Study Scheme : B-Tech. Electrical & Electronics Engineering

Course Outline Semester Wise

Semester-III-EEE

Subject Code	Subject	L T P	Marks E + S	Marks Total	Credit
TCS-301	Computer Based Numerical Technique	2-1-0	75+25	100	3
TEC-301	Electronic Devices and Circuits	3-1-0	100+50	150	4
TEE-302	Electromechanical Energy Conversion-I	3-1-0	100+50	150	4
TEC-303	Electronics Measurement & Instrumentation	3-1-0	100+50	150	4
TEE-301	Network Analysis and Synthesis	3-1-0	100+50	150	4
THM-301	Engineering Economics	2-0-0	75+25	100	2
PRACTICAL:					
PEC-351	Electronic Devices and Circuits Lab	0-0-2	25+25	50	3
PEC-352	EMEC Lab-I	0-0-2	25+25	50	2
PEE-353	Network and Measurement Lab	0-0-2	25+25	50	2
Personality Development/GP				50	
TOTAL				1000	28

Semester-IV-ECE

Subject Code	Subject	L T P	Marks E + S	Marks Total	Credit
TEE-401	Electrical & Electronics Engg. Materials	3-1-0	100+50	150	4
TEE-402	EMEC-II	2-1-0	75+25	100	3
TCS-403	Microprocessor & Application	3-1-0	100+50	150	4
TEC-404	Signal and Systems	3-1-0	100+50	150	4
TEE-405	Elements of Power Systems	3-1-0	100+50	150	4
TEC-406	Communication Engineering	2-1-0	75+25	100	2
Practical					
PEE -451	EMEC-II lab	0-0-2	25+25	50	3
PCS -452	Microprocessors Lab	0-0-2	25+25	50	2
PEC-453	Communication Engineering Lab	0-0-2	25+25	50	2
Personality Development/GP				50	
TOTAL				1000	28

Sl. No.	TEC 301 L T P 3 1 0 ELECTRONIC DEVICE AND CIRCUIT	No of periods per unit
1.	**Unit-I** **Crystal Properties and charge Carriers in Semiconductors:** Elemental and compound semiconductor materials, crystal lattice structure **Magnetic material:-**Origin of magnetic dipoles in solids, permanent magnetic dipoles, diamagnetic paramagnetic, ferromagnetic anti-ferromagnetic and ferry-magnetic materials	5
2.	**Unit-II** **Transistor amplifier Frequency response:** Bipolar Transistor as amplifier, Ebers mole and h-parameter model high Frequency model) high frequency response of common source, common collector, common base. High frequency response of common source, common gate, common drain.	10
3.	**Unit-III** **Feedback:** Concept of feedback, classification feedback, Analysis of different type of feedback. **Oscillators:** Concept of oscillators, condition of oscillations, frequency and amplitude stability of oscillations, analysis of quartz, Hartely, colpitts, RC phase shift, Wein bridge and UJT oscillators	10
4.	**Unit-IV** **Multistage and Tuned Amplifiers:** Introduction to multistage amplifiers, cascade amplifiers, coupling of amplifiers, direct coupled, differential coupling, and transformer coupled amplifier, Darlington amplifier and its analysis, bootstrapping, tuned and double tuned voltage amplifiers	10
5.	**Unit-V** **Multivibrator:** Astable, mono-stable, and bi-stable multivibrators	5

Reference Books:

1. Electronic Devices Circuit and SSD, R K Singh and D S Chauhan, Vikash Publication, Delhi
2. Boylestad, Electronic Devices and Circuit Theory, 10/e, Pearson
3. Donald A Neaman, "Semiconductor Physics and Devices Basic Principles" 3rd Ed TMH India.
4. Integrated Electronics, Milman and Halkias, Pearson

Sl. No	TEE 302 L T P 3 1 0 **ELECTRO-MECHANICAL ENERGY CONVERSION –I**	No of periods per unit
1.	**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	(8)
2.	**Unit-II** **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.	(7)
3.	**Unit-III** **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 (Ward Lenonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test). (8)	(8)
4.	**Unit-IV** **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.	(6)
5.	**Unit-V** **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.	(10)

Reference Books:

1Irving L.Kosow, "Electric Machine and Tranformers", Prentice Hall of India.
2M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
3 Bhag S. Guru and Huseyin R. Hizirogulu, "Electric Machinery and Transformers" Oxford University Press, 2001.

Sl. No.	TCS-302 L T P 2 1 0 **Computer Based Numerical Technique**	No of periods per unit
1.	**Unit-I** **Introduction:** Numbers and their accuracy, Computer Arithmetic, Mathematical preliminaries, Errors and their Computation, General error formula, Error in a series approximation. **Solution of Algebraic and Transcendental Equation:** Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Methods of finding complex roots, Muller's method, Rate of convergence of Iterative methods, Polynomial Equations	**8**
2.	**Unit-II** **Interpolation:** Finite Differences, Difference tables Polynomial Interpolation**:** Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula.	**6**
3.	**Unit-III** **Numerical Integration and Differentiation:** Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Boole's rule, Waddle's rule.	**6**
4.	**Unit-IV** **Statistical Computation:** Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines, Regression Analysis, Linear and Non linear Regression, Multiple regression, Statistical Quality Control methods.	**6**

Reference Books:

1. Gerald & Whealey, "Applied Numerical Analyses", AW
2. Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi.
3. Numerical Method Principles, analysis and algorithms ,Srimamta Pal (Oxford Higher ed)
4. Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.

Sl. No.	TEC 303 L T P 3 1 0 ELECTRONIC INSTRUMENTATION AND MEASUREMENTS	No of periods per unit
1.	**Unit-I** **Unit, dimensions and standards:** Scientific notations and metric prefixes. SI electrical units, SI temperature scales, Other unit systems, dimension and standards. Measurement Errors: Gross error, systematic error, absolute error and relative error, accuracy, precision, resolution and significant figures, Measurement error combination, basics of statistical analysis. PMMC instrument, galvanometer, DC ammeter, DC voltmeter, series ohm meter	7
2.	**Unit-II** Transistor voltmeter circuits, AC electronic voltmeter, current measurement with electronic instruments, multimeter probes Digital voltmeter systems, digital multimeters, digital frequency meter System, Voltmeter and ammeter methods, Wheatstone bridge, low resistance measurements, low resistance measuring instruments AC bridge theory, capacitance bridges, Inductance bridges, Q meter	7
3.	**Unit-III** **Analog to digital converter:** Transfer characteristics, A/D conversion technique: Simple potentiometer and servo method, successive approximation method ramp type, integrating and dual slope integrating method **D/A Converter:** Transfer characteristic, D/A conversion technique, digital mode of operation, performance characteristics of D/A convertors. **Display Devices:** Alpha numeric display using LCD and LED Specification of digital meters, Display digits and count resolution, sensitivity, accuracy, speed and settling time etc.	9
4.	**Unit-IV** **CRO:** CRT, wave form display, time base, dual trace oscilloscope, measurement of voltage, frequency and phase by CRO, Oscilloscope Probes, Oscilloscope specifications and performance. Delay time based Oscilloscopes, Sampling Oscilloscope, DSO, DSO Applications	8
5.	**Unit-V** **Signal generator and analyzer:** Signal generator: Sine wave, non-sinusoidal signal and function generators, frequency synthesis techniques and digital signal generators **Signal analyzers:** Spectrum analyzer and distortion, **Concept of ECG, EMI, EMC, EEG** etc. **Recorders:** X-Y recorders, plotters	9

Reference Books:

1. David A. Bell, "Electronic Instrumentation and Measurements", 2nd Ed., PHI , New Delhi 2008
2. Elements of Electronic Instrumentation and Measurement, 3/e, Carr. Pearson
3. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH, 2009.
4. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann), 2008

Sl. No	TEE 301 L T P 3 1 0 NETWORK ANALYSES AND SYNTHESIS	No of periods per unit
1.	**Unit-I** **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)
2.	**Unit-II** **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)
3.	**Unit-III** **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 plot, frequency response and Bode plots.	(9)
4.	**Unit-IV** **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 & π Representation.	(8)
5.	**Unit-V** **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.	(7)

Reference Books:

1. Network Analysis with Applications, 4/e (with CD), Stanley. pearson
2. Franklin F. Kuo, "Network Analysis and synthesis", 2nd Edition, Wiley India Pvt Ltd.
3. Behrouz Peikari, "Fundamentals of Network Analysis & synthesis", Jaico Publishing House, 2006.
4. M. E. Van Valkenberg, "Network Analysis", 2nd Edition, Prentice Hall of India Ltd.Oliver and Cage,

Sl. No	THU-301 L T P 2 0 0 **ENGINEERING ECONOMICS**	No of periods per unit
1.	**Unit-I** **Time value of money :** Simple and compound interest, Time value equivalence, Compound interest factors, Cash flow diagrams, Calculation, Calculation of time –value equivalences. Present worth comparisons, Comparisons of assets with equal, unequal and infinite lives, comparison of deferred investments, Future worth comparison, payback period comparison.	(8)
2.	**Unit-II** Use and situations for equivalent annual worth comparison, Comparison of assets of equal and unequal life. Rate of return, Internal rate of return, comparison of IIR with other methods, IRR misconceptions.	(8)
3.	**Unit-III** **Analysis of public Projects:** Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.	(9)
4.	**Unit-IV** Depreciation, computing depreciation charges, after tax economic comparison, Break-even analysis; linear and non-linear models. Product and Process Costing, Standard Costing, cost estimation, Relevant Cost for decision making, Cost control and Cost reduction techniques.	(8)

Reference Book :

1. Horn green, C.T., Cost Accounting, Prentice Hall of India
2. Riggs, J.L., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGraw Hill International Edition, 1996

PEC 301 ELECTRONICS DEVICES & CIRCUITS LAB

L T P
0 0 2

The following experiments must be performed on Bread Board

1. Field Effect Transistors-Single stage Common source FET amplifier –plot of gain in dB Vs frequency, measurement of bandwidth, input impedance, maximum signal handling capacity (MSHC) of an amplifier

2. Bipolar Transistors- Design of single stage RC coupled amplifier –design of DC biasing circuit using Potential divider arrangement –Plot of frequency Vs gain in dB. Measurement of bandwidth of an amplifier , input impedance and Maximum Signal Handling Capacity of an amplifier.

3. Two stage Amplifier. Plot of frequency Vs gain. Estimation of Q factor, bandwidth of an amplifier

4. Common Collector Configuration-Emitter Follower (using Darlington pair)-Gain and input impedance Measurement of the circuit.

5. Study of Series and shunt feedback amplifier and determination of voltage and current gain, Plot of gain in dB Vs frequency, measurement of bandwidth

6. Study of Wein bridge oscillator (b) phase shift oscillator

7. Study of Hartely & Colpitts oscillator

8. Study of Mono and astable multiviberator using transistor

9. Fabrication of DC unregulated power supply

10. PCB Lab: (a) Artwork & printing of a simple PCB. (b) Etching & drilling of PCB. (c) Testing of power supply fabricated in Experiment No. 6 (d) Mini Project

PEE-301 ELECTROMECHANICAL ENERGY CONVERSION- I LAB

L T P
0 0 2

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.

PEC 302 **MEASUREMENT LAB**

L T P
0 0 2

1. Study of semiconductor diode voltmeter and its us as DC average responding AC voltmeter.
2. Study of L.C.R. Bridge and determination of the value of the given components.
3. Study of distortion factor meter and determination of the % distortion of the given oscillator.
4. Study of the transistor tester and determination of the parameters of the given transistors.
5. Study of the following transducer (i) PT-100 Transducer (ii) J- type Transducer (iii) K-type Transducer (IV) Presser Transducer
6. Measurement of phase difference and frequency using CRO (Lissajous Pattern)
7. Measurement of low resistance Kelvin's double bridge.
8. Radio Receiver Measurements
9. Study of A to D convertor and its realization
10. Study of D to A convertor and its realization
11. Designing of some characters like A by alpha numeric Display.