K.S.R.M. College of Engineering, Kadapa.

(AUTONOMOUS)

Department of Electrical and Electronics Engineering

III Semester (R20 UG)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2002301	Switching Theory & Logic Design	PCC	3	0	0	40	60	3
2	2002302	Electromagnetic Field Theory	PCC	3	0	0	40	60	3
3	2002303	Electrical Circuit Analysis - II	PCC	3	0	0	40	60	3
4	2002304	Electrical Measurements & Measuring Instruments	PCC	3	0	0	40	60	3
5	2002305	DC Machines & Transformers	PCC	3	0	0	40	60	3
6	2002306	Electrical Circuit Analysis - II Lab	PCC	0	0	3	40	60	1.5
7	2002307	Electrical Measurements & Measuring Instruments Lab	PCC	0	0	3	40	60	1.5
8	2002308	DC Machines & Transformers Lab	PCC	0	0	3	40	60	1.5
9	2002309	Skill Oriented Course	SC	1	0	2	40	60	2.0
10	2024310	Universal Human Values	MC	3	0	0	40	60	3
Total				18	00	11	400	540	24`.5

IV Semester (R20 UG)

S. No.	Subject Code	SUBJECT	SC	L	T	P	IM	EM	CR
1	2021401	Special Functions & Complex Analysis	BSC	3	0	0	40	60	3
2	2025402	Fundamentals of Management for Engineers	HSMC	3	0	0	40	60	3
3	2002403	Induction Motors & Synchronous Machines	PCC	3	0	0	40	60	3
4	2002404	Linear Control Systems	PCC	3	0	0	40	60	3
5	2002405	Power Systems - I	PCC	3	0	0	40	60	3
6	2002406	Induction Motors & Synchronous Machines Lab	PCC	0	0	3	40	60	1.5
7	2002407	Control Systems Lab	PCC	0	0	3	40	60	1.5
8	2005408	Python Programming Lab	ESC	0	0	3	40	60	1.5
9	2002409	Skill Oriented Course	SC	1	0	2	40	60	2.0
Total				16	00	11	360	540	21.5

B. Tech., III Semester

Course Title	Switching Theory & Logic Design				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002301	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit.

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

CO 1	Change numeric information in different forms
CO 2	Change simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions
CO 3	Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
CO 4	Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
CO 5	Understand different types of Programmable Logic Devices

UNIT I

Number Systems and Codes: Introduction to Number systems, Basic Conversion Methods, Arithmetic's of Number systems, Complements of Numbers- 1's complement,2's Complement,9's complement,10's complement, Classification of Binary Codes-BCD Code ,XS-3 Code, Gray Code, Error detection and Correction

UNIT II

Logic Gates and Boolean algebra: Basic Logic Gates, Universal Gates, XOR gate and it's Properties, Boolean Algebra-logic Operations, Laws, Boolean Expression in SOP and POS Form, Minimization of Switching Functions using K-Maps-2 variable,3 variable,4 variable, Don't Care Combination, tabulation Method.

UNIT III

Combinational Circuits: Introduction, Adders-Half Adder, Full Adder ,Subtractors-Half Subtractor, Full Subtractor, Realization of Adder and Subtractor using Universal gates, Look Ahead carry adder, BCD Adder, Multiplexers, De-multiplexers, Encoders, Decoders.

UNIT IV

Sequential Circuits: Introduction, Flip Flops- Truth Table, Characteristic Table and Excitation Tables, Conversion of Flip-Flops, Shift Registers-SISO, SIPO, PISO, PIPO, Bidirectional and Universal Shift Registers, Counters-Design of Synchronous and Asynchronous Counters, Ring Counter, Johnson's counter.

UNIT-V

Programmable Logic Devices: Introduction to PLC, ROM Organization, Types of ROMs, PAL,PLA, PROM, Comparison of PLD's.

Text Books

1. Morris Mano, "Digital Design", PHI, 3rd Edition, 2006.
2. A. Anand Kumar, "Switching Theory & Logic Design", 2008, PHI.

Reference Books

1. R.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2009..
2. D.V. Hall, "Digital Circuits and Systems", Tata McGraw Hill, 1989.

Course Title	Electromagnetic Field Theory				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002302	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	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, behavior 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.

UNIT - III

Magneto Static Fields: Biot-savart's law, MFI due to a straight current carrying filament, circular 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. Scalar and Vector magnetic Potential

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. Engineering Electromagnetics, William H. Hayt and John A. Buck, TMH, 7th edition 2006.

Reference Books:

1. Electromagnetic Fields, TVS Arun Murthy, S. Chand & Company Ltd., 1st edition 2008
2. Field Theory, K. A. Gangadhar, P. M. Ramanathan, Khanna Publishers, 15th edition, 2003.

Course Title	Electrical Circuit Analysis - II				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002303	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn the concept of locus diagrams, the application of resonance, transients applied for ac and dc circuits, necessary conditions for network functions, various parameters and its relationships.

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

CO 1	Understand the basic concepts of resonance, network functions and locus diagrams.
CO 2	Analyze R-L,R-C and R-L-C circuits for DC and AC transient response.
CO 3	Analyze two port network behavior for various parameters.
CO 4	Evaluate the time domain response for various DC and AC networks

UNIT - I

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 - II

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.

UNIT - III

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

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.

UNIT - V

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.

Text Books:

1. Networks and Systems – D. Roy Chowdari – New Age International
2. Network Analysis – Van Valkenburg - 3rd edition.

Reference Books:

1. Circuits & Networks – A. Sudhakar, Shayammohan. S. Pillai, 4th Edition – TMH.
2. Electrical Circuits - N. Sreenivasulu.

Course Title	Electrical Measurements & Measuring Instruments				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002304	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	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

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

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.

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 DC 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 – 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.

Reference Books

1. Electrical Measurements: Fundamentals, Concepts, Applications – by Ressland, M.U, New Age International (P) Limited, Publish.
2. Electronic Instrumentation by H. S. Kalsi, Tata Mcgraw Hill Mc, 3rd Edition.

Course Title	DC Machines & Transformers				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002305	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	40	60	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 & parallel operation of dc machines, Speed control and starting of DC motors, phasor diagrams and parallel operation of single phase transformers
CO 3	Compare losses and efficiency by conducting different test on dc machines and transformers
CO 4	Illustrate the Auto transformers, Scott connection and connections types of 3-phase transformers.

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) 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, separation of stray losses in a dc motor, numerical problems.

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.

Text Books

1. Electrical Machines, P. S. Bimbra, Khanna Publishers
2. Electrical Machines, J.B. Gupta, Kataria Publications

Reference Books

1. Electrical Machines, I.J. Nagarath & D.P. Kothari, TMH, 7th Edition 2005
2. Electrical Machinery, A. E. Fitzgerland, C. Kingsley and S. Umlauts, TMH,5th Edition

Course Title	UNIVERSAL HUMAN VALUES					E.E.E. (III Sem)		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
2024310	**MC**	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exams**	**Total**
		3			03	40	60	100
Mid Exam Duration: 2Hrs								

Course Objectives:

- To understand the moral values that ought to guide the Management profession and resolve the moral issues in the profession,
- To justify the moral judgment concerning the profession.
- To develop a set of beliefs, attitudes, and habits that engineers should display concerning morality.
- To create an awareness on Management Ethics and Human Values.
- To inspire Moral and Social Values and Loyalty.
- To appreciate the rights of others.

This course deals with professional ethics which includes moral issues and virtues, social responsibilities of an ngineer, right qualities of moral leadership

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

CO 1	develop appropriate technologies and management patterns to create harmony in professional and personal life.
CO 2	ensure students sustained happiness through identifying the essentials of human values and skills.
CO 3	get awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)
CO 4	bring to bear ethical analysis and reasoning in the light of normative ethics frameworks on a selection of ethical challenges and dilemmas across the chosen range of professions
CO 5	relate ethical concepts and materials to ethical problems in specific professions and professionalism

UNIT I : HUMAN VALUES

Morals, Values and Ethics - Integrity - Trustworthiness - Work Ethics - Service Learning - Civic Virtue - Respect for others - Living Peacefully - Caring - Sharing - Courage - Value Time - Co-operation - Commitment - Empathy - Self-confidence - Spirituality - Character.

UNIT - II : ENGINEERING ETHICS

Senses of Engineering Ethics – Variety of Moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues.

UNIT – III : ENGINEER'S RESPONSIBILITY FOR SAFETY

Safety and Risk – Assessment of Safety and Risk – Risk benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk – Chernobyl Case and Bhopal Case studies.

UNIT- IV: VALUE EDUCATION

Self- exploration- its content and process- natural acceptance- Happiness and Prosperity- Understanding Human relations.

UNIT - V: HOLISTIC PERCEPTION OF HARMONY

Understanding the Harmony in the society- -Universal order- critical appreciation of Human values- Justice, Trust.

TEXT BOOKS :

1. Mike martin and Roland Schinzinger." Ethics in Engineering '', McGrow Hill, New York 2005
2. Charles E Harris. Michael S Pritchard and Michael J Rabins." Engineering Ethics – Concepts and Cases ", Thompson Learning 2000.
3. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93- 87034-47-1

REFERENCE BOOKS:

1. Charles D Fleddermann, " Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. John R Baatright. "Ethics and the Conduct of Business", Pearson Education 2003.
3. Edmund G Seeabauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University press 2001
4.JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amar kantak, 1999.
5. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004

<table>
<tr><td>Course Title</td><td colspan="5">Electrical Circuits Analysis - II Lab</td><td colspan="3">B. Tech. III Semester (EEE)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2002306</td><td rowspan="2">Professional Core (PCC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>--</td><td>--</td><td>3</td><td>1.5</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives: The objective of the course is to determine and verify various network parameters using simulation software.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Verify DC and AC circuits using MATLAB/SIMULINK</td></tr>
<tr><td>CO 2</td><td colspan="8">Apply theorems for DC and AC circuits using MATLAB/SIMULINK</td></tr>
<tr><td>CO 3</td><td colspan="8">Analyze transient response behavior in MATLAB/SIMULINK</td></tr>
<tr><td>CO 4</td><td colspan="8">Determine the two port parameters using MATLAB/SIMULINK</td></tr>
</table>

List of Experiments (Any Eight)

1. Verification of Kirchhoff's current and Voltage law
2. Verification of superposition and reciprocity theorem
3. Verification of compensation theorem
4. Verification of Millman's theorem
5. Determination of average, rms value, form factor, peak factor of sinusoidal wave
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.

Note: All the above experiments are simulated using MATLAB/OCTAVE/MULTISIM

Course Title	Electrical Measurements & Measuring Instruments Lab				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2002307	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	3	1.5	40	60	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 Three Phase Power by using Two Wattmeter Method
6. Schering bridge
7. Anderson bridge
8. Measurement of 3 phase reactive power with single phase wattmeter.
9. Measurement of parameters of a choke using 3 voltmeter and 3 ammeter methods.
10. Calibration LPF wattmeter – by phantom testing.
11. Characteristics of Strain Gauge
12. Study and Calibration of LVDT for Displacement Measurement

<table>
<tr><td>Course Title</td><td colspan="5">DC Machines & Transformers Lab</td><td colspan="3">B. Tech. III Semester (EEE)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2002308</td><td rowspan="2">Professional Core (PCC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>--</td><td>--</td><td>3</td><td>1.5</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives: The objective of the course is to learn and illustrate the performance of DC machines and transformers.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Analyze performance characteristics of DC machines and transformers</td></tr>
<tr><td>CO 2</td><td colspan="8">Evaluate regulation and efficiency of transformers</td></tr>
<tr><td>CO 3</td><td colspan="8">Distinguish various tests between DC motor and DC generator</td></tr>
</table>

List of Experiments (Any Eight)

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

<table>
<tr><td>Course Title</td><td colspan="5">Skill Oriented Course
(Fundamentals of MATLAB Programming)</td><td colspan="3">B. Tech. III Semester (EEE)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2002309</td><td rowspan="2">Skill Course (SC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>1</td><td>--</td><td>2</td><td>2</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives: The objective of the course is to learn basic knowledge in MATLAB Programming to solve Electrical Engineering Problems.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Understand the basic features of MATLAB Programming, Array construction methods, operations, Relational & Logical Operators.</td></tr>
<tr><td>CO 2</td><td colspan="8">Illustrate the Polynomial operations</td></tr>
<tr><td>CO 3</td><td colspan="8">Analyze the Control flow structures IF-ELSE, FOR and WHILE</td></tr>
<tr><td>CO 4</td><td colspan="8">Solve electrical engineering problems using MATLAB Programs</td></tr>
</table>

Module-1: 10hrs

Basic features: Introduction –Simple math – MATLAB Workspace – About variables – comments, punctuation and aborting execution – Script M-files.

Arrays and Array Operations: Simple arrays – Array addressing – Array construction –Scalar Array Mathematics - Array Array Mathematics –Array size.

Module-2: 10hrs

Control Flow: Relational & Logical operators – For, While Loops, If-Else-End Construction.

Polynomials: Roots, multiplication, addition, division, derivatives and Integrals

Module-3: 10hrs

Electrical Engineering Applications: Solving simple problems in Electrical Circuits, Electrical Machines, Control Systems and Power Systems.

Text books

1. Mastering MATLAB by Hanselman, Littlefield – Pearson Publications, 1st Edition, 2012.
2. MATLAB Programming by David C. Kuncicky -Prentice Hall, 2004

Course Title	Human Values & Professional Ethics				B. Tech. III Semester (EEE)		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
20MC310	Mandatory Course (MC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	-	--	--	40	--	40
Mid Exam Duration: 2Hrs					End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to understand the moral values that ought to guide the management profession and resolve the moral issues in the profession, justify the moral judgment concerning the profession, develop a set of beliefs, attitudes, and habits that engineers should display concerning morality, create an awareness on Management Ethics and Human Values, inspire Moral and Social Values and Loyalty and appreciate the rights of others.

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

CO 1	develop appropriate technologies and management patterns to create harmony in professional and personal life.
CO 2	ensure students sustained happiness through identifying the essentials of human values and skills.
CO 3	get awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research)
CO 4	bring to bear ethical analysis and reasoning in the light of normative ethics frameworks on a selection of ethical challenges and dilemmas across the chosen range of professions
CO 5	relate ethical concepts and materials to ethical problems in specific professions and professionalism

UNIT I

Human Values: Morals, Values and Ethics - Integrity - Trustworthiness - Work Ethics - Service Learning - Civic Virtue - Respect for others - Living Peacefully - Caring - Sharing - Courage - Value Time - Cooperation - Commitment - Empathy - Self-confidence - Spirituality - Character.

UNIT II

Engineering Ethics: Senses of Engineering Ethics – Variety of Moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Consensus and Controversy – Professions and Professionalism – professional ideals and virtues.

UNIT III

Engineer's Responsibility for Safety: Safety and Risk – Assessment of Safety and Risk – Risk benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk – Chernobyl Case and Bhopal Case studies.

UNIT IV

Value Education: Self- exploration- its content and process- natural acceptance- Happiness and Prosperity- Understanding Human relations.

UNIT V

Holistic Perception of Harmony: Understanding the Harmony in the society- -Universal order- critical appreciation of Human values- Justice, Trust.

Text Books

1. Mike Martin and Roland Schinzinger." Ethics in Engineering ", McGrow Hill, New York 2005.
2. Charles E Harris. Michael S Pritchard and Michael J Rabins." Engineering Ethics – Concepts and Cases ", Thomson Learning 2000.

3. R R Gaur, R Asthana, G P Bagaria, “A Foundation Course in Human Values and Professional Ethics”, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.

Reference Books

1. Charles D Fleddermann, “ Engineering Ethics”, Prentice Hall, New Mexico, 1999.
2. John R Baatright. “Ethics and the Conduct of Business”, Pearson Education 2003.
3. Edmund G Seeabauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University press 2001.

B. Tech., IV Semester

Course Title	Special Functions & Complex Analysis				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
2021401	Basic Sciences (BSC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	--	3	40	60	100
Mid Exam Duration : 2Hrs					End Exam Duration : 3Hrs			

Course Objectives: The objective of this 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 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's equation – Rodrigue's formula, Legendre Polynomials – 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: $w = e^z$, 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.

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, Wiley Publications, 9th edition.

Reference Books:

1. Higher Engineering Mathematics, B.V.Ramana, Mcgraw Hill Education(India) Private Limited.
2. Engineering Mathematics, Volume – III , E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

Course Title	Fundamentals of Management for Engineers				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
2025402	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to understand the functions and responsibilities of managers, provide them tools and techniques to be used in the performance of the managerial job, enable them to analyze and understand the environment of the organization and to develop cognizance of the importance of management principles.

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

CO 1	Know and understand principles, functions, approaches and theories of Management.
CO 2	Use problem solving strategies and critical thinking skills in real life situations.
CO 3	Design organization structures and understand the concept of Human Resource Management in present Competitive Organizations.
CO 4	Recognize and Describe the role of leaders in business and other types of Organizations.
CO 5	Explain the basic control process, monitoring points and describes the different levels and types of controls

UNIT – I

Introduction to Management: Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

UNIT – II

Planning and Decision Making: General Framework for Planning: Planning Process, Types of Plans, Management by Objectives, Development of Business Strategy. Decision making and Problem solving: Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making.

UNIT – III

Organization Structures and HRM: Principles of Organization: Organizational Design & Organizational Structures. Organizational Culture; Organizational Climate and Organizational Change.

Human Resource Management & Business Strategy: Talent Management, Talent Management Models and Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

UNIT – IV

Leading and Motivation: Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories.

UNIT – V

Controlling: Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non- Budgetary Controls. Characteristics of Effective Controls, Establishing control systems, Control frequency, and Methods.

Text Books:

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

Reference Books:

1. Essentials of Management, Koontz Kleihrich, Tata McGraw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012

Course Title	Induction Motors & Synchronous Machines					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2002403	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	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, circle diagram construction.

UNIT - II

Starting methods: Methods of starting 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 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.

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.

Reference Books:

1. Electro mechanics – II & III (Induction Motors, Synchronous and Single Phase Machines) by S. Kamakashiah, Overseas Publishers Private Ltd.
2. The Performance and Design of AC Machines, M. G. Say, ELBS and Pitman & Sons.

Course Title	Linear Control Systems					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2002404	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	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 able to,

CO 1	Understand modeling 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, Polar plots - gain and phase margin.

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. "Control Systems" by A. Anand Kumar, Prentice Hall of India Pvt. Ltd.

Reference Books

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.

Course Title	Power Systems - I					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2002405	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	40	60	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.

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.

Reference Books

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.

Course Title	Induction Motors & Synchronous Machines Lab					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2002406	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	3	1.5	40	60	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to analyze the performance of various AC machines like induction motors and synchronous machines.

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

CO 1	Identify parts of transformers and AC machines
CO 2	Determine the performance of AC machines
CO 3	Choose the apparatus in experimental circuit based on loading and rating of the AC machines

List of experiments (Any Eight)

1. Brake test on Three Phase Induction Motor
2. No-load & Blocked rotor Tests on Three Phase Induction Motor
3. Speed Control of three phase Induction Motor
4. Equivalent Circuit of a Single Phase Induction Motor
5. Determination of X_d and X_q of a Salient Pole Synchronous Machine
6. Load test of a three phase alternator by Resistive, Inductive and Capacitive Loading
7. Regulation of a Three –Phase Alternator by Synchronous Impedance Method
8. Regulation of Three Phase Alternator by Z.P.F. Method.
9. V and Inverted V Curves of a 3 Phase Synchronous Motor.
10. Determination of transient, sub-transient and steady state reactance of an alternator.

<table>
<tr><td>Course Title</td><td colspan="5">Control Systems Lab</td><td colspan="3">B. Tech. EEE IV Sem</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2002407</td><td rowspan="2">Professional Core (PCC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>--</td><td>--</td><td>3</td><td>1.5</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives: The objective of the course is to learn the performance of a second order system, PID controller, synchros and characteristics of servo motor. Stability analysis in time and frequency domain, state space analysis in MATLAB.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Understand the performance of second order system, PID controller, synchros and armature voltage controlled DC motor</td></tr>
<tr><td>CO 2</td><td colspan="8">Analyze the characteristics of magnetic amplifier and servo motor</td></tr>
<tr><td>CO 3</td><td colspan="8">Evaluate stability of linear systems in time and frequency domain using MATLAB</td></tr>
<tr><td>CO 4</td><td colspan="8">Convert transfer function to state space and vice versa using MATLAB</td></tr>
</table>

List of the experiments (Any Ten - 8 from Conventional, 2 from MATLAB)

1. Time response of Second order system
2. Characteristics of Synchros
3. Effect of feedback on DC servo motor
4. Transfer function of DC Machine
5. Effect of P, PI, PID Controller on a second order systems
6. Characteristics of magnetic amplifiers
7. Characteristics of AC servo motor
8. Lag and lead compensator design in the frequency domain using MATLAB.
9. Linear system analysis (Time domain analysis) using MATLAB.
10. Stability analysis (Bode, Root Locus) of Linear Time Invariant system using MATLAB
11. State space model for classical transfer function using MATLAB – Verification.

<table>
<tr><td>Course Title</td><td colspan="5">Python Programming Lab</td><td colspan="3">B. Tech. EEE IV Sem</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2005408</td><td rowspan="2">Engineering Sciences (ESC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>--</td><td>--</td><td>3</td><td>1.5</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Examine python syntax and semantics and be fluent in the use of python flow control and functions</td></tr>
<tr><td>CO 2</td><td colspan="8">Demonstrate proficiency in handling Strings and file Systems</td></tr>
<tr><td>CO 3</td><td colspan="8">Create, run and manipulate Python programs using core data structures like lists, dictionaries and regular Expressions.</td></tr>
</table>

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.

<table>
<tr><td>Course Title</td><td colspan="5">Skill Oriented Course
(2-D Graphics & Symbolic Processing using MATLAB)</td><td colspan="3">B. Tech. IV Semester (EEE)</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">2002409</td><td rowspan="2">Skill Course (SC)</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>1</td><td>--</td><td>2</td><td>2</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="6"></td><td colspan="3">End Exam Duration : 3Hrs</td></tr>
<tr><td colspan="9">Course Objectives: The objective of the course is to learn the knowledge on graphical representation of data using Two Dimensional Graphical features in MATLAB and to gain knowledge to solve problems using symbolic processing techniques.</td></tr>
<tr><td colspan="9">Course Outcomes: On successful completion of this course, the students will be able to,</td></tr>
<tr><td>CO 1</td><td colspan="8">Understand basic features of Two-Dimensional graphics</td></tr>
<tr><td>CO 2</td><td colspan="8">Illustrate subplots, interactive plotting tools and specialized 2-D plots</td></tr>
<tr><td>CO 3</td><td colspan="8">Analyze Interpolation and Curve fitting techniques</td></tr>
<tr><td>CO 4</td><td colspan="8">implement symbolic techniques for problem solving</td></tr>
</table>

Module-1: 10hrs

2-D Graphics: The Plot function - Line styles, Markers and Colors – Plot Grids, Axes Box, Labels – Multiple plots – Multiple Figures – Subplots – Interactive plotting tools.

Module-2: 10hrs

Specialized 2-D plots–area, fill, bar, pie, stairs and stem.Data Interpolation and curve fitting.

Module-3: 10hrs

Symbolic Processing: Symbolic Expressions and Algebra – Manipulating Trigonometric expressions – Evaluating and Plotting Symbolic Expressions – Solving Algebraic and Transcendental equations - Calculus.

Text books:

1. Mastering MATLAB by Hanselman, Littlefield– Pearson Publications, 1st Edition, 2012.
2. MATLAB Programming by David C. Kuncicky -Prentice Hall, 2004.