Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
Department of Electrical & Electronics Engineering

B. Tech. (EEE) IV SEMESTER

Sl. No.	Category	Course code	Course title	Period/Week			Credits
				L	**T**	**P**	**C**
1	PCC	EE221	Electrical Circuits II	3	1	0	4
2	PCC	EE222	Electrical Machines - II	3	1	0	4
3	PCC	EE223	Power System-II	3	1	0	4
4	PCC	EE224	Power Electronics	3	1	0	4
5	PCC	EE225	Digital Electronics and Logic Design	3	0	0	3
6	PCC	EE226L	Electrical Circuits Laboratory	0	0	2	1
7	PCC	EE227L	Electrical Machines Laboratory-I	0	0	2	1
8	PCC	EE228L	Digital Electronics and Logic Design Laboratory	0	0	2	1
9	MC	MC-220	Constitution of India	2	0	0	0
			TOTAL CREDITS	**17**	**4**	**7**	**22**

[L= Lectures, T= Tutorials, P= Practical, C= Credits]

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
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B. Tech. (EEE) IV SEMESTER
MC-220
CONSTITUTION OF INDIA

Course code	MC				
Category	Mandatory Course				
Course title	CONSTITUTION OF INDIA				
Scheme and Credits	L	T	P	Credits	Internal marks =30
	2	0	0	0	External Marks = 70

UNIT -1:   1. Making of Indian Constitution - Constituent Assembly

2. Historical Perspective of the Constitution of India

3. Salient Features and characteristics of the Constitution of India

UNIT -2:   1. The Fundamental Rights

2. The Fundamental Duties and their Legal Status

3. The Directive Principles of State Policy – Their Importance and Implementation

UNIT -3:   1. Federal Structure and Distribution of Administrative, Legislative and Financial Powers between the Union and the States

2. Parliamentary Form of Government in India – The Constitutional Powers and Status of the President of India

3. Amendment of the Constitutional Provisions and Procedure

UNIT -4:   1.The Judiciary

2. Constitutional and Legal Frame Work for Protection of Environmental in Global and National Level

3. Corporate Social Responsibility (CSR) International and National Scenario.

Text Books:

1. D.D. Basu: An Introduction of Indian Constitution

2. Greanvile Austin: The Indian Constitution

3. Paras Diwan: Studies on Environmental cases

References Books:

1. Khannna Justice.H.R: Making of India's Constitution, Eastern Book Companies.

2. Rajani Kothari: Indian Politics

3. Ghosh Pratap Kumar: The Constitution of India. How it has been Formed, World Press.

4. A.Agrawal (Ed): Legal Control of Environmental Pollution.

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B. Tech. (EEE) IV SEMESTER
EE-221
ELECTRICAL CIRCUITS – II

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT I

Fourier Series and Integral: Fourier series representation of periodic functions, Symmetry conditions, Exponential Fourier series, Discrete spectrum, Fourier integra l and its properties, Continuous spectrum, Application to simple networks

UNIT II

Laplace Transform Method of Analysis of Networks: Definition of Laplace pair, Evaluation of Laplace transform of common time function, Laplace properties and theorems, Convulution theorem, Waveforms synthesis, Partial fraction method of inverse transforms, Application to networks, Transfer functions.

UNIT III

Two port network parameters: Open circuit impedance, Short circuit admittance, Transmission, Hybrid parameters & inter-relationships, Series, parallel and cascade connection of two port networks, System function, Impedance and admittance functions

UNIT IV

Topological Description of Networks: Graph, tree, chord, cut-set, incident matrix, circuit matrix and cut-set matrix, Formulation of node equations, loop equations, cut-set equations for RLC networks.
Network synthesis of driving point functions, Positive real function, properties of PR functions, Testing of PR functions

UNIT V

Synthesis of LC, RC, RL functions, Properties of LC, RC and RL networks, Minimum Functions, Synthesis of RLC networks, Brune's method, Properties of networks interms of poles and zero.

Suggested Reading:

1. VanValkenburgM.E, *Network Analysis*, Prentice Hall of India, 3rdEdition,2000.

2. WilliamHaytH,KimmerlyJackE.andStevenDurbinM,*EngineeringCircuitAnalysis*,McGraw Hill, 6th Edition,2002

3. JaganN.C,Lakshrninarayana C.,*NetworkAnalysis*,B.S.Publications,3rdEdition,2014.

4. ChakravarthyA.,*CircuitTheory*,DhanpatRai&Co.,FirstEdition,1999

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Department of Electrical & Electronics Engineering

B. Tech. (EEE) IV SEMESTER
EE-222
ELECTRICAL MACHINES –II

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT-I

Single Phase Transformers: Constructional features of single phase transformers, principle of two winding transformer, ideal transformer - transformer on no load and on load - phasor diagrams• equivalent circuits, losses , Testing - Polarity test, OC and SC tests, Sumpner's test, Regulation and efficiency, All day efficiency, separation of losses - Excitation phenomena in transformers, Auto transformer - Comparison with two winding transformer and applications.

UNIT-II

Three - Phase Transformers: Connections - Choice of transformer connections – Third harmonic voltages - Phase conversion - 3-phase to 2-phase transformation, Scott connection - constructional features of poly phase transformers - Tertiary winding, Parallel operation of transformers, phase shifting transformer, Tap changer.

UNIT-III

Three - Phase Induction Motor: Constructional features - Rotating magnetic field theory, Principle of operation of Squirrel cage and Slip ring motors, Phasor diagram, Equivalent Circuit – expression for torque - starting torque - Max torque. Slip-torque characteristics, Equivalent circuit parameters from no-load and blocked rotor test, Circle diagram, Determination of performance characteristics of induction motor, Applications.

UNIT-IV

Starting & Speed Control Methods: Starting methods of 3-phase induction motor –Auto transformer, Star-delta Starter. Double cage machine, Speed control methods – Resistance control, Voltage Control, Pole changing, Cascading, Induction Generator - Principle of operation, Applications.

UNIT-V

Single Phase Motors: Double field revolving theory. Equivalent circuit of single phase induction Motor- Principle of operation, speed torque characteristics of a split phase and capacitor motors. Compensated and uncompensated series motor, Repulsion motor and universal motor - Applications.

Suggested Reading:

1. P.S.Bimbhra-Electrical Machinery, KhannaPublishers2006

2. D.P.Kothari&I.J.Nagrath, Electrical Machines, Tata McGraw Hill, 4th Edition, 2010.

3. M.G.Say-ThePerformanceandDesignofAC.MachinesPitmanPublication, 2002.

4. IrvingL. Kosow-Electric Machinery and Transformers. PPH, Pearson Education 2nd Edition,

    2009.

Faculty of Engineering & Technology
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Department of Electrical & Electronics Engineering

B. Tech. (EEE) IV SEMESTER
EE-223
POWER SYSTEMS – II

Teaching Scheme				Examination Scheme	
L	T	P	C	Internal Marks	External Marks
3	1	0	4	30	70

UNIT-I

Transmission Line Theory: Performance of short, medium, long lines - Line calculations - Tuned lines, Power circle diagram and their applications. Corona - Causes - Disruptive and

Visual critical voltages - Power loss - Minimization of corona effects.

UNIT-II

Symmetrical Faults: Use of per unit quantities in power systems, advantages of per unit system. Symmetrical Three-phase Faults, Transients in RL series circuits - Short circuit currents - Reactance's of synchronous machines - Symmetrical fault calculations, Short circuit capacity of bus.

UNIT-III

Unsymmetrical Faults: Symmetrical components of unsymmetrical phasors - Power in terms of symmetrical components - Sequence impedance and sequence networks, Sequence networks of unloaded generators - Sequence impedances of circuit elements - Single line to ground, line to line and double line to ground faults on unloaded generator - Unsymmetrical faults of power systems, Open circuit faults.

UNIT-IV

Voltage Control: Phase modifiers, Induction Regulators -Tap changing Transformers, Series and Shunt Capacitors, Reactive Power requirement calculations, Static VAR compensators - Thyristor Controlled reactor, Thyristor switched capacitor.

UNIT-V

Travelling Wave Theory *:* Causes of over voltages - Travelling wave theory - Wave equation - Open circuited line - The short circuited line - Junction of lines of different natural impedances - Reflection and Refraction Coefficients - Junction of cable and over head lines - Junction of three lines of different natural impedances- Bewley Lattice diagram.

SUGGESTED READINGS:

1.CLWadhwa-ElectricalPowerSystems,NewAgeInternational,4thedition,2006.

2.GraingerandStevenson-PowerSystemAnalysis,TataMcGrawHill,4thedition,2003.

3.NagarathandKothari-ModernPowerSystemAnalysis,TataMcGrawHill,4thedition-2012.

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B. Tech. (EEE) IV SEMESTER
EE-224
POWER ELECTRONICS

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	1	0	4	External Marks :70

UNIT-I

Power Semiconductor Diodes and Transistors : Power Switching Devices - Ideal Switches, Real Switches, Classification of Power Switching devices, Types of power diodes – Their characteristics and applications, Bipolar Junction transistors - Power MOSFETS, IGBT, BJT and GTO operation and switching characteristics - Comparison of BJT, MOSFET and IGBT – Their applications.

UNIT-II

SCRs - Static and Dynamic Characteristics : Two transistor analogy, SCR trigger circuits R, RC and UJT triggering circuits - Triggering circuits for Single phase bridge rectifier and Choppers, The various commutation methods of SCRs - Cooling and mounting techniques of devices, Introduction to heat pipe cooling.

UNIT-III

Controlled Rectifiers : Single phase (continuous & discontinuous) and three phase (continuous) half controlled and fully controlled bridge rectifiers with R, RL, and RLE loads, Effect of source inductance, Dual converters - circulating current mode and circulating current free mode.

UNIT-IV

Choppers and Cycloconverters: Classification of Choppers• A,B,C,D,E - Step-up chopper -

Switched mode regulators - Study of Buck, Boost and Buck-Boost regulators, Principle of operation of single phase bridge type Cycle-converters and their applications.

UNIT-V

Inverters and Voltage controllers : Single phase Inverters, Three phase bridge inverters (180° and 120" modes) - Voltage control of Inverters - Single pulse width modulation - Multiple pulse width modulation- Sinusoidal pulse width modulation, Comparison of VSI and CSI – Single phase and 3-phase AC voltage controller with R, RL loads.

Suggested Reading:

1. Bimbra.P.S.- PowerElectronics, KhannaPublications,2006.

2. RashidM.H.- Power Electronics Circuits, Devicesand Applications- Prentice Hall of India, 2004.

3. Singh.M.D., KhanchandaniK.B.-PowerElectronics-TataMcGrawHill,14th reprint,1999.

4. Mohan, Undeland &Robbins-Power Electronic Converters. Applications and Design–John Wiley & Sons - 3rdEdition, 2007.

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B. Tech. (EEE) IV SEMESTER
EE-225
DIGITAL ELECTRONICS AND LOGIC DESIGN

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :30
3	0	0	3	External Marks :70

UNIT I

Boolean algebras and combinational logic, AND, OR and NOT operations. Laws of Boolean algebra, Minimization of Boolean expressions, Truth tables and maps. Sum of products and product of sums, Map method of reduction, Incompletely specified functions, Multiple output minimization.

UNIT II

Tabular minimization, Digital logic families and IC's, Characteristics of Digital IC's, Introduction to RTL, DTL, TTL, CMOS, ECL families, Details of TTL logic family, Totem pole, Open collector outputs, wired AND Operation, Comparison of performance, TTL sub -families, Multiplexer and dc-multiplexer, Encoder and decoder, Code converters, Implementation of combinational logic using standard logic gates and multiplexers.

UNIT III

Binary arithmetic and circuits, Half and Full adder, Subtractor and Magnitude comparator, Number complements, Two's complement arithmetic, Carry look ahead adder, Decimal numbers and their codes, BCD and Excess -3 arithmetic

UNIT IV

Synchronous Sequential Circuits: basic latch circuits, Debouncing switch, SR, JK, D and T flip- flops, Truth table and execution table, Ripple and Synchronous counters, Up/down counters, General BCD counter, Shift registers, ring counters

UNIT V

A/D and D/A Converters: Converter types — Tracking type, Flash type, Successive approximation type: R-2R ladder, Weighed register type, switched current source type, Switched capacitor type

Suggested Reading:

1. Anand Kumar A., Fundamentals *of Digital Circuits*, Prentice Hall of India, 4th Edition, 2003.

2. Morriss Mano M., *Digital Design*, Prentice Hall of India, 3rd Edition, 2002.

3. Zvykohavi, *Switching & Finite Automata Theory*, Tata McGraw Hill, 2nd Edition, 19

Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
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B. Tech. (EEE) IV SEMISTER
EE-226L
ELECTRICAL CIRCUITS LABORATORY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	2	1	External Marks :50

List of Experiments:

1. Charging and Discharging Characteristics of RC and RL series circuits.

2. Locus diagrams of RC and RL Circuits.

3. Frequencies Response of a Series RLC Circuits.

4. Frequencies Response of a Parallel RLC Circuits.

5. Parameters of two port network.

6. Series, parallel and cascade connection of two port networks.

7. Verification of Theorems.
    (a) Thevenin's theorem (b)
    Norton's theorem

    (c) Superposition theorem

    (d) Maximum power transfer theorem

8.   Two Wattmeter method.

9. Transients in RLC circuits.

10. Network Synthesis.

11. Characteristics of Linear, Non-Linear and Bilinear Elements.

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B. Tech. (EEE) IV SEMISTER
EE-227L
ELECTRICAL MACHINES LABORATORY – I

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	2	1	External Marks :50

LIST OF EXPERIMENTS

1. Magnetization characteristics of a separately excited D.C. generator.

2. Determination of the load characteristics of shunt and compound generators.

3. Determination of the performance and mechanical characteristics of series, shunt and compound motors.

4. Separation of iron and friction losses and estimation of parameters in D.C. machine.

5. Speed control of D.C. Shunt motor using shunt field control and armature control methods.

6. Separation of core losses in a single phase transformer.

7. Open circuit and short circuit and load test on a single phase transformer.

8. Sumpner's test on two identical transformers.

9. Three phase Transformer connections.

10. Three phase to two phase transformation and open delta connection.

11. Retardation test.

12. Hopkinson's test.

13. Swinburne's test.

Note: At least ten experiments should be conducted in the Semester.

Suggested Reading:

1.P.S.Bimbhra-ElectricalMachinery,KhannaPublishers2006

2.D.P.Kothari&I.J.Nagrath,ElectricalMachines,TataMcGrawHill,4thEdition,2010.

3.M.G.Say-ThePerformanceandDesignofAC.MachinesPitmanPublication,2002.

4.IrvingL.Kosow-ElectricMachineryandTransformers.PPH,PearsonEducation, 2nd Edition, 2009

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B. Tech. (EEE) IV SEMISTER
EE-228L
DIGITAL ELECTRONICS AND LOGIC DESIGN LABORATORY

Teaching Scheme				Examination Scheme
L	T	P	C	Internal Marks :25
0	0	2	1	External Marks :50

LIST OF EXPERIMENTS

1. Combinational logic function realization.

2. Realization of 4 bit binary adder / subtracter.

3. Construction of Decimal to Binary encoder, BCD to Binary, Binary to BCD, BCD 10 Excess- 3.

4. Serial/parallel input shift registers.

5. 4-bit binary up-down counter.

6. *555 timer applications.*

7. *Op-Amp applications - Integrator, Adder, summer.*

8. *Active filters - Low pass filter & High pass filter*

9. *Clippers and Clampers using Op-Amps.*

10. *Study of 723 linear voltage regulator and fixed voltage regulator.*

11. *Generation of triangular and square wave using Op-Amp.*

12. *Schmitt triggers circuit.*

Note: At least ten experiments should be conducted in the semester.