



**B.E – ELECTRICAL AND ELECTRONICS ENGINEERING
 (SEVEN SEMESTER PART TIME)
 CURRICULUM 2008
 SEMESTER I**

Code No.	Course Title	L	T	P	C
THEORY					
PEE101	Mathematics- I	3	1	0	3
PEE102	Applied Physics	3	0	0	3
PEE103	Applied Chemistry	3	0	0	3
PEE104	Electric Circuit Analysis	3	1	0	3
PRACTICAL					
PEE105	Electrical Circuit Lab	0	0	3	2

Total Hours: 17

Total Credits: 14

SEMESTER II

Code No.	Course Title	L	T	P	C
THEORY					
PEE201	Mathematics – II	3	1	0	3
PEE202	Electromagnetic Field Theory	3	1	0	3
PEE203	Electrical Machines – I	3	1	0	3
PEE204	Electronic Devices	3	0	0	3
PRACTICAL					
PEE205	Computer Programming Lab	0	0	3	2

Total Hours: 18

Total Credits: 14

SEMESTER III

Code No.	Course Title	L	T	P	C
THEORY					
PEE301	Electrical Machines – II	3	1	0	3
PEE302	Professional Ethics and Human Values (EEE)	3	0	0	3
PEE303	Control Systems	3	1	0	3
PEE304	Electronic Circuits	3	0	0	3
PRACTICAL					
PEE305	Electrical Machines Lab	0	0	3	2

Total Hours: 17

Total Credits: 14

SEMESTER IV

Code No.	Course Title	L	T	P	C
THEORY					
PEE401	Power Electronics	3	0	0	3
PEE402	Protection & Switchgear	3	0	0	3
PEE403	Digital Logic Circuits	3	1	0	3
PEE404	Linear Integrated Circuits	3	0	0	3
PRACTICAL					
PEE405	Power Electronics Lab	0	0	3	2

Total Hours: 16

Total Credits: 14

SEMESTER V

Code No.	Course Title	L	T	P	C
THEORY					
PEE501	Transmission and Distribution	3	0	0	3
PEE502	Measurements & Instrumentation	3	1	0	3
PEE503	Entrepreneurial Development Management	3	0	0	3
PEEE**	Elective –I	3	0	0	3
PRACTICAL					
PEE505	Control Systems Lab	0	0	3	2

Total Hours: 16

Total Credits: 14

SEMESTER VI

Code No.	Course Title	L	T	P	C
THEORY					
PEE601	High Voltage Engineering	3	0	0	3
PEE602	Microprocessor and Microcontroller	3	1	0	3
PEE603	Power System Analysis	3	0	0	3
PEEE**	Elective – II	3	0	0	3
PRACTICAL					
PEE605	Microprocessor & Micro controller Lab	0	0	3	2

Total Hours: 16

Total Credits: 14

SEMESTER VII

Code No.	Course Title	L	T	P	C
THEORY					
PEE701	Social Engineering	3	0	0	3
PEE702	Solid State Drives	3	0	0	3
PEEE**	Elective – III	3	0	0	3
PRACTICAL					
PEE704	Project	0	0	12	12

Total Hours: 21

Total Credits: 21

Over all Credits: 105

ELECTIVES

CODE NO.	COURSE TITLE	L	T	P	C
PEEE51	Design of Electrical Apparatus	3	0	0	3
PEEE52	Visual Languages and Applications	3	0	0	3
PEEE53	Advanced Control System	3	0	0	3
PEEE54	Electrical Energy Generation Utilization and Conservation	3	0	0	3
PEEE55	Special Electrical Machines	3	0	0	3
PEEE56	Communication Engineering	3	0	0	3
PEEE57	Power system operation and control	3	0	0	3
PEEE58	Bio-Medical Instrumentation	3	0	0	3
PEEE59	Artificial Intelligence and Expert Systems	3	0	0	3
PEEE60	Programmable logic controllers	3	0	0	3
PEEE61	Power plant Engineering	3	0	0	3
PEEE62	VLSI design	3	0	0	3
PEEE63	Power System Transients	3	0	0	3
PEEE64	Renewable Energy sources	3	0	0	3
PEEE65	Solid state relays	3	0	0	3

UNIT- I MATRICES 9

Eigen values and Eigenvectors of a real matrix – Characteristic equation
Properties of Eigen values and Eigen vectors - Cayley - Hamilton theorem
(excluding proof) - Similarity transformation (Concept only) – Orthogonal matrix -
Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of
quadratic form to Canonical form by Orthogonal transformation.

UNIT- II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction Cosine and Ratios – Angle between two lines – Equation of plane –
Equation of Straight line – Coplanar lines – shortest distance between skew lines
– Sphere – Tangent plane – Plane section of a sphere,

UNIT –III GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9

Curvature – Cartesian and polar co – ordinates – Centre and radius of curvature
– Circle of curvature – Involutives and evolutes – Envelops – Properties of
envelopes and evolutes.

UNIT –IV FUNCTION OF SEVERAL VARIABLES 9

Functions of two variables – Partial derivatives – Total differential – Taylor's
expansion – Maxima and Minima – Constrained maxima and minima –
Lagrange's Multiplier method – Jacobians

UNIT- V ORDINARY DIFFERENTIAL EQUATIONS (ODE) AND APPLICATIONS

9

Linear equations of second order with constant and variable coefficients - Simultaneous first order linear equations with constant coefficients – Method of variation of parameters.

L:45; T:15; Total: 60

TEXT BOOKS:

1. Grewal .B.S., “Higher Engineering Mathematics”, 38th Edition- Khanna Publication –Delhi, 2004.
2. Kreyszi.E., “Advance Engineering Mathematics”, 8th Edition-John Wiley & Son (Asia) Ltd, Singapore,. 2001.

REFERENCES:

1. Bali. N.P., Narayana Iyengar, and Chand.N., “Engineering Mathematics” Laxmi Publication Pvt. Ltd-New Delhi, 2003.
2. Veerarajan.T., “Engineering Mathematics (For First Year)”, 4th Edition , John Wiley & Son -Hill Publishing company Ltd, New Delhi, 2005.
3. Kandasamy. P., Thilagavathy. K, and Gunavathy. K., “Engineering Mathematics”-Volume I &II, S. Chand & Co, New Delhi, 2005.
4. Venkataraman. M. K., “Engineering Mathematics”-Volume I & II, Revised enlarged 4th Edition, The National Publishing Company, Chennai, 2004.

(Common to B.E. / B.Tech all Branches)

UNIT-I ACOUSTICS AND ULTRASONICS 9

Acoustics: Classification of sound – Characteristics of musical sound – Loudness – Weber-Fechner law – Decibel – Absorption Coefficient – Reverberation – Reverberation time – Sabine's Formula (growth & decay) – Factors affecting acoustics of buildings (reverberation time, loudness, focusing, echo, echelon effect, resonance and noise) and their remedies.

Ultrasonics: Production: Magnetostriction and Piezo electric methods – Applications

UNIT-II WAVE OPTICS, LASERS AND FIBRE OPTICS 9

Wave Optics: Photo elasticity: Birefringence – Stress-optic law - Effect of a stressed model in a plane polariscope – Isoclinic and Isochromatic fringes (definitions) – Photoelastic bench.

Laser: Nd – YAG laser, CO₂ laser, semiconductor laser (homojunction) – Uses of lasers – Holography.

Fibre Optics: Principle and propagation of light in optical fibres – Numerical Aperture and Acceptance angle – Types of optical fibres (material, refractive index, mode) – Applications: Fibre optics communication system (block diagram only).

UNIT-III CRYSTAL PHYSICS AND NDT 9

Crystal Physics: Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures.

NDT: Liquid penetrant method – Ultrasonic flaw detection – Ultrasonic flaw detector (block diagram)– X-ray Radiography: displacement method – X-Ray Fluoroscopy– Merits and Demerits of each method

UNIT- IV CONDUCTING MATERIALS 9

Conductors: Wiedermann Franz law - Lorentz number –Fermi distribution function – Density of energy states – carrier concentration - effect of temperature on fermi energy level

Semiconductors: Semiconductor-properties- types of semiconductor, Hall effect – Determination of Hall co-efficient.

Superconductors: Super conducting phenomena – Properties of superconductors – Meissner effect , Isotope effect – Type I and Type II superconductors– Applications – Magnetic levitation and SQUID

UNIT–V DIELECTRICS AND NEW ENGINEERING MATERIALS 9

Dielectrics: Electrical susceptibility - Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarization – Internal field – Claussius-Mosotti relation (derivation) - Dielectric loss – Dielectric breakdown – Uses of dielectric materials (Capacitor and Transformer).

Introduction to New Materials: Metallic glasses – Nano materials – Shape memory alloys – Bio-materials.

L:45; Total:45

TEXT BOOKS:

1. Avadhanulu M.N. and Kshirsagar P.G., “A Text Book of Engineering Physics”, S.Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.
2. Gaur R. K. and Gupta S. L., “Engineering Physics”, Dhanpat Rai Publishers, New Delhi, 2001.

REFERENCES:

1. Pillai S. O., “Solid State Physics”, New Age International Publication, New Delhi, Fifth Edition, 2003.
2. Rajendran V. and Marikani A., “Materials Science”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2004.

UNIT - I BASIC CIRCUIT CONCEPTS**9**

Lumped circuits – circuit elements, ideal sources (independent and dependent), linear passive parameters R, L and C, V-I relationship of circuit elements – Sinusoidal voltage and current: RMS value, form factor – Kirchoff's Laws – analysis of series and parallel circuits – network reduction: voltage and current division, source transformation, star/delta transformation

UNIT - II TRANSIENT ANALYSIS OF FIRST & SECOND ORDER CIRCUITS**9**

Source free response of RL and RC circuits – forced (step) response of RL and RC circuits – source free response of RLC series circuit – forced (step) response of RLC series circuit – forced response of RL, RC and RLC series circuit to sinusoidal excitation – Time constant and natural frequency of oscillation of circuits – Laplace Transform application to the solution of RL, RC & RLC circuits – Initial and final value theorems and applications – concept of complex frequency – driving point and transfer impedance – poles and zeros of network function.

UNIT - III SINUSOIDAL STEADY STATE ANALYSIS**9**

Concept of phasor and complex Impedance / Admittance – Analysis of simple series and parallel circuits – active power, reactive power, apparent power (voltampere), power factor and energy associated with these circuits – concept of complex power – phasor diagram, impedance triangle and power triangle associated with these circuits – resonance in series and parallel circuits – Q factor, half-power frequencies and bandwidth of resonant circuits.

UNIT - IV MULTI DIMENSIONAL CIRCUIT ANALYSIS & NETWORK THEOREMS 9

Node–voltage analysis of multi node circuit with current sources – rules for constructing nodal admittance matrix $[Y]$ for solving matrix equation $[Y][V]=[I]$ – Mesh current analysis of multi node circuits with voltage sources – rules for constructing mesh impedance matrix $[Z]$ for solving matrix equation $[Z]I=V$ – Super position theorem – Thevenin’s theorem – Norton’s theorem – Reciprocity theorem – Compensation theorem – Tellegen’s theorem – Millman’s theorem – maximum power transfer theorem for variable resistance load, variable impedance load and variable resistance and fixed reactance load.

UNIT - V COUPLED CIRCUITS AND THREE PHASE CIRCUITS 9

Coupled circuits: mutual inductance – coefficient of coupling – dot convention – analysis of simple coupled circuits – Three phase circuits: three phase balanced/unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & unbalanced – phasor diagram of voltages & currents – power and power factor measurements in three phase circuits.

L:45 T:15; Total: 60

TEXT BOOKS:

1. William H.Hayt Jr, Jack E.Kemmerly, and Steven M.Durbin, “Engineering Circuit Analysis”, Tata McGraw-Hill Publishing Co Ltd, New Delhi, 2002
2. Joseph A.Edminister, Mahmood Nahvi, “Electric Circuits”, Schaum’s Series, Tata McGraw-Hill, New Delhi 2001.

REFERENCES:

1. R.C. Dorf, “Introduction to Electric Circuits” John Wiley & Sons Inc, New York, Second Edition, 1993
2. Charles K.Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuit” McGraw-Hill, N.Y, 2003.

LIST OF EXPERIMENTS

1. Verification of Kirchoff's voltage and current laws, Thevenin's and Norton's Theorems.
2. Study of oscilloscope and measurement of sinusoidal voltage, frequency and power factor.
3. Measurement of time constant of series R-C electric circuits.
4. Frequency response of RC and RL circuits.
5. Resonant frequency and frequency response of a series RLC circuit.
6. Study of the effect of Q on frequency response and bandwidth of series and parallel resonant circuits.
7. Study of low pass and high pass filters.
8. Measurement of real power, reactive power, power factor and impedance of RC, RL and RLC circuits using voltmeters and ammeters.
9. Power measurement in a three-phase circuit by two Wattmeter method.
10. Study of first and second order circuit transients by digital simulation.

Total: 45

TEXT BOOKS:

1. Grewal.B.S. Higher Engineering Mathematics, Thirty eighth Edition, Khanna Publication, Delhi 2004.
2. Kreyszig, E, Advance Engineering Mathematics, Eighth Edition, John Wiley and Son (Asia) Ltd Singapore 2001.

REFERENCES:

1. Bali N.P and Narayana Iyengar, N.Chand, Engineering Mathematics Laxmi Publication Pvt, Ltd, New Delhi, 2003.
2. Veerarajan. T., Engineering Mathematics Fourth Edition, Tata McGraw Publishing company Ltd, New Delhi, 2005.
3. Kandasamy. P., Thilagavathy. K, and Gunavathy. K Engineering Mathematics Volume I, II and III S. Chand & Co, New Delhi, 2005.
4. Venkataraman. M. K., Engineering Mathematics, Volume I and II Revised enlarge Fourth Edition, The National Publishing Company, Chennai, 2004.

UNIT - I INTRODUCTION**8**

Sources and effects of electromagnetic fields – Vector fields – Different coordinate systems (brief description only) - Divergence theorem – Stoke's theorem.

UNIT - II ELECTROSTATICS**10**

Coulomb's Law – Definitions-Electric charge, Electric field, flux, Properties of Flux lines, Flux density, Field intensity-Permittivity –Field due to point and continuous charges – Gauss's law and application – Electrical potential – Electric field and equipotential plots – Electric field in free space, conductors, dielectric – Dielectric polarization, Electric field in multiple dielectrics – boundary conditions, Poisson's and Laplace's equations, Example of application of Laplace equation – Capacitance, loss angle of capacitor-energy density – Dielectric strength.

UNIT - III MAGNETOSTATICS**9**

Lorentz Law of force, magnetic flux line, properties of magnetic flux lines, magnetic field intensity-permeability – Biot-savart's Law - Ampere's Law – Magnetic field due to straight conductors, circular loop, solenoid– Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization – Magnetic field in multiple media – Boundary conditions – Scalar and vector potential – Magnetic force – Torque – Self Inductance(L), Mutual Inductance(M) – Energy density – Magnetic circuits-permanent magnets.

UNIT - IV ELECTRODYNAMIC FIELDS**9**

Faraday's law of induced emf, eddy current loss- Hysteresis loss-Transformer and motional EMF, Maxwell's equations (differential and integral forms) – Conduction current, Displacement current – Relation between conduction current density and electric field intensity-Qualitative differences between field theory and circuit theory-Electro magnetic shielding.

UNIT - V ELECTROMAGNETIC WAVES

9

Generation of electromagnetic waves– Electro Magnetic Wave equations – Wave parameters; velocity, intrinsic impedance, propagation constant, surge impedance of a line in terms of energy balance – Waves in free space, lossy and loss less dielectrics, conductors-skin depth, Poynting vector, typical applications of poynting vector – Plane wave- reflection and refraction- relation between electric field intensity and magnetic field intensity.

L:45 T:15; Total: 60

TEXT BOOKS:

1. John.D.Kraus, 'Electromagnetics', McGraw Hill book Co., New York, Fourth Edition, 1991.
2. William. H.Hayt, 'Engineering Electromagnetics', Tata McGraw Hill edition, 2001.

REFERENCES:

1. D.Sathaiah-M.Anitha, 'Electro magnetic fields' Second edition-2008, SCITECH publications (India) Pvt Ltd., Chennai.
2. Joseph. A.Edminister, 'Theory and Problems of Electromagnetics', Second edition, Schaum Series, Tata McGraw Hill, 1993.
3. I.J. Nagrath, D.P. Kothari, 'Electric Machines', Tata McGraw Hill Publishing Co Ltd, Second Edition, 1997.
4. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 1999.
5. Sadiku, 'Elements of Electromagnetics', Second edition, Oxford University Press, 1995.

UNIT - I BASIC CONCEPTS OF ROTATING MACHINES 8

Principles of electromechanical energy conversion – Single and multiple excited systems – m.m.f of distributed A.C. windings – Rotating magnetic field – Generated voltage – Torque in round rotor machine.

UNIT - II DC GENERATORS 8

Constructional details – emf equation – Methods of excitation – Self and separately excited generators – Characteristics of series, shunt and compound generators – Armature reaction and commutation – Parallel operation of DC shunt and compound generators.

UNIT - III DC MOTORS 9

Principle of operation – Back emf and torque equation – Characteristics of series, shunt and compound motors – Starting of DC motors – Types of starters – Speed control of DC series and shunt motors.

UNIT - IV TRANSFORMERS 12

Constructional details of core and shell type transformers – Types of windings – Principle of operation – emf equation – Transformation ratio – Transformer on no-load – Parameters referred to HV / LV windings – Equivalent circuit – Transformer on load – Regulation – Parallel operation of single phase transformers – Auto transformer – Three phase transformers – Vector group.

UNIT - V TESTING OF DC MACHINES AND TRANSFORMERS 8

Losses and efficiency in DC machines and transformers – Condition for maximum efficiency – Testing of DC machines – Brake test, Swinburne's test, Retardation test and Hopkinson's test – Testing of transformers – Polarity test, load test, open circuit and short circuit tests – All day efficiency.

L:45 T:15; Total: 60

TEXT BOOKS:

1. D.P. Kothari and I.J. Nagrath, 'Electric Machines', Tata McGraw Hill Publishing Company Ltd, 2002.
2. P.S. Bimbhra, 'Electrical Machinery', Khanna Publishers, 2003.

REFERENCES:

1. A.E. Fitzgerald, Charles Kingsley, Stephen.D.Umans, 'Electric Machinery', Tata McGraw Hill publishing Company Ltd, 2003.
2. J.B. Gupta, 'Theory and Performance of Electrical Machines', S.K.Kataria and Sons, 2002.
3. K. Murugesh Kumar, 'Electric Machines', Vikas publishing house Pvt Ltd, 2002.

UNIT - I SEMICONDUCTOR DIODE 9

Semiconductor – Types - Theory of p-n junction – p-n junction as diode – p-n diode currents – Volt-amp characteristics – Diode resistance – Temperature effect of p-n junction – Transition and diffusion capacitance of p-n diode – Diode switching times.

UNIT - II BI-POLAR TRANSISTOR 9

Junction transistor – Transistor construction – Detailed study of currents in transistor – Input and output characteristics of CE, CB and CC configurations – Transistor hybrid model for CE configuration – Analytical expressions for transistor characteristics – Transistor switching times – Voltage rating – Power transistors.

UNIT - III FIELD EFFECT TRANSISTORS 9

Junction field effect transistor – Pinch off voltage – JFET volt-ampere characteristics – JFET small signal model – MOSFETS and their characteristics – FET as a variable resistor – Unijunction transistor.

UNIT - IV OPTO ELECTRONIC DEVICES 9

Photo emissivity and photo electric theory – Theory, construction and characteristics: light emitting diodes, liquid crystal cell, seven segment display, photo conductive cell, photodiode, solar cell, photo transistor, opto couplers and laser diode.

UNIT - V MISCELLANEOUS DEVICES

9

Theory, characteristics and application: SCR, TRIAC, PUT, tunnel diode, thermistors, piezo electric devices, zener diode, Scottky diode, PIN diode - charge coupled devices, varactor diode and LDR.

L:45; Total: 45

TEXT BOOKS:

1. Jacob. Millman, Christos C.Halkias, 'Electronic Devices and Circuits', Tata McGraw Hill Publishing Limited, New Delhi, 2003.
2. David A.Bell, 'Electronic Devices and Circuits', Prentice Hall of India Private Limited, New Delhi, 2003.

REFERENCES:

1. Theodre. F. Bogher, 'Electronic Devices & Circuits', Pearson Education, VI Edition, 2003.
2. Ben G. Streetman and Sanjay Banerjee, 'Solid State Electronic Devices', Pearson Education, 2002 / PHI
3. Allen Mottershead, 'Electronic Devices and Circuits – An Introduction', Prentice Hall of India Private Limited, New Delhi, 2003.

INTRODUCTION

Application Packages

1. Word
2. Spread sheet
3. Power point

C PROGRAMMING

1. Programs using Operators and Expressions
2. Programs using IO Formatting
3. Programs using Control Structures
4. Programs using Looping Structures
5. Programs using Arrays and String manipulations
6. Programs using Functions and Recursion
7. Programs using Structures and Unions
8. Programs using Pointers
9. Programs using Files
10. Programs using Command line arguments