

TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

Laplace Transform of Standard functions, derivatives and integrals – Inverse Laplace transform – Convolution theorem – Periodic functions – Application to ordinary differential equations and simultaneous equations with constant coefficients and integral equations.

Fourier series – Dirichlet's conditions - Half range Fourier cosine and sine series - Parseval's relation - Fourier series in complex form - Harmonic analysis.

Fourier transforms - Fourier cosine and sine transforms - inverse transforms - convolution theorem and Parseval's identity for Fourier transforms - Finite cosine and sine transforms.

Formation of partial differential equations eliminating arbitrary constants and functions - solution of first order equations - four standard types - Lagrange's equation - homogeneous and non-homogeneous type of second order linear differential equation with constant coefficients.

One-dimensional wave equation and one-dimensional heat flow equation - method of separation of variables - Fourier series solution.

1. Venkataraman, M.K., 'Engineering Mathematics Vol.4', National publishing company, 2004.
2. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, 2000.

EE201

DC MACHINES AND TRANSFORMERS

Principle of Energy conversion – Basic magnetic circuit analysis Faradays law of electromagnetic induction – singly and doubly Excited magnetic field systems – Torque production in rotating machines and general analysis of electro mechanical system

DC Generator – construction, principle of operation, types – emf equation – Characteristics - commutation - Armature reaction

DC motor – principle of operation, types – Torque equation – Electrical & Mechanical characteristics – starting – speed control – Various testing – Braking

Transformers – construction, principle of operation, types – Equivalent circuit - regulation and efficiency – Auto transformer

Three phase transformer connection-Scott connection – all day efficiency - Sumpner's test - parallel operation of transformers.

1. Nagrath, I.J.and Kothari, D.P., `Electrical Machines', Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
2. Dr. P.S. Bimbhra, „Electrical Machinery, "Khanna Publishers, 2007.
3. Vincent Del Toro, „Electrical Engineering Fundamentals', PHI, 2003
4. Parkar Smith, N.N., „Problems in Electrical Engineering" CBS Publishers and Distributers, New Delhi, 1984.
5. Irving L. Kosow „Electric Machinery and Transformers" PHI, New Delhi, 1991.

EE203

CIRCUIT THEORY

- Fundamental concepts of DC. and A.C. circuits, R, L and C elements -phasor diagram -complex impedance- real and reactive power -series and parallel circuits- loop and nodal analysis.
- Voltage -current source transformations, Various Network theorems and its applications to dc and ac circuits, star-delta transformations
- Resonance in series and parallel circuits, self and mutual inductances, coefficient of coupling - dot convention- analysis of coupled circuits,
- Three - phase star and delta circuits with balanced and unbalanced loads power measurements-power factor calculations.
- Time response of RL, RC and RLC circuits for step and sinusoidal inputs

References:

1. Hayt,W.H. and Kemmerly,J.E., ` Engineering Circuit Analysis ', McGraw Hill, New York, 7th edition, 2007.
2. Joseph. A. Edminister, ` Electric Circuits - Schaum's outline series', McGraw Hill International, 4th edition, 2003.

3. Arumugam, M. And Premkumar, N., 'Electric Circuit Theory', M/S. Khanna Publishers Co., 9th Reprint, 1997.

4. Charles K. Alexander, Matthew N. O. Sadiku, Fundamentals of Electric Circuits, 2nd Edition, McGraw-Hill Companies.

EE205

ELECTRON DEVICES

- Semi Conductors- charge carriers, electrons and holes in intrinsic and extrinsic semi conductors-Hall effect
- Diodes-PN junction-current equation -junction capacitance-breakdown characteristics, Zener, tunnel, Schottky diodes.
- Bipolar junction transistors - Low frequency and high frequency equivalent circuits – analysis of CB, CE, CC amplifier configurations.
- Uni-polar devices-FET, MOSFET, UJT and Opto-Electronic devices-theory and characteristics.
- Rectifiers and switched mode power supplies - theory and design, filter circuits, applications

REFERENCES:

1. David, A. Bell, „Electronic Devices and Circuits“, 5th Edition, PHI, 2008.
2. Millman and Halkias, 'Electronic Devices and Circuits', McGrawHill International student Edition, 5th Reprint, 1993.
3. Allen Mottershead, „Electronic Devices and Circuits-An Introduction“, PHI, 18th Reprint, 2006.
4. Malvino, „Electronic Principles“, Tata McGraw Hill, 7th edition, 2008

ME231

THERMAL ENGINEERING

- Definitions of system - system boundary, property, process, cycle, heat, work, reversible and quasistatic processes- Heat and work transfer during different types of processes
- First law of Thermodynamics - Closed system application-internal energy -heat transfer calculations -open system applications-non flow and flow System applications
- Second Law of Thermodynamics- Heat engine, Refrigerators, Kelvin – Planck statement – Clausius statement – their equivalence – Carnot cycle – Clausius Inequality – entropy change – TS diagram.

- Entropy change – Gas power cycle -Vapour power cycle-Rankine cycle-reheat cycle-regenerative cycle-calculations for efficiency and power output using steam tables and mollier chart
- Reciprocating air compressors –optimum pressure ratio in multistage compression-inter cooling-effect of clearance volume- Performance and testing of IC engines.

REFERENCES:

1. Gordan Van Wylen, Richard Sonntag., 'Fundamentals of Classical Thermodynamics', Jhon Wiley and Sons, 1994
2. Kothandaraman. C.P., 'A Course in Thermodynamics and Heat Engines', Dhanpat, Rai and Sons, 1992.
3. Nag, P.K ., 'Engineering Thermodynamics', Tata McGraw Hill, 1997.

CE287

MECHANICS OF SOLIDS AND FLUIDS:

- Stress – Strain – Elastic constants – Stress in Composite bars – Beams – Types – Shear force and bending moment diagrams for simply supported and overhanging.
- Columns Long column – Euler's Theory – Short column – Empirical formulae – Torison of Circular shafts – Hollow Shafts – Power transmission
- Vapour Pressure – Pressure at a point its variation – Measurement with Piezometer, manometers and gauges.
- Continuity equation in one dimension – Bernoulli's equation – Venturimeters and Orificie meters – Flow through pipes – Laminar Turbulent flow Major losses.
- Pumps – General principles of displacement and Centrifugal pumps – Efficiency and Perofrmance Curves of Pumps – Caviation in Pumps – Turbines – Efficiency – Governing of turbines

REFERENCES:

1. Ramamirtham, S., 'Strength of Materials ', Dhanpat Rai and Sons, New Delhi, 2003.
2. Rajput , R.K., 'Strength of Materials ', S.Chand & Co Ltd., New Delhi, 1996.
3. Nagarathnam, S. 'Fluid Mechanics', Khanna Publishers,New Delhi, 1995.

EE207

DC MACHINES AND TRANSFORMERS LABORATORY

- 1. Open circuit and load characteristics of DC shunt generator**
- 2. Load characteristics of DC compound generator**
- 3. Load test on DC shunt motor**
- 4. Speed control of DC shunt motors**
- 5. Swinburne's test**
- 6. Open circuit and short circuit test on single phase transformer**
- 7. Separation of no load losses in a single phase transformer**
- 8. Sumpner's test**
- 9. Load test on single phase transformer**
- 10. Parallel operation of single phase transformer**

EE209

CIRCUITS AND DEVICES LABORATORY

- 1. Verification of Circuit theorems.**
- 2. Half wave and full wave rectifiers.**
- 3. Bridge Rectifier.**
- 4. Volt-ampere characteristics of semi conductor diode and zener diodes.**
- 5. Characteristics of UJT**
- 6. Characteristics of FET.**
- 7. Clipping and clamping circuits.**
- 8. Transistor characteristics - CE.**
- 9. Transistor characteristics - CB.**

