SEMESTER - 1

19Z101 CALCULUS AND ITS APPLICATIONS

3 1 0 4

DIFFERENTIAL CALCULUS : Functions of two variables, limit, continuity, partial derivatives, differentiability, linearization and total differential, extreme values and saddle points, Taylor's formula for two variables. (9 + 3)

MULTIPLE INTEGRALS I : Double integrals over rectangles, double integrals as volumes, Fubini's theorem, double integrals over general regions, changing the order of integration, double integrals in polar form, applications to area, volume. (9 + 3)

MULTIPLE INTEGRALS II : Triple integrals in rectangular coordinates, spherical and cylindrical coordinates, applications to volume. (9 + 3)

SECOND ORDER LINEAR ORDINARY DIFFERENTIAL EQUATIONS : Homogeneous equations with constant coefficients, superposition principle, initial value problem, general solution, Euler-Cauchy equation, non- homogeneous linear equations, method of variation of parameters, modeling of electric circuits. (9 + 3)

VECTOR CALCULUS : Directional derivative and gradient vectors, vector fields, divergence, curl. Integration in vector field - line integrals, work, circulation and flux, path independence. Green's, Gauss divergence and Stokes's theorems. (9 + 3)

Total L: 45 +T: 15 = 60

TEXT BOOKS:
1. Maurice D. Weir, Joel Hass, Christopher Heil "Thomas' Calculus", Pearson Education., New Delhi, 2018
2. Erwin Kreyszig "Advanced Engineering Mathematics", Wiley India Pvt Ltd., New Delhi, 2015

REFERENCES:
1. Gilbert Strang "Calculus", Wellesley-Cambridge Press., USA, 2017
2. Marsden J E, Tromba A J, Weinstein A "Basic Multivariable Calculus", Springer Verlag., NewYork, 2019
3. James Stewart "Multivariable Calculus", Cengage Publishing., Boston, 2017
4. Howard Anton, Irl Bivens, Stephen Davis "Calculus", John Wiley and Sons, INC., USA, 2016

19Z102 ELECTRICAL AND ELECTRONICS SYSTEMS

3 0 0 3

DC CIRCUIT : current-voltage –power-energy, electrical circuit elements: resistors-inductor- capacitor, source of electrical energy. Ohm's law-Kirchhoff's laws, series and parallel circuits, Maxwell's loop current method, Network theorems: superposition theorem-thevenin'stheorem-Norton'stheorem-maximum power transfer theorem. (9)

AC CIRCUITS : Single phase AC circuits: Average and RMS values of sinusoidal wave form-RLC Circuit-Phasor representation-active ,reactive apparent power –power factor, analysis of RLC Circuit, three phase circuit: star and delta connection-phase and line quantities-balance and unbalance systems (9)

ELECTROMAGNETISM AND MAGNETIC CIRCUITS : Electromagnetic induction: induced currents, Faraday's law, induction and energy, motional emf and Lenz's law. Magnetic field-magnetic circuit-inductance and mutual inductance-magnetic materials –ideal transformers and real transformers (8)

SEMICONDUCTOR DEVICES : Basic diode concepts-diode circuit: half wave rectifier-full wave rectifier-bridge rectifier-special purpose diodes-zener diode –transistor fundamentals –transistor biasing- bipolar junction transistors-basis amplifier concept-loading effect-power supplies and efficiency. (10)

OPERATIONAL AMPLIFIERS : Definition of terms — Inverting and non-inverting amplifiers, inverting summing amplifier, integrators and differentiators. (9)

Total L: 45

TEXT BOOKS:
1. John Hiley, Keith Brown, Ian McKenzie Smith, Edward Hughes "Electrical and Electronic Technology", Pearson education., New Delhi, 2016 , twelfth edition
2. Murugesh Kumar K "Basic Electrical Science and Technology", Vikas Publishing House., New Delhi, 2009

REFERENCES:
1. Leach D P "Digital Principles & Applications", Tata McGraw Hill., 2014 , eighth edition
2. Hambley A R "Electrical Engineering Principles and Applications", PHI Learning Pvt. Ltd., New Delhi, 2011
3. Boylestad R. L., Nashelsky L "Electronic Devices and Circuit Theory", Pearson Education., Noida, 2014 , eleventh edition
4. Theraja B. L. "Basic electronic Solid State", S. Chand & Company Ltd.,., New Delhi, 2010