Need and requirement of first aid. First aid equipment and upkeep. First AID Techniques, First aid related with respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries. First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. First aid related with Bites and Stings. First aid related with Sense organs, Handling and transport of injured traumatized persons. Sports injuries and their treatments.

Semester IV

Engineering Mathematics-II   3 (3+0)

Objective

To make the students acquainted with the application of various advanced mathematics such as vector calculus, Fourier series and Laplace transform and applications of numerical methods in engineering

Theory

Vector calculus: Scalar and vector point functions, vector differential operator Del, gradient of scalar point function, divergent and curl of vector point function and their physical interpretations, line, surface and volume integrals, Green's, Stock's and Divergence theorem (without proofs), functions of a complex variable, limit, continuity and analytic function, Cauchy-Reimann equations, harmonic functions.

Fourier series: Periodic functions, Euler's formulae, functions having arbitrary period, even and odd functions, half range series expansion, series expansion of functions with finite discontinuity; Laplace Transform: rules for Laplace transform and inverse Laplace transform, applications to find solutions of ordinary and simultaneous differential equations.

Numerical methods: Finite difference operators and their relationship, factorial notation. Newton's forward and backward interpolation formula, Newton's divide difference interpolation and Lagrange's interpolation formula, numerical differentiation and integration rule, numerical solutions of ODE by Taylor's series, Euler's and modified Euler's method, Runge-Kutta method of order four.

Suggested Readings

1. Grewal, B S. 2004. *Higher Engineering Mathematics*. Khanna Publishers Delhi.
2. Narayan, S. 2004. *A Text Book of Vector*. S. Chand and Co. Ltd., New Delhi.
3. Narayan, S. 2004. *Differential Calculus*. S. Chand and Co. Ltd., New Delhi.
4. Narayan, S. 2004. *Integral Calculus*. S. Chand and Co. Ltd. New Delhi.

   Ramana, B. V. 2008. *Engineering Mathematics*. Tata McGraw-Hill, New Delhi.

Theory of Structures   2 (1+1)

Objectives

To make the students acquainted with the principles of structural design and to enable them to design small and medium RCC and steel structures

Theory

Types of Load and use of BIS code

Design of steel structures: Specifications, use of IS code (IS 800-2007) and steel table, design of steel sections under tension, compression and bending, use of any one design software such as Staad Pro, ETABS, etc. for design of roof truss.

Design of RCC structures: Specifications, use of IS code (IS 456-2000), analysis and design of singly and doubly reinforced sections, design of beams, design of one way and two-way slabs, columns and foundations, design considerations for retaining walls and silos, use of design software for simple RCC structures.

Practical

Design and drawing of steel roof truss including tension member, compression member, and member under bending; use of design softwares; Design and drawing of RCC building, including single reinforced beam, double reinforced beam, one-way slab, two-way slabs, columns and foundations; use of design softwares for simple RCC structures.

Suggested Readings

1. Bhavikatti, S. S. 2014. *Design of Steel Structures: By Limit State Method as Per IS: 800-2007*. I K International Publishing House Pvt. Ltd.
2. Duggal, S. K. 2017. *Limit State Design of Steel Structures*. McGraw Hill Education.
3. Punmia, B. C., Jain, A. K. and Jain, A. K. 2016. *Limit State Design of Reinforced Concrete*. Laxmi Publications.
4. Raju, N. K. 2019. *Design of Reinforced Concrete Structures: IS:456-2000*. CBS Publishers & Distributors.

Building Construction and Cost Estimation   2 (2+0)

Objective

To make the students acquainted with the methods of construction of agricultural buildings and to enable them to prepare various types of estimates of buildings

Theory

Building materials: Description of important building materials, rocks, different stones; formation of stones, types of stones, quarrying process, stone products and uses; Bricks, types, preparation and burning of bricks, properties and uses; Tiles, types and classification; Lime, properties and uses, cement, different uses and grades.

Concrete: Grades, preparation, mixing and laying of concrete, use of sand; Use of ferrous material, iron and steel products; Use of non-ferrous metals, glass, rubber, plastics, aluminum, copper, nickel; Timber and its uses, seasoning, defects, commercial form of timber, miscellaneous building materials.

Building construction: Building components, foundations, brick work, lintels, columns, roofs and stair cases, different types of floors, plastering and pointing, damp proofing and waterproofing,