GOVERNMENT OF INDIA
MINISTRY OF
PARLIAMENTARY AFFAIRS

Azadi Ka Amrit Mahotsav

mygov मेरी सरकार

PREAMBLE TO THE CONSTITUTION

PREAMBLE

WE, THE PEOPLE OF INDIA,

having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC **REPUBLIC** and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity;

and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this 26th day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

I have read the Preamble

[redacted]

Signature

23-01-2022

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

("Deemed to be University u/s 3 of the UGC Act, 1956")
Accredited 'A+' Grade by NAAC
Agalakote, B.H.Road, Tumkur – 572 107.KARNATAKA, INDIA.

No. SSAHE/ACA-S&C/26 /UG(BE)/2024 Date: 15/07/2024

N O T I F I C A T I O N

Sub: - Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (2nd Year Electrical and Electronics Engineering)

Ref: Proceedings of the Academic Council meeting held on 10/07/2024 vide agenda No. SSAHE/AC/XXVIII-12/2024

In exercise of the powers vested under section 6 of 6.05 of MoA / Rules of SSAHE, the Revised Ordinance pertaining to Curriculum of Undergraduate Programme Bachelor of Engineering (2nd Year Electrical and Electronics Engineering) is notified herewith as per Annexure.

By Order,

REGISTRAR

REGISTRAR
Sri Siddhartha Academy of Higher Education
TUMKUR - 572 107, Karnataka.

To,
Dean / Principal, Sri Siddhartha Institute of Technology,

Copy to
1) Office of the Chancellor, SSAHE, for kind information,
2) PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE
3) All Officers of the Academy Examination Branch / Academic Section
4) Guard File / Office copy.

S.S.A.H.E TUMKUR

SRI SIDDHARTHA
INSTITUTE OF TECHNOLOGY, TUMAKURU
Nurturing Young Minds
A Constituent College of Sri Siddhartha Academy of Higher Education
Department of Electrical and Electronics Engineering
(Accredited by NBA, New Delhi in Tier-1)

Scheme & Syllabus for Second Year-2024-25

Department of Electrical & Electronics Engineering

Under Graduate courses where students and faculty can pursue knowledge without boundaries, a place where theory and practice combine to produce a better understanding of our world and ourselves. The objective of department is to equip students with techniques to become providers of innovative and indigenous solutions. The discipline of E&EE has been striving towards providing a vibrant atmosphere for students in diverse areas of Electrical Engineering. Its programs are designed to prepare students for technical excellence.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
(Accredited by NBA, New Delhi for Three Years 2023-26)

Department Vision:

To impart value based education in the field of Electrical and Electronics Engineering which provides agreat learning experience and be an outstanding part of the community.

Department Mission:

- To impart fundamental knowledge of science and technology.
- To instill managerial, entrepreneurial and soft skills.
- To make significant contribution to meet societal needs.
- To develop a knowledge-based information system in the Electrical Engineering domain which canbe updated regularly for future learning and cater to the needs of the society.

Department Program Educational Objectives (PEOs):

- To mould Electrical and Electronics Engineering graduates with fundamental Knowledge of engineering and sciences to excel in professional career.
- To work in a team, exhibit leadership qualities and provide solutions to Electrical Engineeringproblems and demonstrate the importance of professional integrity.
- To produce graduates who will continue to enhance their knowledge and are able to take upconfidently diverse career paths with professional ethics and meet the societal needs.

Program Specific Outcomes (PSOs)

- Identify, formulate, analyze, design and implement electrical and electronic circuits, Control Systems, Drives, Power Systems and Power Electronic Systems.
- Understand and apply the impact of engineering solutions by using modern tools to solve problems in diverse and multidisciplinary environment and a commitment to maintain professional ethics and lifelong learning.
- Demonstrate the ability to effectively work in a team, communicate appropriately, develop a fair attitude and concern for society & environment.

Program Outcomes (POs)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, tomanage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY, TUMAKURU-572105
(A Constituent College of Sri Siddhartha Academy of Higher Education, Deemed-to-be-University)
Scheme of Teaching and Examination-2022 (160 Credits Scheme, NEP-Batch)

SECOND YEAR B.E., ELECTRICAL AND ELECTRONICS ENGINEERING

3rd Semester BE **Academic year 2024-25**

SI No	Course Code		Course Title	Teaching Dept.	L	T	P	Credits	CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	BS	22MA301	Integral Transforms and Numerical Techniques	MA	3	-	-	3	50	50	100	3
2	PC	22EE302	Electric Circuit Analysis	EE	3	-	-	3	50	50	100	3
3	PC	22EE303	Analog and Digital Electronics	EE	3	-	2	4	50	50	100	3
4	PC	22EE304	DC Machines and Synchronous Machines	EE	3	-	2	4	50	50	100	3
5	PC	22EE305	Electrical Power Generation, Transmission and Distribution	EE	3	-	-	3	50	50	100	3
6	PC	22EE306	Dept. Skill Lab-1 (Level- II)	EE	1	-	2	2	50	50	100	3
7	HS	22HS307	Universal Human Values	HS	1	-	-	1	50	-	50	-
8	HS	22HS308	Environmental Studies	HS	1	-	-	1	50	-	50	-
L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination				**Total**	**18**	**-**	**6**	**21**	**400**	**300**	**700**	**-**

Credits Distribution: Basic Science (BS)=08+08+3=19, Engineering Science (ES)=10+11=21, Humanities & Social Sciences (HS)=1+2=03, Program Core (PC)=02+16=18, Total Credits=20+20+21=61.

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY, TUMAKURU-572105
(A Constituent College of Sri Siddhartha Academy of Higher Education, Deemed-to-be-University)
Scheme of Teaching and Examination-2022 (160 Credits Scheme, NEP-Batch)

SECOND YEAR B.E., ELECTRICAL AND ELECTRONICS ENGINEERING

4th Semester BE **Academic year 2024-25**

SI No	Course Code		Course Title	Teaching Dept.	L	T	P	Credits	CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	BS	22ES401	Probability and Advanced Linear Algebra	MA	3	-	-	3	50	50	100	3
2	PC	22EE402	Control Systems	EE	3	-	-	3	50	50	100	3
3	PC	22EE403	Power Electronics	EE	3	-	2	4	50	50	100	3
4	PC	22EE404	Transformers and Induction Machines	EE	3	-	2	4	50	50	100	3
5	PC	22EE405	Electrical Measurements and Transducers	EE	3	-	-	3	50	50	100	3
6	PC	22EE406	Dept. Skill Lab-2 (Level – III)	EE	1	-	2	2	50	50	100	3
7	HS	22SK407	Skill Development-1	T&P	1	-	-	1	50	-	50	-
8	HS	22HS408	Constitution of India	HS	1	-	-	1	50	-	50	-
L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination				**Total**	**18**	**-**	**6**	**21**	**400**	**300**	**700**	**-**

Credits Distribution: Basic Science (BS)=08+08+3+3=22, Engineering Science (ES)=10+11=21, Humanities & Social Sciences (HS)=1+2+2=5, Program Core (PC)=02+16+16=34, Total Credits=20+20+21+21=82. Total 60 AICTE Activity points need to earn by each regular student and Total 35 AICTE Activity points need to earn by each Lateral entry student at the end of 2nd Year BE.

Syllabus for the Academic Year – 2024 – 2025

Department: Electrical & Electronics Engineering
Semester: III
Subject Name: Integral Transforms and Numerical Techniques
Subject Code: BS-22MA301 **L-T-P-C: 3-0-0-3**

Common to: EC, EE, ET, BM

Course Objectives:

1. Introduce the concept of Numerical methods.
2. Introduce the concept of Laplace Transform and Inverse Laplace transform
3. Introduce the concept of Statistical methods and Curve fitting.
4. Introduce the concept of Fourier series, Fourier transform and Z-transform

UNIT	Description	Hours
I	**Numerical solution of ordinary differential equations of first order and first degree**: Taylor's series method, Modified Euler's method, Runge-Kutta method of fourth order, Milne's and Adams-Bash forth Predictor and Corrector methods (No derivation of formulae)-problems. **Numerical Integration:** Simpson's $1/3^{rd}, 3/8^{th}$ rule, Weddle's rule, (without proof)-problems.	**08**
II	**Laplace Transforms:** Basic definition, Laplace transforms of elementary functions, Properties of Laplace transforms, Laplace transforms of Periodic function, Unit step function (All results without proof)-Problems only. **Inverse Laplace transforms**: Basic definition, Evaluation of inverse Laplace transforms by standard methods. Convolution theorem - Problems only. Solutions of second order linear differential equations using Laplace transforms method.	**08**
III	**Statistical Methods:** Definition of Correlation-Karl Pearson's coefficient of correlation–problems, Regression lines (All results without proof)–Problems. **Curve fitting:** Curve fitting by the method of least squares- Fitting of the straight line, second degree parabola and exponential form of the curve □ = □b□(All results without proof) –Problems.	**08**
IV	**Fourier Series:** Periodic function, Dirichlet's conditions. Fourier series of even and odd functions. Fourier series of periodic functions with period 2π and 2l-problems. Applications to Engineering problems: Fourier series for Periodic square wave, Full wave rectified form, Saw-tooth wave with graphical representation. Half range Fourier series, Practical harmonic analysis- problems.	**08**
V	**Fourier Transforms:** Infinite Fourier transforms. Fourier Sine and Cosine transforms. Inverse Fourier transforms and simple problems. **Z-Transforms:** Basic definitions of Z-transform, Standard Z-transforms, Damping rule, Shifting rule, Initial value and Final value theorems(without proof)-problems, Inverse Z-transform-problems. Application to difference equations using Z-transforms.	**08**

Course Outcomes:

After completion of course, student will be able to:

1. Understand the basic concepts of Numerical and Statistical methods, Laplace transforms, Inverse Laplace transform, Fourier series, Fourier and Z- transforms.
2. Apply the concepts of Laplace transform, inverse Laplace transform, Fourier series to solve problems in Engineering field.
3. Demonstrate Fourier series and Fourier transforms to study behavior of periodic functions arising problems in engineering.
4. Analyze and apply Z- transforms, Numerical and Statistical methods in engineering fields.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3														
CO2	3	1													
CO3	3	1													
CO4	3	2													

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Higher Engineering Mathematics	B.S. Grewal	43rdEdition Khanna Publications, 2015. ISBN: 9788174091956
2	Higher Engineering Mathematics	B.V. Ramana	1st Edition, Tata McGraw-Hill,2006. ISBN: 9780070634190
Reference Books:			
1	Advanced Engineering Mathematics	E. Kreyszig	10th Edition Jon Wiley & Sons, 2015. ISBN:9780470913611
2	Higher Engineering Mathematics	H.K. Das Er. Rajnish Verma	1stEdition, Chand publishing, 2011. ISBN:9788121938907
3			
NPTEL: https://nptel.ac.in/courses/108/104/108104139			

Department: Electrical & Electronics Engineering
Semester: III
Subject Name: ELECTRIC CIRCUIT ANALYSIS
Subject Code: PC-22EE302 **L-P-C: 3-0-3**

Course Objectives:

1. To explain the concept of circuit analysis.
2. To apply different techniques to solve electric circuits.
3. To analyze the given circuit to obtain the solution.
4. To assess the electrical quantities of any network.

Unit	Description	Hours
1	**Basic Concepts:** Ideal & practical sources, Source transformation and source shifting, Network reduction using Star-Delta transformation, Loop and node analysis with independent and dependent sources.	08
2	**Network Theorems:** Superposition theorem, Reciprocity theorem, Millman's theorem. Thevenin's & Norton's theorem, Maximum Power transfer theorem (independent sources only).	08
3	**Resonant Circuits:** Analysis of Series and parallel circuits under resonance, Frequency response, resonant frequency, Bandwidth, Selectivity & Q- factor at resonance.	08
4	**Laplace Transformation & Applications:** Review of Laplace transform, Waveform synthesis, Initial and final value theorems, Step, ramp and impulse responses, Convolution theorem, Solution of simple R-L, R-C, R-L-C networks for AC and DC excitations using Laplace transforms.	08
5	**Unbalance Three phase system:** Analysis of three-phase system, calculation of real and reactive powers. **Two port network parameters:** Definition of z, y, h and transmission parameters, modeling with these parameters, relationship between parameter sets.	08

Course Outcomes:

After completion of course, student will be able to:

1. Explain the concept of circuit analysis.
2. Apply different techniques to solve Electric Circuits.
3. Analyze the given circuit to obtain the solution.
4. Assessing the electrical quantities of any network.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				2						2	3		
CO2	2	2				1						2	3		
CO3	2	2										1	3		
CO4	3	3									3	3	2	2	

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Network Theory: Analysis and Synthesis.	Smarajit Ghosh	PHI, 2005
2	Theory and Problems of Electric Circuits		Schaum`s Series, 2nd Edition
Reference Books:			
1	Engineering Circuit Analysis	Hayt, Kemmerly and Durbin	6th Edition, 2002
2	Network Analysis	M.E. Van Valkenburg	3rd Edition, Reprint 2002
3	Network and systems	Roy Choudhury	2nd edition, 2006 reprint, New Age International
NPTEL: https://nptel.ac.in/courses/108/104/108104139			

Syllabus for the Academic Year – 2024-2025

Department: Electrical & Electronics Engineering
Semester: III
Course Name: Analog and Digital Electronics
Course Code: PC-22EE303 **L-P-C: 3-2-4**

Course Objectives:

1. To explain the concept of amplifiers and digital circuits.
2. To apply the concept of amplifier and digital circuits
3. To analyze amplifiers and digital circuits.
4. To design power amplifiers and digital circuits.

UNIT	Description	Hours
I	**Amplifiers:** **General Amplifiers**: Introduction, Cascade connections, Cascode connection, Darlington connections. **Feedback Amplifier:** Feedback concept, Feedback connections type, Practical feedback circuits. Design procedures for the feedback amplifiers.	**08**
II	**Power Amplifiers**: Definitions and amplifier types, series fed class A amplifier, Transformer coupled Class A amplifiers, Class B amplifier operations, Class B amplifier circuits, Amplifier distortions. Designing the Power amplifiers.	**08**
III	**Combinational Circuits and Data Processing Circuits**: **Combinational Circuits:** Karnaugh Map, Karnaugh simplifications, Don't-care Conditions, Sum-of-Product and Product-of-Sum simplifications, Introduction to HDL and implementation Models. **Data Processing Circuits**: Multiplexers, Demultiplexers, 1-of-16 Decoder, BCD to Decimal Decoders, Seven Segment Decoders, Encoders, Magnitude Comparator, ROM, PAL, PLA, HDL Implementation of Data Processing Circuits.	**08**
IV	**Sequential Circuits:** **Flip- Flops**: RS flip-flops, Gated flip-flops, Edge–triggered RS flip-flops, Edge-Triggered D flip-flops, Edge-triggered JK flip-flops, JK Master-Slave flip-flops, Various representations of flip-flops, HDL implementation of flip-flop. **Registers**: Types-SISO, SIPO, PISO, PIPO (representation of block diagram only), Shift registers, Applications of shift registers-Ring counter, Johnson counter. **Counters:** Asynchronous Counters, Decoding Gates, Synchronous Counters, Changing the Counter Modulus, Decade Counters, Presettable Counters, Counter Design as a Synthesis problem, Counter Design using HDL.	**08**
V	**Design of Synchronous Sequential Circuits:** Model selection, State Transition Diagram, State Synthesis Table, Design Equations and Circuit Diagram, Implementation using ROM, Algorithmic State Machine, State Reduction Technique.	**08**

LAB CONTENT

SL.	Description
-	Realization of Basic and Universal Gates, Half / Full - Adder / Subtractor.
I	Determination of the gain, input and output impedances in BJT Darlington Emitter follower
II	Determination of Input and Output waveforms and calculate the Efficiency of Class-B Push-pull Power Amplifier
III	Implementation of 4-variable logic expression using 8:1 MUX. Simulate and verify.
IV	Realize the digits 0-9 using BCD-to-7 Segment Decoder.
V	Realize 1-bit comparator using logic gates.
VI	Truth table verification of Flip-Flops: (i) JK Master Slave (ii) D type.
VII	Realize Ring and Johnson counters using IC 7495. Simulate and verify.
VIII	Design a modulus-n synchronous and asynchronous counter.

Course Outcome:

After completion of course, student will be able to:

1. Explain the concept of amplifiers and digital circuits.
2. Apply the concept of amplifier and digital circuits
3. Analyze amplifiers and digital circuits.
4. Design power amplifiers and digital circuits.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3								1	3	3	2	2
CO2	3	2	3		3						1	3	3	2	2
CO3	3	2	3		3							3	3	2	2
CO4	3	3	3									3	3	2	2

Learning Resources:

Sl.	Title	Author	Publishers
	Text Book:		
1	Electronic Devices and Circuit Theory	Robert L. Boylestad and Louis Nashelsky	PHI/Pearson Education. 9th Edition
2	Digital Principles and Applications	Donald P Leach, Albert Paul Malvino and Goutam Saha	Eighth Edition, TMH Education (P) Limited, 2015
	Reference Books:		
1	Electronic Devices and Circuits	Anil K Maini, Varsha Agarwal	Wiley, 2012
2	Fundamentals of Digital Logic Design with VHDL	Stephen Brown, Zvonko Vranesic	2nd Edition, TMH, 2005
3	Illustrative Approach to Logic Design	R D Sudhaker Samuel	Sanguine-Pearson, 2010
4	Digital Logic and Computer Design	M Morris Mano	10th Edition, Pearson, 2008
NPTEL: https://onlinecourses.nptel.ac.in/noc21_ee10/preview https://onlinecourses.nptel.ac.in/noc23_ee77/preview			

Syllabus for the Academic Year–2024-2025

Department: Electrical & Electronics Engineering Semester: III
Course Name: DC MACHINES AND SYNCHRONOUS MACHINES
Course Code: PC-22EE304 **L -P-C: 3-2-4**

Course Objectives:

1. To Summarize the concepts of excitation and characteristics of electrical machines.
2. To apply testing methods on DC and Synchronous machines.
3. To analyze the performance characteristics of DC and Synchronous machine.
4. To evaluate the results obtained from tests on DC and Synchronous machines.

UNIT	Description	Hours
I	**DC Generator:** Types of excitation, no load & load characteristics, armature reaction and its effects, commutation, use of Inter poles and compensating winding, & load characteristics, demagnetizing , cross magnetizing ampere turns($AT_d$and AT_c) per pole.	**08**
II	**DC Motors:** Characteristics of shunt, series, compound motors & their applications. Speed control of shunt and series motors. Testing of DC machine: Losses & efficiency, direct loading, Swinburne's test and Hopkinson's test,	**08**
III	**Synchronous Machines:** Basic Principles of Operation, Construction of Salient & Non - Salient Pole Synchronous Machines, Generated Emf in a Concentrated Winding, Effect of Distributed Winding. **Salient Pole Synchronous Machines**: Two Reaction Theory, Power-Angle Diagram, Reluctance Power, Slip Test, Problems on Power angle characteristics.	**08**
IV	**Alternators:** Regulation by EMF, MMF and ZPF methods, Synchronizing to infinite bus bars, parallel operation of alternators, load sharing between the alternators for constant and variable excitations.	**08**
V	**Operating characteristics of synchronous Machine:** Power-Angle Characteristics, Synchronous condenser, Power flow equation including armature resistance, capability curves of synchronous generators. Hunting in synchronous machines, damper windings, starting methods of synchronous motor.	**08**

LAB CONTENT

SL.	Description
I	Open circuit characteristics (OCC) of DC shunt generator and determination of its Critical field resistance (Rc)
II	Load characteristics of DC shunt generator.
III	Load test on DC shunt motor, determination of speed-torque& BHP-efficiency
IV	Swinburne's test or no-load test on DC shunts motor.
V	Speed control of DC motor by armature voltage control and flux control.
VI	Hopkinson's test or Back-to-Back test or Regenerative test on DC shunt machines.
VII	Voltage regulation of alternator by EMF, MMF and ZPF Method.
VIII	Slip test on salient pole synchronous machine.

Course Outcomes:

At the end of the course, student will be able to:

1. Summarize the concepts of excitation and characteristics of electrical Machines.
2. Apply the testing methods on DC and Synchronous Machines.
3. Analyze the performance characteristics of DC and Synchronous machine
4. Evaluate the results obtained from tests on DC and Synchronous machines

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3			2	3			2	3		2	2	2
CO2		3	3			2	3			2	3		3	2	
CO3		2	2			2	3			2	2		2	3	

Learning Resources:

Sl.	Title	Author	Publishers
	Text Book:		
1	Electrical Technology	B L Thereja	Volume 2,S Chand publication
2	Principles of Electrical Machines	V. K. Mehta & Rohith Mehta	2nd Edition, 2009, S. Chand & Company Ltd.
	Reference Books:		
1	Electric Machines	Ashfaq Hussian	2nd Edition, 2010, Dhanpat Rai Company
2	Electrical Machinery	Bhimbra	5th edition, 2018, Khanna Publications
3	Electrical Machines	I J Nagrath and D P Kothari	3rd Edition, 2010, Tata McGraw Hill Education Pvt. Ltd,
NPTEL: https://nptel.ac.in/courses/108/102/108102146.			

Syllabus for the Academic Year – 2024 - 2025

Department: Electrical & Electronics Engineering
Semester: III
Course Name: ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION
Course Code: PC-22EE305 **L-P-C: 3-0-3**

Course Objectives:

1. To Explain the concept of energy sources and power generation techniques.
2. To apply the different methods of power generation.
3. To analyze the need of insulators and their importance in transmission and distribution ofelectrical power.
4. To evaluate the Performance of transmission lines.

UNIT	Description	Hours
I	**Introduction to energy sources-** Conventional energy sources-Hydro,nuclear, thermal, diesel, gas. Non-conventional energy sources-solar, wind, ocean, tidal, geothermal. Energy scenario**.** **Hydro-Electric Power Plant-**Selection of site, classification,general arrangement and operation. **Thermal Power Plant**- Schematic layout & working, description of mainparts.	**08**
II	**Nuclear Power Plant-** Components of nuclear reactors, Schematic layout & operation of nuclear power plant, types of nuclear reactors, radiation hazards & safety precautions. **Ocean Thermal power generation-** Basic principle of ocean thermal energy conversion, open cycle, closed cycle & hybrid cycle OTEC system	**08**
III	**Overhead transmission lines:** Types of conductors, Sag calculation in conductors: a) Suspended on level supports (b) supports at different levels. Effect of wind and ice. **Insulators:** Types, potential distribution over a string of suspension insulators,String efficiency and methods of increasing string efficiency. **Corona**: Phenomena, expression for disruptive and visual critical voltages andcorona power loss.	**08**
IV	**Characteristics and performance of power transmission lines:** ABCD Constants, short transmission lines, medium transmission lines, Nominal **T** and **π** representation, long lines, equivalent **T** and **π** representation of longtransmission lines.	**08**
V	**Underground Cables**: Types, materials used, Insulation resistance, charging current, grading of cables, capacitance grading and inter sheath grading, testing of cables. **Distribution**: Radial and ring main systems, AC to DC distribution: Problems on concentrated loads.	**08**

Course Outcomes:

At the end of the course, student will be able to:

1. Explain the concept of energy sources and power generation techniques.
2. Apply the different methods of power generation.
3. Analyze the need of insulators and their importance in transmission and distribution ofelectrical power.
4. Evaluate the performance of transmission lines.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1	1			2	2					2	1	2	1
CO2	2	1	1			2	2					3		2	1
CO3	2	2	1				1					2	2		
CO4	1	3	2									2	1		

Learning Resources:

Sl.	Title	Author	Publishers
	Text Book:		
1	Non-conventional sources of energy	G D Rai	Khanna Publication, 2012
2	A Course in Electrical Power	Soni, Gupta & Bhatnagar	Dhanpat Rai and Sons (NewDelhi), 2013
	Reference Books:		
1	Electrical Power Transmission and Distribution	K.L. Ratnakar	New Age International Publication, ISBN No. 978-81-224-3924-3.2016
2	Power System Engineering	A Chakrabarthi, M L Soni, P V Guptha & Dhanpat, US Bhatnagar	Dhanpat rai Publication, 2009 edition
3	Electric Power Generation Transmission and Distribution	S M Singh	PHI, 2004
4	Electric Power Generation Transmission and Distribution	S M Singh	P.H.I., New Delhi 2010.
NPTEL: /nptel.ac.in/courses/108/105/108105058. https://nptel.ac.in/courses/108/102/108102047			

*** Note:** Visit to Related Industry/ Power Plant and Report Submission is Mandatory and Carries 20% of CIE.

Syllabus for the Academic Year – 2024 - 2025
Department: Electrical & Electronics Engineering
Semester: III
Course Name: EE DEPARTMENT SKILL LAB - 1 (Level-II)
Course Code: PC-22EE306 **L-P-C: 1-2-2**

Course Objectives:

1. To apply the basic concepts of network theorems using PSPICE.
2. To Analyze the Resonant Phenomenon using PSPICE.
3. To Measure the Basic Electrical Parameters.

SL	Description
1	Verification of Reciprocity, Thevenin's theorem, Maximum Power Transfer Theorem using PSPICE.
2	Verification of Superposition and Millman's theorem using PSPICE.
3	Resonance Characteristics for series and Parallel Circuits using PSPICE.
4	Measurement of low resistance using kelvin's double bridge.
5	Measurement of Capacitance and its dissipation factor using Desauty's Bridge.
6	Measurement of Power and Power Factor using Two-Wattmeter Method.

Course Outcomes:

After completion of course, student will be able to:

1. Apply the basic concepts of network theorems using PSPICE.
2. Analyze the Resonant Phenomenon using PSPICE.
3. Measure the Basic Electrical Parameters.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	2	2	2	3	3	3	2	3	3	2	3
CO2	2	2	3	2	2	2	2	3	3	3	2	3	3	2	3
CO3	2	2	2	2	2		2	3	3	3	2	3	3	2	3

Syllabus for the Academic Year 2024 - 2025

Department: Common to all branches of engineering
Semester: III (Group-1.branches-CE/ME/EEE/CSE/AI&ML)
Semester: IV (Group-2.branches –ISE/ECE/ETE/MLE/DSE)

Subject Name: Universal Human Values
Subject Code: HS- 22HS307 **L-P-C: 2-0-1**

Course Objectives:

This introductory course input is intended:
1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.
4. This course is intended to provide a much needed orientation input in value education to the young enquiring minds.

UNIT	Description	Hours
I	**Introduction to Value Education:** 1.Understanding Value education-Need, Guidelines, content, Role of education-Sanskar 2. Process for Value Education-Self-exploration, the Dialogue Within. 3. Continuous Happiness and Prosperity – the Basic Human Aspirations 4. Right Understanding, Relationship and Physical Facility 5. Exploring the Meaning of Happiness and Prosperity. 6. Method to Fulfill the Basic Human Aspirations	**06**
II	**Harmony in the Human Being:** 7. Understanding the Human being (As the Co-existence of the Self and Body) 8. Distinguishing between the Needs of the Self and the Body 9. The Body as an Instrument of the Self-The response of the self and the body 10: Understanding Harmony in the Self-State of imagination 11: understanding Harmony of the Self with the Body 12: Programme to ensure self-regulation and Health-Nurturing the body	**06**

III	**Understanding Harmony in the Family and Society** 13: Harmony in the Family – the Basic Unit of Human Interaction 14: Values in Human-to-Human Relationship 15: 'Trust' – the Foundational Value in Relationship 16: 'Respect' – as the Right Evaluation 17: Other Naturally Acceptable Feelings in Relationship-Affection, Care, Guidance, Reverence, Glory, Gratitude and Love 18: Vision for the Universal Human Order-from family to world family	**06**
IV	**Understanding Harmony in the Nature/Existence:** 19: Understanding Harmony in the Nature 20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature 21:Realizing Existence as Co-existence at All Levels 22: The Holistic Perception of Harmony in Existence	**06**
V	**Implications of the Holistic Understanding – a Look at Professional Ethics** 23: Natural Acceptance of Human Values 24: Definitiveness of (Ethical) Human Conduct 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order 26: Competence in Professional Ethics 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies 28: Strategies for Transition towards Value-based Life and Profession	**06**

Course Outcomes:

After completion of the course student will be able to understand

1. By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

2. They would have better critical ability, also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).

3. It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

4. This is only an introductory foundational input. It would be desirable to follow it up by

a) Faculty-student or mentor-mentee programs throughout their time with the institution

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1		3	3	3	2	3					
CO2				2		3	3	3	2	3					
CO3				2		3	3	3	2	3					
CO4				2		3	3	3	2	3					

Learning Resources:

Sl.	Title	Author	Publishers
	Text Book:		
1	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Sangal G P Bagaria	Excel Books, New Delhi,2010
2	A Foundation Course in Human Values and, Professional Ethics	R R Gaur, R Asthana, G P Bagaria	2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
	Reference Books:		
1	Jeevan Vidya EkParichaya	A Nagaraj	Jeevan Vidya Prakashan, Amarkantak, 1999.
2	Human Values	A.N. Tripathi	New Age Intl. Publishers, New Delhi, 2004
3	The Story of Stuff (Book).	Small is Beautiful - E. F Schumacher. ii)Slow is Beautiful - Cecile Andrews	
4	The Story of My Experiments with Truth	Mohandas Karamchand Gandhi	

SUGGESTED ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions; self-assessment will be used in evaluation.
Example: Assessment through 2-Tests, each carries 25 marks
The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

Syllabus for the Academic Year 2024 - 2025

Department: Common to all branches of engineering
Semester: III (Group-1.branches -CE/ME/EEE/CSE/AI&ML)
Semester: IV (Group-2.branches-ISE/ECE/ETE/MLE/DSE)

Subject Name: Environmental Studies
Subject Code: HS-22ES308 **L -P-C: 2-0-1**

Course Objectives:

1. To identify the major challenges in environmental issues and evaluate possible solutions.
2. Develop analytical skills, critical thinking and demonstrate socio-economic skills for sustainable development.
3. To gain knowledge on different types of pollution in the environment.
4. To analyze an overall impact of specific issues and develop environmental management plan environment.

COURSE TOPICS

The course has 28 lectures in 5 Units. The 2- lecture hours per week of 1-hour duration.
The syllabus for the lectures is given below

UNIT	Description	Hours
I	Introduction: Environment - Components of Environment Ecosystem: Types of Ecosystem, Balanced ecosystem. Human Activities – Food, Shelter, And Economic & Social Security, Effects of human activities on environment-Agriculture, Housing, Industry, Mining & Transportation. Environmental Impact Assessment (EIA), Sustainable Development.	**06**
II	Natural Resources-Introduction, types of resources, Water resources – Availability & Quality aspects, Water borne diseases &water induced diseases, Fluoride problem in drinking water. Mineral resources**,** Forest Wealth. Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.	**06**
III	Energy – Different types of energy, Conventional sources & Non-conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass &Biogas Fossil Fuels, Hydrogen as an alternative energy.	**04**
IV	Environmental Pollution – Air Pollution & Automobile Pollution Water Pollution, Noise pollution, Land Pollution, Public Health Aspects. Global Environmental Issues: Population Growth, Urbanization, Land Management, Water& Waste Water Management.	**06**
V	Definition, Effects – Global Warming, Acid rain &Ozone layer depletion, controlling measures. Solid Waste Management, E - Waste Management & Biomedical Waste Management -Sources, Characteristics & Disposal methods. Environmental Acts & Regulations, Role of government, Legal aspects, Role of Non-governmental Organizations (NGOs) , Environmental Education	**06**

Course Outcomes:

1. Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
3. Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	1	1	1	3	3	2	2	2	1	3			
CO2	2	2	1	1	1	3	3	2	2	2	1	1			
CO3	2	2	1	1	1	3	3	2	2	2	1	1			
CO4	2	2	1	1	1	3	3	2	2	2	1	1			

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Environmental Studies	Benny Joseph, Tata McGraw	Hill Publishing Company Limited (2005), Delhi.
2	Environmental Studies	R Rajagopalan	From Crisis to Cure", Oxford University Press, 2005
Reference Books:			
1	Environmental Science and Engineering	Aloka Debi	Universities Press (India)Pvt. Ltd. 2012
2	Environmental Studies	R.J. Ranjit Daniels and Jagadish Krishnaswamy	Wiley India Private Ltd., New Delhi(2009),
3	Text Book of Environmental and Ecology	Dr. Pratiba Sing, Dr. Anoop Singh and Dr. Piyush Malaviya	Acme Learning Pvt. Ltd. New Delhi
4	Environmental Science	G. Tyler Miller	Jr., Eleventh Edition, Thomson Brooks /Cole, 2006

SUGGESTED ASSESSMENT:

Internal Assessment through 2-Tests, each carries 25 marks
The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY, TUMAKURU-572105
(A Constituent College of Sri Siddhartha Academy of Higher Education, Deemed-to-be-University)
Scheme of Teaching and Examination-2022 (160 Credits Scheme, NEP-Batch)

SECOND YEAR B.E., ELECTRICAL AND ELECTRONICS ENGINEERING

4th Semester BE **Academic year 2024-25**

SI No	Course Code		Course Title	Teaching Dept.	L	T	P	Credits	CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	BS	22ES401	Probability and Advanced Linear Algebra	MA	3	-	-	3	50	50	100	3
2	PC	22EE402	Control Systems	EE	3	-	-	3	50	50	100	3
3	PC	22EE403	Power Electronics	EE	3	-	2	4	50	50	100	3
4	PC	22EE404	Transformers and Induction Machines	EE	3	-	2	4	50	50	100	3
5	PC	22EE405	Electrical Measurements and Transducers	EE	3	-	-	3	50	50	100	3
6	PC	22EE406	Dept. Skill Lab-2 (Level – III)	EE	1	-	2	2	50	50	100	3
7	HS	22SK407	Skill Development-1	T&P	1	-	-	1	50	-	50	-
8	HS	22HS408	Constitution of India	HS	1	-	-	1	50	-	50	-
L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination				**Total**	**18**	**-**	**6**	**21**	**400**	**300**	**700**	**-**

Credits Distribution: Basic Science (BS)=08+08+3+3=22, Engineering Science (ES)=10+11=21, Humanities & Social Sciences (HS)=1+2+2=5, Program Core (PC)=02+16+16=34, Total Credits=20+20+21+21=82. Total 60 AICTE Activity points need to earn by each regular student and Total 35 AICTE Activity points need to earn by each Lateral entry student at the end of 2nd Year BE.

Syllabus for the Academic Year – 2024 - 2025

Department: Mathematics
Semester: IV
Course Name: Probability and Advanced Linear Algebra
Course Code: BS-22ES401 **L-P-C: 3-0-0-3**

Course Objectives:

1. Introduce the concept of vector space, linear transformations, probability and joint probabilitydistributions and complex analysis.
2. Apply discrete and continuous probability distributions for single and two variables in analyzing the probability models arising in engineering field.
3. Study the concept of joint probability distribution and Markov chain.
4. Apply the vector space and linear transformation problems in engineering fields.

UNIT	Description	Hours
I	**Vector spaces:** Solution of system of equations by LU decomposition method. Vector space, Sub spaces, Linear Combinations, Linear Spans, row space and column space of a Matrix, Linear Dependence and Independence (all statements only). Basis and Dimensions: Basis and Dimensions of Vector space and problems.	**08**
II	**Linear transformation:** Introduction, Linear Mappings, Kernel and Image of a linear transformations, Matrix representation of linear transformations, Range space, Null space, Nullity, Rank-Nullity Theorem, Singular and Nonsingular linear transformations (all statements only), Problems.	**07**
III	**Probability Distributions**: Review of basic probability theory. Random variables (Discrete and Continuous), Probability of mass/density functions and problems. Binomial distribution, Poisson's distribution and Normal distribution (without derivations) and problems.	**09**
IV	**Joint probability distribution:** Joint probability distribution for two discrete random variables, Marginal distributions, Expectation, covariance, problems. Markov Chain: Probability Vector, Stochastic Matrix, Regular Stochastic Matrix, definition of Markov chain, Transition Probabilities and Transition probability Matrix, Higher Transition Probabilities, stationary distribution of regular Markov chains, problems.	**08**
V	**Complex Analysis**: Review of function of a complex variables, limits, continuity and differentiability. Analytic functions, Cauchy-Reimann equations in Cartesian and polar forms (without proof). Properties and construction of analytic functions by Milne-Thompson Method. Bilinear Transformations.	**08**

Course Outcomes:

After completion of course, student will be able to:

1. Understand the concept of vector space, Basis and Dimensions, linear transformations and complex analysis.
2. Formulate and solve mathematical problems on probability distribution, LU-decomposition method, and linear transformations.
3. Make use of linear transformations, stochastic process and complex analysis to solve the Engineering problems.
4. Apply and analyze the concept of Joint probability distribution and stochastic models in Engineering fields.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3														
CO2	3	1													
CO3	3	2													
CO4	3	2													

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Higher Engineering Mathematics	B.S.Grewal	43rd Edition Khanna Publications, 2015. ISBN:9788174091956
2	An Introduction to Probability Theory and its Applications	W.Feller	3rd Edition, John Wiley & Sons, Inc,2008. ISBN:9788126518050
Reference Books:			
1	A First Course in Probability	S.Ross	8th Edition,Pearson,2010. ISBN:9780136033134
2	Higher Engineering Mathematics	B.V.Ramana	1st Edition, Tata McGraw-Hill,2006. ISBN:9780070634190

Syllabus for the Academic Year–2024-2025

Department: Electrical & Electronics Engineering
Semester: IV
Course Name: CONTROL SYSTEMS
Course Code: PC-22EE402

L-P-C: 3-0-3

Course Objectives:

1. To Summarize the concepts of mathematical models of physical systems, transfer functions, stability analysis and compensating networks.
2. To solve RH criteria and Laplace Transform for stability analysis.
3. To Inspect the response of the system for different inputs and stability by RH criteria.
4. To Justify the stability of the system using frequency domain analysis

Unit	Description Hours	Hours
1	**Introduction and mathematical models of control systems**: Introduction, example of control systems, closed loop versus open loop control system, mechanical systems, and electrical systems, electrical analogous of mechanical systems. (Gear trains excluded)	**08**
2	**Block diagrams and signal flow graphs**: Transfer function of Electrical systems and Mechanical Systems, block diagrams, signal flow graphs (State variable formulation excluded).	**08**
3	**Time Domain Analysis**: Time response of continuous–data systems, typical test signals for the time response of continuous systems, steady state error, unit step response & time domain specifications, transient response of a prototype second order system.	**08**
4	**Stability Analysis**: Introduction, determining Stability by RH Criterion. Root locus technique: Basic properties of the root loci, construction of root loci.	**08**
5	**Frequency domain analysis**: Introduction, Nyquist criteria for stability, relative stability, GM and PM, stability analysis by Bode plot, Introduction to compensators, lead, lag, lead & lag compensator (Transfer functions only).	**08**

Course Outcomes:

After completion of course, student will be able to:

1. Summarize the concepts of mathematical models of physical systems, transfer functions, stability analysis and compensating networks.
2. Solve the concept of Laplace transformation and RH criteria for stability analysis.
3. Inspect the response of the system for different inputs and stability by RH criteria.
4. Justify the stability of the system using frequency domain analysis.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3		2		3						2	3		
CO2	1	2		2		3						1	3		
CO3	3	2		2		3						1	3		
CO4	3	2		2											

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Modern control Engineering	K Ogata	P.H.I publication.5th edition, 2010
2	Control Systems Engineering	J Nagrath and M Gopal	New age International, 5th edition, 2008
Reference Books:			
1	Automatic control systems	Benjamin c kuo	P.H.I publication.9th edition, 2010
2	Control Systems	Ashfaq Husain and Haroon Ashfaq	Dhanpat rai and Co. (p) Ltd., 1st Edition, 2011.
3	Control Systems	A. Nagoor Kani	RBA Publications, 2nd Re-print, 1999
4	Control System Engineering	H M Rai	Sathya Prakashan, New Delhi. Reprint 1995
NPTEL: https://nptel.ac.in/courses/107/106/107106081			

Syllabus for the Academic Year – 2024 - 2025

Department: Electrical & Electronics Engineering
Semester: IV
Course Name: POWER ELECTRONICS
Course Code: P C - 22EE403 **L-P-C: 3-2-4**

Course Objectives:

1. To provide an introduction to power electronics and its applications in various fields.
2. To familiarize students with the working principles, control characteristics, and types of power semiconductor devices used in power electronics.
3. To understand the structure, operation, steady-state characteristics, and switching characteristics of Power MOSFETs, IGBTs, Thyristors, and Controlled Rectifiers.
4. To explore the principles of operation, performance parameters, and various types of power electronic converters such as inverters, AC voltage controllers, and choppers.

UNIT	Description	Hours
I	**Power Semiconductor Devices:** Introduction to Power Electronics, Power semiconductor devices, Control Characteristics, Types of power electronicconverters. Wide band gap. **Power MOSFET:** Structure, operation, steady state characteristics, switching characteristics.	**08**
II	**IGBT**: Structure, Operation, steady state characteristics, switchingcharacteristics. **Thyristors:** Structure, Two Transistor Model, steady state characteristics,switching characteristics. Communication Techniques	**08**
III	**Controlled Rectifiers:** Principle of phase controlled converter operation, Single-phase half wave and Full wave converters, Three-phase half-wave and full-wave converters. (Continuous conduction mode only).	**08**
IV	**Inverters:** Principle of operation, Performance parameters, Single-phase half wave and full bridge inverters, Three phase inverters (180 and 120 degree conduction mode), SPWM technique for single phase and three phase inverter.	**08**
V	**AC Voltage Controllers:**Principle of ON-OFF and phase control, Single-phase bi-directional controllers with Resistive load. **Choppers:** Principle of step-down and step-up chopper with R and R-L load,Performance parameters, Chopper classification.	**08**

LAB CONTENT

SL. NO.	Description
1.	a) Static characteristics of SCR b) Static characteristics of MOSFET
2.	Single-phase controlled full-wave rectifier with R and R-L loads.
3.	Simulation of single phase fully controlled converter for R and RL load using MATLAB/SIMULINK.
4.	A.C. voltage controller using TRIAC and DIAC combination connected to R and R-L loads.
5.	Simulation of single phase A.C. voltage controller for R and RL load using MATLAB/SIMULINK.
6.	a) Step down chopper feeding R and RL load. b) Step up chopper feeding R and RL load.
7.	a) Simulation of Step down chopper for R and RL load using MATLAB/SIMULINK. b) Simulation of Step up chopper for R and RL load using MATLAB/SIMULINK.
8.	a) Simulation of single phase full bridge inverter for R and RL load using MATLAB/SIMULINK. b) Simulation of three phase full bridge inverter for R and RL load using MATLAB/SIMULINK.

Course Outcomes:

At the end of the course, the student will be able to:

1. Demonstrate a clear understanding of power electronics and its significance in modern electronic systems.
2. Analyze and evaluate the structure, operation, and characteristics of different power semiconductor devices, including Power MOSFETs, IGBTs, Thyristors, and Controlled Rectifiers.
3. Design and implement various power electronic converters such as inverters, AC voltage controllers, and choppers, considering different load conditions.
4. Apply appropriate control techniques and modulation strategies to optimize the performance of power electronic systems, taking into account factors such as efficiency, power quality, and reliability.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	1										1	2	1	
CO2	1	3	1	1		2					1	1	2	1	
CO3	2	3	3	1	2						1	1	2	1	
CO4	2	3	3	1	2						1	1	2	1	

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Power Electronics	M H Rashid	Pearson, 3rdEdition, 2006
2	Power Electronics	M D Singh and Khan Chandani K B	2nd Edition, 2001.
Reference Books:			
1	Power Electronic Converters, Applications and Design	Ned Mohan, Tore M Undeland, and William Robins	3rd Edition, 2008
2	Power Electronics A Simplified Approach	R S Ananda Murthy and V Nattarasu	Pearson& Sanguine Technical Publishers, Power Electronics Essentials and Applications, L Umanand, Reprint,2001
NPTEL: https://nptel.ac.in/courses/108/102/108102145			

Syllabus for the Academic Year – 2024 – 2025

Department: Electrical & Electronics Engineering
Semester: IV
Course Name: TRANSFORMERS AND INDUCTION MACHINES
Course Code: PC-22EE404

L-P-C: 3-2-4

Course Objectives:

1. To Summarize the basic concepts of Transformers and Induction Motors.
2. To apply testing methods on Transformers and Induction Motors.
3. To analyze performance characteristics of Transformers and Induction Motors.
4. To evaluate the results obtained from tests conducted on Transformers and Induction Motors.

UNIT	Description	Hours
I	**Single phase transformer:** Introduction, Principle of operation, EMF equation, Operation of practical transformer under no-load and on load (Resistive load) with Phasor diagram, Losses in a Transformer, Open circuit and Short circuit tests, Efficiency & Voltage regulation	**08**
II	Testing of Transformer: Sumpner's test, Pre-determination of efficiency, All day efficiency. Parallel operation of transformers with equal voltage ratios and necessary conditions.	**08**
III	**Three-phase Transformer:** Transformer connections for three phase operation- Star / Star, Delta/Delta, Star/Delta, Delta / Star, Scott connection for three- phase to two-phase conversion.	**08**
IV	**Three-phase Induction Motor:** Operating principle, Rotating Magnetic Field, Constructional details, power Stages, efficiency, output power, torque, current and power factor, Torque-slip characteristics, Equivalent circuit (theory).	**08**
V	**Circle Diagram:** No-load and blocked rotor tests. Circle diagram and performance evaluation of the motor. **Starting and Speed Control of Three-phase Induction Motor:** Need for starter. DOL, Star Delta and auto transformer starters.	**08**

LAB CONTENT

SL.	Description
I	OC and SC test on Single-phase transformer, predetermination of efficiency & regulation
II	Sumpner's test to find the efficiency of transformers.
III	Parallel operation and load sharing of two dissimilar single phase transformers.
IV	Polarity test and Connection of three single transformers in Star/Star, Star/delta, Delta/Star, Delta/Delta and find their transformation ratio.
V	Conversion of Voltage from three phase to two phase using Scott connection.
VI	Load Test on single phase induction motor by mechanical loading
VII	No Load & Blocked rotor tests on three-phase Induction Motor and to obtain equivalent Circuit diagram.
VIII	Performance Characteristics of three-phase Induction Motor from Circle diagram

Course Outcomes:

After completion of course, student will be able to:

1. Summarize the basic concepts of Transformers and Induction Motors.
2. Apply testing methods on single phase and three phase transformers.
3. Analyze performance characteristics of Transformers and Induction Motors.
4. Evaluate the results obtained from tests conducted on Transformers and Induction Motors.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	3		2		3						2	1		
CO2	2	1		2		3						2	1		
CO3	3	2		2		3						1	1		
CO4	1	1													

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Electrical Machines	I.J Nagrath and D.P.Kothari	T M H,3rd Edition ,2004, ISBN: 0-07-058377-3
2	Electrical Technology	B.L. Theraja	Vol. 2 AC and DC Machines: A.K. Theraja,S. Chand & Company Ltd., Twenty third Edition, 2016 ISBN 978-81-219-24375
Reference Books:			
1	Electrical Machines and Transformers	Kosco	P H I, Second Edition, 2007
2	Electrical Machines	Ashfaq Hussain, Dhanpatrai and Co	Second Edition, 2002
3	Performance and Design of A.C. Machines	M.G. Say	C.B.S. Publishers,2005
4	Theory of Alternating Current Machines	Alexander Langsdorf	T M H.,2001
NPTEL: https://nptel.ac.in/courses/108/102/108102146			

Department: Electrical & Electronics Engineering
Semester: IV
Course Name: ELECTRICAL MEASUREMENTS AND TRANSDUCERS
Course Code: P C - 22EE405 **L-P-C: 3-0-3**
Course Objectives:

Course Objectives:

1. To explain the concept of various electrical and electronic measuring instruments, Transducers, and Sensors.
2. To apply the measurement techniques to measure circuit parameters and electrical quantities.
3. To analyze the working principle of measuring instruments.
4. To design the proper instruments for measuring the electrical quantities.

UNIT	Description	Hours
I	**Measurement of Resistance, Inductance and Capacitance:** Classification of Resistance, Wheatstone bridge- sensitivity analysis, limitations, Kelvin's double bridge, Megger, Anderson's bridge, Maxwell's bridge, Schering bridge, Sources and detectors.	**08**
II	**Extension of Instrument ranges:** shunts and multipliers, construction and theory of instrument transformers, equations of ratio and phase angle errors of C.T and P. T (derivation excluded), illustrative examples.	**08**
III	**Measurement of Power & Energy related Parameters:** Construction and operation – Dynamometer type wattmeter, Digital energy meter, Maximum demand indicator, Tri-vector meter, single phase power factor meter (electro dynamometer type), Weston frequency meter and phase sequence indicators.	**08**
IV	**Electronic Instruments**- Introduction, True RMS responding voltmeter, Electronic multi-meter, Digital Voltmeters – Ramp type, Successive approximation, LCR meter **Display Devices**: Digital display system, classification, LEDs & LCD. **Sensors – Principle of working & limitations:** Types – Proximity Sensor, Accelerometer, IR-Sensor (Infrared Sensor), Pressure Sensor, Light Sensor, Ultrasonic Sensor, Smoke , Gas and Alcohol Sensor	**08**
V	**Transducers:** Introduction, electrical transducers, selection, resistive transducers, strain gauges, expression for gauge factor, thermo-couples, LVDT, inductive transducers, capacitive transducers, Piezoelectric transducers, photo electric transducers, Hall effect sensors, introduction to data acquisition system.	**08**

Course Outcomes:

At the end of the course, student will be able to:

1. Explain the concept of various electrical measuring instruments and electronic measuring instruments, Transducers, and Sensors.
2. Apply the measurement techniques to measure circuit parameters and electrical quantities.
3. Analyze the working principle of measuring instruments.
4. Design the proper instruments for measuring the electrical quantities.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2		1			1	2		2			2	2	2	
CO2	2	2	1	1		1	1		1			2		2	
CO3	1	2										2	2		
CO4		1	2	1								1	1		

Learning Resources:

Sl.	Title	Author	Publishers
Text Book:			
1	Electrical and Electronic Measurements and Instrumentation	AK Sawhney	Fifth edition, 2009
2	Sensor & transducers	D. Patranabis	PHI Learning, 2005
Reference Books:			
1	Electrical and Electronics Measurements and instrumentation	JB Guptha	fifth edition, 2015
2	Principles of measuring systems	John P Bently	Fourth edition,2012
NPTEL: https://nptel.ac.in/courses/108/105/108105153			

Department: Electrical & Electronics Engineering
Semester: IV
Course Name: EE DEPARTMENT SKILL LAB - 2 (Level-III)
Course Code: PC-22EE406 **L-P-C: 1-2-2**

Course Objectives:

1. To understand the basic concepts of OP-AMP, Servo motors, time domain and frequency domain methods.
2. To evaluate the performance of different controllers.
3. To apply the concept of Root locus and Bode plots for stability studies.

SL	SYLLABUS CONTENT
1	**Regulated Power Supply:** Implementation of various DC Regulated Power Supply.
2	Design and Analysis of OP-AMP Applications
3	Performance of a second order system for different damping conditions Using MATLAB.
4	Torque-speed characteristics of DC and AC Servo motor.
5	Step response of P, PI , PD and PID controller.
6	Root locus and Bode plots using MATLAB .

Course Outcomes:

1. Understand the basic concepts of OP-AMP, Servo motors, time domain and frequency domain methods.
2. Evaluate the performance of different controllers.
3. Apply the concept of Root locus and Bode plots for stability studies.

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	2	2	2	2	3	3	3	2	3	3	2	3
CO2	2	2	3	2	2	2	2	3	3	3	2	3	3	2	3
CO3	2	2	2	2	2		2	3	3	3	2	3	3	2	3

Syllabus for the Academic Year 2024 - 2025

Department: Common to all branches of engineering
Semester: III (Group-2.branches -ISE/ECE/ETE/MLE/DSE)
Semester: IV (Group-1.branches -CE/ME/EEE/CSE/AI&ML)

Subject Name: SKILL DEVELOPMENT- I
(Communication Skills and Professional Ethics)

Subject Code: HS- 22SK307/22SK407 **L -P-C: 1-1-1**

Course Objectives:

1. Improve Communication Skills: Enhance students' ability to express ideas clearly, listen actively, and adapt communication style to different contexts and audiences.
2. Foster Effective Teamwork: Develop students' teamwork skills, including cooperation, active participation, conflict resolution, and leveraging diverse strengths for collaborative
3. Enhance Leadership Abilities: Cultivate leadership qualities by helping students develop self-awareness, problem-solving skills, and decision-making abilities
4. Promote Professional Etiquette: Instill a sense of professionalism in students, emphasizing appropriate workplace behavior, business etiquette, and ethical conduct.

COURSE TOPICS

The course has 28 lectures in 5 Units. The 2- lecture hours per weekof 1-hour duration.
The syllabus for the lectures is given below

UNIT	Description	Hours
I	**Communication Skills**: Basics, Method, Means, Process and Purpose, Basics of Business Communication, Written & Oral Communication, Listening. Communication with Confidence & Clarity- Interaction with people, the need the uses and the methods, Getting phonetically correct, using politically correct language, Debate & Extempore.	06
II	**Assertive Communication-** Concept of Assertive communication, Importance and applicability of Assertive communication, Assertive Words, being assertive. **Presentation Skills** Discussing the basic concepts of presentation skills, Articulation Skills, IQ & GK, How to make effective presentations, body language & Dress code in presentation, media of presentation	05

III	**Team Work**: Team Work and its important elements Clarifying the advantages and challenges of team work Understanding bargains in team building Defining behavior to sync with team work Stages of Team Building Features of successful teams. **Body Language & Proxemics**: Rapport Building - Gestures, postures, facial expression and body movements in different situations, Importance of	05
IV	**Group discussion, Motivation and Stress Management** a. Theory &Evaluation : Understanding why and how is the group discussion conducted. b. Techniques of group discussion c. Discussion on FAQs of group discussion d. Body language during group discussion Self-motivation, group motivation, leadership abilities, Stress clauses and stress busters to handle stress and de-stress; Understanding stress - Concept of sound body and mind, Dealing with anxiety, tension, and relaxation techniques. Individual Counseling & Guidance, Career Orientation. Balancing Personal & Professional Life	06
V	**Interview Skills, Professional Practice** a. Personal and Group Interviews b. Mock Interviews - Questions asked & how to handle them c. Body language in interview d. Etiquette, Dress code in interview e. Behavioral and technical interviews f. Practice on stress interviews, technical interviews, General HR interviews **Professional Practice**: Professional Dress Code, Time Sense, Respecting People & their Space, Relevant Behavior at different Hierarchical Levels. Positive Attitude, Self Analysis and Self-Management. Professional Ethics values to be practiced, standards and codes to be adopted as professional engineers in the society for various projects. Balancing Personal & Professional Life	06

Course Outcomes:

1. Improved Communication Skills: Students will demonstrate enhanced verbal and written communication abilities, effectively expressing ideas, actively listening, and adapting their communication style to different situations.
2. Effective Teamwork and Collaboration: Students will exhibit improved teamwork skills, actively contributing to group projects, resolving conflicts constructively, and leveraging the strengths of team members to achieve shared goals.
3. Professional Etiquette and Conduct: Students will display professional behavior, adhering to workplace etiquette, demonstrating appropriate appearance, punctuality, and practicing ethical conduct in professional settings.
4. Strengthened Aptitude Skills: Students will demonstrate improved aptitude skills, including logical reasoning, analytical thinking, and problem-solving abilities, enabling them to excel in competitive exams, interviews, and real-life problem-solving scenarios

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1					2		3	3	3					
CO2	1					2		3	3	3					
CO3	1					2		3	3	3					
CO4	1					2		3	3	3					

Learning Resources:

Sl.	Title	Author	Publishers
	Reference Books:		
1	Technical Communication Principles and Practices	Meenakshi Raman and Sangeeta Sharma	Oxford Publishers, 2004
2	Tools for Talking When Stakes are High	Kerry Patterson, Joseph Grenny, Ron McMillan, Crucial Conversation	McGraw-Hill Publication, ISBN: 9780071772204

SUGGESTED ASSESSMENT:

Internal Assessment through 2-Tests, each carries 25 marks
The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

Syllabus for the Academic Year 2024- 2025

Department: Common to all branches of engineering
Semester: III (Group-2.branches-ISE/ECE/ETE/MLE/DSE)
Semester: IV (Group-1.branches –CE/ME/EEE/CSE/AI&ML)

Subject Name: Constitution of India
Subject Code: HS- 22CI308/22CI408 **L-P -C: 1-1-1**

Course Objectives:

1. To be familiar with salient features and preamble of the constitution of India. Including fundamental rights of the citizen of India and types of Fundamental rights
2. To understand the relevance of directive principles under part-IV, and the responsibilities of the individuals towards society.
3. To understand the powers and functions of the Legislature, Executive, and judicial bodies.
4. To provide the information of FDs, Electoral Process, emergencies and amending procedures.

COURSE TOPICS

The course has 28 lectures in 5 Units. The 2- lecture hours per week of 1-hour duration.
The syllabus for the lectures is given below

UNIT	Description	Hours
I	Introduction, Meaning and definitions. Salient features, Sources, Constituent Assembly, Drafting Committee. Preamble to the constitution of India.	06
II	Fundamental rights under part III – details of exercise of rights, Scopes & Limitations and, important cases	06
III	Relevance of directive principles of state policy under part-IV Fundamental duties and their significance-part-IV A	06
IV	Union Executive- President, Prime minister, Parliament and Supreme Court of India. State Executive – Governors, Chief Ministers, State legislature and High Courts.	04
V	Constitutional Special Provisions for Scheduled Castes and Tribes, Women, Children and backward classes. Emergency provisions under Part XVIII. Electoral process, Amendment procedure, 42nd, 44th, 74th, 76th, and 91stConstitutional amendments.	06

Course Outcomes:

1. Have general knowledge and legal literacy and thereby to take up competitive examinations
2. Understand the freedom, rights and restrictions including directives, through fundamental duties
3. Understand the importance of the three main organs of the constitution, Viz-the legislature, the executive and the judiciary.
4. Understand the power and functions of political institutions established throughout the country

Course Articulation Matrix

PO/PSO CO	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1						2	1	3	3	2					
CO2						2	2	3	3	2					
CO3						2	3	3	2	2					
CO4						2	2	3	3	2					

Learning Resources:

Sl.	Title	Author	Publishers
	Text Book:		
1	Introduction to the Constitution of India	Durga Das Basu	EEE, 19th/20th Edn.,2001
2	An Introduction to Constitution of India	MV Pylee	Volume-1, Vikas Publishing, 2002
	Reference Books:		
1	An Introduction to Constitution of India	Brijkishore Sharma	Prentice-Hall of India, Volume-12002
2	Constitution of India and Professional Ethics	V. Rajaram	Second Edition New Age International Publication. 2011

SUGGESTED ASSESSMENT:

Internal Assessment through 2-Tests, each carries 25 marks
The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.