BOARD OF STUDIES MEETING – 2019-20

K.S.R.M COLLEGE OF ENGINEERING

AUTONOMOUS

Department of Electrical and Electronics Engineering

Minutes of the Meeting

Date	03.06.2019	**Day**	
Time	11.00AM to 1.30PM	**Venue**	HoD Chamber
Dept./SS	EEE	**Convener**	Dr.K.Amaresh

Members Present:08 **Members Absent: 01**

S.No	Name	Designation	Member	Signature	S.No	Name	Member
1.	Dr. K. Amaresh	Professor and HoD	Chairman		7	Dr. M.Vijaya Kumar	Expert nominated by Academic Council
2.	Smt. C.N. Arpitha	Associate Professor	Member		8	Dr. Y.V.Siva Reddy	Expert nominated by Academic Council
3.	Sri M. Bhaskara Reddy	Associate Professor	Member		9	Prof.R.Kiranmayi	Expert nominated by JNTU Anantapur
4.	Sri K. Kalyan Kumar	Associate Professor	Member				
5.	Smt. Saleha Tabassum	Associate Professor	Member				
6.	Sri P. Durga Prasad	Assistant Professor	Member				

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Minutes of the Meeting:

Dr.K.Amaresh welcomed all the members to the meeting and presented the agenda of the BoS meeting. There solutions are:

S.No.	Item	Presenteranddiscussion	Resolution
1	Course structure of R18 regulations for III, IV, V, VI, VII and VIII Semesters.	Course structure of R18 regulations for III, IV, V, VI, VII AND VIII Semestersbased on stakeholders' feedback on curriculum	As per the suggestions made by the expert of Academic Council, c electives are to be interdisciplinary.
2	Detailed syllabus for III and IV Semesters	Detailed syllabus for III and IV Semesters	If possible, credit division from III to VII Semesters are to be unifor For each unit in the course, learning outcomes are to be prepared an be added in the syllabus. Course Outcomes are to be placed in the syllabus, CO Vs PO mappi not to be included in the syllabus. Internship to be changed from V to VI or VII Sem.
3	Discussion on Action taken report based on stakeholders' feedback on curriculum	The BoS members appreciated the syllabus as per feedback from all stakeholders, action taken report.	R15 -IV B. Tech Syllabus, R18 -I B.Tech Syllabus and R18 -M.Tec and II year Syllabus were approved comprising of new courses.

Dr.K.Amaresh, HoD & BoS chairman of EEE department conveyedthanks to all internal and external BoS members for giving suggestions and inputs for B.Tech curriculum. As per the suggestions given through feedback obtained from all stakeholders, action taken reportand BoS members necessary modifications have been incorporated.

Convenor

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B. Tech – III Semester (Theory - 6, Lab - 3)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	1823301	Biology for Engineers	BSC	2	0	0	30	70	2
2	1814302	Electronics Devices & Circuits	PCC	3	0	0	30	70	3
3	1802303	Electrical Circuit Analysis	PCC	3	1	0	30	70	4
4	1802304	Electromagnetic Fields	PCC	3	0	0	30	70	3
5	1802305	Electrical Machines - I	PCC	3	1	0	30	70	4
6	1802306	Power Systems - I	PCC	3	0	0	30	70	3
7	1802307	Electrical Circuit Analysis Lab	PCC	0	0	2	50	50	1
8	1814308	Electronics Devices & Circuits Lab	PCC	0	0	2	50	50	1
9	1824309	Soft Skills Lab	HSMC	0	0	2	50	50	1
Total				17	02	06	330	570	22

B. Tech – IV Semester (Theory - 6, Lab - 3)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	1821401	Mathematics - III	BSC	3	0	0	30	70	3
2	1814402	Digital System Design	PCC	3	0	0	30	70	3
3	1802403	Electrical Measurements	PCC	3	0	0	30	70	3
4	1802404	Control Systems	PCC	3	0	0	30	70	3
5	1802405	Electrical Machines - II	PCC	3	0	0	30	70	3
6	1802406	Power Systems - II	PCC	3	0	0	30	70	3
7	1802407	Electrical Measurements Lab	PCC	0	0	2	50	50	1
8	1802408	Electrical Machines - I Lab	PCC	0	0	2	50	50	1
9	1805409	Python Programming Lab	ESC	0	0	4	50	50	2
10	18994M1	Environmental Science	MC	2	0	0	30	00	0
Total				20	00	08	360	570	22

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B. Tech – V Semester (Theory - 5, Lab - 3)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	1804501	Microprocessors & Microcontrollers	PCC	3	0	0	30	70	3
2	1814502	Linear Digital IC Applications	PCC	3	0	0	30	70	3
3	1802503	Power Electronics	PCC	3	0	0	30	70	3
4	1802504	Power System Operation & Control	PCC	3	0	0	30	70	3
5		**Professional Elective-I (PE-I)**							
	1802505	Energy Auditing & Demand Side Management	PEC	3	0	0	30	70	3
	1802506	Electrical Machine Design	PEC	3	0	0	30	70	3
	1802507	Advanced Control Systems	PEC	3	0	0	30	70	3
	1802508	Instrumentation	PEC	3	0	0	30	70	3
	1802509	Energy Conversion Systems	PEC	3	0	0	30	70	3
6	1802510	Electrical Machines - II Lab	PCC	0	0	3	50	50	1.5
7	1802511	Control Systems & Simulation Lab	PCC	0	0	3	50	50	1.5
8	1824514	Advanced English Communication Lab	HS MC	0	0	4	50	50	2
10	1802513	Socially Relevant Projects (60 hrs/Semester)	PROJ	-	-	-	100	-	2
Total				15	01	08	400	500	22

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B. Tech – VI Semester (Theory - 5, Lab - 3)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	1824601	Management Science	HSMC	3	0	0	30	70	3
2	1802602	Power Semiconductor Drives	PCC	3	0	0	30	70	3
3	1802603	Switchgear & Protection	PCC	3	0	0	30	70	3
4		**Professional Elective -II (PE -II)**							
	1802604	Power System Deregulation	PEC	3	0	0	30	70	3
	1802605	High Voltage DC Transmission	PEC	3	0	0	30	70	3
	1802606	PLC & its Applications	PEC	3	0	0	30	70	3
	1802607	Signals & Systems	PEC	3	0	0	30	70	3
	1802608	Electric & Hybrid Vehicles	PEC	3	0	0	30	70	3
5	--	**Open Elective - I (OE-I)**	OEC	3	0	0	30	70	3
6	1802609	Power Electronics & Simulation Lab	PCC	0	0	3	50	50	1.5
7	1802610	Power Systems - I Lab	PCC	0	0	3	50	50	1.5
8	1802611	Internet of Things Lab	PCC	0	0	4	50	50	2
9	1802612	Internship	PROJ	0	0	0	100	00	2
10	18996M2	Constitution of India	MC	2	0	0	30	--	--
Total				17	00	10	430	500	22

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B. Tech – VII Semester (Theory - 5, Lab - 3, Project - I Stage)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	1825701	Project Management	HSMC	3	0	0	30	70	3
2	1802702	Utilization of Electrical Power	PCC	3	0	0	30	70	3
3		**Professional Elective -III (PE - III)**							
	1802703	Flexible AC Transmission System	PEC	3	0	0	30	70	3
	1802704	Power Quality	PEC	3	0	0	30	70	3
	1802705	Digital Control Systems	PEC	3	0	0	30	70	3
	1802706	Digital Signal Processing	PEC	3	0	0	30	70	3
	1802707	Smart Grid	PEC	3	0	0	30	70	3
4	--	**Open Elective - II (OE-II)**	PEC	3	0	0	30	70	3
5	--	**Open Elective - III (OE-III)**	PEC	3	0	0	30	70	3
6	1802708	Labview Programming	ESC	0	0	3	50	50	1.5
7	1802709	Power Systems -II Lab	PCC	0	0	3	50	50	1.5
8	1824710	Effective Technical Communication Skills Lab	HSMC	0	0	2	50	50	1
8	1802711	Project Stage - I	PROJ	0	0	6	100	00	3
9	18997M3	Universal Human Values	MC	2	0	0	30	00	0
			Total	19	00	14	380	450	22

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B. Tech – VIII Semester (Theory - 2, Project - II Stage)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1		**Professional Elective - IV (PE-IV)**							
	1802801	Electrical Distribution Systems	PEC	3	0	0	30	70	3
	1802802	Power System Reliability	PEC	3	0	0	30	70	3
	1802803	Industrial Automation & Control	PEC	3	0	0	30	70	3
	1802804	SCADA & its Application	PEC	3	0	0	30	70	3
	1802805	Distributed Generation & Micro Grid	PEC	3	0	0	30	70	3
2	--	**Open Elective -IV (OE-IV)**	OEC	3	0	0	30	70	3
3	1802806	Technical Seminar	PROJ	2	0	0	100	00	1
4	1802807	Project Stage - II	PROJ	0	0	10	50	50	5
			Total	08	0	10	210	190	12

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B. Tech., III Semester

Course Title	Biology for Engineers				B. Tech. EEE III Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1823301	Basic Sciences (BSC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	--	--	2	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration : 3Hrs		

Course Objectives:

- Introduction to Basics of Biology which includes cell, the unit of life, Different types of cells and classification of living organisms.
- Understanding what are biomolecules present in a cell, their structure function and their role in a living organism. Application of certain bio molecules in Industry.
- Brief introduction to human physiology, which is essential for bioengineering field.
- Understanding the hereditary units, that is genes and genetic materials (DNA and RNA) present in living organisms and how they replicate and pass and preserve vital information in living organisms.
- How biology can be applied in our daily life using different technology, for the production of medicines to transgenic plants and animals to designing new biotechnological products.

On successful completion of this course, the students will be able to,

CO 1	**Define** the cells, its structure and function, and Different types of cells and basis for Classification of living organisms.
CO 2	**Explain** about biomolecules its structure and function and their role in a living organism How biomolecules are useful in Industry & explain about human physiology.
CO 3	**Demonstrate** the concept of biology and its uses in combination with different technologies for production of medicines and production of transgenic plants and animals.
CO 4	**Illustrate** about genes and genetic materials (DNA & RNA) present in living organisms and how they replicate, transfer & preserve vital information in living organisms.
CO 5	**Understand the** importance of transgenic plants and animals in synthesis of proteins.

UNIT I

Introduction to Basic Biology: Cell: What is a Cell, Cell theory, Cell shapes, structure of a Cell, Cell cycle chromosomes? The Plant Cell and animal Cell, protoplasm, prokaryotic and eukaryotic Cell, Plant Tissue and Animal Tissue. Brief introduction to five kingdom of classification.

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UNIT II

Introduction to Bio-molecules: Carbohydrates, proteins, Amino acid, nucleic acid (DNA and RNA) and their types.

Enzymes and their application in Industry. Large scale production of enzymes by Fermentation.

UNIT III

Human Physiology: Nutrition (Classes of nutrients or food substances), Digestive systems Respiratory system (two kinds of respiration – aerobic and anaerobic) Respiratory organs, respiratory cycle. Excretory system.

UNIT IV

Genes, Replication of DNA & Introduction to recombinant DNA Technology: Prokaryotic gene and Eukaryotic gene structure, gene replication, Transcription and Translation in Prokaryote and Eukaryote and synthesis of protein in Eukaryotes. Recombinant DNA technology and cloning introduction.

UNIT V

Application of Biology: Brief Introduction to Production of vaccines, Enzymes, antibodies, Cloning in microbes, plants and animals, Basics of biosensors, biochips, Bio fuels, and Biosensors. What is Tissue engineering? and its application, transgenic plants and animals, Bio engineering (production of artificial limbs, joints and other parts of the body).

Text Books:

1. Cell and Molecular Biology-P.K. Gupta.
2. Cell Biology-Verma and Agarwal.
3. Cell Biology-Rastogi.
4. N.A. Campbell, J.B. Reece, L. Urry, M.L. Cain and S.A. Wasserman, "Biology: A global approach", Pearson Education Ltd., 2018.
5. T. Johnson, Biology for Engineers, CRC press, 2011 Molecular Biology and Biotechnology 2nd ed. J.M. Walker and E.B. Gingold. Panima Publications. PP 434.

References:

1. Alberts Et. Al. The molecular biology of the cell, 6/E, Garland Science, 2014.
2. De Robertis EDP & EMF De Robertis. 2001. Cell and Molecular biology. Lippincott Williams & Wilkins. Bombay.
3. E.E. Conn, P.K. Stumpf, G. Bruening and R.H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
4. John Enderle and Joseph Bronzino Introduction to Biomedical Engineering, 3/e, 2012 Principles of Biochemistry. 2nd edition, 1993. A.L. Lehninger, D.L. Nelson. M. Cox. Paniama Publications. PP. 1090.
5. Harper's biochemistry. 1988. R.K. Murray. D.K. Granner, P.A. Mayes. Printice Hall International.
6. Introductory Microbiology. 1995, by Trevor Gross.
7. Molecular Biology by G. Padmanabhan, K. Sivaram Sastry, C. Subramanyam, 1995, Mac Millan.
8. Biochemistry of Nucleic Acids. 1992, 11th edition, R.L.P. Adams, J.T. Knowler. D.P. Leader,Chapman and Hall.
9. Genetic Engineering –Sandhya Mitra.
10. Molecular Biology and Biotechnology by Meyers, RA, A comprehensive Desk reference (VCH Publishers).

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B. Tech., III Semester

Course Title	Electronic Devices & Circuits					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1814302	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn the working of various diodes and its circuits, transistors and its applications, multi vibrators and the fundamentals of logic families.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand the principles of semiconductor devices.
CO 2	Apply semiconductor devices in the design of electronic circuits.
CO 3	Analyze electronic circuits using diodes and transistors.
CO 4	Illustrate frequency response of amplifiers.

UNIT I

Diode and its Characteristics: PN Junction diode, Symbol, V-I characteristics, Diode Applications, Rectifiers-Half Wave, Full Wave and Bridge Rectifiers (Simple Problems), Zener Diode- Volt-Ampere Characteristics, Zener Diode as Voltage Regulator, Light Emitting Diode, SCR characteristics and its applications.

UNIT II

Bipolar Junction Transistor (BJT): Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT-CB, CE and CC Configurations, Relation between IC, IB and IE. Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications-Transistor as an Amplifier, Transistor as a Switch, Single Stage CE Amplifier, Frequency Response of CE Amplifier.

UNIT III

Junction Field Effect Transistor: Theory and Operation of JFET, Output Characteristics, Transfer Characteristics, Configurations of JFET- CD, CS and CG Configurations, JFET Applications- JFET as an Amplifier, JFET as a Switch, Comparison of BJT and JFET, MOSFET-The Enhancement and Depletion MOSFET, Static Characteristics of MOSFET, Applications of MOSFET.

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UNIT IV

Oscillators: Concepts of Feedback Amplifier, Necessary conditions for Oscillators, RC phase shift Oscillator, Colpits Oscillator, Hartley Oscillator, and Crystal Oscillator.

Power amplifiers: Classification of power amplifiers, efficiency of class-A, class-B, class-C and class-D power amplifiers, complementary symmetry push pull power amplifier.

UNIT V

Digital Logic Circuits: AND, OR & NOT Gates using Diodes and transistors, Analysis of DCTL, RTL, DTL, TTL, ECL, IIL, MOS, CMOS Logic families and Comparison between the logic families.

Text Books:

1. Jacob Millman, Christos C. Halkias, "Integrated electronics" Tata McGraw-Hill Publication.
2. A. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.
3. David A. Bell, "Solid State Pulse Circuits", PHI, 4th edition, 2002.
4. Jimmie J. Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3rd edition, McGraw-Hill (India), 2010.

References:

1. Electronic Devices and Circuits-K. Lal Kishore, 2nd Edition, 2005, BSP.
2. J.Millman, H. Taub and Mothiki S. Prakash Rao, " Pulse, Digital and Switching Waveforms", TMH, 2nd Edition, 2008.
3. J. Millman and A. Grabel, Microelectronics, 2nd edition, McGraw-Hill, 1988.
4. Charles A. Schuler " Electronics –Principles and Applications", McGraw-Hill, 8th Edition.

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B. Tech., III Semester

Course Title	Electrical Circuit Analysis					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802303	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	1	--	4	30	70	100
Mid Exam Duration: 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn network theorems, application of resonance, transients applied for ac and dc circuits, necessary conditions for network functions, various parameters and its relationships, balanced & unbalanced systems applied for three phase circuits.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand the basic concepts of three phase circuits, resonance, network functions and locus diagrams.
CO 2	Solve DC & AC circuits by using various theorems.
CO 3	Analyse R-L,R-C and R-L-C circuits for DC and AC transient response.
CO 4	Evaluate the voltage, Current and Power for balanced and unbalanced circuits.
CO 5	Analyse two port circuit behaviour for various parameters.

UNIT I

Network Theorems: Reciprocity, compensation & millman's theorem for dc and sinusoidal excitations, superposition theorem, thevenin's & norton's theorems, maximum power transfertheorems to ac excitation, simple problems.

UNIT II

Resonance: Series, parallel circuits, concept of half power frequencies, bandwidth and q factor. simple problems.

Locus diagrams: Impedance and admittance locus diagrams of series and parallel combinations R-L, R-C, R-L-C with variation of various parameters.

UNIT III

Network Functions: Single port and multiport networks, immittance functions of two port parameters, necessary conditions for driving point and transfer functions, poles and zeros, time domain response from pole zero plots, restrictions from pole zero locations.

Two Port Networks: Two port networks, impedance, admittance, transmission parameters, hybrid and inverse hybrid parameters, relationships between parameters, conditions for symmetry and reciprocity.

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UNIT IV

DC Transient Analysis: Determination of initial conditions – transient response of R-L, R-C and R-L-C circuits for DC–solution method using differential equation and laplace transforms.

AC Transient Analysis: Transient response of R-L, R-C and R-L-C series circuits for sinusoidal excitations – solution method using differential equation and laplace transforms.

UNIT V

Three Phase Circuits: Phase sequence, balanced and unbalanced systems – magnitude & phasor relationship between line and phase voltages and currents in balanced Y and Δ circuits. Analysis of unbalanced loads- neutral displacement method, Y-Δ conversion and loop current method.

Measurement of three phase power by two wattmeter method, measurement of three phase reactive power by single wattmeter method.

Text Books:

1. Theory and Problems of Electrical Circuits – Joseph A. Edminister,Schaum Series
2. Circuit Theory - A. Chakrabarty
3. Electrical Engineering Fundamentals V. Del Toro, Prentice HallInternational, 2nd Edition, 2019.
4. Network Analysis – Van Valkenburg - 3rd edition.

References:

1. Circuits & Networks – A. Sudhakar, Shayammohan. S. Pillai, 4th Edition –TMH.
2. Theodore F. Bogart "Electrical Circuits", McGraw-Hill International Edition Series.
3. Network Analysis with applications – Stanely - Pearson education 4th edition.
4. Network Analysis by G.K. Mittal, Khanna Publishers.

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B. Tech., III Semester

Course Title	Electromagnetic Fields				B. Tech. EEE III Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1802304	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn the concepts of electric and magnetic fields under static conditions which will be used in theory of transmission lines and electrical machines.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand electric and magnetic fields due to electric charges and Steady Currents, time varying electric and magnetic fields.
CO 2	Analyze Maxwell's equations for both time variant and invariant electric and magnetic fields.
CO 3	Evaluate electric fields and magnetic fields by various laws such as Coulomb's Law, Gauss's Law, Biot Savart's law, Ampere's circuital law, etc.
CO 4	Determine potential, potential gradient, electric dipole, current and current density, polarization, boundary conditions and capacitance of a capacitor.
CO 5	Determine force, torque, self inductance, statically and dynamically induced EMFs and displacement current.

UNIT I

Electric Field & Gauss Law: Coulomb's law, electric field intensity (efi), efi due to a line charge, surface charge and volume charge, work done in moving a point charge in an electric field, gauss law, gauss law using infinite line charge and coaxial cable, gauss law in point form (Maxwell first law, div($\mathbf{D}$) = ρ_v), numeric problems

Electric Potential & Dipole: Electric potential, potential gradient electric dipole, dipole moment – potential & EFI due to an electric dipole, numerical problems.

UNIT II

Conductors: Current and current density, conduction and convection current densities, continuity equation, behaviour of conductors in electric fields, ohm's law in point form, numeric problems.

Polarization & Capacitance: Polarization, boundary conditions – dielectric -conductor, dielectric - dielectric. capacitance – capacitance of parallel plate, spherical and co-axial capacitors, numeric problems.

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UNIT III

Magneto Static Fields: Biot-savart's law, MFI due to a straight current carrying filament, circular. square and solenoid current carrying wire. maxwell's second equation,

Ampere's Law: Ampere's circuital law and its applications, ampere's circuital law in point form, maxwell third equation , numerical problems.

UNIT IV

Magnetic Force: Lorentz force equation, Force on a current element in a magnetic field, Force on a straight and long current carrying conductors in magnetic fields, the force between two and straight parallel current carrying conductors, Numeric Problems.

Torque & Inductance: Torque on a current loop placed in a magnetic dipole. Self Inductance, Application of self inductance of a Solenoid and Toroid, numerical Problems.

UNIT V

Time varying Fields: Faraday's laws of electromagnetic induction, its integral and point forms, maxwell's fourth equation. statically and dynamically induced emfs, modification of maxwell's equation for time varying fields, displacement current, and maxwell's equation in differential and integral form, numerical problems.

Text Books:

1. Principles of Electromagnetics, Mathew N.O. Sadiku, Oxford (I) student 4th edition.
2. Electromagnetic Fields, Dr. S. Kamakshaiah, Right Publishers, 2007.
3. Engineering Electromagnetics, William H. Hayt and John A.Buck, TMH, 7th edition 2006.
4. Electromagnetic Waves & Radiating Systems, Edward C. Jordanand Keith G. Balmain, Prentice Hall of India Pvt. Ltd.

References:

1. Electromagnetics, J.D. Kraus, TMH, 4th edition 1992.
2. Electromagnetic Fields, TVS Arun Murthy, S. Chand & Company Ltd., 1st edition 2008.
3. Field Theory, K.A. Gangadhar, P.M. Ramanathan, Khanna Publishers, 15th edition, 2003.
4. Electromagnetics, J.P. Tewari, Khanna Publishers.

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B. Tech., III Semester

Course Title	Electrical Machines-I					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802305	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	1	--	4	30	70	100
Mid Exam Duration: 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn principle, operation, construction, characteristics of dc machines, and transformers.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand the principle, operation and constructional details of dc machines and transformers.
CO 2	Analyze the characteristics of dc machines, phasor diagrams and parallel operationof single phase transformers.
CO 3	Compare losses and efficiency by conducting different test on dc machines and transformers.
CO 4	Choose different types of connections to be considered for three phasetransformers.

UNIT I

DC Generators: Construction, principle of operation, emf equation, armature reaction, commutation, numerical problems.

Types of dc generators, open circuit characteristics, load characteristics of shunt, series and compound generators, parallel operation of dc generators, numeric problems.

UNIT II

DC Motors: Principle of operation, back emf, torque equation, characteristics and application of series, shunt and compound motors, numerical problems.

Speed Control: Speed control of dc shunt & series motors, starters (3 & 4point), design of starters, numerical problems.

UNIT III

Testing of DC Machines: Losses & efficiency, condition for maximum efficiency, brake test, swinburne's test, Hopkinson's test, field's test, retardation test, separation of stray losses in a dc motor, numerical problems.

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UNIT IV

1Φ Transformer: Construction, principle of operation, types, emf equation, operation on no load and load, phasor diagrams, equivalent circuit, losses, efficiency & regulation, all day efficiency, numerical problems.

Testing of Transformer: OC & SC tests, sumpner's test, predetermination of efficiency & regulation, separation of losses test, numeric problems.

UNIT V

Parallel Operation & Auto transformer: Parallel operation with equal & unequal voltage ratios, auto transformer, equivalent circuit, comparison with two winding transformer, numeric problems.

3Φ Transformer: Types of connections, Y-Y, Y-Δ, Δ-Y, Δ-Δ, open delta, scott connection, 3-winding transformers, tertiary windings.

Text Books:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Electrical Machines, I.J. Nagarath & D.P. Kothari, TMH, 7th Edition 2005.
3. Electrical Machines, J.B. Gupta, Kataria Publications.
4. Elctrical Mchines-Fundamentals of Electromechnical convertion, JacekF. Gieras,

Reference:

1. Electrical Machinery, A.E. Fitzgerland, C. Kingsley and S. Umlauts, TMH,5th Edition.
2. Performance and Design of DC machines, Clayton and Hancock, BPB Publishers, 2004.
3. DC Machines & Transformers, R.K. Rajput, Laxmi Publications.
4. A text Book of Electric Machinery, Haris J. Ryan, Vol 1.

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B. Tech., III Semester

Course Title	Power Systems-I					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802306	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration: 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn conventional & non conventional energy sources, economic aspects mechanical and electrical design of transmission lines, and underground cables.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand the basic concepts of various generating systems and its load characteristics.
CO 2	Understand the construction and types of cables used for underground.
CO 3	Analyze the mechanical aspects of transmission lines and corona phenomenon.
CO 4	Evaluate inductance and capacitance of transmission lines and grading of underground cables.
CO 5	Determine the cost of electrical energy, tariff charges on consumers.

UNIT I

Thermal, Hydro & Nuclear Power Stations: Line diagram & its explanation for thermal, hydro & nuclear power stations, and principle of operation of nuclear reactor.

UNIT II

Economic Aspects of Power Generation: Load curve, load duration curve, integral load duration curves, load factor, demand factor, diversity factor, capacity factor, utilization factor and plant use factors-numerical problems.

Choice of size and number of generating units cost of electrical energy, problems, types of tariff charges on consumers – numerical problems.

UNIT III

Mechanical Design of Transmission Lines: Insulators, types of insulators, string efficiency, methods of improving string efficiency, numerical problems.

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Sag and tension calculations for equal and unequal heights of towers, effect of wind and ice on weight of conductors, numerical problems.

UNIT IV

Electrical Design of Transmission Lines: Types of conductors, calculation of resistance for solid conductor, concept of GMR & GMD, calculation of inductance and capacitance for 1Φ and 3Φ single and double circuit lines, symmetrical and asymmetrical conductor configuration with and without transportation, effect of earth on capacitance - numerical problems.

UNIT V

Underground Cables: Construction, types of cables, insulation in cables, calculation of insulation resistance and stress in insulation. capacitance of single and 3 core belted cables. grading of cables, capacitance grading, description of intersheath grading, numeric problems.
Corona: Description of corona phenomenon, factors affecting corona, critical disruptive voltage, visual disruptive voltage and power loss, radio interference, numeric problems.

Text Books:

1. Electrical power systems - by C.L. Wadhwa, New Age International (P) Limited, Publishers, 4th Edition, 2005.
2. A Text Book on Power System Engineering by M.L. Soni, P.V. Gupta, U. S. Bhatnagar, A. Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd., 2003.
3. Power Systems, Leonard L. Grigsby, 3rd Edition.
4. Elements of power System Analysis, William D. Stevenson, McGraw-Hill.

References:

1. Principles of power systems by V.K. Mehta, S. Chand publishers.
2. Electric Power Systems by S.A. Nasar, Schaum Outline Series, TMH, 3rd Edition, 2008.
3. Electrical Power system Technology, Dale R. Patrick, Stephen W. Fardo, 3rd Edition.
4. Power System analysis and Design J. Duncan Glover, Thomas J. Overbye, 4th Edition.

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B. Tech., III Semester

Course Title	Electrical Circuits Analysis Lab					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802307	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to determine and verify various network parameters using simulation software.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Verify DC and AC circuits using MATLAB/SIMULINK.
CO 2	Apply theorems for DC and AC circuits using MATLAB/SIMULINK.
CO 3	Analyze transient response behavior in MATLAB/SIMULINK.
CO 4	Determine the two port parameters using MATLAB/SIMULINK.

List of Experiments

1. Verification of Kirchhoff's current and Voltage law using simulation.
2. Verification of superposition and reciprocity theorem using simulation.
3. Verification of compensation theorem using simulation
4. Verification of Millman's theorem using simulation.
5. Determination of average, rms value, form factor, peak factor of sinusoidal wave usingsimulation.
6. Determination of Z and Y parameters.
7. Determination of ABCD and h parameters.
8. Analysis of RLC series and parallel resonance.
9. Determine the transient response of RL and RC series networks.
10. Determine the transient response of RLC series networks.

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B. Tech., III Semester

Course Title	Electronic Devices & Circuits Lab					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1814308	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to verify the characteristics of different diodes, transistors and the performance of amplifier and oscillator.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Verify the characteristics of various electronic devices such as Diodes, BJT and FET.
CO 2	Analyze the frequency response of various Amplifiers.
CO 3	Examine the load characteristics of rectifier circuits.
CO 4	Demonstrate the working of oscillators.

List of Experiments

1. Study of CRO
2. V-I Characteristics of PN Diode
3. V-I Characteristics of Zener diode.
4. Zener diode as voltage regulator.
5. V-I Characteristics of LED
6. HWR with and without Capacitor filter
7. FWR with and without Capacitor filter
8. Bridge Rectifier with and without Capacitor filter
9. I/P & O/P Characteristics of BJT in CB Configuration
10. I/P & O/P Characteristics of FET
11. Frequency Response of CE Amplifier
12. Frequency Response of CC AMPLIFIER
13. RC Phase shift Oscillator
14. Voltage Shunt Feedback Amplifier

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B. Tech., III Semester

Course Title	Soft Skills Lab					B. Tech. EEE III Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1824309	Humanities & Social Sciences (HSMC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to enable learners to develop their communicative competence and to equip them with employability skills to enhance their prospects of placements.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	Describe the attributes of soft skills.
CO 2	Understand the importance of soft skills for effective and harmonious relations.
CO 3	Analyze the reasons for stress and techniques to handle for efficient performance.
CO 4	Illustrate the points in multi tasks and prioritizing them.
CO 5	Classify communication, motivation, teamwork, time management, work ethic, and flexibility.

List of Experiments

1. Self Analysis: SWOT analysis, who am I, importance of self-confidence, self-esteem.
2. Art of Negotiation: To understand what is negotiation, Ways of negotiating and being successful in it, to understand the power of language and non-verbal communication.
3. Motivation: Factors of motivation, self-talk, intrinsic & extrinsic motivators
4. Emotional Intelligence: What is emotional intelligence, emotional quotient, why emotional intelligence matters, emotion scales, managing emotions.
5. Team Building: To know the nature of the team, to understand personal as well as professional goals of the members of the group, to work effectively in a team through building relations and interpersonal communication.
6. Organizing Meetings: How to call the meeting, How to organize a meeting in the smooth manner, How to design the agenda and prepare the minutes of the meeting.

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7. Time Management: Goal setting, to make students understand the importance of time, How to prepare the timeline and allocate time to complete different tasks, How to successfully follow the prepared time-schedule.
8. Stress Management: To learn kinds of stress, to identify the right reason/s of stress, How to handle the pressure and perform efficiently in such situation at a workplace.
9. Multi-Tasking: How to prioritize the work, Importance of Multi-tasking and concerns related to multitasking, to identify what to multi-task.
10. Organizational Skills: To understand the nature of the organization, to understand the structure and communication channels of the organization, Clarity about the roles and responsibilities in an organization, How to be a team member, How to draft reports.

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B. Tech., IV Semester

Course Title	Mathematics - III				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1821401	Basic Sciences (BSC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	--	3	30	70	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs			

Course Objectives: The objective of the course is to familiarize the students Bessel functions, Legendre's equations and the concepts of complex variables to equip the students to solve application problems in their disciplines.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	**Solve** Bessel and Legendre's equations in terms of polynomials.
CO 2	**Define** analytic function, singularities, poles and residues.
CO 3	**Determine** the differentiation of complex functions used in engineering problems and analyze images from z-plane to w-plane.
CO 4	**Discuss** the various special transformations.
CO 5	**Analyze** real definite integrals in definite regions.

UNIT I

Bessel functions: Introduction – Recurrence formulae for $J_n(x)$ – Generating function for $J_n(x)$ – Jacobi series – Orthogonality of Bessel functions – Legendre polynomials – Solution of Legendre's equation – Legendre Polynomials – Rodrigue's formula – Generating function for $P_n(x)$ - Recurrence formulae for $P_n(x)$ – Orthogonality of Legendre polynomials.

UNIT II

Functions of a complex variable: Limit – Continuity -Differentiability – Analytic function – Properties – Cauchy – Riemann equations in cartesian and polar coordinates – Harmonic and Conjugate harmonic functions. Construction of analytic function using Milne's Thomson method.

UNIT III

Conformal Mapping: **Some standard transforms – translation, rotation, magnification, inversion and reflection. Bilinear transformation – invariant points. Special conformal transformations = e^z , z^2, sinz and cosz.**

UNIT IV

Complex integration: Line integral - Evaluation along a path – Cauchy's theorem – Cauchy's integral formula – Generalized integral formula. Singular point – Isolated singular point – Simple pole, Pole of order m – Essential singularity.

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UNIT V

Residues: Evaluation of residues by formula. Cauchy's residue theorem – Evaluation of the real definite integrals of the type (i) Integration around the unit circle (ii) integration around a small semi circle.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers.
2. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications,9th edition.

References:

1. Higher Engineering Mathematics, B.V. Ramana, McGraw-Hill Education (India) Private Limited.
2. Advanced Engineering Mathematics by N. Bali, M. Goyal, Firewall Media 7th edition.
3. Engineering Mathematics, Volume – III, E. Rukmangadachari & E. Keshava Reddy, PearsonPublisher.

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B. Tech., IV Semester

Course Title	Digital System Design					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1814402	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to provide fundamentals of number systems and boolean algebra, the design of combinational and sequential circuits, various memories and PLDs.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	Understand various number systems and binary codes.
CO 2	Apply K-map to simplify Boolean functions.
CO 3	Design combinational logic circuits.
CO 4	Design synchronous sequential logic circuits.
CO 5	Realize Switching functions using Programmable Logic Devices.

UNIT I

Number Systems & Codes: Overview of number systems –complement representation of negative numbers- binary arithmetic, binary codes, code conversion, error detecting & error correcting codes – hamming codes.

UNIT II

Boolean Algebra and Minimization of Switching Functions: Fundamental postulates of boolean algebra - basic theorems and properties –canonical and standard forms- minimal SOP and POS forms, algebraic simplification, digital logic gates –universal gates-multilevel NAND/NOR realizations. the K- map method, tabulation method.

UNIT III

Combinational Logic Design: Design using conventional logic gates, half and full adders, sub tractors, serial and parallel adders, encoder, decoder, multiplexer, de- multiplexer, realization of switching functions using multiplexer, parity bit generator, code-converters, hazards and hazard free realizations.

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UNIT IV

Sequential Logic Design: Synchronous and asynchronous sequential circuits, flip-flop-triggering and excitation tables, flip flop conversions, shift registers, design of synchronous and asynchronous counters, ring and Johnson counters. Finite state machines (mealy model, Moore model) and their representation, designing synchronous sequential circuits like serial binary adder, sequence detector.

UNIT V

Semiconductor Memories & Programmable Logic Devices: ROM- Internal structure, Static RAM and Dynamic RAM. Basic PLD"s-ROM, PROM, PLA, and PAL, Realization of Switching functions using basic PLD"s. Concept of PLD"s like CPLDs and FPGAs.

Text Books:

1. ZVI Kohavi, Switching & Finite Automata theory –, TMH, 2nd Edition.
2. Morris Mano,"Digital Design", PHI, 3rd Edition, 2006.
3. A. Anand Kumar, "Switching Theory & Logic Design", 2008, PHI.
4. John M. Yarbrough, "Digital Logic Applications and Design", Thomson Publications, 2006.

Reference:

1. R.P. Jain, "Modern digital Electronics", Tata McGraw-Hill, 4th edition, 2009.
2. W.H. Gothmann, "Digital Electronics- An introduction to theory and practice", PHI, 2nd edition, 2006.
3. D.V. Hall, "Digital Circuits and Systems", Tata McGraw-Hill, 1989.
4. William I. Fletcher, "An Engineering Approach to Digital Design", PHI.
5. Charles H. Roth, "Fundamentals of Logic Design", Thomson Publications, 5th Edition, 2004.

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B. Tech., IV Semester

Course Title	Electrical Measurements					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802403	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn about the measuring instruments, ac and dc bridges, instrument transformer, potentiometer and CRO.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Classify the types of instruments and bridges.
CO 2	Choose a suitable instrument to measure Voltage, Current, Power, Energy and lissajous patterns.
CO 3	Determine circuit parameters using Bridges.
CO 4	Measure Phase angle errors from CT's and PT's, magnitude and frequency from the CRO.

UNIT I

Measuring Instruments: Classification, deflecting, control and damping torques, ammeters and voltmeters, PMMC, moving iron, dynamometer type instruments, expression for the deflecting torque and control torque, errors and compensations, extension of range using shunt and multipliers, numeric problems.

UNIT II

Measurement of Power: Single phase dynamometer wattmeter, expression for deflecting and control torques, types of p.f. meters – dynamometer and moving iron type, 1Φ& 3Φ meters

Measurement of Energy: Single phase induction type energy meter, driving and braking torques, errors and compensations. Three phase energy meter.

UNIT III

D.C. Bridges: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's Bridge – Kelvin's Double Bridge for measuring low resistance, measurement of high resistance – loss of charge method.

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A.C. Bridges: Measurement of inductance - Maxwell's Bridge, Anderson's Bridge, measurement of capacitance and loss angle, Desauty's Bridge, Schering Bridge- frequency measurement- Wien's Bridge.

UNIT IV

Instrument Transformers: CT and PT – ratio and phase angle errors–design considerations.
Potentiometers: Principle and operation of d.c. crompton's potentiometer, standardization, measurement of unknown resistance, current and voltage. a.c. potentiometers: polar and coordinate types, standardization – applications.

UNIT V

Electronic Measurements: Cathode ray oscilloscope – cathode ray tube – time base generator – horizontal and vertical amplifiers – application of cro – measurement of phase, frequency, current & voltage – lissajous pattern.
Digital meters: Digital voltmeter – successive approximation, ramp and integrating type.

Text Books:

1. Electrical measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications.
2. Electrical & Electronic Measurement & Instruments by A.K. Sawhney, Dhanpat Rai & Co. Publications.
3. Electronic Instrumentation and measurement techniques by William D. Cooper- PrenticeHall Publishers.
4. Electrical Measurements-Martin U. Reisland, New Age International Publishers.

References:

1. Electrical Measurements – by Buckungham and Price, Prentice – Hall.
2. Electrical Measurements: Fundamentals, Concepts, Appliations – by Ressland, M.U., NewAge International (P) Limited, Publish.
3. Electronic Instrumentation by H.S. Kalsi, Tata McGraw-hill, 3rd Edition.
4. Principles of Electrical Measurements, Authur Whitemore Smith, classic reprint series.

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B. Tech., IV Semester

Course Title	Control Systems				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1802404	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn mathematical modeling of physical systems, electrical systems, time response of first order and second order Systems, stability analysis using time domain and frequency domain and design compensator in frequency domain to improve the performance.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	Understand modelling of physical systems, time and frequency domain specifications and stability of the system.
CO 2	Analyze the stability of the system in time and frequency domains.
CO 3	Evaluate the transfer function using block diagram reduction technique and signal flow graph, steady state error and static error constants.
CO 4	Design lag, lead, lag-lead compensators in frequency domain.

UNIT I

Control System Concepts: Introduction to control systems, classification, transfer function, effect of feedback, mathematical modeling of physical systems, block diagram, reduction techniques, signal flow graphs and mason's gain formula, transfer function of simple electrical systems.

UNIT II

Time Domain Analysis: Standard test signals, time response of first and second order systems- time response specifications, steady state error and error constants, response of P, PI, and PID controllers.

UNIT III

Concept of Stability and Root Locus: The concept of stability, necessary conditions for stability – Routh Hurwitz's criterion – limitations of Routh's stability – Root locus concept – construction of Root loci, effect of poles & zeros on stability.

UNIT IV

Frequency Domain Analysis: Introduction, correlation between time and frequency response, frequency domain specifications, bode plots, Nyquist stability criterion - gain and phase margin.

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UNIT V

Compensation Techniques: System design and compensation – realization of basic lead, lag and lead – lag cascade compensations in frequency domain.

Text Books:

1. "Control Systems Engineering" by I.J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 5th edition, 2007.
2. "Automatic Control Systems" by B.C. Kuo and Farid Goinaraghi – John Wiley and Son's, 8th edition, 2003.
3. Control Systems" by A. Anand Kumar, Prentice Hall of India Pvt. Ltd.
4. "Control System Engineering", Norman S. Nise, 7th Edition.

References:

1. "Modern Control Engineering" by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. "Control Systems Engineering" by NISE, 5th edition, John Wiley.
3. "Modern Control Systems" by C. Dorf, Robert H. Bishop, 12th edition, Pearson New International Edition.
4. "Advanced Control Engineering", Roland S. Burns.

B. Tech., IV Semester

Course Title	Electrical Machines – II				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1802405	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn principles, operation, construction, characteristics and starting methods of induction motor and synchronous machines.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand Constructional details, working, characteristics, starting methods of synchronous machines and induction motors.
CO 2	Distinguish torque-speed curves and Speed control methods of induction motors.
CO 3	Analyze the regulation, synchronization, hunting of synchronous machines and power factor improvement.
CO 4	Evaluate the performance of three phase induction machines and synchronous machines by direct and indirect tests.

UNIT I

3-Φ Induction Motors: Production of rotating magnetic field - construction, types (squirrel cage and slip-ring), torque slip characteristics, starting and maximum torque, equivalent circuit. phasor diagram, losses and efficiency, effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, and frequency), circle diagram construction.

UNIT II

Starting methods: Methods of starting and speed control for induction motors.

1-ø Induction Motor: Introduction - double field revolving theory– equivalent circuit – determination of equivalent parameters- problems - starting methods – resistance & capacitance split phase and shaded pole motors.

UNIT III

Synchronous Generators: Constructional details of synchronous machines, armature windings, distribution, pitch and winding factors - emf equation; armature reaction, concept of leakage flux, synchronous reactance, equivalent circuit, phasor diagram, voltage.

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regulation, determination of regulation by synchronous impedance method, MMF and ZPF method.

UNIT IV

Salient Pole Machines: Theory of salient pole machines, phasor diagrams, and determination of X_d and X_q from slip test, expression for power output of salient pole and cylindrical pole synchronous generators, power angle characteristics, Synchronizing power and torque.

Parallel Operation: Conditions for parallel operations, synchronizing and load sharing of synchronous generators

UNIT V

Synchronous Motors: Principle of operation, methods of starting, phasor diagram of synchronous motor, variation of current and power factor with excitation, hunting and use of damper bars, synchronous condenser and power factor correction, excitation and power circles.

Text Books:

1. Electric Machines by I.J. Nagrath and D.P. Kothari, TMH Publishers, 4th Edition 2010.
2. Electrical Machines by P.S. Bimbhra, Khanna Publishers.
3. Electrical Machines by Abhijit Chakrabarti, Sudipta Debnath, Mcgraw Hill Education (INDIA) Private Limited.
4. Electrical Machines Fundamentals, Stephen J. Chapmon, 4th Edition.

References:

1. Theory of Alternating Current Machinery by Langsdorf, TMH Publishers, 2nd Edition
2. Electro mechanics – II & III (Induction Motors, Synchronous and Single Phase Machines)by S. Kamakashiah, Overseas Publishers Private Ltd.
3. Electrical Machines by M.S. Sarma and M.K. Pathak, CENGAGE Learning.
4. The Performance and Design of AC Machines, M.G. Say, ELBS and Pitman & Sons.

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B. Tech., IV Semester

Course Title	Power Systems - II				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1802406	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn transmission line performance, per unit system, fault analysis on transmission and iterative methods.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Understand various transmission lines, the formulation of impedance and admittance bus matrices for a power system network, symmetrical and unsymmetrical faults, importance of power flow studies.
CO 2	Evaluate the performances of transmission lines and Y_{bus} for a given power system network.
CO 3	Analyze per unit quantities and fault calculations for various types of faults.
CO 4	Investigate the load flow studies using different iterative techniques.

UNIT I

Performance of Transmission Lines: Classification of transmission lines – short, medium and long line and their model representation – estimation of regulation and efficiency by nominal T, nominal π and rigorous methods - problems. equivalent T and π, surge impedance loading, Ferranti effect.

UNIT II

System Modeling: Representation of power system components– per unit representations and advantages – single line diagram representation – impedance and reactance diagram – changing the base of per unit quantities.

UNIT III

Symmetrical Fault Studies: Introduction to symmetrical fault analysis – short circuit capacity of a bus – the short circuit currents and the reactance of synchronous machines – internal voltages of loaded machines under transient conditions – expressions for fault MVA in terms of per unit and percentage quantities – need for current limiting reactors and their location.

UNIT IV

Unsymmetrical Fault Studies: Symmetrical components – phase shift of symmetrical components in star-delta transformer banks – power in terms of symmetrical components –

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sequence impedances and sequence networks of synchronous machines, transmission lines, transformers – zero sequence networks of 3 Φ loads and 3 Φ transformer banks – unsymmetrical fault analysis on unloaded generator and on power systems with and without fault impedance.

UNIT V

Load Flow Studies: Need for load flow studies in a power system – formation of bus admittance matrix – classification of types of buses in a power system – formulation of load flow equations – gauss-seidel iterative method for load flow studies – treatment of pv bus – acceleration factors – problems (sample one iteration only), newton - raphson method in rectangular and polar coordinates – formulation of load flow solution with or without pv buses – derivation of jacobian elements, algorithm and flowchart.

Text Books:

1. Elements of power system analysis, William. D. Stevenson, 4th Edition Jr., MGH.
2. Modern Power System Analysis by I.J. Nagarath & D.P. Kothari, TMH, 2nd Edition.
3. A Text Book on Power System Engineering by M.L. Soni, P.V. Gupta, U.S.Bhatnagar, Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd., 2003.
4. Power Systems Engineering, Yoshihide Hase, Wiley Publications.

References:

1. Electrical power systems by C.L. Wadhwa, New Age International publications.
2. A course in Power Systems by J.B. Gupta, S.K. Kataria & Sons, 11th Edition, 2013.
3. Power System analysis and Design, J. Duncan Glover, Thomas J. Overbye, 4th Edition.
4. Electrical Power system Technology, Dale R. Patrick, Stephen W. Fardo, 3rd Edition.

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B. Tech., IV Semester

Course Title	Electrical Measurements Lab					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802407	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to calibrate instruments and measure various circuit parameters.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Compare and calibrate various measuring Instruments.
CO 2	Identify balanced conditions among bridges.
CO 3	Measure the percentage errors among measuring instruments.

List of Experiments (Any Eight Experiments)

1. Calibration and testing of single phase energy meter.
2. Calibration of dynamometer power factor meter.
3. Crompton d.c. potentiometer – calibration of pmmc ammeter and pmmc voltmeter.
4. Kelvin's double bridge – measurement of resistance – determination of tolerance.
5. Measurement of % ratio error and phase angle of given C. T. by comparison.
6. Schering bridge & Anderson bridge.
7. Measurement of 3 phase reactive power with single phase wattmeter.
8. Measurement of parameters of a choke using 3 voltmeter and 3 ammeter methods.
9. Calibration lpf wattmeter – by phantom testing.
10. Measurement of 3 phase power with two wattmeter method (balanced & unbalanced).
11. Dielectric oil testing using H. T. testing kit.
12. AC potentiometer – calibration of ac voltmeter, parameters of choke.

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B. Tech., IV Semester

Course Title	Electrical Machines – I Lab					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802408	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn and illustrate the performance of DC machines and transformers.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	Analyze performance characteristics of DC machines and transformers.
CO 2	Evaluate regulation and efficiency of transformers.
CO 3	Distinguish various tests between DC motor and DC generator.

List of Experiments (Any Eight)

1. OCC Characteristics of DC shunt Generator.
2. Brake test on DC shunt motor.
3. Swinburne's test and Speed control of DC shunt motor.
4. Fields test on DC series machines.
5. Hopkinson's test on DC shunt machines.
6. Load test on DC shunt generator.
7. OC and SC Test on single phase transformer
8. Brake test on DC compound motor.
9. Load test on DC compound Generator.
10. Load test on DC series generator.
11. Sumpner's test on single phase transformer.
12. Scott connection of three phase transformer.
13. Load test on single phase transformer.
14. Separation of losses on single phase transformer.

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B. Tech., IV Semester

Course Title	Python Programming Lab					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1805409	Engineering Sciences (ESC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	4	2	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn syntax and semantics, create functions in python, Handle Strings and files in Python, understand lists, dictionaries and regular expressions in Python.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	Examine python syntax and semantics and be fluent in the use of python flow control and functions.
CO 2	Demonstrate proficiency in handling Strings and file Systems.
CO 3	Create, run and manipulate Python programs using core data structures like lists, dictionaries and use regular Expressions.

List of Experiments (Any Eight)

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers.
5. Linear search and Binary search.
6. Selection sort, Insertion sort.
7. Merge sort.
8. First 'n' prime numbers.
9. Multiply matrices.
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file.
12. Simulate elliptical orbits in Pygame.
13. Simulate bouncing ball using Pygame.

Software Required: Python 3 interpreter for Windows/Linux.

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B. Tech., IV Semester

Course Title	Environmental Science				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
18994M1	Mandatory Course (MC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	--	--	0	30	00	30
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to get awareness on the importance of the environment in our life, protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save the earth from the inventions by the engineers.

Course Outcomes: On successful completion of this course, the students will be ableto,

CO 1	**Influence** the society in proper utilization of Natural resources
CO 2	**Understand** the interconnection of human dependence on this ecosystem.
CO 3	**Recall** the concepts of biodiversity & gain knowledge on distribution at different levels.
CO 4	**Analyze** the impact of environmental pollution on environment & solving environmental problems
CO 5	Discuss environmental laws & analyze the environmental concerns and follow sustainable developmental activities.

UNIT I

Introduction to Environmental Studies- Natural Resources:

Multidisciplinary nature of environmental studies. Scope and Importance.
Natural resources and associated problems – Renewable and non renewable Resources

1. Forest resources –Deforestation: Causes and impacts due to mining, dams – benefits and problems
2. Water resources – Use and over utilization of surface and groundwater – Floods, drought, and conflicts over water
3. Energy resources –Renewable and Non Renewable energy resources, use of alternate energy resource
4. Land resources -Soil erosion and desertification, Land degradation. Role of an individual in conservation of natural resources.

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UNIT II

Ecosystems: Ecosystem- Definition – Structure and function of an ecosystem – Energy flowin the ecosystem –Food chains, food webs, Ecological succession.
Introduction, types, characteristic features of the following ecosystem:

(a)Forest ecosystem,(b)Grassland ecosystem,(c)Desert ecosystem,(d)Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT III

Biodiversity and its Conservation: Levels of Biodiversity: genetic, species and ecosystem diversity – Bio-geographical classification of India – Hotspots .Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – India as a mega-diversity nation – Endangered and endemic species. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT IV

Environmental Pollution: Definition, Cause, effects and control measures of (a) Air Pollution, (b) Water pollution (c) Soil pollution (d) Noise pollution. Nuclear hazards –Risks to human health. Solid waste management: Control measures of urban and industrial wastes. Pollution case studies. Global Warming, Ozone layer depletion, acid rains and impacts on human communities and the environment. Disaster management: floods, earthquakes, cyclones.

UNIT V

Environmental policies: Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act .International agreements: Montreal and Kyoto protocols and conservation on Biological Diversity (CBD).

Human communities and Environment: Human population and growth: impacts on environment, human health and welfares. Environmental movements: Chipko, silent valley.
Environmental Ethics: The Role of Individuals in Environmental conservation. Public awareness.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
2. Environmental studies by Benny Joseph, McGraw-Hill Publications.
3. Principles and a basic course of Environmental science for undergraduate courseby Kousic, Kou Shic.
4. Textbook of Environmental Science and Technology by M. Anji Reddy, BS Publication.

References:

1. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice Hall of India Private limited.
2. Environmental Studies by Anindita Basak – Pearson education.
3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

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