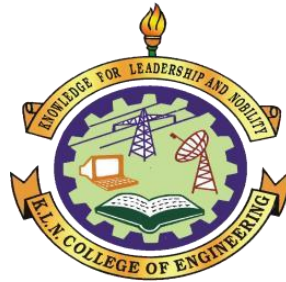


K.L.N. COLLEGE OF ENGINEERING

Pottapalayam- 630612, Sivagangai District

(An Autonomous Institution, Affiliated to Anna University, Chennai)



Estd: 1994

THIRD SEMESTER CURRICULUM AND SYLLABUS REGULATIONS 2024

For Under Graduate Program

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING CHOICE BASED CREDIT SYSTEM

(For the students admitted from the academic year 2024-2025 onwards)



VISION OF THE INSTITUTION

To become a Centre of Excellence in Technical Education and Research in producing Competent and Ethical professionals to the society.

MISSION OF THE INSTITUTION

To impart Value and Need based curriculum to the students with enriched skill development in the field of Engineering, Technology, Management and Entrepreneurship and to nurture their character with social concern and to pursue their career in the areas of Research and Industry.

VISION OF THE DEPARTMENT

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION OF THE DEPARTMENT

1. To create graduates possessing excellent knowledge and skill in Electrical and Electronics Engineering fundamentals.
2. To provide employable graduates for industry and to do high quality research;
3. To Emphasis on Ethics, professional conduct for Societal development.



PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO 1** To excel in industrial or graduate work in Electrical and Electronics Engineering and allied fields.
- PEO 2** To practice their Professions conforming to Ethical Values and Environmentally friendly policies.
- PEO 3** To work in international and multi-disciplinary Environments.
- PEO 4** To successfully adapt to evolving Technologies and stay current with their Professions.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- PSO 1** Apply the fundamentals of Mathematics, Science and Engineering knowledge to identify, formulate, design and investigate complex engineering problems of Electric Circuits, Analog and Digital Electronic Circuits, Electrical Machines and Power Systems.
- PSO 2** Apply appropriate techniques and modern Engineering hardware and software tools in Power Systems to engage in life- long learning and to successfully adapt in multidisciplinary environments.



Knowledge and Attitude Profile (WK)

- WK1:** A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
- WK2:** Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
- WK3:** A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
- WK4:** Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
- WK5:** Knowledge, including efficient resource use, environmental impacts, whole-life cost, re- use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
- WK6:** Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
- WK7:** Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
- WK8:** Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
- WK9:** Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.



Program Outcomes (POs)

- PO1: Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
- PO2: Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
- PO3: Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
- PO4: Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
- PO5: Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
- PO6: The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
- PO7: Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
- PO8: Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
- PO9: Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
- PO10: Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
- PO11: Life-Long Learning:** Recognize the need for, and have the preparation and ability for
i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)



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REGULATIONS 2024

For Under Graduate Program

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

CHOICE BASED CREDIT SYSTEM

CATEGORY OF COURSES

- i. **Humanities and Social Sciences (HS) Courses** include Technical English, Environmental Science and Engineering, Engineering Ethics and human values, Communication Skills and Management courses.
- ii. **Basic Sciences (BS) Courses** include Mathematics, Physics, and Chemistry.
- iii. **Engineering Sciences (ES) Courses** include Engineering Practices, Engineering Graphics, Basics of Electrical / Electronics / Mechanical / Computer Engineering / Instrumentation etc.
- iv. **Professional Core (PC) Courses** include the core courses relevant to the chosen programme of study.
- v. **Professional Elective (PE) Courses** include the elective courses relevant to the chosen programme of study.
- vi. **Open Elective (OE) Courses** include courses from other departments which a student can choose from the list specified in the curriculum of the students B.E. / B.Tech. Programmes.
- vii. **Employability Enhancement Courses (EEC)** include Project Work and/or Internship, Seminar, Professional Practices, Case Study and Industrial/Practical Training.
- viii. **Mandatory (MC) Courses** include Personality and Character development and the courses recommended by the regulatory bodies such as AICTE, UGC, etc.,



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B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

REGULATIONS 2024

CHOICE BASED CREDIT SYSTEM

CURRICULUM AND SYLLABUS

SEMESTER III

S. NO	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	24BS301	Transforms and Partial Differential Equations (Common to B.E. Mechanical & B.E. EEE programmes)	BS	4	3	1	0	4
2.	24EE301	Digital Logic Circuits	PC	3	3	0	0	3
3.	24EE302	Electronic Devices and Circuits	PC	3	3	0	0	3
4.	24EE303	Electromagnetic Theory	PC	4	3	1	0	4
5.	24EE304	DC Machines and Transformers	PC	3	3	0	0	3
6.	24HS301	Human Values and Ethics (Common to all B.E. / B.Tech. programmes)	HS	2	1	1	0	2
PRACTICAL								
7.	24EE3L1	Electronics Laboratory	PC	3	0	0	3	1.5
8.	24EE3L2	Electrical Machines Laboratory – I	PC	3	0	0	3	1.5
9.	24HS3L1	Aptitude and Soft Skills – II (Common to all B.E./ B.Tech. programmes)	EEC	2	0	0	2	1*
TOTAL				27	16	3	8	22

* The grades earned by the students will be recorded in the mark sheet, however the same shall not be considered for the computation of CGPA

S.M.K 24/7/25

24BS301	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To learn the formation of partial differential equations and the solution of first order and higher order partial differential equations.
- To apply Fourier series to solve one dimensional wave, one and two dimensional heat equations which occur frequently in various branches of Engineering disciplines.
- To make the students familiar with the topics such as Fourier Transforms, Z-Transforms and Fourier series.

UNIT - I PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation of partial differential equations – Singular integrals - Solutions of standard types of first order partial differential equations - Lagrange’s linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT - II FOURIER SERIES 9+3

Dirichlet’s conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic analysis.

UNIT - III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9+3

Classification of PDE – Method of separation of variables - Fourier Series solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction.

UNIT - IV FOURIER TRANSFORMS 9+3

Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval’s identity.

UNIT - V Z -TRANSFORMS AND DIFFERENCE EQUATIONS 9+3

Z-transforms - Elementary properties – Inverse Z-transform (using partial fraction and residues) – Initial and final value theorems - Convolution theorem - Formation of difference equations – Solution of difference equations using Z - transforms.

TOTAL: 45+15 PERIODS

TEXT BOOKS:

1. Grewal .B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2017.
2. Bali.N.P. and Manish Goyal, "A Textbook of Engineering Mathematics", Laxmi Publications Pvt. Ltd, 9th Edition, 2014.

REFERENCES:

1. Erwin Kreyszig, "Advanced Engineering Mathematics ", John Wiley, India, 8th Edition, 2016.
2. James.G., "Advanced Modern Engineering Mathematics", Pearson Education, 3rd Edition, 2007.

3. Andrews.L.C., L.C and Shivamoggi .B, "Integral Transforms for Engineers", SPIE Press, 1999.
4. Narayanan.S., Manicavachagom Pillay.T.K. and Ramanaiah.G, "Advanced Mathematics for Engineering Students", S.Viswanathan Publishers Pvt. Ltd, Chennai, Vol. II 2003 & Vol.III 2002.
5. Ramana.B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt.Ltd, New Delhi, 2016.

OUTCOMES:**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

Course Name : Transforms And Partial Differential Equations		Course Code :24BS301	
CO	Course Outcomes	Unit	K-CO
C201.1	Solve linear partial differential equations, second and higher order with constant coefficients.	I	K3
C201.2	Solve partial differential equations using Fourier series analysis.	II	K3
C201.3	Solve one, two dimensional heat flow problems and one dimensional wave equation problems.	III	K3
C201.4	Compute the Fourier transforms of various functions.	IV	K3
C201.5	Apply Z-transforms techniques to solve difference equation.	V	K3

S.M.F.  20/7/25

3. William Keitz, Digital Electronics-A Practical Approach with VHDL, Pearson,2021
4. Raj Kamal “Digital Systems – Principles and Design” Pearson Education India, 2020.

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

Course Name: Digital Logic Circuits		Course Code:24EE301	
CO	Course Outcomes	Unit	K- CO
C202.1	Apply the knowledge of Engineering fundamentals to convert different types of codes and the various types of number system, simplify the Boolean functions and gate level minimization and implementation.	I	K3
C202.2	Design the Combinational logic circuits,	II	K4
C202.3	Design the synchronous Sequential logic circuits, draw the block diagram of Shift Registers and Counters	III	K4
C202.4	Design the asynchronous sequential circuits and explain the hazards & errors in digital circuits and analysis the Programmable Logic Devices and describe the operation of digital logic families.	IV	K4
C202.5	Develop the VHDL coding for combinational logic and Sequential circuits.	V	K3

S. M. K  20/7/25

24EE302	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the structure of basic electronic devices.
- Be exposed to active and passive circuit elements.
- To familiarize the operation and applications of electronic devices.
- To explore the gain Vs frequency response characteristics of amplifier.
- To learn the required functionality of positive and negative feedback systems.

UNIT - I PN JUNCTION DEVICES 9

PN junction diode — structure, operation and V-I characteristics, Transition and Diffusion capacitances — Rectifiers — Half Wave and Full Wave Rectifier. Zener diode — reverse characteristics – Zener as voltage regulator, Display devices – LED, Laser diode.

UNIT - II BJT AND SMALL SIGNAL AMPLIFIERS 9

BJT - structure, operation of NPN and PNP transistor, Input and output characteristics of CE, CB and CC configurations. DC Load Line and operating point, Need for biasing - Fixed and Voltage divider biasing. Single stage BJT amplifiers — AC analysis of CE amplifier with Voltage divider bias using h-parameters - Gain and frequency response.

UNIT - III FIELD EFFECT TRANSISTORS AND THYRISTORS 9

JFET, MOSFET - structure, operation and characteristics, Biasing - self and voltage divider biasing. FET small signal model - Analysis of CS and Source follower. Thyristor - SCR operation and characteristics, UJT - operation and characteristics.

UNIT - IV DIFFERENTIAL AMPLIFIERS AND LARGE SIGNAL AMPLIFIERS 9

Cascade amplifier, BJT Differential amplifier — DC and AC analysis of common mode gain, differential mode gain and CMRR - Single tuned amplifier - construction, operation and frequency response. Power amplifiers — class A, class B and class C (Qualitative analysis).

UNIT - V FEEDBACK AMPLIFIERS AND OSCILLATORS 9

Feedback concepts, feedback connections - voltage / current, series / shunt feedback - Transfer gain with feedback - effect of negative feedback on R_i and R_o - Advantages of negative feedback. Positive feedback — Condition for oscillations, RC phase shift, Wien bridge, Hartley, Colpitts and Crystal oscillators.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press Higher Education, 5th Edition, 2008.
2. Sedra and Smith, “Microelectronic circuits”, 8th Ed., Oxford University Press 2020.

REFERENCES:

1. Thomas L.Floyd, “Electronic devices” Conventional current version, Pearson prentice Hall, 10th Edition, 2017.
2. Robert Boylestad and Louis Nashelsky., “Electron Device and Circuit Theory” Prentice Hall Private Limited, 11th edition, 2017.
3. Sedha R.S, “A Text Book of Applied Electronics”, S. Chand & company Ltd., Revised Edition, 2015.

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

Course Name: Electronic Devices and Circuits		Course Code: 24EE302	
CO	Course Outcomes	Unit	K- CO
C203.1	Apply the knowledge of Engineering fundamentals to explain the operation and characteristics of PN junction diode, Zener diode, LED and Laser diode.	I	K2
C203.2	Apply the knowledge of Engineering fundamentals to derive the expression for voltage gain, current gain, Input resistance and output resistance of a BJT CE amplifier with voltage divider biasing using h-parameter model.	II	K3
C203.3	Apply the knowledge of Engineering fundamentals to derive the expression for voltage gain, input resistance and output resistance of FET amplifier under CS and Source follower connection.	III	K3
C203.4	Apply the knowledge of Engineering fundamentals to derive the expression for voltage gain of cascade amplifier, differential amplifier, single tuned amplifier and power amplifier.	IV	K3
C203.5	Apply the knowledge of Engineering fundamentals to derive the expression for gain of different types of negative feedback connections and expression for the oscillating frequency of RC and LC tuned Oscillators.	V	K3

S.M.F. 24/7/25

24EE303

ELECTROMAGNETIC THEORY

L	T	P	C
3	1	0	4

OBJECTIVES:

- To introduce the basic mathematical concepts related to electromagnetic vector fields
- To impart knowledge on the concepts of Electrostatic fields, electrical potential, energy density and their applications.
- Magneto static fields, magnetic flux density, vector potential and its applications.
- Different methods of emf generation and Maxwell's equations
- Electromagnetic waves and characterizing parameters

UNIT - I VECTOR CALCULUS

9+3

Review of Vector algebra - Introduction to Cartesian, Cylindrical and Spherical coordinate systems - Vector calculus - Differential length, area and volume, line, surface and volume integrals - Del operator - Gradient, Divergence of a vector, Divergence theorem, Curl of a vector, Stokes theorem - Laplacian of a scalar.

UNIT - II STATIC ELECTRIC FIELDS

9+3

Coulomb's law - Electric field intensity - Electrical field due to point, Line, Surface and Volume charge distributions - Gauss law and its applications - Absolute Electric potential - Potential difference - Calculation of potential differences for different configurations - Electric dipole - Electrostatic Energy and Energy density - Current and current density - Continuity of current - Boundary conditions of perfect dielectric materials - Permittivity of dielectric materials - Capacitance, Capacitance of different configurations - Poisson's and Laplace's equation - Applications.

UNIT - III STATIC MAGNETIC FIELDS

9+3

Biot-Savart's Law — Ampere's Circuital Law - Steady magnetic fields produced by current carrying conductors — Magnetic flux and magnetic flux density - Scalar and Vector Magnetic potentials - Lorentz Force - Magnetic Force and Torque - Nature of magnetic materials - Magnetization and permeability - Magnetic boundary conditions - Magnetic circuits - Inductances and Mutual inductances - Energy density - Applications.

UNIT - IV TIME VARYING FIELDS

9+3

Faraday's law for Electromagnetic induction- Motional and Transformer EMF- Displacement current, Point form and Integral form of Maxwell's equation- Maxwell's equation in Phasor form - Applications.

UNIT - V ELECTROMAGNETIC WAVES

9+3

Derivation of Wave Equation - Uniform Plane Waves - Wave equation in Phasor form - Plane waves in lossy dielectrics - Plane waves in free space and in a homogenous material - Wave equation for a conducting medium-Propagation in good conductors - Skin effect - Poynting theorem - Reflection and Refraction of Uniform plane waves - Standing wave ratio - Applications.

TOTAL: 45+15 PERIODS

TEXT BOOKS:

1. Mathew N. O. Sadiku, 'Principles of Electromagnetics', 6th Edition, Oxford University Press Inc. Asian edition, 2015.
2. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.

3. K A Gangadhar, 'Electromagnetic Field Theory', Khanna Publishers; Eighth Reprint : 2015

REFERENCES:

1. Joseph. A.Edminister, 'Schaum's Outline of Electromagnetics, Third Edition (Schaum's Outline Series), McGraw Hill, 2010.
2. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.
3. J.P.Tewari, 'Engineering Electromagnetics - Theory, Problems and Applications', Second Edition, Khanna Publishers,2013

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO

Course Name : - ELECTROMAGNETIC THEORY		Course Code : 24EE303	
CO	Course Outcomes	Unit	K- CO
C204.1	Apply vector calculus in Cartesian, Cylindrical, and Spherical coordinate systems to solve electromagnetic field problems.	I	K3
C204.2	Apply electrostatic field theory to determine electric field intensity, potential, energy density, and capacitance.	II	K3
C204.3	Apply magnetostatic laws to compute magnetic fields, inductance, and torque in current-carrying systems and magnetic materials.	III	K3
C204.4	Apply Maxwell's equations in differential and integral forms to time-varying electromagnetic fields.	IV	K3
C204.5	Apply the principles of electromagnetic wave theory to determine wave behavior, power transmission, reflection, and refraction in various media.	V	K3

S.M.F. 24/7/25

24EE304	DC MACHINES AND TRANSFORMERS	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the Constructional details, the principle of operation, types, performance characteristics and applications of DC generators.
- To understand the Constructional details, the principle of operation, types, performance characteristics and applications of DC motor.
- To explain the need of starters, types and its operation for DC motors and to explain the various methods of testing of DC machines.
- To understand the Constructional details, the principle of operation, types, performance characteristics and applications of Single Phase Transformer.
- To explain the various methods of testing of single phase transformer and types of three phase transformer connections.

UNIT - I DC GENERATOR 9

Constructional Details – Working Principle – Types of Armature Winding and Connections – EMF Equation – Methods of Excitation – Characteristics of Series, Shunt and Compound Generators – Armature Reaction and Commutation – Parallel Operation – Losses, Efficiency and Power Stages in DC Generator – Condition for Maximum Efficiency – Applications.

UNIT - II DC MOTOR 9

Principle of Operation – Back EMF – Maximum output power - Torque Equation – Types of DC Motor – Characteristics of Series, Shunt and Compound Motor – Losses, Efficiency and Power Stages in DC Motor – Condition for Maximum Efficiency - Applications.

UNIT - III STARTERS, SPEED CONTROL AND TESTING OF DC MACHINES 9

Need of starters – two point, three point, four point starters – Speed Control Methods – Separation of No Load Losses – Testing of DC Machines – Brake Test, Swinburne's Test, Hopkinson's Test - Electric braking – Plugging, dynamic and regenerative braking.

UNIT - IV TRANSFORMER 9

Constructional Details – Principle of Operation - Types – EMF Equation – Transformation Ratio – Phasor Diagram – Transformer on No Load and Load – Equivalent Circuit – OC and SC Test – Regulation – Parallel Operation – Auto Transformer – Saving of Copper.

UNIT - V THREE PHASE TRANSFORMER AND TESTING OF TRANSFORMER 9

Losses and Efficiency in Transformers – Condition for Maximum Efficiency – Testing of Transformers – Polarity Test, Load Test – Phasing out Test – Sumpner's Test – Separation of Losses – All day Efficiency – Three Phase Transformers – Types of Connections.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Nagrath.I. J and Kothari. D. P., 'Electric Machines', 5th Edition, Tata McGraw Hill Publishing Company, New Delhi, 2017.
2. P.C Sen, 'Principles of Electric Machines and Power Electronics' John Wiley & Sons; 3rd edition 2013.

REFERENCES:

1. Bimbra P.S. - Electrical Machinery, 1st Edition, Khanna Book Publishing co(P) Ltd, New Delhi, 2021
2. S.K. Bhattacharya, 'Electric Machines' McGraw - Hill education, New Delhi, 3rd edition, 2009.
3. Sahdev. S.K., 'Electrical Machines', Cambridge University Press, 2018.

OUTCOMES:

AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:

Course Name : DC MACHINES AND TRANSFORMER		Course Code : 24EE304	
CO	Course Outcomes	Unit	K-CO
C205.1	The knowledge of Engineering fundamentals to calculate the required field turns and brush adjustment to compensate the armature reaction effect and explain the construction and working of D.C generator.	I	K3
C205.2	The knowledge of Engineering fundamentals to analyze the characteristics of D.C motor to identify its applications based on requirement	II	K3
C205.3	The knowledge of Engineering fundamentals to calculate the required resistance to minimize the starting current of D.C motor and to predetermine the efficiency of D.C. machine in different methods.	III	K3
C205.4	The knowledge of Engineering fundamentals to calculate the voltage regulation and efficiency of two winding and auto transformer at different loading conditions in different methods	IV	K3
C205.5	The knowledge of Engineering fundamentals to predetermine the voltage regulation and efficiency of single phase transformer. Different types of three phase transformer connection and calculating phase and line voltages.	V	K3

S.M.F.  24/7/25

24HS301	HUMAN VALUES AND ETHICS	L	T	P	C
		1	1	0	2

OBJECTIVES:

- To create an awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.

UNIT - I INTRODUCTION TO VALUE EDUCATION 6

Value Education – Definition - Concept and Need for Value Education - Natural acceptance, Self exploration - Fundamentals of value education - Happiness and Prosperity as parts of Value Education- fulfilling human aspirations.

Practice Session: Sharing about Oneself, Exploring Human Consciousness – self exploration, Exploring Natural Acceptance.

UNIT - II HARMONY IN THE HUMAN BEING 6

Understanding Myself as Co-existence of the Self and the Body - 'I' and Body synchronization - Realization of Self, Body needs - Self-regulation and Health.

Practice Session: Exploring the difference of Needs of Self and Body, Exploring Sources of Imagination in the Self, Harmony of Self with the Body - program for ensuring health vs dealing with disease.

UNIT - III HARMONY IN THE FAMILY, SOCIETY AND NATURE 6

Family as a basic unit of Human Interaction-Values in Relationships - The Basics for Trust and Respect in today's Crisis: Affection, e-Guidance, Reverence, Glory, Gratitude and Love –Harmony in society: Resolution, Prosperity, Fearlessness and Co-existence as Comprehensive Human Goal- Harmony in Nature: The Four Orders in Nature - The Holistic Perception of Harmony in Existence.

Practice Session: Exploring the Feelings of Trust, Respect and Gratitude, Exploring Systems to fulfil Human Goals considering society and nature - Co-existence in Existence.

UNIT - IV SOCIAL ETHICS 6

The Basics for Ethical Human Conduct - Defects in Ethical Human Conduct - Holistic Alternative and Universal Human Order and Ethical Conduct - Human Rights violation and Social Disparities.

Practice Session: Exploring Ethical Human Conduct, Humanistic Models in Education, Exploring Steps of Transition towards Universal Human Order.

UNIT - V PROFESSIONAL ETHICS 6

Value based Life and Profession - Professional Ethics and Right Understanding - Competence in Professional Ethics - Issues in Professional Ethics – The Current Scenario - Vision for Holistic Technologies.

Practice Session: Holistic Technologies - Production Systems and Management Models, Holistic vision of life - Socially responsible behaviour and environmentally responsible work.

TOTAL: 30 PERIODS

TEXT BOOKS:

1. R.R. Gaur, R. Asthana, G.P. Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd revised edition, Excel Books, New Delhi, Reprint 2019.
2. A N Tripathy, Human Values, New Age International Publishers, New Delhi, 2003.

REFERENCES:

1. E G Seebauer & Robert L.Berry, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press, 2000.

KLNCE UG EEE R2024

2. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd, Reprint 2011.
3. Mike Martin and Roland Schinzinger "Ethics in Engineering" McGraw Hill, New York, 4th edition, Reprint 2017.
4. Charles E. Harries, Michael S. Protchard and Michael J. Rabins, "Engineering Ethics-concepts and Cases", Thomson Learning, 2000.
5. S.K. Chakraborty and Dabangshu Chakraborty, "Human Values and Ethics: Achieving Holistic Excellence", ICFAI University Press, 2006.

OUTCOMES:**AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

Course Name : HUMAN VALUES AND ETHICS		Course Code : 24HS301	
CO	Course Outcomes	Unit	K-CO
C206.1	Explain the significance of value inputs and start applying them in their life and profession to ensure happiness and prosperity.	I	AD
C206.2	Differentiate between Thyself & the Body to ensure competency of an individual.	II	AD
C206.3	Explain the role of a human being in ensuring harmony in family, society, and nature.	III	AD
C206.4	Develop an awareness of human values to appreciate the rights of others and to enable social balance.	IV	AD
C206.5	Differentiate between ethical and unethical professional practices, and apply suitable strategy to actualize a harmonious working environment.	V	AD

S. M. K. 24/7/25

24EE3L1

ELECTRONICS LABORATORY

L	T	P	C
0	0	3	1.5

OBJECTIVES:

- To understand the behavior of semiconductor devices experimentally.
- To design the amplifiers and oscillators.
- To analyze the rectifier and filters

LIST OF EXPERIMENTS:

1. Characteristics of PN Junction diode and Zener diode
2. Realization of Clipper and Clamper Circuit
3. Simulation and Experimental Verification of Single Phase Half-wave Rectifier
4. Simulation and Experimental Verification of Single Phase Full-wave Rectifier
5. Characteristics of BJT under common emitter and common base configurations.
6. Design and testing of Common Emitter amplifier.
7. Characteristics of UJT and generation of saw tooth waveforms.
8. Characteristics of JFET.
9. Differential amplifier using FET.
10. Design and testing of RC phase shift and LC oscillators.
11. Design and testing of Negative Feedback amplifiers.
12. Simple Electronic Projects

TOTAL: 45 PERIODS

OUTCOMES:

Course Name: ELECTRONICS LABORATORY		CourseCode: 24EE3L1	
CO	Course Outcomes	EXP	K-CO
C207.1	Apply the knowledge of Engineering fundamentals to determine the Breakdown voltage, forward and reverse resistance of PN junction diode and Zener diode and calculate the ripple factor of rectifier circuits with filter and analyze the input and output performance of the given diode-based circuit using simulation tools.	1,2, 3,4	K3
C207.2	Apply the knowledge of Engineering fundamentals to calculate the hybrid parameters of a BJT in both Common-Emitter (CE) and Common-Base (CB) configurations from their characteristics.	5	K3
C207.3	Apply the knowledge of Engineering fundamentals to obtain the frequency response of BJT CE amplifier, feedback amplifier and calculate its bandwidth.	6,11	K3
C207.4	Apply the knowledge of Engineering fundamentals to obtain the UJT and JFET parameters from the characteristics and also to calculate the gain of differential amplifier using JFET.	7,8, 9	K3
C207.5	Apply the knowledge of Engineering fundamentals to design the RC and LC tuned oscillators for a specific oscillating frequency.	10	K3

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LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:		
S.No.	NAME OF THE EQUIPMENT	Qty.
1	Semiconductor devices like Diode, Zener Diode, NPN Transistors	20 Each
2	JFET, UJT	10 Each
3	Resistors and Capacitors (Various Values)	30 Each
4	Function Generators	10 Nos.
5	Regulated Power Supply $\pm 15V$	10 Nos.
6	CRO	10 Nos.
7	Storage Oscilloscope	1 No.
8	Bread boards	20 Nos.
At least one demo kit for the listed experiment.		

S. M. K  24/7/25

OBJECTIVES:

- To analyze the characteristics of D.C motor and D.C generator under actual load test.
- To analyze the characteristics of D.C motor and D.C generator by indirect method
- To analyze the characteristics of transformer by direct and indirect method

LIST OF EXPERIMENTS:

1. Load test on DC Shunt motor & DC Series motor
2. Load characteristics of DC Compound generator.
3. Load test on DC Compound motor
4. Speed Control of DC Motor: Field control and Armature control.
5. Swinburne's test.
6. Open circuit and Load characteristics of DC generator (Self and Separately Excited).
7. Load test on DC series generator.
8. Hopkinson's test.
9. Load test on Single phase transformer and Study of Three phase transformer connections.
10. Open circuit & Short circuit test on single phase transformer
11. Sumpner's test.
12. Study of EV Trainer Module.

TOTAL: 45 PERIODS**OUTCOMES:****AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:**

Course Name ELECTRICAL MACHINES LABORATORY -I		Course Code : 24EE3L2	
CO	Course Outcomes	EXP	K-CO
C208.1	The knowledge of Engineering fundamentals to calculate torque, output power, input power, efficiency and speed control of DC motors	1,3,4	K3
C208.2	The knowledge of Engineering fundamentals to calculate voltage drop due to winding resistance and armature reaction for DC generators	2,6,7	K3
C208.3	The knowledge of Engineering fundamentals to calculate constant and variable losses and to predetermine the efficiency of DC shunt machine for both motor and generator operation. Study of EV trainer kit and BLDC motor	5,8,12	K3
C208.4	The knowledge of Engineering fundamentals to obtain equivalent circuit, and to calculate voltage regulation and efficiency of single phase transformer in direct method	9	K3
C208.5	The knowledge of Engineering fundamentals to obtain equivalent circuit, and to calculate voltage regulation and efficiency of single phase transformer in indirect method.	10,11	K3

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S. No.	NAME OF THE EQUIPMENT	Qty.
1.	DC Shunt Motor with Loading Arrangement	3 Nos.
2.	Single Phase Transformer	4 Nos.
3.	DC Series Motor with Loading Arrangement	1 No.
4.	DC compound Motor with Loading Arrangement	1 No.
5.	DC Shunt Motor Coupled with DC Compound Generator	2 Nos.
6.	DC Shunt Motor Coupled with DC Shunt Motor	1 No.
7.	Tachometer -Digital/Analog	8 Nos.
8.	Single Phase Auto Transformer	2 Nos.
9.	Three Phase Auto Transformer	1 No.
10.	Single Phase Resistive Loading Bank	2 Nos.

S. M. F. 24/7/25

24HS3L1

APTITUDE AND SOFT SKILLS – II

L	T	P	C
0	0	2	1

Module I Aptitude Skills II

15

Pipes and cisterns, boats and streams, Problems on trains, Alpha Numeric Puzzles, Simple Interest, Compound Interest, Mixtures and Allegations, calendar, clock, permutation and combination, probability, height and distance.

Module II Soft Skills II

15

Introduction to Soft skills – Non-Verbal Communication - Role play - Learning styles – Writing Bio-data and Process description - Peak Life Moment / Challenging moment - People management – team work, leadership, Decision making – problem identification - Email and Essay writing - Just a minute (JAM).

TOTAL: 30 PERIODS

REFERENCES:

1. Quantitative aptitude for competitive examinations , R.S.Agarwal, S.Chand publications
2. Quantitative Aptitude – AbijithGuha, TMH
3. Quantitative Aptitude for Cat – Arun Sharma, TMH
4. Gulati. S., (2006) “Corporate Soft Skills”, New Delhi, India: Rupa& Co.
5. Prasad, HariMohan, A Handbook of Spotting Errors, Mcgraw Hill Education, 2010

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