the do statement, The for statement, Jumps in Loops ,One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, the scope, visibility and lifetime of variables.

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments- Program Applications

Numerical Methods: Solutions of Algebraic and Transcendental Equations, Bisection Method, Newton Raphson Method. Newton's forward and backward Interpolation, Lagrange's Interpolation in unequal intervals. Numerical

Integration: Trapezoidal rule, Simpson's 1/3 rules. Solutions of Ordinary First Order Differential Equations: Euler's Method, Modified Euler's Method and Runge-Kutta Method.

Text Books:

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.

2. Introduction to Numerical Methods, SS Sastry, Prentice Hall

Reference Books:

1. Let Us C ,YashwantKanetkar, BPB Publications, 5th Edition.

2. Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.

3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI.

4. Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), Enzo Marinari (Author), Giovanni Organtini, World Scientific.

CV-1205 SURVEYING AND GEOMATICS

Course Objectives:

* To impart knowledge about the different methods of surveying to determine the position and elevation of inaccessible points.

* To familiarise the students with chain and compass surveying and train them to determine the bearing of any required station by different methods.

* To impart knowledge about the concept of levelling and reduced level of any station and teach them the procedure to establish bench marks.

* To familiarize the students with total station and explain the usage of Total Station with respect to all the areas of surveying.

* To explain the concept of Global Positioning System and its applications.

Course Outcomes:

Students will be able to

* Determine the precise location of any required point with respect to horizontal and vertical control.

* Carry out different methods of levelling the profile levelling, reciprocal levelling etc. to determine the elevation of points with respect to bench mark.

* Understand the procedure to establish bench marks with respect to mean sea level.

* Handle the instrument theodolite to measure the horizontal and vertical angles and analyze to determine the inaccessible distances.

* Understand the concept of global positioning system and its applications in surveying.

SYLLABUS

Introduction: Classification and Principles of Surveying, Triangulation and Trilateration – Earth as Spheroid, Datum, Geoid, Azimuth, Latitude, Longitude, Map Projections, Scales, Plans and Maps. Chain Surveying: Instrumentation for Chaining – Errors due to Incorrect Chain–Chaining on uneven and sloping Ground – Errors in Chaining –Tape Corrections – Problems: Base Line Measurement – Chain Triangulation – Check Lines, Tie Lines, Offsets. Basic Problems in Chaining – Obstacles in Chaining – Problems – Conventional Signs.

Compass Survey: (a) Introduction to Compass Survey Definitions of Bearing. True bearing, True meridian, Magnetic Meridian, Magnetic Bearing. Plane Table Surveying: Introduction – Advantages, Accessories. Theodolite – Types of Theodolites – Temporary Adjustments, Measurements of Horizontal Angle – Method of Repetition, Method of Reiteration – Uses of Theodolites. Curves – Sample Curves – Elements of Simple Curves – Methods of Setting Simple Curves – Rankine's Method – Two Theodolite Method.

Levelling: Definitions of Terms – Methods of Levelling – Uses and Adjustments of Dumpy Level – Temporary and Permanent Adjustments of Dumpy Level Levelling Staves – Differential Levelling, Profile Levelling – Cross Sections – Reciprocal levelling. Precise Levelling – Definition of BS, IS, FS, HI, TP – Booking and Reduction of Levels, H.I. Methods – Rise and Fall Method – Checks – Related Problems – Curvature and Refraction Related Problems – Correction – Reciprocal Levelling – Related Problems – L.S & C.S Leveling – Problems in Levelling – Errors in Levelling. Contouring: Definitions – Contour Intervals, Characteristics of Contours

Total Station Surveying: Electronic Theodolite, Electronic Distance Measurements, Total Station, Errors in Measurements, Advantages, Disadvantages, Applications; Contour Mapping, Determination of Height of Remote Point, Position of Hidden Point, Free Station, Area Measurement, Volume Measurement.

Modern Surveying and Mapping: GPS Survey – Introduction, Errors in GPS, Positioning Methods, Classification of GPS Surveying, Applications, Advantages and Disadvantages, Photogrammetric Surveying; Sensors and Platforms, Aerial Photogrammetry, Satellite Images Resolution, Concept of Stereo Models, Photogrammetric Products, Rectified Images, Orthophotography, Topographic Map, Digital Maps, DEM, GIS, Advantages and Disadvantages of Photogrammetric Surveying.

Text Books

1. Surveying Vol. I, II and III by B.C.Punmia, Standard Book House.

2. Advanced Surveying -by SatheeshGopi, Sathikumar and Madhu, Pearson India.

3. Geomatics Engineering by M.K.Arora and R.C.Badjatia, Nemchand& Bros.

Reference Books

1. Surveying Vol. I and II by S.K. Duggal, Tata McGraw-Hill Publishing Co. Ltd.

2. Surveying: Theory & Practices by James M. Anderson and Edward M. Mikhail, Tata McGraw-Hill Publishing Co. Ltd.

CV-1206 ENGLISH LANGUAGE LAB

Course Objectives:

* To make students recognize the sounds of English through Audio-Visual aids;

* To help students build their confidence and help them to overcome their inhibitions and self- consciousness while speaking in English;

* To familiarize the students with stress and intonation and enable them to speak English effectively; and

* To give learners exposure to and practice in speaking in both formal and informal contexts.

Course Outcomes:

* Students will be sensitized towards recognition of English sound patterns and the fluency in their speech will be enhanced;

* A study of the communicative items in the laboratory will help students become successful in the competitive world;

* Students will be able to participate in group activities like role plays, group discussions and debates; and

* Students will be able to express themselves fluently and accurately in social as well professional context.

SYLLABUS

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

Reading and Writing skills: Reading Comprehension – Précis Writing - E-Mail writing - Punctuation.

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation.

Reference Books:

1. Ashraf Rizvi. Effective Technical Communication. Tata McGraw Hill Education Private Limited, New Delhi.

2. Speak Well. Orient Blackswan Publishers, Hyderabad.

3. Allan Pease. Body Language. Manjul Publishing House, New Delhi.

CV-1207 SURVEY FIELD WORK

Course Objectives:

* To impart knowledge about the art of determining the relative positions of points on, above or beneath the surface of the earth.

* To impart knowledge of the measurement of angles and distances and keeping of a record in field book.

* To familiarise the students with instruments like chain, compass, dumpy level, plane table and some special instruments.

* To impart knowledge about advanced instruments of surveying like total station and GPS.

* To familiarize about the theodolite and electronic theodolites that can read angles directly.

Course Outcomes:

At the end of the course the student will be able to:

* Determine the inaccessible horizontal and vertical distances from the observed bearings and calculated angles between the survey lines.

* Determine the relative positions of points on, above or beneath the surface of the earth by direct or indirect measurements of distance, direction and elevation.

* Find out the elevations of points with respect to a given datum and also to establish points at a given elevation.

* Handle the advanced survey instruments like total station and global positioning system.

* Use the theodolite as a tacheometer to determine the elevations and reduced levels of points.

LIST OF EXPERIMENTS:

1. Chain traversing: Plotting a chain traverse for a building.
2. Compass traversing: Measurement of bearings and determination of inaccessible distance using a compass.
3. Levelling: Determination of reduced levels of different points by Height of Instrument method and Rise & Fall method.
4. Theodolite traversing: Measurement of horizontal angles by Reiteration method and repetition method, Determination of inaccessible distance using a theodolite, Heights and Distances using vertical and horizontal angles.
5. Point positioning using GPS
6. Total station exercises:
   i. Contour mapping using total station.
   ii. Height of remote point using total station.
   iii. Position of hidden point using total station
   iv. Area& volume measurement using total station.

CV-1208 : COMPUTER PROGRAMING AND NUMERICAL METHODS LAB

Course Objectives:

* To impart writing skill of C programming to the students and solving problems.

* To write and execute programs in C to solve problems such as Modularize the problems into small modules and then convert them into programs.,

* To write and execute programs in C to solve problems such as arrays, files, strings, structures and different numerical methods.

* This reference has been prepared for the beginners to help them understand the basic to advanced concepts related to Objective-C Programming languages.

Course Outcomes:

* Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.

* Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.

* Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.

* Apply and practice logical ability to solve the real world problems.

* Apply Numerical methods to Solve the complex Engineering problems

LIST OF PROGRAMS

1. Write a program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?
2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (e.g. for, while, and do while).
3. Write a set of string manipulation functions e.g. for getting a substring from a given position, Copying one string to another, Reversing a string, adding one string to another.
4. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int, long, float, and double. What happens when you add 1 to the largest possible integer number that can be stored?
5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.
6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).
7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.
8. Given two points on the surface of the sphere, write a program to determine the smallest arc length between them.
9. Implement bisection method to find the square root of a given number to a given accuracy.
10. Implement Newton Raphson method to det. a root of polynomial equation.
11. Given table of x and corresponding f(x) values, Write a program which will determine f(x) value at an intermediate x value by using Lagrange's interpolation.
12. Write a function which will invert a matrix.
13. Implement Simpson's rule for numerical integration.
14. Write a program to solve a set of linear algebraic equations.

B.Tech II Year - I Semester

CV2101 PYTHON PROGRAMMING

Course Objectives

1. To develop skills on procedural oriented and object oriented programming in Python

2. To understand and apply different data wrangling techniques using Python.

3. To perform data analysis using python libraries like NumPy, Pandas and exploratory data analysis using Matplotlib

Course Outcomes

At the end of the course, a student should be able to:

1. acquire programming knowledge on Basics of Python
2. acquire programming knowledge on Text and File Handling
3. develop Python programs to Mean, Median, Mode, Correlation
4. acquire programming knowledge on NumPy, Pandas Library
5. acquire programming knowledge on Graph Visualizations in Python and Data Analysis using Python

SYLLABUS

1. **Introduction to Python: Rapid Introduction to Procedular Programming, Data Types**: Identifiers and Keywords, Integral Types, Floating Point Types

Strings: Strings, Comparing Strings, Slicing and Striding Strings, String Operators and Methods, String formatting with str.format

Collections Data Types: Tuples, Lists, Sets, dictionaries, Iterating and copying collections

2. **Python Control Structures, Functions and OOP:Control Structures and Functions**: Conditional Branching, Looping, Exception Handling, Custom Fuctions

Python Library Modules: random, math, time, os, shutil, sys, glob, re, statistics,creating a custom module

Object Oriented Programming: Object Oriented Concepts and Terminology, Custom Classes, Attributes and Methods, Inheritance and Polymorphism, Using Properties to Control Attribute Access

File Handling: Writing and Reading Binary Data, Writing and Parsing Text Files

3. **NumPy Arrays and Vectorized Computation**: NumPy arrays, Array creation, Indexing and slicing, Fancy indexing, Numerical operations on arrays, Array functions, Data processing using arrays, Loading and saving data, Saving an array, Loading an array, Linear algebra with NumPy, NumPy random numbers

4. **Data Analysis with Pandas**: An overview of the Pandas package, The Pandas data structure-Series, The DataFrame, The Essential Basic Functionality: Reindexing and altering labels , Head and tail, Binary operations, Functional statistics , Function application Sorting, Indexing and selecting data, Computational tools, Working with Missing Data, Advanced Uses of Pandas for Data Analysis - Hierarchical indexing, The Panel data

5. **Data Analysis Application Examples**: Data munging,Cleaning data, Filtering, Merging data, Reshaping data, Data aggregation, Grouping data

6. **Data Visualization**: The matplotlib API primer-Line properties, Figures and subplots, Exploring plot types-Scatter plots, Bar plots, Histogram plots, Legends and annotations, Plotting functions with Pandas

Text Books

1. Programming in Python 3: A Complete Introduction to Python Language, Mark Summerfield, Second Edition, Addison-Wesley Publications

2. Python: End-to-End Data Analysis Learning Path, Module 1: Getting Started with Python Data Analysis , Phuong VothiHong , Martin Czygan, , Packt Publishing Ltd

Reference Books

1. Learning Python, 5th Edition, Mark Lutz, Orielly Publications

2. Python for Data Analysis, Wes McKinney, Orielly Publications

3. How to Think Like a Computer Scientist: Learning with Python 3 Documentation 3rd Edition, Peter Wentworth, Jeffrey Elkner, Allen B. Downey, Chris Meyers

4. Core Python Programming, Second Edition, Wesley J. Chun, Prentice Hall

5. Python Cookbook – Recipes for Mastering Python 3,3rdEdition, David Beazley, Brian K. Jones, Oreilly

CV2102 MECHANICS OF SOLIDS

Course Objectives:

* The student can understand the concepts of stress and strain by analysis of solids.

* The student can understand the engineering properties of materials, force-deformation, and stress-strain relationships.

* The student can understand the determinate and indeterminate members, and beams, torque, shear forces, and bending moments.

* The student can understand the combined bending and direct stresses on column and strut members, axial load on open and closed coiled helical spring subjected to axial load.

Course Outcomes:

The student will be able to:

* Understand the basic concepts of stresses and strain along with their relations.

* Determine the shear force and bending moments of the simply supported, cantilever and over hanging beams under various loads.

* Assess the flexural normal and shear stresses of various cross sections.

* Analyse the stresses on oblique plane and torsional shear stress distribution of solid and hollow circular sections.

* Analyse the stresses on columns and struts using various theories.

* Analyse open and closed coiled helical springs subjected to axial load.

SYLLABUS

Duties/Obligations Accountability ofStructural Engineer for the Design of a Structure: a) Economy b) Safety: (i) Strength Consideration (ii) Stiffness Consideration. Need for Assessment ofStrength of a Material – Analysis for Strength Requirement for Design Purposes – Review of IS Code Provisions.

Effects ofForce: Tension, Compression and Shear. Stress as Internally Elastic Resistance of a Material – Strain – Property ofElasticity – Hooke's Law – Stress-Strain Diagrams. Characteristic Strengths, Factors ofSafety and Working Stresses for Materials and Various Types ofApplicationofLoad. Elastic Strain – Energy, Stress due to Gradually Applied Load, Sudden Load, Impact Load and Shock Load. Lateral Strain, Poisson's Ratio. Complementary Shear Stress, Shear Strain, Shear Modulus. Relation between Modulus of Elasticity, Modulus of Rigidity and Bulk Modulus.Stresses in Composite Assemblies due to Axial Load and Temperature Change.

Effect of Transverse Force, Shear Force, BendingMoment and Axial Thrust Diagrams for A) Cantilever B) Simply Supported and C) Over Hanging Beams for various patterns of Loading. Relation between (i) Intensity of Loading (ii) Shear Force and (iii) Bending Moment at a Section. Theory of Simple Bending: Flexural Normal Stress Distribution; Flexural Shear Stress Distribution for Various Shapes of Cross Section.

Stresses on Oblique Plane – Resultant Stress – Principal Stress and Maximum Shear Stress and Location of their Planes. Mohr's Circle for Various Cases ofStresses; Theory ofPure Torsion for Solid and Hollow Circular Sections – Torsional Shear Stress Distribution, Effect of Combined Torsion, Bending and Axial Thrust – Equivalent B.M and T.M.

Longitudinal and Hoop stresses in Thin Cylinders subjected to Internal Pressure. Wire Wound Thin Cylinders.Thick Cylinders –Lamme's Theory, Compound Tubes – Theory of Failure (i) Principal Stress Theory, (ii) Principal Strain Theory, (iii) Maximum Shear Stress Theory and (iv) Maximum Strain Energy Theory.

Columns and Struts: Combined Bending and Direct Stresses – Kern of a Section – Euler's Theory – End Conditions. Rankine-Gordon Formula – Eccentrically Loaded Columns. Open and Closed Coiled Helical Springs subjected to Axial Load.

Text Books

1. Strength of materials by S.Ramamrutham and R.Narayanan, Dhanpat Rai Publishing Company, New Delhi.

2. Mechanics of Materials by B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications.

3. Analysis of Structures, Vol. I, 1993 edition, by V.N.Vazirani and M.M.Ratwani, Khanna Publishers Books.

Reference Books

1. Strength of Materials (Elementary Theory and Problems) by S.Timoshenko and D.H.Young, CBS Publishers & Distributors Pvt. Ltd.

2. Introduction to Mechanics of Solids by Popov, Prentice-Hall.

3. Strength of Materials by Hyder, Universities Press.

4. Elementary Mechanics of Solids by P.N. Singer and P.K.Jha, New Age International Publishers.

CV2103 : FLUID MECHANICS - I

Course Objectives

* To familiarize students with the fundamentals and basic concepts of fluid mechanics.

* To impart knowledge to the students about fluid statics and kinematics which are prerequisite to comprehend fluid dynamics and other more advanced aspects.

* To enable students to understand one-dimensional applications of energy equation and to impart the concepts of flow measuring devices.

* To develop insight in the application of momentum principle to closed conduits.

* To impart knowledge on fluid flow through pipes and pipe network analysis.

Course Outcomes

Students will be able to

* Understand the significant properties of fluids and pressure measurement, and analyze hydrostatic forces on plane and curved surfaces.

* Comprehend kinematics of fluid flow and further derive and apply continuity equation which is useful in analyzing more complex field problems such as seepage analysis.

* Understand the theory of flow measuring devices in pipes and open channel flows using Bernoulli's equation.

* Compute forces on pipe bends using linear impulse momentum application and understand the basics of angular momentum principle which is essential to understand the concepts of hydraulic turbines.

* Perform analysis of pipes and hydraulic design of pipe networks.

SYLLABUS

Fluid Properties: Introduction & Physical Properties of Fluids –Newton's Law of Viscosity.

Fluid Statics: Forces acting on a fluid element – Pascal'slaw; Variation of Pressure in Static Fluid; Absolute, Gauge and Total Pressure; Pressure Measurement, Forces on Immersed Bodies in Static Fluids – Force on a Plane Surface and curved surfaces.

Fluid Kinematics: Types of Flow, Streamline, Path line, Streak line; Stream Tube, Translation, Deformation and Rotation of a Fluid Element in Motion; Local, Convective and Total Accelerations; One, Two and Three Dimensional Analysis of Flows. Ideal Fluid Flow – Stream Function, Velocity Potential; Rotational& Irrotational Flows–Vorticity and Circulation; Laplace Equation in terms of Stream Function and Velocity Potential; Flow Nets. Principle of Conservation of Mass – Concepts of System and Control Volume; Continuity Equation in three dimensional Cartesian coordinates; Continuity Equation for flow through a Stream tube.

Fluid Dynamics: Principle of Conservation of Energy – Equation of Motion for Ideal Fluids, Euler's Equation in Streamline Coordinates, Derivation of Energy Equation through integration of Euler's Equation, Bernoulli's Equation, Energy Correction Factor. Flow measuring devices – Flow Measurement in Pipes – Measurement of Static, Stagnation and Dynamic Pressures and Velocity – Pitot Tube, Prandtl Pitot Tube; Measurement of Discharge through a Pipe using Flow Meters – Venturimeter, Flow Nozzle meter and Orifice meter.

Flow through Tanks and Reservoirs – Measurement of Discharge from Tanks and Reservoirs – Steady and Unsteady Flow through Orifices and Mouthpieces – Small & Large Orifices – Different types of Mouthpieces; Discharge from tanks through Drowned Orifices, Time of Emptying Tanks, Discharge from a Tank with Inflow. Flow Measurement in Channels – Flow Measurement in Open Channels, Flow Past Weirs and Notches, Sharp Crested and Broad Crested Weirs, Weirs with and without end contractions, Ventilation of Weirs, Triangular Notches, Cipolletti Weir.

Principle of Conservation of Momentum – Momentum of Fluids in Motion, Impulse Momentum Equation, Momentum Correction Factor, Application of Momentum Principle – Forces on Pipe Bends and Reducers, Flow through a Nozzle; Angular Momentum of Fluid Flow – Sprinkler Problems.

Flow through Pipes: Introduction to Pipe Flow and Laws of Friction – Reynolds Experiment; Steady Turbulent Flow through Pipes; Laws of Friction; Darcy-WeisbachEquation;Total Energy and Hydraulic Gradient – Energy and Hydraulic Gradient Lines; Minor Losses in Pipes; Pipes in Series and Parallel – Equivalent Length of Pipe; Flow Between Two Reservoirs; Siphon; Pipe Network Analysis by Hardy–Cross Method; Hydraulic Power Transmission through Pipes and Nozzles, Water Hammer (Only Concept).

Text Books

1. Fluid Mechanics and Hydraulic Machinery by P.N.Modi and S.M. Seth, Standard Book House.
2. Fluid Mechanics by A.K.Jain, Khanna Publishers.

Reference Books

1. Engineering Fluid Mechanics by K.L.Kumar, S. Chand &Co.Ltd.
2. Engineering Hydraulics, H.Rouse, John Wiley & Sons Inc.
3. Mechanics of Fluids, I.H.Shames,McGraw-Hill Professional.
4. Fluid Mechanics and Its Applications, Vijay Gupta and Santosh K Gupta, New Academic Science Ltd

CV2104 : STRUCTURAL ANALYSIS - I

Course Objectives:

* Familiarise students to the various methods of determining deflections of beams

* Improve student's ability in understanding strain – energy due to Axial load, Shear force, Bending Moment and Torque.

* Impart skills of analysing the fixed beams, three span continuous beams subjected to different types of loads.

* Enable students understand the concept of moving loads and draw maximum Shear force and Bending moment diagrams for different types of loads

* Expose students to understand Lamme's theory in analyzing thick cylinders and know the concept of theories of failure.

Course Outcomes:

the student will be able to:

* Understand behavior of beams and determine slope and deflections of a beams, trusses (having 9 members or less) using various methods.

* Differentiate determinate and indeterminate structures and determine deflections of statically determinate structures.

* Apply strain energy principle to determine the deflections of beams using various methods.

* Understand the concept of moving loads and draw the maximum Shear force and Bending moment diagrams for different types of moving loads.

* Gain knowledge on thick cylinders and compound cylinders. Learns basic concepts of theories of failure.

SYLLABUS

Deflections of Beams: (i) Cantilever (ii) Simply Supported and (iii) Over Hanging Beams, using (a) Double Integration and (b) Macaulay's Method.

Deflections of Beams Using (i) Moment Area Method, (ii) Conjugate Beam Method, (iii) Unit Load Method (iv) Castigliano's Theorem – 1. Strain – Energy due to (i) Axial Load, (ii) Shear Force, (iii) Bending Moment and (iv) Torque;

Deflections of Statically Determinate Structures: (A) Single Storey, Single Bay Rectangular Portal Frames using (i) Unit Load Method,(ii) Castigliano's Theorem –1. (B) Trusses (Having 9 Members or less) using (i) Unit Load Method and (ii) Castigliano's Theorem-1.

Analysis of (A) Fixed Beams, (B) Three Span Continuous Beams using (i) Theorem of Three Moments, (ii) Slope Deflection Method and (iii) Moment Distribution Method

Moving Loads: Maximum Shear Force and Bending Moment Diagrams for Different types of Loads. Maximum Bending Moment at a Section under a Wheel Load and Absolute Maximum Bending Moment in the case ofseveral Wheel Loads. Equivalent Uniformly Distributed Live Load for Shear Force and Bending Moment. Reversal of Nature of Shear Force, Focal Length, Counter Bracing for Truss Panels, Influence Lines for (i) Beams and (ii) Members of Warren and Pratt Trusses.

Text Books

1. Theory of Structures, Vol- I,byG.S.Pundit, S.P.Gupta and R.Gupta,, McGraw-Hill Education India.

2. Mechanics of structures Vol- I byH.J.Shah and S.B.Junnarkar, Charotar Publishing House.

3. Strength of Materials by S.RamamruthamandR.Narayanan, Dhanpat Rai Publishing House.

Reference Books

1. Elementary Strength ofMaterialsbyS.Timoshenko and D.H.Young, Affiliated East-West Press.

2. Analysis and Design ofStructures Vol-I by V.N.Vazirani and M.M.Ratwani, Khanna Publishers.

3. Intermediate Structural Analysis by C.K.Wang, McGraw-Hill.

4. Strength ofMaterialsbyB.C.Punmia, Laxmi Publications.

CV2105 MANAGERIAL ECONOMICS

(Common for all Branches)

Course Objectives:

* To introduce micro as well as macro, financial concepts that can be used in business decision making

* To analyze various business situations with the help of different economic concepts.

* To assist in a better understanding of the application of modern principles and methods of microeconomics to real-world business issues in different contexts.

* To master the basic tools of microeconomics: supply and demand analysis; firms' production and pricing decisions, market equilibrium, and market structure analysis.

* To enable the students to understand how organizations make important investment and financing decisions.

Course Outcomes:

The student will be able to

* Understand the concepts of cost, nature of production, and its relationship to Business operations.

* Apply marginal analysis to the "firm" under different market conditions.

* Use the tools of marginal analysis to explain the optimal allocation of resources within the firm.

* Analyze the causes and consequences of different market conditions.

* Integrate the concept of price and output decisions of firms under the various market structure.

SYLLABUS

Significance of Economics and Managerial Economics:

Economics: Definitions of Economics- Wealth, Welfare and Scarcity definitions Classification of Economics- Micro and Macro Economics.

Managerial Economics: Definition, Nature and Scope of Managerial Economics, Differences between Economics and Managerial Economics, Main areas of Managerial Economics, Managerial Economics with other disciplines.

Demand and Utility Analysis: Demand - Definition, Meaning, Nature and types of demand, Demand function, Law of demand - Assumptions and limitations. Exceptional demand curve.

Elasticity of demand - Definition, Measurement of elasticity, Types of Elasticity (Price, Income, Cross and Advertisement), Practical importance of Price elasticity of demand, Role of income elasticity in business decisions, Factors governing Price Elasticity of demand.

Utility Analysis: Utility- Meaning, Types of Economic Utilities, Cardinal and Ordinal Utility, Total Utility, Marginal Utility, The law of Diminishing Marginal Utility and its Limitations.

Theory of Production and Cost analysis: Production - Meaning, Production function and its assumptions, use of production function in decision mak-

ing; Cost analysis - Nature of cost, Classification of costs - Fixed vs. Variable costs, Marginal cost, Controllable vs. Non - Controllable costs, Opportunity cost, Incremental vs. Sunk costs, Explicit vs. Implicit costs, Replacement costs, Historical costs, Urgent vs. Postponable costs, Escapable vs. Unavoidable costs, Economies and Diseconomies of scale.

Market Structures: Definition of Market, Classification of markets; Salient features or conditions of different markets - Perfect Competition, Monopoly, Duopoly, Oligopoly, Importance of kinked demand curve; Monopolistic Competition.

Pricing and Business Cycles:

Pricing Analysis : Pricing – Significance; Different Pricing methods- Cost plus pricing, Target pricing, Marginal cost pricing, Going -rate pricing, Average cost pricing, Peak load pricing , Pricing of joint Products, Pricing over the life cycle of a Product, Skimming pricing Penetration pricing, Mark- up and Mark-down pricing of retailers.

Business cycles - Definition, Characteristics, Phases, Causes and Consequences; Measures to solve problems arising from Business cycles.

Text Books:

1. Sankaran,S., Managerial Economics,Marghan Publications, 2015, Chennai.

2. Aryasri, A.R., Managerial Economics and Financial Analysis, MC Graw Hill Education, New Delhi,2015.

Reference Books:

1. Dwivedi, D.N., Managerial Economics,Vikhas Publishing House Pvt. Ltd. 6th Edition, New Delhi,2004.

2. Dewett, K.K., Modern Economic Theory, S.Chand& Company Ltd., New Delhi, 2005.

CV2106 : MECHANICS OF SOLIDS LAB

Course Objectives:

* To impart knowledge about behaviour of materials under the action of loads.

* To explain about various kinds of loads that are going to act on materials.

* To understand about various kinds of stress and strain measuring machinery that is used in laboratory.

* To familiarize he students with various physical, mechanical properties of various engineering materials.

* To explain about various deformations of materials under the action of loads.

Course Outcomes:

The student will be able to:

* Understand strength and quality of materials through laboratory tests.

* Understand about properties of elastic materials.

* Find deformation of materials after the respective experiment.

* Apply the knowledge of mathematics to find the properties of materials.

LIST OF EXPERIMENTS

1. Tension test on Mild/HYSD bars
2. Compression test on wood (parallel and perpendicular to grains)
3. Tests on springs for the determination of rigidity modulus and spring constant.
4. Brinell's and Rockwell hardness tests.
5. Charpy and Izod impact tests.
6. Double shear test on mild steel specimen.
7. Bending test.: Load deflection test for the determination of young's modulus on simply supported and cantilever beam for wood and steel.
8. Buckling of Wooden column

CV2107 : FLUID MECHANICS-I LAB

Course Objectives:

* To impart knowledge in measuring pressure, discharge and velocity of fluid flow.

* To understand the flow measurement in tanks.

* To determine the metacentric height of a floating body.

* To determine the flow measurement in pipe flow.

* To measure the discharge in a open channel flow.

* To learn and practice writing technical reports.

Course Outcomes:

The student will be able to:

* Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases, as well as documenting them in engineering reports.

* Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design.

* Provide exposure to modern computational techniques in fluid mechanics.

LIST OF EXPERIMENTS:

1. Study of Small Orifice by Constant Head Method and Time of Emptying a Tank through a Small Orifice.
2. Study of Cylindrical Mouthpiece by Constant Head Method and Time of Emptying a Tank through a Cylindrical Mouthpiece.
3. Determination of Metacentric Height of Floating Body.
4. Study of Surface Profiles in Free and Forced Vortex Motions.
5. Study of Venturimeter.
6. Study of Orifice meter.
7. Study of Flow Nozzle Meter.
8. Study of Sharp-crested Full Width and Contracted Weirs.
9. Study of V-Notch and Trapezoidal Notch.
10. Study of Broad-crested Weir.

CV2108 : PYTHON PROGRAMMING LAB

Course Objectives

1. familiarize students with key data structures in Python including lists and dictionaries and apply them in context of searching, sorting, text and file handling
2. introduce students to calculation of statistical measures using Python such as measures of central tendency, correlation
3. familiarize students with important Python data related libraries such as Numpy and Pandas and use them to manipulate arrays and dataframes
4. introduce students to data visualization in Python through creation of line plots, histograms, scatter plots, box plots and others
5. implementation of basic machine learning tasks in Python including pre-processing data, dimensionality reduction of data using PCA, clustering, classification and cross-validation.

Course Outcomes

After completion of the course the student should be able to:

1. implement searching, sorting and handle text and files using Python data structures such as lists and dictionaries
2. calculate statistical measures using Python such as measures of central tendency, correlation
3. use Python data related libraries such as Numpy and Pandas and create data visualizations
4. implement basic machine learning tasks pre-processing data, compressing data, clustering, classification and cross-validation.

Syllabus

1. Python Programs on lists & Dictionaries
2. Python Programs on Searching and sorting
3. Python Programs on Text Handling
4. Python Programs on File Handling
5. Python Programs for calculating Mean, Mode, Median, Variance, Standard Deviation
6. Python Programs for Karl Pearson Coefficient of Correlation, Rank Correlation
7. Python Programs on NumPy Arrays, Linear algebra with NumPy
8. Python Programs for creation and manipulation of DataFrames using Pandas Library
9. Write a Python program for the following.

   * Simple Line Plots,
   * Adjusting the Plot: Line Colors and Styles, Axes Limits, Labeling Plots,
   * Simple Scatter Plots,
   * Histograms,
   * Customizing Plot Legends,
   * Choosing Elements for the Legend,
   * Boxplot
   * Multiple Legends,
   * Customizing Colorbars,
   * Multiple Subplots,
   * Text and Annotation,
   * Customizing Ticks

10. Python Programs for Data preprocessing: Handling missing values, handling categorical data, bringing features to same scale, selecting meaningful features
11. Python Program for Compressing data via dimensionality reduction: PCA
12. Python Programs for Data Clustering
13. Python Programs for Classification
14. Python Programs for Model Evaluation: K-fold cross validation

Reference Books

1. Core Python Programming, Second Edition, Wesley J. Chun, Prentice Hall

2. Chris Albon, “Machine Learning with Python Cookbook-practical solutions from preprocessing to Deep learning”, O’REILLY Publisher,2018

3. Mark Summerfield, Programming in Python 3—A Complete Introduction to the Python Language, Second Edition, Additson Wesley

4. Phuong Vo.T.H , Martin Czygan, Getting Started with Python Data Analysis, Packt Publishing Ltd

5. Armando Fandango, Python Data Analysis, Packt Publishing Ltd

6. Magnus Vilhelm Persson and Luiz Felipe Martins, Mastering Python Data Analysis, Packt Publishing Ltd

7. Sebastian Raschka& Vahid Mirjalili, “Python Machine Learning”, Packt Publisher, 2017

CV2109 : COMPUTER-AIDED DRAFTING

Course Objectives:

* Use computer aided drafting tools to produce 2D and 3D working drawings.

* Develop 2D civil engineering drawings of simple building elements and 3D drawings of simple objects.

* Familiarize with creating layers, formatting text styles and dimension styles.

* Create a new drawing and edit an existing drawing.

* Draw different 3D elements and edit them with 3D space.

Course Outcomes:

The student will be able to:

* Know basic commands used in computer drafting.

* Acquire skills to draw 2D and 3D drawings.

* Use geometric tools such as lines, circles, polylines, and rectangles in AutoCAD to create and modify geometry.

* Use dimension and annotation tools such as dimensions, tolerances, hatch, and text in AutoCAD to annotate drawings.

* Draw different 3D elements along with editing.

SYLLABUS

Introduction: Introduction to computer drafting tools, Coordinate system, Setting up a drawing starting from scratch, Setting up a drawing using a Wizard, Using and creating a template file, Opening an existing drawing, saving a drawing file, Screen layout, Pull-down menus, Screen icons, Command line, Status bar, Dialogue boxes.

2D Drawing: Point, Line, Ray, Construction Line, Multiline and Polylines, Rectangles, Arc, Circle and Ellipse, Polygon, Spline, etc.

2D Editing; Trim, Extend, Lengthen, Break, Move, Copy, Scale, Stretch, Mirror, Rotate, Fillet, Chamfer, Array, Hatch and gradient, Object snap, Direct distance entry, Polar tracking, Object snap tracking, Dynamic input, Properties, etc.

Layers and Text creation: Creating Layers, Text (multi-line & single line) and Formatting Text Styles Dimension Command Formatting Dimension Style and Multi-leader Style, Drawing Settings and Aids, Saving and Plotting

3D Drawing: Introduction, 3D Coordinate system, UCS, 3D Orbit, Box, Wedge, Cone, Sphere, Cylinder, Torus, Helix, Loft, Revolve.

Editing with 3D Space: Union, Subtract, Intersect, Extrude faces, Move faces, Rotate faces, Offset faces, Taper faces, Delete faces, Copy faces

CV2110 : PROFESSIONAL ETHICS AND UNIVERSAL HUMAN VALUES

Course Objectives:

* To recognize the moral values that should guide the Engineering profession.

* To resolve moral issues concerning one’s profession.

* To develop and exhibit a set of moral beliefs and attitudes that engineers should inculcate.

* To inculcate social values and morality in one’s life.

* To develop awareness about Professional/Engineering Ethics and Human Values.

Learning Outcomes:

Students will be able to:

* Apply the conceptual understanding of ethics and values into everyday practice.

* Understand the importance of moral awareness and reasoning in life.

* Acquire professional and moral etiquette that an engineer requires.

* Develop the acumen for self-awareness and self-development.

* Develop cultural tolerance and integrity.

* Tackle real-life challenges with empathy.

CONTENTS

Unit - I: HUMAN VALUES : Values - Respect - Caring - Sharing - Honesty-Courage - Self confidence - Communal Harmony Morals - Virtues

Unit –II PROFESSIONAL VALUES : Integrity - Discipline - Valuing time - Cooperation - Commitment - Code of conduct - Challenges in the workplace

Unit – III PROFESSIONAL ETHICS : Overview - Engineering ethics - Moral issues - Profession - Models of professional roles - Responsibility

Unit – IV RESPONSIBILITIES AND RIGHTS : Safety and risk - Collegiality and loyalty - Confidentiality - Occupational crime - Human rights - Employee rights - Intellectual property rights

Unit – V GLOBAL ISSUES : Globalization - Environmental ethics - Computer ethics - Code of ethics - Multinational corporations - Engineers as advisors in Planning and Policy making

Suggested Textbook:

R.S. Nagarazan. A Textbook on Professional Ethics and Human Values. New Age International Publishers. 2006.

Reference Books:

Premvir Kapoor. Professional Ethics and Human Values. Khanna Publishing House. 2019.

B.S. Raghavan. Human Values and Professional Ethics. S.Chand Publications. 2012.

R.R. Gaur & Others. *A Foundation Course in Human Values and Proff. Ethics*. Excel Books. 2009.

A. N. Tripathi. *Human Values*. New Age International (P) Limited. 2009

R. Subramanian. *Professional Ethics*. OUP India. 2013.

CV2111 NCC/NSS

B.Tech &B.Tech. +M.Tech II Year - II Semester

CV2201 WATER SUPPLY ENGINEERING

Course Objectives:

* Outline planning and the design of water supply systems for a community/town/city.

* Provide knowledge of water quality requirements for domestic usage.

* Understanding the importance of protection of water source quality and enlightening the efforts involved in converting raw water into clean potable water.

* Selection of valves fixture stored in water distribution systems.

* Impart knowledge on design of water distribution network.

* Visit at least one Water Treatment Plant and supply system.

Course Outcomes:

The student will be able to

* Plan and design the water and distribution networks and sewerage systems.

* Identify the water source and select the proper intake structure.

* Design & estimation of the water supply system of an apartment.

* Select the appropriate appurtenances in the water supply.

* Selection of suitable treatment flow for raw water treatments.

SYLLABUS

Introduction: Importance and Necessity of Protected Water Supply systems, Waterborne diseases, Planning of public water supply system, components of public water supply systems. Per capita demand and factors influencing it, types of water demands and their variations, factors affecting water demand, Design Period, Factors affecting the Design period, estimation of water demand for a town or city, Population Forecasting.

Sources of Water: Various surface and subsurface sources are considered for water supply and their comparison- Capacity of storage reservoirs, Types of subsurface water bearing formations, Yields from wells and infiltration galleries. Conveyance of Water from the source to the point of interest: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, selection of pipe materials, Pipe joints.

Quality and Analysis of Water: Characteristics of water and their measurement or estimation or analysis: Physical, Chemical and Biological characteristics. Water quality criteria for different uses- Rural, Municipal, Industrial and Agricultural uses. Drinking water quality standards: IS and WHO guidelines.

Treatment of Water: Typical treatment flow of a municipal water treatment plant, Unit operations of water treatment: Theory and Design of Sedimentation, Coagulation, flocculation, Filtration, Water conditioning and softening, Disinfection, Removal of color and odors – Removal of Iron and manganese – Fluoridation and deflouridation –Ion Exchange - Ultra filtration- Reverse Osmosis.

Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks: Hardy Cross and equivalent pipe methods – Appurtenances of water distribution system–Laying and testing of pipe lines. Ideal water supply system.

Text Books

1. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus – Mc-Graw-Hill Book Company, New Delhi, 1985.

2. Water Supply Engineering. Dr. P.N. Modi, Standard Book House, Delhi.

3. Rural, Municipal and Industrial Water management, KVSG Murali Krishna, Reem Publications, New Delhi, 2012

Reference Books

1. Elements of Environmental Engineering – K.N. Duggal, S. Chand & Company Ltd., New Delhi.

2. Water Supply Engineering.– Dr. B.C. Punmia, A.K. Jain and A.K. Jain. LaxmiPublicatgins(P) Ltd., NewDelhi.

3. Water Supply and Sanitary Engineering – G.S.Birdie and J.S.Birdie

CV2202 FLUID MECHANICS-II

Course Objectives:

* To classify the types of flows in open channel and also design most economical open channel sections andlearns about critical flows.

* To study about non-uniform flows in open channels and also to learn about the characteristics of hydraulic jump in rectangular channels.

* To impart knowledge on impact of jets, working principle, selection and designing of impulse and reaction turbines.

* To explain governing of turbines and performance characteristics of pumps and turbines working under different conditions.

* To explain various components and working principles of centrifugal pump and reciprocating pumps. Also, to teach the criteria of selection of the pumps.

Course Outcomes:

Students will be able to

* To calculate discharge carrying capacity of open channel sections and design of most economical channel sections.

* To calculate water surface profiles in open channels, hydraulic jump analysis.

* Select appropriate hydraulic turbines for given conditions and study their performance characteristics.

* Understand the operation of pumps and study their characteristics.

SYLLABUS

Open Channel Flows: Basic Concepts – Introduction, Classification of Open Channels – Classification of Flow; Geometric Elements of a Channel Section; Velocity Distribution in a Channel Section; Wide Open Channel; Measurement of Velocity; Velocity Distribution Coefficients; Pressure Distribution in a Channel Section – Effect of Slope on Pressure Distribution; Basic Equations – Chezy's Equation, Manning's Equation.

Uniform Flow Computation; Most Economical Channel Sections – Rectangular, Trapezoidal, Circular and Triangular Channel Sections; Critical Flow – Computation of Critical Flow, Section Factor for Critical Flow.

Application of Energy Principle in Open channels – Definition of Specific Energy, Specific Energy Diagram, Critical depth, Critical Velocity, Conjugate or Alternate Depths, Sub-critical, Critical and Super-critical Flows, Froude Number, Relationship between Critical depth and Specific Energy for Rectangular, Trapezoidal Sections; Application of Momentum Principle in Open channels – Specific Force; Canal Transitions – Change of Depth in Channels with Change in Cross-section and Hump in the Bed; Control Sections; Venturi Flume and Parshall Flume.

Varied Flow in Open Channels: Analysis &Computation of G.V.F: Definition of G.V.F. and Derivation of Governing Equation – Mild, Steep, Critical, Horizontal and Adverse Slopes – Backwater and Drawdown Curves –Computation of G.V.F. Profiles in rectangular channels using Direct and Single Step methods (Simple Slope cases only).

Rapidly Varied Flow – Hydraulic Jump, Types of Jumps, Hydraulic Jump in Horizontal Rectangular Channels.

Impact of Jets: Force Exerted by Fluid Jet on Stationary and Moving Flat and Curved Vanes, Torque and Work Done by Series of Moving Vanes.

Hydraulic Machines-Turbines: Introduction and Classification of Turbines –Working of Impulse Turbines and Design Principles – Components and Working Principles of Pelton Turbine – Work Done; Hydraulic and overall Efficiencies; Design of Pelton Turbine – Working Proportions.

Working of Reaction Turbines and Design Principles – Components and Working Principles of a Francis Turbine – Work Done; Hydraulic and overall Efficiencies; Design of Francis Turbine – Working Proportions; Draft Tube Theory; Kaplan Turbine and Working Proportions of Kaplan Turbine. Performance and Characteristics of Turbines: Unit Quantities, Specific Speed and its Importance; Model Relationships; Operating Characteristic Curves; Cavitation Problem in Turbines.

Hydraulic Machines – Centrifugal Pumps; Functions of a Pump– Selection Criterion – Rotodynamic and Positive Displacement Pumps – Comparison between Centrifugal & Reciprocating Pumps; Components & Working principles of Centrifugal Pumps; Classification of Centrifugal Pumps; Working Head and Number of Stages, Single & Double Suction. Work done by Centrifugal Pumps – Pressure Change in a Pump, Manometric and Static Head – Velocity triangles– Minimum Starting Speed of pump – Multistage Pumps; Pumps in Parallel and Series; Cavitation – Limitation of Suction Lift, NPSH and its importance in Selection of Pumps. Performance Characteristics of Pumps – Similarity Relations and Specific speed of Pumps – Dimensionless characteristics – Constant Efficiency Curves of Centrifugal Pumps.

Hydraulic Machines – Reciprocating Pump: Reciprocating Pumps – Fundamental concepts, Component Parts and Working principle of Single Acting and Double Acting Reciprocating Pumps – Discharge Coefficient, Volumetric Efficiency and Slip; Work done by Reciprocating pumps.

Text Books

1. Fluid Mechanics and Hydraulic Machinery by P.N.Modi and S.M. Seth, Standard Book House.
2. Flow in Open Channels by K.Subramanya, Tata McGraw-Hill Publishing Co. Ltd.

Reference Books

1. Fluid Mechanics by A.K.Jain, Khanna Publishers.
2. Engineering Fluid Mechanics by K.L.Kumar, S. Chand &Co.Ltd.
3. Flow through Open Channels by K.G.Ranga Raju, Tata McGraw-Hill Publishing Co. Ltd.
4. Open Channel Hydraulics by V.T.Chow, McGraw-Hill Ltd.

CV2203 HYDROLOGY AND WATER RESOURCES ENGINEERING

Course Objectives:

* To build knowledge in hydrology and hydraulics and understanding of water resources systems.
* To develop skills in the groundwater flow, type of aquifer, and yield from the well.
* To provide the knowledge of the design of reservoir operation, sedimentation, and flood routing techniques.
* To develop skills in modeling flood flows and flood routing.
* To study the effect, causes, and remedial measures of waterlogging and canal systems.

Course Outcomes:

The students will be able to

* Demonstrate the concepts of the hydrograph, S-hydrograph, Unit hydrograph, and IUH
* Analysis of groundwater flow hydraulics along with rainwater harvesting methods.
* Demonstrate the basic types of irrigation, irrigation standards, and crop water assessment.
* Identify various types of reservoirs and their design aspects along with flood routing techniques.
* Design aspects of canal systems and waterlogging remedies.

SYLLABUS

Introduction to Hydrological Aspects: Water Resources in India, Hydrology in Water Resources Planning – Hydrologic Planning –Water Budget Equation;

Climate and Weather – Importance of Monsoon Rains, Clouds, Storms, and Precipitation – Precipitation – Types, Measurement of Rainfall; Influence and Feedbacks of Hydrological Changes Due to Climate Change; Average Depth of Rainfall over an Area, Mean Annual Rainfall, Analysis of Rainfall Data – Consistency of Rainfall Record, Double Mass Curve, Depth –Intensity, Depth-Area-Duration Curves, Frequency of Point Rainfall – Intensity-Duration-Frequency (IDF) Curves, Probable Maximum Precipitation (PMP) Curves; Infiltration – Factors affecting and its Determination, Evaporation and Evapo-Transpiration – Pan Evaporation; Runoff – Factors Affecting Runoff, Methods of Determination of Runoff, Hydrograph Analysis, Base Flow Separation, Unit Hydrographs, Hydrograph of Different Durations, Applications of Unit Hydrograph; S-Hydrograph, Synthetic Unit Hydrograph; Stream Flow Measurement methods.

Groundwater Flow: Mechanics of Interstitial Flow, Definitions, Subsurface Distribution of Water, Ground Water Movement; Darcy's Law; Permeability – Intrinsic Permeability; Well Hydraulics – Steady Flow in Different Types of Aquifers and Wells; Determination of Hydraulic Properties of Aquifer; Well Losses; Specific Capacity of Well; Well Efficiency – Pumping Tests – Recuperation Test Method for Determination of Well Yield. Rain Water Harvesting and Recharging of Underground Storage – Methods of Recharging – Infiltration Galleries, Infiltration Wells, Springs.

Methods of Construction of Open Well–Yield of an Open Well – Methods of Construction of Tube Wells, Well Shrouding and Well Development, Spacing of Tube Wells, Design of Tube Well; Pumping Requirements.

Reservoir Planning and Flood Routing: Types of Reservoir – Investigations for Reservoir Planning, Selection of Site for a Reservoir, Zones of Storage in a Reservoir; Purpose of Reservoir, Design Studies, Reservoir Regulation, Reservoir Yield, Mass Curve and Demand Curve, Determination of Reservoir Capacity, Yield From a Reservoir of given Capacity; Reservoir Losses – Measures To Reduce Evaporation Loss in Reservoirs, Control of Reservoir Sedimentation. Flood Routing – Hydrologic Reservoir Routing by Pulse Method of Routing, Channel Routing by Muskingum Method.

Irrigation: Definition of Irrigation, Types of Irrigation Systems – Direct and Indirect, Lift and Inundation Irrigation Systems, Methods of Irrigation – Surface and Sprinkler Methods, Trickle or Drip Irrigation, Soil Moisture Constants, Depth of Water Held By Soil In Different Zones, Water Extraction – Quality of Irrigation Water, Irrigation Efficiencies – Soil Moisture – Irrigation Relationship – Estimating Depth and Frequency of Irrigation on the Basis of Soil Moisture Re-

gime Concept; Water Requirements of Crops, Duty, Delta and Base Period – Their Relationship, Crops – Seasons, Factors Affecting Duty and Methods of Improving Duty, Consumptive Use of Water –Determination of Evapotranspiration – Blaney-Criddle and Penman Equations and Hargreaves Method(concepts only); Assessment of Irrigation Water Charges.

Canal Systems: Classification of Irrigation Canals – Canal Alignment, Design of Unlined Canals, Regime Theories – Kennedy's and Lacey's Theories, Critical Tractive Force Method, Design Problems – Balancing Depth; Regulation of Channel System – Canal Outlets, Requirements of a Good Outlet – Types of Outlets; Water Logging – Causes and Control – Land Drainage; Canal Lining – Methods, Design of Lined Canals, Canal Navigation – Requirements, Methods to make Navigability Feasible.

Text Books

1. Irrigation and Water Power Engineering by B.C.Punmia and P.B.B. Lal, Laxmi Publications Pvt. Ltd.

2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.

Reference Books

1. Irrigation and Hydraulic Structures by S.K.Garg, Khanna Publishers.

2. Engineering Hydrology by K.Subramanya, Tata McGraw-Hill Education Private Limited.

3. Hand Book of Applied Hydrology by V.T.Chow, McGraw-Hill Book Co.

4. Impacts of Climate Change and Climate Variability on Hydrological Regimes by Jan C. van Dam, Cambridge University Press.

5. Hydrology: Principles, Analysis and Design by H.M.Raghunath, New Age International.

6. Ground Water by H.M.Raghunath, New Age International.

CV 2204 GEOTECHNICAL ENGINEERING I

Course Objectives:

* To impart knowledge in analysing the composition of the soil matrix and proportioning in developing fundamental relations.

* To understand concepts like plasticity, compressibility, Shear strength, compaction, settlement, etc.

* To identify and classify soils based on their properties.

* To develop skills in the identification of soil characterization when it interacts with water.

* To estimate the magnitude and time rate of settlement due to consolidation.

Course Outcomes:

The student will be able to

* Analyse soil and identify its nomenclature which helps in deriving its behaviour at various in situ conditions.

* Apply basic concepts of soil to compute settlements and the bearing capacity of soils.

* Prediction of seepage characterization under various hydraulic structures.

* Apply the knowledge of compaction during the construction of roads, embankments, canals etc, on weak soils.

* Solve practical problems related to consolidation settlement and the time rate of settlement.

SYLLABUS

Introduction: Soil Formation, Minerals in Clays and Sand, Soil Structure, Physical properties of Soil: Void Ratio, Porosity, Degree of Saturation, Water Content, Unit Weights, Specific Gravity, Weight - Volume Relationships, Relative Density, Consistency Limits and Consistency Indices, Activity.

Mechanical Analysis and Soil Classification: Sieve Analysis, Stoke's Law, Hydrometer and Pipette Analysis, Textural Classification, Classification based on size, Unified Soil Classification and Indian Standard Soil classification systems, Field Identification of Soils.

Soil Hydraulics: Types of Soil Water, Capillary Rise and Surface Tension, Darcy's Law and its Limitations, Constant Head and Variable Head Permeability Tests, Factors effecting coefficient of permeability, Permeability of Stratified Soils. Total, Neutral and Effective Stresses, Effective stress principle, Upward flow conditions, Quick Sand Conditions, Critical Hydraulic Gradient.

Stress Distribution in Soils: Boussinesq's Theory for Determination of vertical stress, Assumptions and validity, Extension to line, strip, Rectangular and Circular loaded areas, Pressure Bulb and Influence Diagrams, Newmark's Influence Chart- Construction and Use, Westergaards's Theory, 2:1 Load Dispersion Method , Contact Pressure Distribution beneath Footings.

Compaction: Mechanism of Compaction, Factors Effecting Compaction, Laboratory Compaction Tests, Effect of Compaction on Soil Properties, Field Compaction: Compaction Equipment and Evaluation of Field Compaction.

Consolidation: Basic Definitions: Compression Index, Coefficient of Compressibility and Coefficient of volume decrease: Spring Analogy for Primary Consolidation: Initial compression, Primary compression and secondary compression, Generation of Effective Stress- Void Ratio relationship from consolidation test: Height of Solids Method and change in Void Ratio method: Determination of Preconsolidation Pressure, Normally consolidated, Over consoli-

dated and under consolidated clays, Terzaghi's One Dimensional Consolidation Theory - Assumptions, Derivation of differential equation and Solution, Laboratory Determination of coefficient of consolidation by time fitting methods.

Shear Strength of Soils: Stress at Point, Mohr circle of stress, Mohr-Coulomb Failure Theory, Shear Parameters, Laboratory Shear Tests- Shear Box, Triaxial and Unconfined Compression Tests, Laboratory and Field Vane Shear Tests, Sensitivity of Clays, Types of Shear Tests based on Drainage Conditions, Total stress analysis and effective stress analysis, Shear Strength of Sands, Critical Void Ratio and Dilatancy, Liquefaction of Soils, Factors affecting Shear Strength of Clays and Sands.

Text Books:

1. Soil Mechanics and Foundation Engineering by K.R.Arora, Standard Publishers

2. Basic and Applied Soil Mechanics by Gopal Ranjan and A.S.R Rao, New Age International Publishers.

3. Geotechnical Engineering by P.Purushothama Raj, Pearson Publishers.

4. Principals of Geotechnical Engineering by Braja.M.Das, Cengage Learning Publishers.

Reference Books:

1. Gopal Ranjan and Rao, P. Basic and Applied Soil Mechanics, New Age International Pvt. Limited, New Delhi, 2002.

2. Murthy, V.N.S., A Text Books of Soil Mechanics and Foundation Engineering, UBS Publishers Distributors Ltd., New Delhi, 1999

3. Punmia, B.C. Soil Mechanics and Foundation Engineering, Laxmi Publications Pvt. Ltd., New Delhi,1995.

4. Braja M. Das, Fundamentals of Geotechnical Engineering, Thomson Asia Pvt. Ltd., Singapore,2005.

CV2205 : CONCRETE TECHNOLOGY

Course Objectives:

* To understand the concepts of application of chemical and mineral admixtures in concrete.

* To understand the concepts of dimensional stability due to creep and Shrinkage of concrete.

* To impart knowledge about the durability of concrete.

* To understand the mix design of concrete using different Standards.

* To understand the properties and application of special concretes.

Course Outcomes:

The student will be able to:

* Understand the effect of chemical and mineral admixtures on the properties of concrete.

* Understand the creep, relaxation and shrinkage of concrete.

* Understand the relation between durability and permeability of concrete

* Design the concrete mix as per IS, BS and ACI standards.

* Understand in detail about the properties and application of special concretes.

SYLLABUS

Chemical and Mineral Admixtures: Water Reducers, Air Entrainers, Set Controllers, Special Admixtures – Structure, Properties and effects on Concrete Properties. Introduction to Supplementary Cementing Materials and Pozzolans – Fly ash, Blast Furnace Slag, Silica Fume, and Metakaolin– their Production, Properties, and Effects on Concrete Properties; Other Mineral Additives –Reactive and Inert.

Dimensional Stability and Durability: Creep and Relaxation –Parameters Affecting; Shrinkage of Concrete –Types and Significance. Parameters affecting Shrinkage; Measurement of Creep and Shrinkage**.**

Durability of Concrete: Introduction to Durability; Relation between Durability and Permeability – Chemical Attack of Concrete; Corrosion of Steel Rebars; other Durability Issues**.**

Mix Design: Review of Methods and Philosophies of IS, BS and ACI Methods, Mix Design for Special Purposes. Acceptance Criteria for Compressive Strength of Concrete

Special Concretes: Properties and Applications of High Strength –High Performance Concrete, Reactive Powder Concrete, Lightweight, Heavyweight and Mass concrete; Fib rereinforced Concrete; Self-compacting Concrete; Shotcrete.

Text Books

1. Concrete Technology Theory and Practice by M.S.Shetty, S.Chand& Company Ltd, New Delhi.

Reference Books

1. Properties of Concrete by A.M.Neville, Longman 1995.

2. Concrete micro-structure, Properties and Materials by P.K.Mehta, J.M.Monteiro, Printice Hall INC & McGraw-Hill, USA.

CV2206 : GEOTECHNICAL ENGINEERING – I LAB

Course Objectives

* To develop skills to identify and classify different types of soils

* To impart knowledge about different methods of determination of insitu density of soils

* To study the necessity of sedimentation analysis for classifying fine grained soils

* To assess the drainage capacity of different soils

* To understand laboratory methods used for determining density of soil.

Course Outcomes:

The student will be able to

* Perform suitable tests for assessing grain size distribution and classify the soil accordinglySelect appropriate method for determining field density of soil for a given soil

* Determine specific gravity of coarse and fine grained soils3

* Evaluate Permeability of given soil

* Estimate compaction characteristics of soil

LIST OF EXPERIMENTS

1. Atterberg limits
2. Field density by Core Cutter and Sand replacement method
3. Grain size analysis
4. Hydrometer/pipette analysis
5. Specific gravity by pycnometer/density bottle method
6. Permeability of soil – Constant and variable head tests
7. IS light compaction

DEMONSTRATION EXPERIMENTS:

1. Consolidation test.
2. Quicksand model and others if any.

CV2207 : BUILDING MATERIALS LAB

Course Objectives:

* To impart knowledge about various tests used at construction sites.

* To understand the concepts of physical properties of tiles, different bricks, and paver blocks.

* To familiarize the basic properties of fresh and hardened concrete.

* To develop skills to design mix proportions of concrete to arrive at the required strength of concrete with a specific ratio of its ingredients.

Course Outcomes:

The student will be able to

* Understand the concept of the physical properties of concrete ingredients.

* Understand the concepts of physical properties of tiles, different bricks, and paver blocks.

* Conduct various tests on cement, fine aggregate, and coarse aggregate.

* Analyse the properties of fresh and hardened concrete.

* Design mix proportions of concrete.

LIST OF EXPERIMENTS

1. Determination of Specific Gravity and Unit Weight of Cement
2. Determination of Specific Gravity and Unit Weight of Coarse and Fine Aggregates
3. Determination of Normal Consistency of Cement
4. Determination of Initial and Final Setting Time
5. Determination of Fineness of Cement.
6. Determination of Compressive Strength of Cement (for different grades of cement).
7. Determination of flexural strength and water absorption for different tiles.
8. Determination of compressive strength and water absorption for burnt clay and fly ash bricks.
9. Determination of crushing strength and water absorption for different paver blocks.
10. Determination of Bulking Characteristics of Sand.
11. Sieve Analysis of Coarse and Fine Aggregates and Classification as per IS 383.
12. Workability Tests on Green Concrete by using: Slump Cone, Compaction Factor Apparatus, Flow Table, Vee-Bee Consistometer.
13. Tests on Hardened Concrete.
    a. Determination of Compressive Strength
    b. Determination of Split tensile strength
    c. Determination of Modulus of rupture.

14. Design of Concrete Mix by using IS Code Method (for classwork only)

CV2208 : BUILDING PLANNING AND COMPUTER AIDED DRAWING

Course Objectives:

* To familiarize building components, principles, methods, software, and codes of practices for planning and design of the building

* To impart knowledge about the elements of climate to the design and construction of buildings.

* Prepare constructional detailed representation drawing of a building.

* Analyze the planning laws and recommendations involved in planning, and building drawings concepts of buildings.

* Design plan and elevation of different types of building with their functional and furniture requirements.

Course Outcomes:

The students will be able to

* Analyse the various types of residential buildings.

* Assess different climatic elements to decide the orientation of the building for ventilation

* Draw the complete drawing of plan of a residential building

* Draw the plan, elevation, and sectional view of the building with functional requirements.

* Draw the plan using computer drafting tools.

SYLLABUS

Residential Building: Different types of Residential Buildings

Climatology: Elements of Climate: Sun, Wind, Relative Humidity, Temperature effects, Comfort Conditions for House, Various types of Macro Climatic Zones. Orientation of Buildings, Solar Charts, Ventilation.

Principles of Planning

Preliminary Drawing: (a) Conventional Signs of Materials, Various equipment used in a Residential Building (copying exercise) (b) Plan, Section, and Elevation of a Small House (one room and Verandah) (copying exercise) (c) Plan, Section and Elevation of Two Bed Room House (copying exercise) (d) Plan Section and Elevation of Three Bed Room House in Hot and Humid Zone. (copying exercise). Design of individual Rooms with Particular Attention to Functional and Furniture requirements. Building Regulations and Bye-laws of Residential Buildings;

Drawing the plan, Elevation of Houses with given Functional Requirements and Climatic Data. (emphasis may be given to Hot and Humid zones.)

AUTOCAD Drawing of Residential Building.

Text Books

1. Building Planning and Drawing by N. Kumar Swamy and A. Kameswara Rao, Charotar Publication House.

2. Building planning Drawing and Scheduling by Gurucharansingh and Jagadish Singh, Standard Publishers Distributors

Reference Books

1. Civil Engineering Drawing by Sharma and Gurucharan Singh, Standard Publishers.

2. Civil Engineering Drawing Series 'B' by R. Trimurthy, M/S Premier Publishing House.

3. Building Drawing with an integrated Approach to Built Environment by M.G.Shah, C.M.Kale and S.Y.Patki, McGraw-Hill Publishing Company Ltd.

CV2209 : ENVIRONMENTAL SCIENCE

(Common for all Branches)

Course Objectives

* Familiarize the fundamental aspects of environment and the environmental management'

* Provide information of some of the important international conventions which will be useful during the future endeavors after graduation.

* Make realize the importance of natural resources management for the sustenance of the life and the society.

* Appraise the impact of pollution getting generated through the anthropogenic activities on the environment

* Provide the concept of sustainable development, energy and environmental management

* Impart knowledge on the new generation waste like e-waste and plastic waste.

Course Outcomes

At the end of the course the student will be able to:

* Knowledge on the fundamental aspects of environment and the environmental management

* The knowledge on the salient features of the important international conventions

* Understanding of the importance of natural resources management for the sustenance of the life and the society.

* Familiarity on various forms of pollution and its impact on the environ-ment.

* Understand the elements of Sustainable Development, energy andenvironmental management

* Knowledge on the new generation waste like e-waste and plastic waste.

SYLLABUS

Introduction: Structure and functions of Ecosystems-Ecosystems and itsDynamics-Value of Biodiversity-impact of loss of biodiversity, Conservation of bio-diversity. Environmental indicators - Global environmental issues and their impact on the ecosystems. Salient features of International conventions on Environment: Montreal Protocol, Kyoto protocol, Ramsar Convention on Wet- lands, Stockholm Convention on Persistent Organic Pollutants, United Na- tions Framework Convention on Climate Change (UNFCCC),

Natural Resources Management: Importance of natural resources man- agement-Land as resource, Land degradation, Soil erosion and desertifica- tion, Effects of usage of fertilizer, herbicides and pesticide-watershed man- agement.

Forest resources: Use and over-exploitation, Mining and dams – their effects on forest ecosystems and the living beings.

Water resources: Exploitation of surface and groundwater, Floods, droughts, Dams:benefits and costs.

Mineral Resources: Impact of mining on the environment and possible environmental management options in mining and processing of the miner- als. Sustainable resource management (land, water, and energy), and resil- ient design under the changing environment.

Environmental Pollution: Local and Global Issues. Causes, effects and control measures. Engineering aspects of environmental pollution control systems.

Air pollution: impacts of ambient and indoor air pollution on human health.Water pollution: impacts water pollution on human health and loss of fresh water resources. Soil pollution and its impact on environment. Marine pollu- tion and its impact on blue economy. Noise pollution.

Solid waste management: Important elements in solid waste manage- ment- Waste to energy concepts. Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act and their amendments. Salient features of Environmental protection Act, 1986.

Sustainable Development: Fundamentals of Sustainable Development– Sustainability Strategies and Barriers – Industrialization and sustainable de- velopment. Circular economy concepts in waste (solid and fluid) manage- ment.

Energy and Environment: Environmental Benefits and challenges, Avail- ability and need of conventional energy resources, major environmental prob- lems related to the conventional energy resources, future possibilities of en- ergy need and availability. Solar Energy: process of photovoltaic energy con- version, solar energy conversion technologies and devices, their principles, working and applications, disposal of solar panel after their usage. Biomass energy: Concept of biomass energy utilization, types of biomass energy, con- version processes, Wind Energy, energy conversion technologies, their prin- ciples, equipment and suitability in context of India.

Management of plastic waste and E-waste: Sources, generation and characteristics of various e- and plastic wastes generated from various indus- trial and commercial activities; Waste management practices including onsite handling, storage, collection and transfer. E-waste and plastic waste process- ing alternatives. E-Waste management rules and Plastic waste management rules, 2016 and their subsequent amendments.

Text Books:

1. Bharucha,Erach (2004). Textbook for Environmental Studies for Un- dergraduate Courses of all Branches of Higher Education, University Grants Commission, New Delhi.

2. Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India

3. Masters, G. M., &Ela, W. P. (1991). Introduction to environmental engi- neering and science. Englewood Cliffs, NJ: Prentice Hall.

4. Enger, E. and Smith, B., Environmental Science: A Study of Interrela-tionships, Publisher: McGraw-Hill Higher Education; 12th edition, 2010.

Reference Books:

1. Sharma, P. D., & Sharma, P. D. (2005). Ecology and environment.Rastogi Publications

2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

3. Clark R.S. (2001). Marine Pollution, Clanderson Press Oxford (TB)

4. Jadhav, H &Bhosale, V.M. (1995). Environmental Protection and Laws.Himalaya Pub. House, Delhi 284 p.

5. MoEF&CC, Govt. of India, CPCB: E-waste management rules, 2016and its amendments 2018.

6. MoEF&CC, Govt. of India, CPCB: Plastic waste management rules,2016.