SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRICAL ENGINEERING
REVISED SYLLABUS

S.E. (Electrical)-Part-I (SEM- III)

Sr. No.	Name of Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	Engineering Mathematics-III	3	1	--	04	100	25	--	125
02	Analog Electronics	3	--	02	05	100	25	25	150
03	Electrical Circuit Analysis	3	1	02	06	100	25	25	150
04	DC Machines and Transformers	4	--	02	06	100	25	50	175
05	Generation & Its Economics	3	--	--	03	100	--	--	100
06	Introduction to Pspice & MATLAB	1	--	02	03	--	50	--	50
07	Advanced C - programming	1	--	02	03	--	50	---	50
TOTAL		18	02	10	30	500	200	100	800

S.E. (Electrical)-Part-II (SEM- IV)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	Signals and Systems	4	1	--	05	100	25	--	125
02	A.C. Machines	4	-	02	06	100	25	50	175
03	Industrial Management and Economics	3	1	--	04	100	25	--	125
04	Electrical Measurement	3	1	02	06	100	25	25	150
05	Digital Systems and Microprocessors	4	1	02	07	100	25	50	175
06	Introduction to advanced packages (LABVIEW)	--	--	02	02	--	50	--	50
TOTAL		18	4	8	30	500	175	125	800

T.E. (Electrical)-Part-I (SEM- V)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Electromagnetic Engineering**	**4**	**--**	**-**	**4**	**100**	**---**	**--**	**100**
02	**Power Systems Analysis**	**4**	**-**	**2**	**6**	**100**	**25**	**50**	**175**
03	**Instrumentation Techniques**	**3**	**--**	**2**	**5**	**100**	**25**	**---**	**125**
04	**Feedback Control systems**	**4**	**-**	**2**	**6**	**100**	**25**	**25**	**150**
05	**Digital Signal Processing**	**3**	**-**	**2**	**5**	**100**	**25**	**25**	**150**
06	**Mini project**	**-**	**-**	**2**	**2**	**--**	**50**	**--**	**50**
07	**Introduction to PSIM / EMTP / ETAP**	**-**	**--**	**2**	**2**	**--**	**50**	**--**	**50**
Total		**18**	**--**	**12**	**30**	**500**	**200**	**100**	**800**

T.E. (Electrical)-Part-II (SEM- VI)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Power System Stability and Control**	**4**	**-**	**2**	**6**	**100**	**25**	**--**	**125**
02	**Control Systems Design**	**4**	**-**	**2**	**6**	**100**	**50**	**25**	**175**
03	**Power Electronics**	**3**	**-**	**2**	**5**	**100**	**50**	**25**	**175**
04	**Microcontroller and its applications**	**4**	**-**	**2**	**6**	**100**	**25**	**25**	**150**
05	**Energy conservation and Energy auditing**	**3**	**-**	**2**	**5**	**100**	**50**	**--**	**150**
06	**Seminar**	**-**	**-**	**2**	**2**	**-**	**25**	**-**	**25**
Total		**18**	**-**	**12**	**30**	**500**	**225**	**75**	**800**

NOTE: Industrial Training of 15 days is to be completed in vacation after TE-Part-II. It will be assessed in BE (Electrical) part-I (SEM- VII).

B.E. (Electrical)-Part-I (SEM- VII)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Industrial Drives and Control**	**3**	**1**	**2**	**6**	**100**	**25**	**50**	**175**
02	**Power System Protection**	**4**	**1**	**2**	**7**	**100**	**25**	**50**	**175**
03	**EHVAC Transmission**	**4**	**1**	**-**	**5**	**100**	**25**	**--**	**125**
04	**Communication Engineering**	**4**	**-**	**-**	**4**	**100**	**--**	**--**	**100**
05	**Elective-I**	**3**	**1**	**-**	**4**	**100**	**25**	**--**	**125**
06	**Project Phase - I**	**-**	**-**	**4**	**4**	**--**	**25**	**25**	**50**
07	**Industrial Training (To be completed in vacation after TE-Part II)**	**-**	**-**	**-**	**-**	**--**	**50**	**--**	**50**
TOTAL		**18**	**4**	**8**	**30**	**500**	**175**	**125**	**800**

B.E. (Electrical)-Part-II (SEM- VIII)

Sr. No.	Name of Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Electrical Machine Design**	**3**	**1**	**2**	**6**	**100**	**25**	**25**	**150**
02	**HVDC Transmission**	**3**	**1**	**--**	**4**	**100**	**--**	**25**	**125**
03	**FACTS**	**3**	**1**	**2**	**6**	**100**	**25**	**25**	**150**
04	**Elective-II**	**4**	**1**	**--**	**5**	**100**	**25**	**--**	**125**
05	**ElectiveIII**	**3**	**--**	**--**	**3**	**100**	**--**	**--**	**100**
06	**Project Phase - II**	**--**	**--**	**6**	**6**	**--**	**75**	**75**	**150**
Total		**16**	**4**	**10**	**30**	**500**	**150**	**150**	**800**

Elective I

1. Electrical Engineering Materials
2. High Voltage Engineering
3. Programmable Logic Controllers & SCADA

Elective II

1. Fuzzy Systems and Neural Network
2. Wavelet Transform and Multirate Signal Processing
3. Nonlinear control System
4. Embedded Systems

Elective III

1. Deregulated Power Systems
2. Estimation of Signals and Systems
3. Numerical Protection
4. Renewable Energy Sources

SHIVAJI UNIVERSITY, KOLHAPUR
ELECTRICAL ENGINEERING
REVISED SYLLABUS

S.E. (Electrical)-Part-I (SEM- III)

Sr. No.	Name of Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	Engineering Mathematics-III	3	1	--	04	100	25	--	125
02	Analog Electronics	3	--	02	05	100	25	25	150
03	Electrical Circuit Analysis	3	1	02	06	100	25	25	150
04	DC Machines and Transformers	4	--	02	06	100	25	50	175
05	Generation & Its Economics	3	--	--	03	100	--	--	100
06	Introduction to Pspice & MATLAB	1	--	02	03	--	50	--	50
07	Advanced C - programming	1	--	02	03	--	50	---	50
TOTAL		18	02	10	30	500	200	100	800

S.E. (Electrical)-Part-II (SEM- IV)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	Signals and Systems	4	1	--	05	100	25	--	125
02	A.C. Machines	4	-	02	06	100	25	50	175
03	Industrial Management and Economics	3	1	--	04	100	25	--	125
04	Electrical Measurement	3	1	02	06	100	25	25	150
05	Digital Systems and Microprocessors	4	1	02	07	100	25	50	175
06	Introduction to advanced packages (LABVIEW)	--	--	02	02	--	50	--	50
TOTAL		18	4	8	30	500	175	125	800

T.E. (Electrical)-Part-I (SEM- V)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Electromagnetic Engineering**	**4**	**--**	**-**	**4**	**100**	**---**	**--**	**100**
02	**Power Systems Analysis**	**4**	**-**	**2**	**6**	**100**	**25**	**50**	**175**
03	**Instrumentation Techniques**	**3**	**--**	**2**	**5**	**100**	**25**	**---**	**125**
04	**Feedback Control systems**	**4**	**-**	**2**	**6**	**100**	**25**	**25**	**150**
05	**Digital Signal Processing**	**3**	**-**	**2**	**5**	**100**	**25**	**25**	**150**
06	**Mini project**	**-**	**-**	**2**	**2**	**--**	**50**	**--**	**50**
07	**Introduction to PSIM / EMTP / ETAP**	**-**	**--**	**2**	**2**	**--**	**50**	**--**	**50**
Total		**18**	**--**	**12**	**30**	**500**	**200**	**100**	**800**

T.E. (Electrical)-Part-II (SEM- VI)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Power System Stability and Control**	**4**	**-**	**2**	**6**	**100**	**25**	**--**	**125**
02	**Control Systems Design**	**4**	**-**	**2**	**6**	**100**	**50**	**25**	**175**
03	**Power Electronics**	**3**	**-**	**2**	**5**	**100**	**50**	**25**	**175**
04	**Microcontroller and its applications**	**4**	**-**	**2**	**6**	**100**	**25**	**25**	**150**
05	**Energy conservation and Energy auditing**	**3**	**-**	**2**	**5**	**100**	**50**	**--**	**150**
06	**Seminar**	**-**	**-**	**2**	**2**	**-**	**25**	**-**	**25**
Total		**18**	**-**	**12**	**30**	**500**	**225**	**75**	**800**

NOTE: Industrial Training of 15 days is to be completed in vacation after TE-Part-II. It will be assessed in BE (Electrical) part-I (SEM- VII).

B.E. (Electrical)-Part-I (SEM- VII)

Sr. No.	Name of the Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Industrial Drives and Control**	**3**	**1**	**2**	**6**	**100**	**25**	**50**	**175**
02	**Power System Protection**	**4**	**1**	**2**	**7**	**100**	**25**	**50**	**175**
03	**EHVAC Transmission**	**4**	**1**	**-**	**5**	**100**	**25**	**--**	**125**
04	**Communication Engineering**	**4**	**-**	**-**	**4**	**100**	**--**	**--**	**100**
05	**Elective-I**	**3**	**1**	**-**	**4**	**100**	**25**	**--**	**125**
06	**Project Phase - I**	**-**	**-**	**4**	**4**	**--**	**25**	**25**	**50**
07	**Industrial Training (To be completed in vacation after TE-Part II)**	**-**	**-**	**-**	**-**	**--**	**50**	**--**	**50**
TOTAL		**18**	**4**	**8**	**30**	**500**	**175**	**125**	**800**

B.E. (Electrical)-Part-II (SEM- VIII)

Sr. No.	Name of Subject	Teaching Scheme				Examination Scheme			
		L	T	P	Total Hours	TH	TW	POE/ OE	Total Marks
01	**Electrical Machine Design**	**3**	**1**	**2**	**6**	**100**	**25**	**25**	**150**
02	**HVDC Transmission**	**3**	**1**	**--**	**4**	**100**	**--**	**25**	**125**
03	**FACTS**	**3**	**1**	**2**	**6**	**100**	**25**	**25**	**150**
04	**Elective-II**	**4**	**1**	**--**	**5**	**100**	**25**	**--**	**125**
05	**ElectiveIII**	**3**	**--**	**--**	**3**	**100**	**--**	**--**	**100**
06	**Project Phase - II**	**--**	**--**	**6**	**6**	**--**	**75**	**75**	**150**
Total		**16**	**4**	**10**	**30**	**500**	**150**	**150**	**800**

Elective I

1. Electrical Engineering Materials
2. High Voltage Engineering
3. Programmable Logic Controllers & SCADA

Elective II

1. Fuzzy Systems and Neural Network
2. Wavelet Transform and Multirate Signal Processing
3. Nonlinear control System
4. Embedded Systems

Elective III

1. Deregulated Power Systems
2. Estimation of Signals and Systems
3. Numerical Protection
4. Renewable Energy Sources

S.E.(ELECTRICAL ENGINEERING)-PART I (SEM- III)
1. ENGINEERING MATHEMATICS-III

Teaching scheme

Lectures	: 3 hours/week	Theory	: 100 marks
Tutorial	: 1 hour/week	Term Work	: 25 marks

SECTION -I

Unit 1: Linear Differential Equations: Linear Differential Equations with constant coefficients, Homogenous Linear differential equations, method of variation of parameters. [6]

Unit 2: Application of Linear Differential Equations: Application of Linear Differential Equations with constant coefficients to Electrical circuits [5]

Unit 3: Partial differential equations: Four standard forms of partial differential equations of first order. [4]

Unit 4: Fourier series: Definition, Euler's formulae, conditions for a Fourier expansion, Fuctions having points of discontinuity, change of interval, expansions of odd & even periodic functions, Hall range series. [5]

SECTION –II

Unit 1: Laplace Transform: Definition, properties of Laplace transforms, transforms of derivatives, transforms of integral, convolution theorem, Inverse Laplace transforms, [5]

Unit 2: Laplace Transform of Special Function: Laplace transform of impulse function , Unit step function, periodic function, Applications of Laplace transforms to linear differential equations (Electric circuit problems) [4]

Unit 3: Z Transform:

Z- transform of elementary functions, properties of Z transform and inverse Z transform. [5]

Unit 4 Vector Differentiation: Differentiation of vectors, normal, & tangential components of velocity & acceleration, Gradient of scalar point fuction, Directional derivative, Divergence of vector point function, Curl of a vector point function, Irrotational & solenoidal vector field. [6]

Text Books:

1. A Text Book on Applied Mathematics Vol I and II by P. N. Wartikar & J. N. Wartikar.
2. Higher Engineering Mathematics by B. S. Grewal
3. Engineering Mathematics by N. P. Bali
4. Advanced Engineering Mathematics by H. K. Das

S.E. ELECTRICAL PART- I (SEM-III)

2. ANALOG ELECTRONICS

Teaching Scheme:
Lecture-03 Hr/week — Theory-100marks,
Practical-02 Hr/week — TW-25 marks
POE-25 marks

SECTION- I

1. Diode applications **(3)**

Load line analysis, diode approximation, configuration with D.C. Inputs- parallel, series, half wave and full wave rectification, clipper and clamper circuits, computer analysis.

2. BJT biasing **(5)**

Operating point, fixed bias circuit, emitter stabilized bias, voltage divider bias, miscellaneous bias configuration, design operation, transistor switching networks, bias stabilization, transistor as an amplifier, UJT, VI characteristics of UJT, computer analysis

3. FET biasing and MOSFET. **(4)**

Fixed bias, self-bias, voltage divider bias, design, troubleshooting, The MOSFET, VI characteristics, depletion type MOSFET, enhancement type MOSFET, VMOS, CMOS, computer analysis.

4. Compound configuration **(4)**

Cascade connection, cascode connection, Darlington connection, feedback pair, current source circuit, current mirror circuit, and computer analysis.

5. Power amplifiers **(3)**

Types, class A and B amplifier, operation & circuits, distortion, class C, D amplifier, computer analysis.

SECTION II

6. Introduction to op-amp **(3)**

General purpose op-amp, zero crossing detector, voltage level detector, computer interfacing with voltage level detector, inverting, non inverting and differential amplifier, signal conditioning circuit.

7. Comparators and controllers **(3)**

I/p noise effect by positive feedback, zero crossing detector & voltage level detector with hysteresis, Precision Comparator IC, Window Detector

8. Selected Application Of Op-Amp (5)
High Resistance Voltmeter, V to I Converter, Phase Shifter, Integrator, Differentiator, Precision Rectifier, Peak Detector, dead zone circuit, Instrumentation Amplifier

9. DC & AC Performance Of Real Op-Amp. **(3)**
I/p Bias Current, I/p Offset Current, Drift, CMRR, PSRR, Frequency Response of Op-Amp, Slew Rate & O/p Voltage, Noise in O/p Voltage Gain

10. Specialized IC Applications (5)
Analog Multiplier, Phase Angle Detection, IC 555 Timer, Astable & Monostable, XR-2240 Programmable Timer Counter, Linear IC Voltage Regulator, Power Supply For Logic Circuits +/- 15V Power Supply for Linear Applications

---

TERM WORK: List of experiments.
Section I

1. Design and implementation of half wave rectifier.
2. Design and implementation of full wave rectifier.
3. Study of various types clippers.
4. Study of various types clampers.
5. Study of biasing methods of BJT.
6. Study of frequency response of CE configuration of BJT.
7. Study of VI Characteristics of UJT.
8. Study of FET as an amplifier.

Minimum Five Experiments of section I & Simulation By PSPICE/Circuit maker Software

Section II

1. Study of op-amp as an inverting & non-inverting amplifier.
2. Study of op-amp as differentiator & integrator.
3. Study of op-amp as zero crossing detector & peak detector.
4. Study of op-amp as phase shifter.
5. Study of op-amp as precision rectifier.
6. Study of op-amp as instrumentation amplifier.
7. Study of IC 555 in different modes- astable, monostable.

Minimum Five Experiments of section II & Simulation By PSPICE/Circuit maker Software

Reference Books:-

1. Electronic Devices & Circuits by-Allen Mottershed (PHI)
2. Electronic Devices & Circuits by- Boylsted (Pearson)
3. Op-Amp& Linear IC- R Gaikwad (PHI)
4. Op-Amp& Linear Integrated Circuits- Coughlin & Driscoll (PHI)

SE ELECTRICAL, PART-I (SEM-III)

3. ELECTRIC CIRCUIT ANALYSIS

Teaching Scheme:	Examination Scheme:
Lectures: 3 hrs./week	Paper: 100 marks
Practical : 2 hrs./week	T.W.: 25 marks
Tutorial: 1 hrs./week	POE: 25 marks

SECTION-I

1.**Analysis of D.C. Circuit**: Types of Sources, Dependent and Independent sources, Source transformation, Star/delta Transformation, Ladder Network, Nodal and Mesh Analysis. DC analysis using PSPICE **(04)**

2.**Network Theorems**: Superposition theorem, Millman's theorem, Norton's theorem, Thevenin's theorem, Maximum power transfer theorem, Use of PSPICE/ MATLAB for analysis. **(04)**

3.**Operational amplifier**: Ideal Op Amp, Active Op Amp Circuit Analysis **(02)**

4. **Energy storage elements**: Capacitor, Charging and discharging of Capacitor, Energy stored in capacitor, series/ parallel connections. Inductor, series / parallel connections, energy stored in Inductor. **(03)**

5. **First order circuits and Second order circuits**: Source free R-C Circuit, Source free R-L Circuit, Step Response of R-C Circuit, Step Response of R-L Circuit, Transient analysis. Initial condition of switched circuits,, unit step, ramp and impulse function. Response of R-C, R-L series circuit to these signals. Use of PSPICE for analysis.

Second order circuits: Source free Series RLC circuit, Step response of series R-L-C Circuit, General second order circuits, Transient response of second order circuits using PSPICE/MATLAB. **(06)**

SECTION-II

6. **Sinusoidal steady state analysis:** Properties of sinusoidal functions, Phasor, Impedance and admittance, Series and parallel resonance, Q factor, Selectivity and band width, A.C. network solution using Norton's theorem, Thevenin's theorem, Superposition theorem, Sinusoidal steady state analysis using PSPICE/MATLAB. **(05)**

7. **Coupled Circuits**: Self and Mutual Inductance, Dot convention, Energy in coupled circuits, Ideal Transformer, Tuned Circuits. **(03)**

8.**Two port networks**: Single port and two port networks, Driving point function, Transfer function of two port network. Z parameters. Y parameters, Hybrid parameters. ABCD parameters, Inter relation between parameters, parameters of interconnected two port network. **(04)**

9.**Network Solution using Laplace transform:** Introduction to Laplace transform, Properties of Laplace transforms, impulse function, application to solution of differential equation describing volatage-current relationship for circuit in time domain, transformed circuit, transfer function, Determination of Initial Conditions. **(05)**

10.**Fourier Transform**: The trigonometric Fourier series, symmetry properties. Response to periodic excitation, experimental Fourier series frequency spectra. Fourier transforms Use of Fourier series in network analysis. (**03)**

List of Experiments: Any eight experiments to be performed from following list

1. Study of Ladder Network
2. Verification of Star Delta transformation
3. Verification of Superposition and Maximum power transfer Theorem
4. Verification of Norton's and Thevenin's Theorem
5. Study of step response of R-C , R-L and R-L-C Series circuit and verification using Pspice
6. Observation of series and parallel resonance
7. Calculations of Z, Y, ABCD and Hybrid parameters of two port network

8.,9,10. Three programs of Network solution based on Pspice/ MATLAB software.

Reference Books:

- L.P.Huelsman, Basic circuit theory,Third edition, PHI Publication.
- Van Valkenburg: Network Analysis , Third Edition, PHI publication.
- C. K. Alexander, M.N.O.Sadiku: Electrical Circuits, Second Edition Tata McGrawhill
- Mittal G.K.: Network Analysis, Fourth Edition, Khanna Publications

S.E.(ELECTRICAL) PART-I (SEM- III)
(Revised Syllabus)
4. D.C.MACHINES AND TRANSFORMERS

Teaching Scheme :

Lect.: 4 hr/week
Practical : 2 hr/week

Examination Scheme

Theory : 100 Mark
Term Work : 25 Mark
POE : 50 Mark

SECTION –I

1. DC.MACHINES :Construction of D.C. machines, magnetic circuit of d.c machines, commutator and brush arrangement, EMF equation, torque equation, power flow diagram of dc machines. (4)
2. ARMATURE WINDING : Simple lap winding and wave winding, winding diagram and tables, brush position, dummy coils (2)
3. ARMATURE REACTION : MMF due to armature winding, flux distribution due to armature current and resultant flux distribution in a machine. Demagnetization and cross magnetization ampere turns, principle of compensation, compensating winding and its use in machines. (4)
4. D.C. MOTORS : Concept of back emf, characteristics of d.c. motors , Method of speed controls, electro breaking, parallel and series operation of motor . (5)

5. TESTING OF D.C. MACHINES : Losses and efficiency , Break test, swinburn's test, hopkinson's test, redardation test,Field test on d.c series motor (5)

SECTION –II

6. UNIVERSAL MOTOR : Development of torque ,power ,rotational and transformer emf in commutator winding, commutation in universal motor, complexer diagram, circle diagram, operation on A.C. and D.C. supply, compensated winding, application. (4)
7. SINGLE PHASE TRANSFORMER : Construction and type, EMF equation phaser diagram, equivalent circuit, efficiency ,losses ,regulation, Experimental determination of equivalent circuit parameters and calculation of efficiency and regulation, parallel operation . (6)
8. POLY PHASE TRANSFORMER : a)Construction ,single phase bank ,polarity test, transformer winding, Grouping YD1, YD11, DY11, DZ1, DZ11 , YZ1, YZ11 (5)
9. PERFORMANCE OF TRANSFORMERS :Switching inrush current, Harmonics in exciting current causes and effects, Harmonics with different transformers, connection, tertiary winding, oscillating neutral, Testing of transformers , heat run test, sumpners test, Equivalent delta test.. (5)

-----***----

TERM WORK : a)Minimum **Eight** experiment based on above syllabus.
b) **Ten MATLAB** exercises on software based analysis.

LIST OF EXPERIMENTS:

1. Speed control of dc shunt motor (i) Armature control method (ii) Field control method
2. Determination of efficiency of DC motor by swimbuns test
3. Determination of efficiency of DC motor by Hopinkinson.s test
4. Break test on shunt motor
5. Field test on series motor
6 Load test on compound motor I) cumulative ii) differential
7. To perform open circuit and short circuit test for determining equivalent circuit parameter of a single phase transformer
8 Parallel operation of single phase transformer.
9. Scott connection
10. Equivalent Delta test or Heat run Test for three phase transformer.
11. DY1 and DY11 parallel and connection
12. load test on transformer (single and three phase)
13. Polarity test on transformer (single and three phase)

RECOMMENDED BOOKS

1. Electrical Machines by SK Bhattacharya, Tata Mc Graw Hill, New Delhi
2. Electrical Machines by SK Sahdev, Unique International Publications, Jalandhar
3. Electrical Machines by Nagrath and Kothari, Tata Mc Graw Hill, New Delhi
4. Electrical Machines by SB Gupta, SK Kataria and Sons, New Delhi
5. Electric Machine, By Fitzerald and Kingsley (Tata McGraw Hil
6.Alternating current Machines, By M.G. Say.

S.E. (ELECTRICAL) (PART –I) SEM -III
5. GENERATION AND ITS ECONOMICS

Teaching Scheme: Examination Scheme:
Lectures: 3 hrs/week Theory: 100 Marks

SECTION - I

1. Hydroelectric generation –
   Hydrology, run off and stream flow, hydrograph, flow duration curve, mass curve, reservoir capacity, dam storage reservoir, surge tank, penstock, spillway, tail race. Classification of hydroelectric plants on the basis of head, advantages and disadvantages of low, medium and high head plants, pumped storage plants – types and their advantages, different types of water-turbines, layout of different types of hydro power plants. **(4)**

2. Nuclear power generation –
   Principle of nuclear power generation, nuclear fission and fusion processes, materials used as nuclear fuel.
   Nuclear reactor – Main parts of reactor and their functions, classification construction and operation of reactors such as boiling water reactor, pressurized water reactor, heavy water cooled and moderated (CANDU) type reactor, gas cooled reactor and liquid metal cooled reactor. Control of reactors, shielding of reactors.
   Nuclear power plants – Selection of site, schematic layout of nuclear power plants. **(4)**

3. Recent trends in electrical power generation –
   General layout and operating principle of – wind power plant, tidal power plant, geothermal power plant, solar power plants and fuel cells. Comparison of these plants on the basis of installation cost, running cost, reliability and environmental effects. **(6)**

4. Supply requirements of generating station –
Types of loads – residential, industrial, commercial, traction, irrigation loads, variation of these load demands, various factors affecting generation such as – maximum demand, average demand, demand factor, diversity factor, numericals. Total load demand and its variation, chronological load curve, load duration curve, energy load curve, mass curve, plant capacity factor and plant load factor, numericals. **(6)**

SECTION – II

5. Cost of generation –
fixed and running cost of power plants, annualized fixed and running charges, depreciation fund and its calculation by straight line method, sinking fund method and fixed percentage method, numericals.
Fixed and running cost of generation, overall cost for hydroelectric plats, thermal plants and nuclear plants, effects of various factors (like load diversity, load factor and load curve) on cost of generation. **(6)**
6. Generating station –
Selection of site – factors affecting choice of site, minimum kVA transmission method, C.G. method.
Determination of size of generating station – selection of size and number of generating units, operating and spinning reserve units.
Comparison of various types of generating stations – site, cost, time required for completion, space, reliability and environmental effects. **(6)**
7. Tariffs –
Different types of tariffs such as fixed rate tariff, block rate tariff, two-part tariff, maximum demand tariff, penalty for low p.f. and power factor tariff, off peak tariff, numericals based on these tariffs, Spot pricing or time of day (T.O.D.) tariff, M.D. calculation.
Introduction to Electricity Act 2003, deregulation in power industry. **(7)**

Text books:

1 Generation of Electrical Energy - B.R. Gupta, S. Chand & Co. Ltd, V edition, 2005.
2 Electrical Power - S.L Uppal, Khanna Publishers, X edition, 1984.
3 Electrical Power - Soni, Gupta, Bhatnagar, Dhanpatrai & Sons, IX edition, 1989.

Reference books:

1 Principles of Power Systems - V.K. Mehta, S. Chand & Co. Ltd., Reprint, 1995
2 Indian Electricity Act 2003.

S.E. (ELECTRICAL) PART-I (SEM-III)
6. INTRODUCTION TO PSPICE & MATLAB

Teaching Scheme:
Lecture 1 Hr/week
Practical 2Hrs/week

Examination Scheme:
Term work: 50marks

SECTION I

1. Introduction to Matlab
   Matlab environment, different windows in matlab, getting help, Important commands, matlab as scratchpad, different types of files in matlab, complex variables and operations, plot commands **(01)**

2. Matrices & vectors
   Matrix manipulation, matrix and array operations, arithmetic operators , relational operators, logical operators, solution of matrix equation Ax= B , Gauss elimination, inverse of matrix Eigen values and Eigen vectors, Determinant, least square solutions **(02)**

3. Branching statements, loops and programming design
   if statements, for loops, while, switch, Break and continue, nesting loops, if else with logical arrays, function programming **(02)**

SECTION II

4. Symbolic manipulation
   Calculus – limit, continuity, differential calculus, differential equation, integration, integral transforms, Taylor series **(02)**

5. Signals manipulations
   Plotting standard signals, continuous and discrete such as step, ramp, sine, Generating signals from combination of different. signals, and manipulation of signals. **(02)**

6. Transforms and simulink
   Laplace, Z and fourier transform, Inverse transforms, transfer function, partial fraction expansions, introduction to simulink, simulation of linear system in transfer domain and ordinary differential equation domain **(02)**

7. Introduction to PSPICE **(01)**

REFERENCE BOOKS:

1. Matlab programming for Engineers by Stephen Chapman Pub Thomson Learning 2nd edition, 2002
2. Getting started with MATLAB by Rudra Pratap Pub Oxford University press
3. Contemporary linear systems using MATLAB by Robert Strum and Donald Kirk Pub Thomson Learning.
4. Mastering MATLAB by Duane Hanselman & Bruce Little field Pub Pearson Education 2005
5. A guide to MATLAB by Brain R. Hunt, Ronald L. Lipsman & Jonathan M. Rosenberg Pub Cambridge University Press 2002
6. Linear Algebra and differential Equations using MATLAB by Martin Golubitsky, Michael Dellnitz Pub, International Thomson 1999
7. SPICE for Circuits and Electronics using PSpice by Muhammad Rashid pub PHI 2nd Edition 2003.

List of Experiments

1. Introduction to MATLAB Environment

2. To study simple matrix and array manipulations using Matlab

3. Programming using MATLAB

4. Calculus using MATLAB

5. To plot signals discrete and continuous using MATLAB

6. Function programming and Matlab

7. Calculation of Laplace, Z, Inverse Laplace, Z, Partial fraction expansion and transfer function using Matlab

8. Signal Manipulation using Matlab.

9. Simulation of linear system using Matlab

10. Introduction to PSpice.

Note: Minimum Eight experiments are to be conducted based on the above list.

S.E (Electrical) Part-I (SEM -III)

7. Advanced 'C' Programming

Teaching Scheme:
Lectures: - 01Hr/week
Practical: - 02Hrs/week

Examination Scheme:
TW- 50 marks

1) C Fundamentals, Operators & expression, data I/P & O/P, Control statements, functions, Program structure, arrays. **(2)**

2) Pointers **(3)**
   a) Fundamentals
   b) Point Declaration
   c) Passing Pointer to Function
   d) Pointer & One Dimensional Array
   e) Operation Pointers
   f) Pointer & multidimensional array
   g) Passing Function to other Function
   h) More about pointer declaration

3) Structure & pointer **(2)**
   a) Passing Structures to functions
   b) Self referential structures
   c) Unions

4) Data Files **(2)**
   a) Opening & Closing of Data Files
   b) Creating & Processing Data Files
   c) Unformatted Data Files

5) Low Level Programming **(2)**
   a) Register Variables
   b) Bitwise Operator
   c) Bit Fields

6) Additional Features Of C **(1)**
   a) Enumeration
   b) Command Line Parameter
   c) Macros
   d) C Preprocessor

7) MATLAB with C **(1)**
   File Handling in MATLAB with C codes.

TERM WORK: - Minimum **TEN** Programs covering all Topics with **One Small Project.**

REFERENCE BOOKS: -

1. Programming With C	Bryan Gottfried ,Schaum's Outline
2. Programming in Ansi C	E Balguruswamy(TMH)
3. Let us C	Yashwant Kanetkar[BPB]
4. C Made easy	Herbert Schield
5. Understanding pointers in C	Yashwant Kanetkar[BPB]
6. Getting started with MATLAB	RUDRA PRATAP[OXFORD]

S. E. (ELECTRICAL) PART – II (SEM -IV)

1. SIGNALS & SYSTEMS

Teaching Scheme:
Lecture 4hrs/week
Tutorials 1hr/week

Examination Scheme:
Theory 100 marks
Term work 25 marks

SECTION I

3. Introduction to signals & systems
   Continuous & discrete signal: size of signal, signal operations, classification of signals, standard test signals, singularity functions.
   Continuous & discrete systems: Classification of systems, system models of Electrical systems **(8)**
4. Description and analysis of system
   Continuous & discrete systems: zero state response, zero input response, convolution sum and convolution integral, graphical representation of convolution, block diagram representation of differential and difference equation, FIR and IIR systems **(8)**
5. System Analysis using Laplace transform
   Laplace transform: A brief introduction to Laplace transform its properties and inverse Laplace transform, transfer function analysis, solution of LTI differential equation. **(4)**

SECTION II

4. System analysis using Z-transform
   A brief introduction to Z–transform, its properties & inverse – Z transform, connection between Laplace transform and Z–transform, transfer function analysis, solution of LTI difference equation, and stability in Z-domain. **(4)**
5. Fourier analysis of continuous signals
   Periodic representation by trigonometric Fourier series, Fourier spectrum, Dirichlet's condition, exponential Fourier series, exponential Fourier spectra,

Parseval's theorem, Fourier transform and its properties, Relation between Fourier and Laplace Transform, Fourier spectrum **(6)**

6. Fourier analysis of discrete signal
   A brief introduction to discrete Fourier series, D.T.F.T., properties of D.T. F. T., relation between DTFT & Z-transform, DTFT spectrum **(8)**

7. Sampling, corleation and spectral density
   Sampling methods, representing CT signals by samples, sampling DT signals, correlation and Fourier series, energy and power spectral density of signals **(6)**

REFERENCE BOOKS:

1. Linear systems and signals by B. P. Lathi, pub Oxford University press, 2nd Edi, 2005
2. Signals and systems by M. J. Roberts pub Tata Macgraw Hill 2005
3. Signals and systems by Simon Haykin pub Wiley 2003
4. Signals and systems by C. T. Chen pub Oxford 3rd Edition 2004.

S. E. (ELECTRICAL) PART – II (SEM -IV)
2. A.C. MACHINES

Teaching Scheme :
Lect.: 4 hr/week
Practical : 2 hr/week

Examination Scheme
Theory : 100 Mark
Term Work : 25 Mark
POE : 50 Mark

SECTION - I

1. THREE PHASE INDUCTION MOTOR :**A]** Construction, Principle of operation, phaser diagram, equivalent circuit, analysis based on approximate equivalent circuit,, Torque equation, speed equation, speed torque curve, No load test, Blocked rotor test, and circle diagram, starting and types of starter, ratio of starting torque to full load torque. **(6)**

   B] Slip ring Induction Motor : Effect of increase in rotor resistance, starting, speed control of motor.

   Double Cage Induction Motor (D.C.I.M.) : Construction ,Characteristics and Equivalent circuit. (4)

   C] Speed control of Induction Motor : Change of supply frequency, pole changing, cascading, Injection of EMF in secondary (4)

   D] Application and Testing: Testing as per I.S.S., Industrial applications of induction Motor.

   Synchronous Induction Motor : Construction ,Circle diagram, Phaser diagram (4)

2. SINGLE PHASE INDUCTION MOTOR : Types, Construction ,Principle of operation, phaser diagram, equivalent circuit, Experimental determination of parameter, application (5)

SECTION –II

3. SYNCHRONOUS GENERATOR : Construction ,Principle of operation, EMF equation, leakage reactance, armature reaction, armature resistance and reactance, field excitation system, damper winding (5)
4. THREE PHASE WINDING : Single layer, double layer, Integral and fractional slot winding, distribution factor, pitch factor , Elimination of harmonics voltage. (4)
5. PERFORMANCE OF SYNCHRONOUS GENERATOR : Calculation of voltage regulation by synchronous Impedance method, Zero power factor method, MMF method, experimental setup for above method, rating, efficiency and losses, method of synchronizing. , synchronizing power ,hunting, damping operation single and Infinite bus, power angle equaction, short circuit ratio and its significance.

   Two reaction Theory : Phaser diagram, slip test, power angle equation, saliency power. (6)
6. SYNCHRONOUS MOTOR : Method of starting,phaser diagram, torque and torque angle equation , V –curves and experimental setup, hunting and damping , synchronous condenser. (5)

=========

TERM WORK : A) Minimum **Eight** experiment based on above syllabus.
B) **Ten MATLAB** exercises on software base analysis

LIST OF EXPERIMENTS :

1. No load and Blocked rotor test on induction motor and performance of I.M. from circle diagram
2. .Study of A.C. Machines.
3. Study of starters.
4. Speed control of Induction Motor
5. Parameter calculation of single phase induction motor from No load and Blocked rotor test
6. Determination of voltage regulation of alternator using Synchronous Impedance method.
7. Determination of voltage regulation of alternator using MMF method
8. Determination of voltage regulation of alternator using Zero power factor method.
9. Synchronization of alternator with bus bar
10. Parallel operation of alternator.
11. V-Curves of Synchronous motor.
12. Study of starting method of synchronous motor.

REFERENCE BOOKS :

1 Electrical Machine -3/E –S.J.Chapman –Mc Graw Hill
2 Performance and design of A.C.Machines – M.G.Say
3 Performance and design of A.C Commutator motors – O.E.Taylor.
4 Theory of A.C. Machines – Langes dorf
5 A.C. Machines -Puchastein Lioyd and Conard.
6 Electrical Technology – H.Cotton.

S.E. (ELECTRICAL) PART II (SEM – IV)

3. INDUSTRIAL MANAGEMENT AND ECONOMICS

Teaching Scheme:
Lectures: 3 hrs./week
Tutorial: 01 hr / week

Examination Scheme
Paper: 100 marks
TW:25 marks

SECTION I

1. **Industrial Management**: Principles of management, Importance of management, Functions of management, planning, Organisation, staffing, directing, Public relation (04)
2. **Production Management:** Production and Cost Control, Budgetary control, purchasing, storekeeping. (03)
3. **Personnel Management**:Definition and concept, Aims, Objective and Functions of Personnel Management, Principles of good Personnel policy (04)
4. **Financial Management**: Types of Capital, Source of finance, Capital building, Institutions of Industrial finance. (04)
5. **Marketing Management**: Functions of Marketing, Market research, Marketing management and its function, Sales Management, Sales organization, Function sales department, sales forecasting, The selling and marketing concept (03)
6. **Network Analysis**: Network Techniques, Terms related to Network Planning, PERT, CPM, Applications of Network Technique. (02)

SECTION II

7. **Material Management**: Introduction to Material Management, Purchasing, Purchase Organisation, Buying Technique, Purchasing procedure, Inventory control, Inventory Management, Material requirement planning (03)

8. **Wage Administration**: Definition of Salary, different wage schemes, Advantages and disadvantages of them, Incentive, need, types, its merits and demerits. (03)
9. **Total Quality Management**: Definition, Defining quality obstacles, Benefits of TQM, ISO registration benefits, ISO 9000 series standards, sector specific standards, ISO 9001 requirements, Introduction to ISO 14000 series. (03)
10. **Industrial Acts**.: Indian factory act, Indian Electricity act, The Payment wages act, The Workmen's compensation act. (03)
11. **Management Information Systems**: Introduction,, Definition, Elements of MIS, Structure of MIS, Information System requirement, Information based support system. (02)
12. **Engineering economics**: Definition and concept, Importance of economics, valu and Price, Income, Demand and supply, Law of substitution, Functions of Banks, Types of Banks, Commercial banks, Exchange banks, RBI, Stock exchange, Principle of Taxation, Direct and Indirect tax, Free trade and Protection, Introduction of Special Economic Zones. (06)

REFERENCES BOOKS:

1. Industrial Engineering and Management: O.P. Khanna; Dhanpatrai and Company
2. Management Information Systems By G.B. Davis, M.H. Olson: Mc Grawhill; International Edition
3 Total Quality Management By D.H. Besterfield, C.B. Michana & others; PHI Pvt. Ltd.
4. ISO 900 quality systems: A. N. Singh; Dolphin Book N Delhi
5. Business organization and management: M.C. Shukla; S. Chand

S. E. (ELECTRICAL) PART – II (SEM -IV)
4. ELECTRICAL MEASUREMENT

Teaching Scheme :	Examination Scheme
Lect.: 3 hr/week	Theory : 100 Mark
Practical : 2 hr/week	Term Work : 25 Mark
Tutorial:1 hr	POE : 25 Mark

SECTION -I

1. BASIC CONCEPT OF MEASUREMENT : International Standards, Primary Standards, secondary Standards, Working Standards., Types of Error, Type of uncertainties. uncertainty measurement method, direct method and comparison method (4)
2. MOVING COIL INSTRUMENTS : a) Moving coil instrument : scale and pointer, moving coil, damper and restoring spring ,Bearing and suspensions, magnetic path, Properties of damped mass spring system : Step response, theoretical analysis of the step response, determination of torque intertia, Determination of damping constant, Damping of Galvanometer. linear and non linear scales.
   Multi range ammeter and voltmeter. : Shunting technical realization of a multi range ammeter ,calculation of current divider circuit, Voltmeter, series resistor technical realization of a multi range voltmeter, calculation of series resistance (8)
3. MOVING IRON INSTRUMENT : Construction and principle of operation of attraction and Repulsion type, limitation, scale equation of moving iron for power factor measurement ,synchronoscope. (4)
4 POWER AND ENERGY MEASUREMENT : Dynamometer wattmeter, power factor measurement, power measurement in single phase circuit, active and reactive power measurement in three phase circuit using wattcmeters, Construction and working principle of single phase and Three phase energy meter, Error and their compensation, Three phase Trivector meter . (4)

SECTION –II

5 MEASUREMENT OF CIRCUIT PARAMETERS : A.C. Bridges : measurement of Inductance and Capacitance ,frequency measurement ,Methods of measurement of low, medium and High range resistance., Whetstone and slide wire bridge. (6)

6 MEASUREMENT USING DIGITAL INSTRUMENTS : Digital meters : Ammeter, Voltmeter,multimeter, Wattmeter, Energy meter. Basic circuitry of electronic counter, frequency measurement using electronic counter . (4)

7 ADVANCED MEASUREING INSTRUMENT : Digital Oscilloscope, wave and spectrum analyzer, Harmonic distortion analyzer (4)

8 C.T. and P.T : Construction and working principle, phasor diagram, application of C.T. and P.T. (4)

TERM WORK :

Minimum **Eight** experiment from following list.

LIST OF EXPERMENTS :

1 Measurement of power by two wattmeter method
2. Measurement of reactive power.
3. Calibration of single phase and three phase Energy meter.
4. Measurement of inductance by using bridges
5. Measurement of capacitance by using bridges
6. Study of Measuring instruments (M.I.,PMMC)
7. Measurement of power by ammeter and voltmeter.
8. Measurement of KVAR,KVA ,KW by using Trivector meter.
9. Measurement of high resistance by loss of charge method..
10. Study of digital meters
11. Study of C.T. and P.T
12. Study of Harmonic distortion analyzer

TEXT BOOKS :

1. Electrical & Electronic Measurement -- A.K.Sawhney
2. Instrumentation Devices & Systems --- Rangan,Mani ,Sharma
3. Process Control Instrumentation Technology – Johnson
4. Industrial Instrumentation and Control – S.K.Singh
5. Electrical & Electronic Measurement ---Golding
6. Electrical measurement and measuring Instrumentation - G.P.Gupta.

S.E. (Electrical) -Part II (SEM -IV)

5. DIGITAL SYSTEMS AND MICROPROCESSOR

Teaching Scheme:
Lectures- 04 hrs / week
Pract- 02 hrs / week
Tutorial: 01 Hr./week

Examination Scheme:
Theory – 100 marks
TW- 25 marks
POE- 50 marks

SECTION I

1.**Fundamentals of digital system** **(06)**

Binary arithmetic, binary codes, digital logic families- TTL, CMOS, interfacing CMOS & TTL.

2.**Combinational and sequential digital circuits** **(10)**

Standard representation for logical function, k- map representation, simplification of logical functions by using k- map,

Design procedure, adder, code converter- BCD to Gray converter, magnitude comparator, decoder, de-multiplexer.

Flip-flops, triggering of flip-flops, shift registers, ripple (asynchronous) counter, synchronous counter, timing sequences. Counter design-using flip-flop, special counter IC's.

3. **Fundamentals of microprocessor**. **(07)**

Address bus, data bus, control bus, architecture of microprocessor 8085- ALU, general purpose registers, flag register, timing & control unit, interrupt control, serial i/o control.

SECTION II

4, **Assembly language programming,** **(08)**

Addressing modes, instruction set of microprocessor 8085- data transfer, arithmetic, logical, branching, stack, i/o & machine control, subroutine, delay routine, display routine, stack operation, interrupt of 8085, ISR.

5. **Memory interfacing** **(04)**

ROM, RAM, CAM- content addressable memory, CCD- charge coupled device memory, memory chips.

Memory organization, addressing technique-IO mapped IO, Memory mapped IO, memory interfacing to 8085.

6. **Peripheral chips** **(10)**

IC 8255, IC 8253, IC 8279, IC 8259,

Introduction, schematic block diagram, operating modes, interfacing techniques, assembly language program for interfacing these chips to 8085,

Voltage and current measurement by ADC 0808/0809, DAC0800

TERM WORK:

DIGITAL SYSTEMS

List of experiments

1. Study of circuits and families: AND, OR, NAND, NOR, XOR, Operations using TTL and CMOS ICs.
2. Study of flip-flop: S-R, D Type- Truth tables and K- maps.
3. Study of flip-flop: J-K, Master slave J-K- Truth tables and K- maps
4. Study of adder-half, full, BCD
5. Study of subtract or.
6. Study of counters- up down, decade, synchronous, binary, BCD counter
7. Study of MUX, DEMUX

Minimum **five** experiments of Digital Electronics.

MICROPROCESSOR

i) Minimum **five** medium to high skill level experiments on assembly language Programming.

ii) Minimum **five** medium to high skill level experiments on interfacing of 8255, 8279, 8253, ADC & DAC chips.

RECOMMENDED BOOKS:

1. Modern digital electronics- R.P. Jain- TMG
2. Fundamentals of digital circuits- Anand Kumar, PHI
3. Digital logic and computer design- Mano M.M , PHI
4. Digital principles and applications- Leach & Malvino
5. Microelectronics – Jacob Millman, Arvin Grabel, MGH
6. Microprocessor architecture, programming and applications- R. S. Gaonkar
7. 0000 to 8085 introduction to Microprocessor for Engineers & Scientists- P.K. Ghosh, P. R. Sridhar.
8. Fundamentals of microprocessor and microcomputer- B. Ram.

S. E. (ELECTRICAL) PART – II (SEM -IV)

6. INTRODUCTION TO ADVANCED PACKAGES – LAB VIEW

Teaching Scheme:	Examination Scheme:
Lecture : Nil	Theory : Nil
Practical: 2 hr/week	Term work: 50 marks

OBJECTIVE: To get "the students familiar with **LAB VIEW** SOFT WARE & it's applications

LAB VIEW: Basic introduction of LABVIEW ,(a graphical processing language), Introduction, START, Programs, LAB VIEW, study of different MENUS, Different ICONS, RUN, RUN REPEATEDLY,
STOP, PAUSE/CONTINUE (used to control the running of VI) ,
FONTS, ALGNMENT, DISTRIBUTION (used in building front panels),
TEXT MENU items (e.g FILE,EDIT,OPERATE,PROJECT,WINDOWS,HELP),
Different libraries (e.g Tempsystem libraries of VIS),
controls, indication and sub-VIS ,
Study regarding use of LAB VIEW for simple functions.

TERM WORK:
Term Work should consist of study of different **LAB VIEW** modules
Minimum Eight (08) experiments should be performed based on use of **LAB VIEW** software from the following or equivalent .
1.LAB VIEW development system.
2.LABVIEW state chart module.
3.LABVIEW PDA module
4.LABVIEW REAL-TIME module.
5.LABVIEW FPGA module
6.LABVIEW control design & Simulation module.
7.LABVIEW Touch panel module
8.LABVIEW for M/C vision
9.LABVIEW Training card
10.LABVIEW PID CONTROL TOOL KIT

REFERENCE:
LAB VIEW Manuals

EQUIVALANCE FOR THE REVISED SYLLABUS OF ELECTRICAL ENGINEERING

F.E. Part II

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
Basic Electrical Engineering	Basic Electrical Engineering

S.E. Part I

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1. Engg. Mathematics III	1. Engg. Mathematics III
2. D C Machines & Transformer	2. D C Machines & Transformer
3.Digital Electronics	3. Digital Systems & Microprocessor
4. Signal & System	4. Signal & System
5. Electrical Generation	5. Generation & Its Economics

S.E. Part II

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1. A C Machines	1. A C Machines
2.Linear Integrated Circuits	2.Analog Electronics
3. Basic Circuit Theory	3. Electric Circuit Analysis
4.Electrical Measurement	4.Electrical Measurement

T.E. Part I

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1.Electromagnetic Engineering	1.Electromagnetic Engineering
2. Electronic Circuit Theory	2. Analog Electronics
3.Power System	3. Power System Analysis
4.Instrumentation Technique	4.Instrumentation Technique
5. Industrial Organization & Management	5. Industrial Management & Economics

T.E. Part II

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1.Microprocessor & Its Applications	1.Digital Systems & Microprocessor
2.Power System Analysis & Control	2.Power System Stability & Control
3. Linear Control System	3. Feedback Control System
4. Communication System	4. Communication Engineering
5. Power Electronics	5. Power Electronics

BE. Part I

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1.Microcontroller& Applications	1.Microcontroller & Its Applications
2.Industrial Drives & Control	2.Industrial Drives & Control
3.FACTS	3. FACTS
4. Nonlinear & Digital Control System	4. Control System Design
5. Elective I	5. Elective I

BE. Part II

Name of the Subject (Old Syllabus)	Name of the Subject (New Syllabus)
1.Switchgear & Protection	1.Power5t System Protection
2.Electrical Machine Design	2.Electrical Machine Design
3.Utilization & Energy Conservation	3. Energy Conservation & Energy Auditing
4. Elective II	4. Elective II