COURSES & EXAMINATION SCHEME

For

B. Tech. Electrical Engineering

YEAR II, SEMESTER –III

(Effective from the session: 2010-2011)

Uttrakhand Technical University, Dehradun

w.e.f. 2010-11

COURSES AND EVALUATION SCHEME
B.TECH. II YEAR, SEMESTER-III
ELECTRICAL ENGINEERING
EFFECTIVE FROM SESSION :-2010-2011

S. No.	Course No.	Subject	Periods			Evaluation				Subject Total	Credit
						Sessional Exam			Exam ESE		
		Theory	L	T	P	CT	TA	Total			
1.	TMA 301	Mathematics-III	3	1	0	30	20	50	100	150	4
2	TEE 301	Basic Network Analysis	3	1	0	30	20	50	100	150	4
3	TME 304	Thermal & Fluid Machines	2	1	0	15	10	25	50	75	3
4	TEE 302	Electrical Measurement and Instruments	3	1	0	30	20	50	100	150	4
5	TEC 304	Solid State Devices and Circuits	3	1	0	30	20	50	100	150	4
6	TEC 305	Digital Electronics	2	1	0	15	10	25	50	75	3
Practical /Design											
7	PEE 351	Simulation Lab.	0	0	2		25	25	25	50	1
8	PEE 352	Electrical Measurement Lab	0	0	3		50	50	50	100	2
9	PEC 353	Analog and digital Electronics Lab	0	0	2		25	25	25	50	2
10	GP-301	General Proficiency (NSS/NCC/Sports/Cultural)	-	-	-		-	50	-	50	-
		Total								1000	28

TMA – 301 **MATHEMATICS-III**

L	T	P
3	1	0

Unit – I: Function of Complex variable

Analytic function, C-R equations, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic function, Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals of the type $\int_0^{2\pi} f(Cos\theta.Sin\theta)d\theta$ and $\int_{-\infty}^{+\infty} f(x)dx$ **(10)**

Unit –II: Statistical Techniques - I

Moments, Moment generating functions, Skewness, Kurtosis, Curve Fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc, Correlation and Regression. Probability theory. **(8)**

Unit – III: Statistical Techniques – II

Binomial distribution, Poisson distribution, Normal distribution, Sampling theory (small and large), Tests of significations: Chi-square test, t-test, Analysis of variance (one way), Application to engineering, medicine, agriculture etc.

Time series and forecasting (moving and semi-averages), Statistical quality control methods, Control charts, $\overline{X}$ R, p, np, and c charts. **(8)**

Unit – IV: Numerical Techniques –I

Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods. Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation, Lagrange's and Newton's divided difference formula for unequal intervals. **(8)**

Unit – V: Numerical Techniques –II

Solution of system of linear equations, Gauss-Seidal method, Crout method. Numerical differentiation, Numerical integration, Trapezoidal, Simpson's one third and three-eight rules, Solution of ordinary differential (first order, second order and simultaneous) equations by Euler's, Picard's and forth-order Runge- Kutta methods. **(8)**

Reference Books:-

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons,.
2. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.
3. T. Veerajan & T. Ramchandrandran, Theory & Problems in Numerical Methods, TMH, New Delhi, 2004.
4. Devore, Probability and Statistics, Thomson(Cengage) Learning, 2007.
5. Walpole, Myers, Myers & Ye, Probability and Statistics for Engineers & Scientists, Pearson Education, 2003.

TEE 301 BASIC NETWORK ANALYSIS

L T P
3 1 0

Unit – I: Introduction to continuous time signals and systems

Basic continuous time signals, unit step, unit ramp, unit impulse and periodic signals with their mathematical representation and characteristics. Introduction to various types of systems.

Analogous System

Linear mechanical elements, force-voltage and force-current analogy, modeling of mechanical and electro-mechanical systems: Analysis of first and second order linear systems by classical method.

(10)

Unit – II: Graph Theory

Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Node methods of analysis. **(8)**

Unit – III: Network Theorems (Applications to ac networks)

Super- position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem

(8)

Unit – IV: Transform methods of Analysis

Exponential form and Trigonometric form of Fourier series, Fourier symmetry, Fourier Integral and Fourier Transform. Transform of common functions and periodic wave forms: Applications of Fourier Transform to network analysis. **(6)**

Unit – V: Laplace Transform Analysis

Laplace Transform, Laplace Transform of periodic functions, Initial and Final Value Theorems, Inverse Laplace Transform, Convolution Theorem, Superposition Integral, Application of Laplace Transform to analysis of networks, waveform synthesis and Laplace Transform of complex waveforms.

(8)

Reference Books:

1. Kuo, Network Analysis & Synthesis, Wiley India
2. Jagan, Network Analysis, B S Publication
3. ME Van-Valkenberg; " Network Analysis", Prentice Hall of India
4. Choudhary D.Roy, "Network & Systems", Wiley Eastern Ltd.
5. Donald E.Scott, "Introduction to circuit Analysis" Mc. Graw Hill
6. B.P. Lathi, "Linear Systems & Signals" Oxford University Press, 2008.

TME-304: THERMAL AND FLUID MACHINES

L T P
2 1 0

UNIT-I

Thermodynamic equilibrium, cyclic process, enthalpy, Zero, first and second laws of thermodynamics, carnot cycle, concept of entropy, properties of steam, processes involving steam in closed and open systems, Enthalpy.

Vapour Pressure Cycles: Rankine cycle, reheat cycle, Regenerative cycle **(8)**

UNIT-II: Steam Turbine

Classification, impulse and reaction turbines their velocity diagrams and related calculations, workdone and efficiencies, re-heat factor, staging, bleeding and governing of turbines.

Gas Turbine:

Classification, Brayton cycle, working principle of gas turbine, gas turbine cycle with intercooling, reheat and regeneration, stage and polytrophic efficiencies. **(8)**

UNIT-III

Compressors: Classification, single and multistage reciprocating compressors, isothermal and volumetric efficiencies, centrifugal and axial flow compressors, surging, choking and stalling.

I.C. Engines: Otto, Diesel . and Dual cycles, introduction to 2-stroke and 4-stroke SI and CI engines, indicator diagram and power measurement. **(8)**

UNIT-IV

Hydraulic Turbines:

Classification, heads and efficiencies, construction, working, work done and efficiency of impulse and reaction turbines. **(4)**

Reference Books:

1. Introduction to Fluid Mechanics, Fox, John Wiley & Sons

TEE-302 ELECTRICAL MEASUREMENT INSTRUMENTS

L T P
3 1 0

UNIT I:

Philosophy Of Measurement: Methods of Measurement, Measurement System**,** Classification of instrument system, Characteristics of instruments & measurement system**,** Errors in measurement & its analysis, Standards. **(3)**

Analog Measurement of Electrical Quantities: Electrodynamic, Thermocouple, Electrostatic & Rectifier type Ammeters & Voltmeters, Electrodynamic Wattmeter, Three Phase Wattmeter, Power in three phase system , errors & remedies in wattmeter and energy meter. **(7)**

UNIT II:

Instrument Transformers: Theory, construction, characteristics and their application of current and potential transformers. Ration and phase angle errors and their minimization, Introduction to measurement of speed, frequency and power factor. **(7)**

UNIT III:

Measurement of Parameters: Different methods of measuring low, medium and high resistances**,** measurement of inductance & capacitance with the help of Wheatstone, Kelvin, Maxwell, Hay's, Anderson, Owen, Heaviside, Campbell, Schering, Wien bridges. Bridge sensitivity. Errors, Wagner Earthing Device, Q Meter. **(8)**

UNIT IV:

AC Potentiometer: Polar type & Co-ordinate type AC potentiometers , application of AC Potentiometers in electrical measurement **(3)**

Magnetic Measurement: Ballistic Galvanometer , **f**lux meter **,** determination of hysteresis loop, measurement of iron losses**.** **(4)**

UNIT V:

Digital Measurement of Electrical Quantities: Concept of digital measurement, block diagram, Study of digital voltmeter, frequency meter, Power Analyzer and Harmonics Analyzer; Electronic Multimeter. **(4)**

Cathode Ray Oscilloscope : Basic CRO circuit (Block Diagram),Cathode ray tube (CRT) & its components **, a**pplication of CRO in measurement ,Lissajous Pattern.; Dual Trace & Dual Beam Oscilloscopes. **(4)**

Reference Books:

1. E.W. Golding & F.C. Widdis, "Electrical Measurement &Measuring Instrument", A.W. Wheeler& Co. Pvt. Ltd. India.
2. A.K. Sawhney,"Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Sons , India .
3. Forest K. Harries,"Electrical Measurement",Willey Eastern Pvt. Ltd. India .
5. W.D.Cooper," Electronic Instrument & Measurement Technique " Prentice Hall International.

TEC-304 SOLID-STATE DEVICES AND CIRCUITS

L T P
3 1 0

Unit-I

Special Diodes: LED, Varactor, Photodiode, Schotkey, tunnel diodes and their constructions and characteristics. (5)

Linear Wave shaping: RC low pass and high pass circuits and response to sine and square wave inputs, RC circuit as differentiator, integrator & compensated attenuator. (3)

Unit-II

Frequency Response: Low and high frequency response of common emitter and common source amplifiers. Multistage amplifiers: Cascade, cascade and Darlington pair. (6)

Unit-III

Feed Back: General feedback structure, properties of negative feedback, four basic feedback topologies: series shunt; series-series; shunt-shunt; & shunt-series feedback amplifier, determination of Loop gain, stability problem. (6)

Unit-IV

Oscillators: Basic principles of sinusoidal oscillator, RC oscillators: Weinbridge and phases shift oscillators: Collpits, Hartley and Clap. Crystal Oscillators. (6)

Timer: 1C 555 timer and its applications . (1)

Voltage regulators: Concept of series, shunt and switching regulators, (3)

Converters : Sample & hold circuit, A/D and D/A converters (2)

Unit-V

Op-Amp Applications: Astable and monostable multivibrators, schmittrigger, VCO and PLL; simple active filters (LP.NP, BP and notch type) (5)

Op-amp based configurations, fixed and adjustable voltage 1C regulators. (3)

Reference Book

1.Ibbotson, Introduction to Solid State Devices, Wadsworth
2.R.K. Singh & D. S. Chauhan, Solid State Devices and Material, Wiley India
3. Chih Tang - Fundamentals of Solid State Electronics, World Scientific
4. Razeghi - Fundamentals of Solid State Engineering, Springer

TEC-305 DIGITAL ELECTRONICS

L T P
2 1 0

Unit-I

Logic Families: Circuit concepts and comparison of logic families: TTL, CMOS, NMOS and ECL; characteristic parameters: logic levels/fan-in and fan out, noise margin, propagation delay and power consumption. (5)

Minimization of Boolean functions using (i) Karnough Map having don't care entries and (ii) tabular method. (3)

Unit-II

Arithmetic Logic Circuits: Representation of negative numbers, 9's and 10's complements, l's and 2's complements, arithmetic opearation using 2's complements. Adders and Subtracters, magnitude comparator. (4)

Combinational Logic Circuits: Multiplexers/ Demultiplexers, encoders/decoders, PAL and PLA. (4)

Unit-III

Sequential Logic Circuits: Latches& Flip-Flops : SR, D, T, JK and Master-slave JK. (2)

Shift Registers: Basic principle, serial and parallel data transfer, shift left/right register, universal shift register. (3)

Counters: Mode N counters, ripple counters, synchronous counters, ring & Johnson counters (4)

Unit-IV

Memories: Read Only Memories; Random Access Memories; Static and dynamic; sequential memory: Memory Organization. (3)

Reference Books:

1. Digital Electronics: Principles and Integrated Circuits, Maini, Wiley India
2. Malvino & Leach,"Digital Principles and Applications" Tata McGraw Hill
3. Degital Design, Vahid, Wiley India
4. Signov & Donovan,"Digital Electronics"Delmar Thomson Learning.
5. R.A. Gayakwad,"Op-Amps and Linear Integrated Circuits"Prentice Hall of India,
6. Taub & Schilling."Digital Electronics"Tata McGraw Hill
7. IJ. Nagrath, "Electronics Analog and Digital" Prentice Hall of India Ltd.

PEE 351 SIMULATION LAB

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0 0 2

Note: Minimum eight experiments are to be performed from the following list using Matlab/ Multisim /PSIM / PCPICE/any other simulation package

1. Verification of principle of superposition with dc and ac sources
2. Verification of Thevenin and Norton theorem
4. Verification of Maximum power transfer theorems in ac circuits
5. Verification of Tellegin's theorem for two networks of the same topology
6. Verification of Millman theorem
7. Verification of compensation theorem
8. Determination of transient response of current in RL and RC circuits with step voltage input & current input
8. To obtain transient response of a series R-L-C circuit for step voltage input.
9. To obtain transient response of a parallel R-L-C circuit for step current input.
10. To obtain transient response of a series R-L-C circuit for alternating square voltage waveform.
11. To obtain frequency response of a series RLC circuit for sinusoidal voltage input
12. Determination of transient response of current in RLC circuit with step voltage input for under damp, critically damp and over damp cases
13. Determination of frequency response of current in RLC circuit with sinusoidal ac input

* College may add any three experiments in the above list.

PEE – 352 ELECTRICAL MEASUREMENT LAB

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0 0 3

Note: Minimum of TEN experiments from the following:

1. Calibration of ac voltmeter and ac ammeter
2. Determination of frequency and phase angle using CRO.
3. Measurement of low resistance by Kelvin's double bridge
4. Measurement of voltage, current and resistance using dc potentiometer
5. Measurement of inductance by Maxwell's bridge
6. Measurement of inductance by Hay's bridge
7. Measurement of inductance by Anderson's bridge
8. Measurement of capacitance by Owen's bridge
9. Measurement of capacitance by De Sauty bridge
10. Measurement of capacitance by Schering bridge
11 Plotting of Hysteresis loop for a magnetic material using flux meter.
12 Measurement of frequency using Wein's Bridge.
13 To study the connections and use of Current and potential transformers and to find out ratio error

* College may add any two experiments in the above list

PEC-353 **ANALOG & DIGITAL ELECTRONICS LAB**

L T P
0 0 2

1. To Plot V-I characteristics of junction tunnel and schotkey diode.
2. To design R-C Phase shift / Wein Bridge oscillator and verify experimentally the Frequency of oscillation.
3. To study application of Operational Amplifier as summer integrator and voltage Comparator
4. To study operation of Op-Amp based astable and monostable multivibrators.
5. To study operation IC 555 based astable and monostable multibrators.
6. To study operation of (a) multiplexer using IC 74150 (b) demultiplexer using IC 74138.
7. To study operation of Adder / Subtractor using 4 bit / 8 bit IC 7483.
8. To study operation of (a) J K Master – slave flip – flop using IC 7476 (b) Modulo N- counter using programmable counter IC74190.
9. To verify experimentally output of A/D and D/A converters.
10. To study regulation of unregulated power supply using IC 7805/7812 voltage regulator and measure the load and line regulations* College may add two more experiments in the above list
13. Design of P.S : 220/230 V (AC), 5VDC, 200 mA.
14. To study operation of Op-Amp based Schmit trigger as IC oscillator and Triangular wave generator

COURSES & EXAMINATION SCHEME

For

B. Tech. Electrical Engineering

YEAR II, SEMESTER –IV

(Effective from the session: 2010-2011)

Uttrakhand Technical University, Dehradun

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COURSES AND EVALUATION SCHEME
B.TECH. II YEAR, SEMESTER-IV
ELECTRICAL ENGINEERING
EFFECTIVE FROM SESSION :-2010-2011

S. No.	Course No.	Subject	Periods			Evaluation				Subject Total	Credit
						Sessional Exam			Exam ESE		
		Theory	L	T	P	CT	TA	Total			
1.	TEE 401	Electromechanical Energy Conversion-I	3	1	0	30	20	50	100	150	4
2	TEE 402	Network Analysis & Synthesis	3	1	0	30	20	50	100	150	4
3	TEE 403	Electrical &Electronics Engineering Materials	2	1	0	15	10	25	50	75	3
4	TEE 404	Microprocessors & its Applications	3	1	0	30	20	50	100	150	4
5	TEC 401	Electromagnetic Field Theory	3	1	0	30	20	50	100	150	4
6	THU-401	Industrial Economics	2	1	0	15	10	25	50	75	3
Practical /Design											
7	PEE-451	Electromechanical Energy Conversion-I Lab	0	0	3		50	50	50	100	2
8	PEE-452	Microprocessors Lab	0	0	3		25	25	25	50	2
9	PEE-453	Network Lab.	0	0	3		25	25	25	50	2
10	GP-401	General Proficiency (NSS/NCC/Sports/ Cultural)	-	-	-	-	-	50	-	50	-
		Total								1000	28

TEE 401 ELECTROMECHANICAL ENERGY CONVERSION-I

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Unit – I : Principles of Electro-mechanical Energy Conversion:- Introduction, Flow of Energy in Electromechanical Devices, Energy in magnetic systems (defining energy & Co-energy), Singly Excited Systems; determination of mechanical force, mechanical energy, torque equation, Doubly excited Systems; Energy stored in magnetic field, electromagnetic torque Generated emf in machines; torque in machines with cylindrical air gap . **(7)**

Unit – 2 : D.C. Machines:- Construction of DC Machines, Armature winding, Emf and torque equation, Armature Reaction, Commutation, Interpoles and Compensating Windings, Performance Characteristics of D.C. generators. **(8)**

Unit –3 : D.C. Machines (Contd.):- Performance Characteristics of D.C. motors, Starting of D.C. motors ; 3-point and 4-point starters, Speed control of D.C. motors: Field Control, armature control and Voltage Control (Semiconductor Device Control method, Ward Leonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburne's Test).

(9)

Unit –4 : Single Phase Transformer: Phasor diagram, efficiency and voltage regulation, all day efficiency, Testing of Transformers: O.C. and S.C. tests, Sumpner's test, polarity test. Auto Transformer: Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications.

(8)

Unit –5 : Three Phase Transformers: Construction, three phase transformer phasor groups and their connections, open delta connection, three phase to 2 phase, 6 phase or 12 phase connections, and their applications, parallel operation and load sharing of single phase and three phase transformers, excitation phenomenon and harmonics in transformers, three winding transformers.

(9)

Text Books:

1. Principles of Electric Machines and Power Electronics, El Hawary, Wiley India
2. I.J. Nagrath & D.P.Kothari," Electrical Machines", Tata McGraw Hill
3. Charles Gross, Electric Machines, T & F , Delhi
4. A.E. Fitggerald, C.Kingsley Jr and Umans,"Electric Machinery" 6th Edition McGraw Hill, International Student Edition.
5. Principles of Electric Machines and Power Electronics, 2nd ed, Sen, Wiley India

TEE- 402: NETWORK ANALYSIS AND SYNTHESIS

L	T	P
3	1	0

Unit – I : Network Functions :
Concept of Complex frequency, Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode Plots **(8)**

Unit – II : Two Port Networks:
Characterization of LTI two port networks ZY, ABCD and h-parameters, reciprocity and symmetry, Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T & ∏ Representation. **(8)**

Unit – III : Network Synthesis :
Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms. **(8)**

Unit – IV : Filters:
Introduction, Classification of filters, introduction of windows, butter wrath filter challenge filter Equation of Ideal filter, Image parameters and characteristics impedance, passive and active filter/ of various filter FCR and CCR filter window matlab fundamentals, low pass, high pass, constant K type, M derived filters and their design. **(8)**

Unit – V : Sampled Data System
Introduction, Spectrum analysis of sampling process, Signal reconstruction, Difference equation, Z-transform, Z-transform function, Inverse Z-transform, Relation of z- and s-transform, Stability analysis, Application of z-transform **(8)**

Text Books:
1. Kuo, Network Analysis and Synthesis, 2nd ed, Wiley India
2. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India
3. N.C. Jagan and C. Lakshminarayana, "Newwork Analysis & Synthesis" B.S. Publications, 2008.
4. Nagrath and Gopal, "Control System Engineering" Wiley Eastern Ltd.
5. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis",Wiley Eastern Ltd.

TEE-403: ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

L	T	P
2	1	0

UNIT – I : Crystal Structure of Materials:
Bonds in solids, crystal structure, co-ordination number, atomic radius representation of plane distance b/w two planed packing factor, Miller Indices, Bragg's law and x-ray diffraction, structural Imperfections, crystal growth **(7)**

UNIT – II : Dielectric Materials:
Polarization and Dielectric constant, Dielectric constant of mono-atomic, Poly atomic gases and solids, frequency dependence of electronic and ionic polarisabilities, dipolar relaxation, dielectric loss, piezoelectricity, ferroelectric materials **(7)**

UNIT – III : Electrical Engineering Material:
Electron theory of metals, factors affecting electrical resistance of materials, thermal conductivity of metals, heat developed in current carrying conductors, Half effect, Drift and Diffusion currents, continuity equation, thermoelectric effect, superconductivity and super conducting materials, optical properties of solids **(8)**

UNIT – IV : Magnetic Material:
Origin of permanent magnetic dipoles in matters, Classification Diamagnetism, Paramagnetism, Ferromagnetism, Antiferromagnetismand Ferrimagnetism, magnetostriction, Properties of magnetic materials, soft and hard magnetic materials, permanent magnetic materials.

(7)

Text Books :

1 A.J. Dekker,"Electrical Engineering Materials" Prentice Hall of India
2 Solymar, "Electrical Properties of Materials" Oxford University Press.
3. Ian P. Hones," Material Science for Electrical and Electronic Engineering," Oxford University Press.

TEE-404: MICROPROCESSORS and ITS APPLICATIONS

L T P
3 1 0

UNIT-I :
Introduction to Microprocessors: Evolution of Microprocessors, history of computers, Timing and control , Memory devices: Semiconductor memory organization, Category of memory **(4)**

UNIT-II:
8-bit Microprocessors (8085): Architecture, Instruction Set, Addressing modes, Assembly Language Programming. **(6)**

UNIT-III:
16-bit Microprocessors (8086): Architecture, Physical address, segmentation, memory organization, Bus cycle, Instruction Set, Addressing modes, difference between 8085 & 8086 , Assembler Directives , Assembly Language Programming of 8086 **(10)**

UNIT-IV:
Peripheral Interfacing: Introduction, Types of transmission, 8257 (DMA), 8255 (PPI), Serial Data transfer (8251), Keyboard-display controller (8279), Programmable Priority Controller (8259), 8253, ADC, Application of peripheral devices **(11)**

UNIT-V:
Advanced Microprocessors: Introduction to 80186, 80286, 80386, 80486, Pentium microprocessors, introduction To Microcontroller (8051) **(9)**

Text Books:

1 Gaonkar, Ramesh S, "Microprocessor Architecture, programming and applications with the 8085" Pen ram International Publishing 5th Ed.
2 Uffenbeck, John, "Microcomputers and Microprocessors" PHI/ 3rd Edition.
3 Ray, A.K. & Burchandi, K.M., "Advanced Microprocessors and Peripherals: Architecture, Programaming and Interfacing" Tata Mc. Graw Hill.
4 Hall D.V., "Microprocessors Interfacing" Tata Mc Graw Hill
5 Liu and Gibson G.A., "Microcomputer Systems: The 8086/8088 Family" Prentice Hall (India)

TEC-401: ELECTROMAGNETIC FIELD THEORY

L	T	P
3	1	0

Unit-I:

Coordinate systems and transformation:

Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals,del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar. 9

Unit-II:

Electrostatics: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields.

Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition.

Electrostatic boundary value problems: Poission's and Laplace's equations, general procedures for soling Poission's or Laplace's equations, resistance and capacitance, method of images. 10

Unit-III

Magneto-statics: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density, Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential. Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy. 10

Unit-IV

Waves and applications: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, Displacement current, Maxwell's equation in final form.

Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence. 7

Unit-V

Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power, The Smith chart, Some applications of transmission lines. 6

Text Book

1. Kaduskar, Principles of Electromagnetics, Wiley India
2. Hyat, W.H. and Buck, J.A. "Engineering Electromagnetics" Tata McGraw Hill Publishing Co. Ltd.
3. Jorden E.C. and Balmain K.G. "Electromagnetic" wave radiating systems. PHI Second edition.
4. Ramo S, Whinnery T.R and Vanduzer T, Field and Waves in Communication Electronics' JohnWiley and Sons

THU 401: Industrial Economics

L	T	P
2	1	0

Unit-I:
Introduction: Nature & Significance of economics. Relationship between economics and science, Engineering & Technology, Contribution of industrial economics to economic development.

Unit-II:
Micro Economics: Basic concept of Micro Economics. Concept of demand, supply & price, the law pertaining to demand, supply & price indifference curve analysis, price effect, income effect & substitution effect.

Unit-III:
Business & Industry Application: Business cycles. Business Fluctuations. Theory of business cycles. Business forecasting .decision tree based on decision analysis case study based on micro economics. Competitions prevailing in the market.

Unit-IV:
Macro Economics: Introduction to macro economics relationship between macro economics & engineering & industry. National (N.I) Income & measurement of N.I. Inflation & deflation. N.I effect on economy. Unemployment & types of Unemployment. Relationship b/w inflation & unemployment measures to control inflation.
.
Unit-5:
Money & Banking: Balance of payment disequilibrium in balance of payment. Functions of money. Value of money. Functions of bank: commercial banks & central banking in India. Monetary & fiscal policy: a brief introduction case study pertaining to macro economics. A brief description of Indian Financial System.

References:

- *Economics as a Science*, (McGraw-Hill, 1970).
- Boulding, Kenneth E. (1966) *Economic Analysis*. New York: Harper and Row. 2 Volumes. vol. 1
- Bruce **Allen**, Neil Doherty, Keith Weigelt, Edwin Mansfield (2005) Managerial Economics
- Bernadette **Andreosso**, David Jacobson (2005) Industrial Economics and Organization
- Ken **Heather** (2002) The Economics of Industries and Firms
- Essentials of Macroeconomics **by** Peter Jochumzen - BookBoon **,** 2010

PEE-451: ELECTROMECHANICAL ENERGY CONVERSION- I LAB

L	T	P
0	0	3

Note: Minimum eight experiments are to be performed from the following list :

1 To obtain magnetization characteristics of a d.c. shunt generator
2 To obtain load characteristics of a d.c. shunt generator and compound generator (a) Cumulatively compounded (b) Differentially compounded
3 To obtain efficiency of a dc shunt machine using Swinburn's test
4 To perform Hopkinson's test and determine losses and efficiency of DC machine
5 To obtain speed-torque characteristics of a dc shunt motor
6 To obtain speed control of dc shunt motor using (a) armature resistance control (b) field control
7 To obtain speed control of dc separately excited motor using Conventional Ward-Leonard/ Static Ward –Leonard method.
8 To study polarity and ratio test of single phase and 3-phase transformers
9 To obtain equivalent circuit, efficiency and voltage regulation of a single phase transformer using C.C. and S.C. tests.
10 To obtain efficiency and voltage regulation of a single phase transformer by Sumpner's test.
11 To obtain 3-phase to 2-phase conversion by Scott connection.
12 To determine excitation phenomenon (B.H. loop) of single phase transformer using C.R.O.

PEE-452: MICROPROCESSORS LAB

L	T	P
0	0	3

A. Study Experiments

1 To study 8085 based microprocessor system
2 To study 8086 and 8086A based microprocessor system
3 To study Pentium Processor

B. Programming based Experiments (any four)

4 To develop and run a program for finding out the largest/smallest number from a given set of numbers.
5 To develop and run a program for arranging in ascending/descending order of a set of numbers
6 To perform multiplication/division of given numbers
7 To perform conversion of temperature from 0 F to 0 C and vice-versa
8 To perform computation of square root of a given number
9 To perform floating point mathematical operations (addition, subtraction, multiplication and division)

C. Interfacing based Experiments (any four)

10 To obtain interfacing of RAM chip to 8085/8086 based system
11 To obtain interfacing of keyboard controller
12 To obtain interfacing of DMA controller
13 To obtain interfacing of PPI
14 To obtain interfacing of UART/USART
15 To perform microprocessor based stepper motor operation through 8085 kit
16 To perform microprocessor based traffic light control
17 To perform microprocessor based temperature control of hot water.

PEE-453: NETWORK LAB

L	T	P
0	0	3

Note: Minimum eight experiments are to be performed from the following list.

1. Verification of principle of superposition with dc and ac sources.
2. Verification of Thevenin, Norton and Maximum power transfer theorems in ac circuits
3. Verification of Tellegin's theorem for two networks of the same topology
4. Determination of transient response of current in RL and RC circuits with step voltage input
5. Determination of transient response of current in RLC circuit with step voltage input for under damp, critically damp and overdamp cases
6. Determination of frequency response of current in RLC circuit with sinusoidal ac input
7. Determination of z and h parameters (dc only) for a network and computation of Y and ABCD parameters
8. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values
9. Determination of image impedance and characteristic impedance of T and ∏ networks, using O. C. and S.C. tests Write Demo for the following (in Ms-Power point)
10. Verification of parameter properties in inter-connected two port networks: series, parallel and cascade also study loading effect in cascade.
11. Determination of frequency response of a Twin – T notch filter.
12. To determine attenuation characteristics of a low pass / high pass active filters.

Note : College may add any three experiments in the above list.