



Shree Sathyam College of Engineering and Technology

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

NH-544, Salem - Coimbatore Highways, Kuppanur, Sankari Taluk, Salem - 637301, TamilNadu, India.

Email : principal@shreesathyam.edu.in Web : www.shreesathyam.edu.in Phone : 04283 - 244080

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ANNA UNIVERSITY REGULATIONS: 2021

LIST OF COURSES

FIRST YEAR COURSES			
S.NO	NAAC CODE	SUBJECT CODE	SUBJECT NAME
01	C101	HS3152	PROFESSIONAL ENGLISH - I
02	C102	MA3151	MATRICES AND CALCULUS
03	C103	PH3151	ENGINEERING PHYSICS
04	C104	CY3151	ENGINEERING CHEMISTRY
05	C105	GE3151	PROBLEM SOLVING AND PYTHON PROGRAMMING
06	C107	GE3171	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
07	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY - (PHYSICS LABORATORY)
08	C108	BS3171	PHYSICS AND CHEMISTRY LABORATORY - (CHEMISTRY LABORATORY)
09	C109	GE3172	ENGLISH LABORATORY
10	C110	HS3252	PROFESSIONAL ENGLISH - II
11	C111	MA3251	STATISTICS AND NUMERICAL METHODS
12	C112	PH3202	PHYSICS FOR ELECTRICAL ENGINEERING
13	C113	BE3255	BASIC CIVIL AND MECHANICAL ENGINEERING
14	C114	GE3251	ENGINEERING GRAPHICS
15	C115	EE3251	ELECTRIC CIRCUIT ANALYSIS



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16	C117	GE3271	ENGINEERING PRACTICES LABORATORY
17	C118	EE3271	ELECTRIC CIRCUITS LABORATORY
18	C119	GE3272	COMMUNICATION LABORATORY / FOREIGN LANGUAGE
19	C201	MA3303	PROBABILITY AND COMPLEX FUNCTIONS
20	C202	EE3301	ELECTROMAGNETIC FIELDS
21	C203	EE3302	DIGITAL LOGIC CIRCUITS
22	C204	EC3301	ELECTRON DEVICES AND CIRCUITS
23	C205	EE3303	ELECTRICAL MACHINES - I
24	C206	CS3353	C PROGRAMMING AND DATA STRUCTURES
25	C207	EC3311	ELECTRONIC DEVICES AND CIRCUITS LABORATORY
26	C208	EE3311	ELECTRICAL MACHINES LABORATORY - I
27	C209	CS3362	C PROGRAMMING AND DATA STRUCTURES LABORATORY
28	C210	GE3361	PROFESSIONAL DEVELOPMENT
28	C211	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
29	C212	EE3401	TRANSMISSION AND DISTRIBUTION
30	C213	EE3402	LINEAR INTEGRATED CIRCUITS
31	C214	EE3403	MEASUREMENTS AND INSTRUMENTATION
32	C215	EE3404	MICROPROCESSOR AND MICROCONTROLLER
33	C216	EE3405	ELECTRICAL MACHINES - II
34	C217	EE3411	ELECTRICAL MACHINES LABORATORY - II
35	C218	EE3412	LINEAR AND DIGITAL CIRCUITS LABORATORY
36	C219	EE3413	MICROPROCESSOR AND MICROCONTROLLER LABORATORY

THRID YEAR COURSES



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36	C301	EE3501	POWER SYSTEM ANALYSIS
37	C302	EE3501	POWER ELECTRONICS
38	C303	EE3503	CONTROL SYSTEMS
39	C304	EE3014	POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS
40	C305	EE3004	HVDC AND FACTS
41	C306	EE3016	EMBEDDED SYSTEM DESIGN
42	C307	EE3511	POWER ELECTRONICS LABORATORY
48	C308	EE3512	CONTROL AND INSTRUMENTATION LABORATORY
49	C309	EE3601	PROTECTION AND SWITCHGEAR
50	C310	EE3602	POWER SYSTEM OPERATION AND CONTROL
51	C311	OSS353	DATA SCIENCE FUNDAMENTALS
52	C312	MX3089	INDUSTRIAL SAFETY
53	C313	EE3303	HYBRID ENERGY TECHNOLOGY
54	C314	EE3009	SPECIAL ELECTRICAL MACHINES
55	C315	EE3611	POWER SYSTEM LABORATORY
FINAL YEAR COURSES			
56	C401	EE3701	HIGH VOLTAGE ENGINEERING
57	C402	GE3791	HUMAN VALUES AND ETHICS
58	C403	GE3751	PRINCIPLES OF MANAGEMENT
59	C404	EE3032	ENERGY STORAGE SYSTEMS
60	C405	CME365	RENEWABLE ENERGY TECHNOLOGIES
61	C406	OBT355	BIOTECHNOLOGY FOR WASTE MANAGEMENT
62	C407	EE3811	PROJECT WORK/INTERNSHIP



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ANNA UNIVERSITY REGULATIONS: 2021

FIRST YEAR COURSES (I& II SEMESTER)

Course Outcomes (Cos) of the Electrical & Electronics Engineering

C101	HS3152	Professional English – I
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C101.1	To use appropriate words in a professional context
C101.2	To gain understanding of basic grammatical structures and use them in right context.
C101.3	To read and infer the denotative and connotative meanings of technical texts
C101.4	To read and interpret information presented in tables, charts and other graphic forms
C101.5	To write definitions, descriptions, narrations and essays on various topics

C102	MA3151	Matrices and Calculus
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C102.1	Use the matrix algebra methods for solving practical problems.
C102.2	Apply differential calculus tools in solving various application problems.
C102.3	Able to use differential calculus ideas on several variable functions.
C102.4	Apply different methods of integration in solving practical problems
C102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.



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C103	PH3151	Engineering Physics
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C103.1	Understand the importance of mechanics.
C103.2	Express their knowledge in electromagnetic waves.
C103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
C103.4	Understand the importance of quantum physics.
C103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands

C104	CY3151	Engineering Chemistry
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C104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
C104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
C104.3	To apply the knowledge of phase rule and composites for material selection requirements.
C104.4	To recommend suitable fuels for engineering processes and applications.
C104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.



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C105	GE3151	Problem Solving and Python Programming
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C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Develop and execute simple Python programs.
C105.3	Write simple Python programs using conditionals and looping for solving problems.
C105.4	Decompose a Python program into functions
C105.5	Represent compound data using Python lists, tuples, dictionaries etc.
C105.6	Read and write data from/to files in Python programs.

C107	GE3171	Problem Solving and Python Programming Laboratory
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C107.1	Develop algorithmic solutions to simple computational problems
C107.2	Develop and execute simple Python programs.
C107.3	Implement programs in Python using conditionals and loops for solving problems.
C107.4	Deploy functions to decompose a Python program.
C107.5	Process compound data using Python data structures.
C107.6	Utilize Python packages in developing software applications.



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C108	BS3171	Physics and Chemistry Laboratory
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C108.1	Understand the functioning of various physics laboratory equipment.
C108.2	Use graphical models to analyze laboratory data.
C108.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality
C108.4	Access, process and analyze scientific information.
C108.5	Solve problems individually and collaboratively.

C108.1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
C108.2	To determine the amount of metal ions through volumetric and spectroscopic techniques
C108.3	To analyse and determine the composition of alloys.
C108.4	To learn simple method of synthesis of nanoparticles
C108.5	To quantitatively analyse the impurities in solution by electro analytical techniques

C109	GE3172	English Laboratory
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C109.1	To listen to and comprehend general as well as complex academic information
C109.2	To listen to and understand different points of view in a discussion
C109.3	To speak fluently and accurately in formal and informal communicative contexts
C109.4	To describe products and processes and explain their uses and purposes clearly and accurately
C109.5	To express their opinions effectively in both formal and informal discussions



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C110	HS3252	Professional English - II
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C110.1	To compare and contrast products and ideas in technical texts
C110.2	To identify and report cause and effects in events, industrial processes through technical texts
C110.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
C110.4	To present their ideas and opinions in a planned and logical manner
C110.5	To draft effective resumes in the context of job search.

C111	MA3251	Statistics and Numerical Methods
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C111.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C111.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
C111.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
C111.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C111.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.



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C112	PH3202	Physics for Electrical Engineering
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C112.1	know basics of dielectric materials and insulation
C112.2	gain knowledge on the electrical and magnetic properties of materials and their applications
C112.3	understand clearly of semiconductor physics and functioning of semiconductor devices
C112.4	understand the optical properties of materials and working principles of various optical devices
C112.5	appreciate the importance of nanotechnology and nano devices.

C113	BE3255	Basic Civil and Mechanical Engineering
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C113.1	Understanding profession of Civil and Mechanical engineering.
C113.2	Summarise the planning of building, infrastructure and working of Machineries.
C113.3	Apply the knowledge gained in respective discipline
C113.4	Illustrate the ideas of Civil and Mechanical Engineering applications.
C113.5	Appraise the material, Structures, machines and energy.



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C114	GE3251	Engineering Graphics
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C114.1	Use BIS conventions and specifications for engineering drawing.
C114.2	Construct the conic curves, involutes and cycloid.
C114.3	Solve practical problems involving projection of lines.
C114.4	Draw the orthographic, isometric and perspective projections of simple solids.
C114.5	Draw the development of simple solids.

C115	EE3251	Electric Circuit Analysis
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C115.1	Explain circuit's behavior using circuit laws.
C115.2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit
C115.3	Compute the transient response of first order and second order systems to step and sinusoidal input
C115.4	Compute power, line/ phase voltage and currents of the given three phase circuit
C115.5	Explain the frequency response of series and parallel RLC circuits
C115.6	Explain the behavior of magnetically coupled circuits.



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C117	GE3271	Engineering Practices Laboratory
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C117.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
C117.2	Wire various electrical joints in common household electrical wire work.
C117.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
C117.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

C118	EE3271	Electric Circuits Laboratory
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C118.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit
C118.2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit
C118.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods
C118.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods
C118.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods



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C119	GE3272	Communication Laboratory / Foreign Language
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C119.1	Speak effectively in group discussions held in a formal/semi formal contexts
C119.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
C119.3	Write emails, letters and effective job applications.
C119.4	Write critical reports to convey data and information with clarity and precision
C119.5	Give appropriate instructions and recommendations for safe execution of tasks



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SECOND YEAR COURSES (III & IV SEMESTER)

Course Outcomes (Cos)

C201	MA3303	PROBABILITY AND COMPLEX FUNCTIONS
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C201.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon
C201.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications
C201.3	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
C201.4	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals
C201.5	To acquaint the students with Differential Equations which are significantly used in engineering problems.

C202	EE3301	ELECTROMAGNETIC FIELDS
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C202.1	Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects.
C202.2	Compute and analyse electrostatic fields, electric potential, energy density along with their applications
C202.3	Compute and analyse magneto static fields, magnetic flux density, vector potential along with their applications
C202.4	Explain different methods of emf generation and Maxwell's equations
C202.5	Explain the concept of electromagnetic waves and characterizing parameters



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C203	EE3302	DIGITAL LOGIC CIRCUITS
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C203.1	Explain various number systems and characteristics of digital logic families
C203.2	Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions
C203.3	Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders
C203.4	Design various synchronous and asynchronous circuits using Flip Flops
C203.5	Explain asynchronous sequential circuits and programmable logic devices
C203.6	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits

C204	EC3301	ELECTRON DEVICES AND CIRCUITS
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C204.1	Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode)
C204.2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes
C204.3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT
C204.4	Analyze the performance of various configurations of BJT and MOSFET based amplifier
C204.5	Explain the characteristics of MOS based cascade and differential amplifier
C204.6	Explain the operation of various feedback amplifiers and oscillators



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C205	EE3303	ELECTRICAL MACHINES - I
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C205.1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.
C205.2	Explain the construction and working principle of DC machines.
C205.3	Interpret various characteristics of DC machines.
C205.4	Compute various performance parameters of the machine, by conducting suitable tests.
C205.5	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation.
C205.6	Describe the working principle of auto transformer, three phase transformer with different types of connections.

C206	CS3353	C PROGRAMMING AND DATA STRUCTURES
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C206.1	Develop C programs for any real world/technical application.
C206.2	Apply advanced features of C in solving problems.
C206.3	Write functions to implement linear and non-linear data structure operations
C206.4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem.
C206.5	Appropriately use sort and search algorithms for a given application.
C206.6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.



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C207	EC3311	ELECTRONIC DEVICES AND CIRCUITS LABORATORY
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C207.1	Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally
C207.2	Analyze the characteristics of JFET and UJT experimentally
C207.3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally
C207.4	Analyze the characteristics of RC phase shift and LC oscillators experimentally
C207.5	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally
C207.6	Analyze the characteristics of FET based differential amplifier experimentally
C207.7	Calculate the frequency and phase angle using CRO experimentally
C207.8	Analyze the frequency response characteristics of passive filters experimentally

C208	EE3311	ELECTRICAL MACHINES LABORATORY - I
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C208.1	Construct the circuit with appropriate connections for the given DC machine/transformer.
C208.2	Experimentally determine the characteristics of different types of DC machines.
C208.3	Demonstrate the speed control techniques for a DC motor for industrial applications.
C208.4	Identify suitable methods for testing of transformer and DC machines.
C208.5	Predetermine the performance parameters of transformers and DC motor.
C208.6	Understand DC motor starters and 3-phase transformer connections.



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C209	CS3362	C PROGRAMMING AND DATA STRUCTURES LABORATORY
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C209.1	Use different constructs of C and develop applications
C209.2	Write functions to implement linear and non-linear data structure operations
C209.3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
C209.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
C209.5	Implement Sorting and searching algorithms for a given application

C210	GE3361	Professional Development
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C210.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
C210.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
C210.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.



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C211	GE3451	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY
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C211.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
C211.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
C211.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
C211.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
C211.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

C212	EE3401	TRANSMISSION AND DISTRIBUTION
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C212.1	Understand the structure of power system, computation of transmission line parameters for different configurations
C212.2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.
C212.3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.
C212.4	Design the underground cables and understand the performance analysis of underground cable.
C212.5	Understand the modelling, performance analysis and modern trends in distribution system.



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C213	EE3402	LINEAR INTEGRATED CIRCUITS
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C213.1	Explain monolithic IC fabrication process
C213.2	Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell.
C213.3	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp
C213.4	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters
C213.5	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs
C213.6	Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator

C214	EE3403	MEASUREMENTS AND INSTRUMENTATION
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C214.1	Ability to understand the fundamental art of measurement in engineering.
C214.2	Ability to understand the structural elements of various instruments.
C214.3	Ability to understand the importance of bridge circuits.
C214.4	Ability to understand about various transducers and their characteristics by experiments.
C214.5	Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments.



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C215	EE3404	MICROPROCESSOR AND MICROCONTROLLER
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C215.1	Ability to write assembly language program for microprocessor and microcontroller
C215.2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
C215.3	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring
C215.4	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.
C215.5	Ability to understand and appreciate advanced architecture evolving microprocessor field

C216	EE3405	ELECTRICAL MACHINES - II
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C216.1	Ability to understand the construction and working principle of Synchronous generator
C216.2	Ability to understand the construction and working principle of Synchronous Motor
C216.3	Ability to understand the construction and working principle of Three Phase Induction Motor
C216.4	Acquire knowledge about the starting and speed control of induction motors.
C216.5	To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.



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C217	EE3411	ELECTRICAL MACHINES LABORATORY - II
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C217.1	Ability to understand and analyze EMF and MMF methods
C217.2	Ability to analyze the characteristics of V and Inverted V curves
C217.3	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines
C217.4	Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors
C217.5	Ability to acquire knowledge on separation of losses

C218	EE3412	LINEAR AND DIGITAL CIRCUITS LABORATORY
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C218.1	Ability to understand and implement Boolean Functions.
C218.2	Ability to understand the importance of code conversion
C218.3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
C218.4	Ability to acquire knowledge on Application of Op-Amp
C218.5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.



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C219	EE3413	MICRO PROCESSOR AND MICRO CONTROLLER LABORATORY
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C219.1	Ability to write assembly language program for microprocessor.
C219.2	Ability to write assembly language program for microcontroller
C219.3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
C219.4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring
C219.5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

ANNA UNIVERSITY REGULATIONS: 2021

THIRD YEAR COURSES (V & VI SEMESTER)

Course Outcomes (Cos)

C301	EE3501	POWER SYSTEM ANALYSIS
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C301.1	Ability to model the power system under steady state operating condition
C301.2	Ability to carry out power flow analysis using.
C301.3	Ability to infer the significance of short circuit studies in designing circuit breakers.
C301.4	Ability to analyze the state of the power system for various unsymmetrical faults.
C301.5	Ability to analyze the stability of power system using different methods.

C302	EE3591	POWER ELECTRONICS
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C302.1	Understand the operation of semiconductor devices and dynamic characteristics and to design & analyze the low power SMPS
C302.2	Analyze the various uncontrolled rectifiers and design suitable filter circuits
C302.3	Analyze the operation of the n-pulse converters and evaluate the performance parameters
C302.4	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits
C302.5	Understand the operation of AC voltage controllers and its applications.



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C303	EE3503	CONTROL SYSTEMS
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C303.1	Represent simple systems in transfer function and state variable forms
C303.2	Analyze simple systems in time domain.
C303.3	Analyze simple systems in frequency domain.
C303.4	Infer the stability of systems in time and frequency domain
C303.5	Interpret characteristics of the system and find out solution for simple control problems.

C304	EE3014	POWER ELECTRONICS FOR RENEWABLE ENERGY SYSTEMS
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C304.1	Examine the available renewable energy sources.
C304.2	Demonstrate the working principles of electrical machines and power converters used for wind energy conversion system
C304.3	Demonstrate the principles of power converters used for solar PV systems
C304.4	Examine the available hybrid renewable energy systems.
C304.5	Simulate AC-DC converters, buck/boost converters, AC-AC converters and PWM inverters.



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C305	EE3004	HVDC AND FACTS
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C305.1	To Identify and understand the problems in AC transmission systems and understand the need for Flexible AC transmission systems and HVDC Transmission
C305.2	To understand the operation and control of SVC and TCSC and its applications to enhance the stability and damping.
C305.3	To Analyze basic operation and control of voltage source converter based FACTS controllers
C305.4	To demonstrate basic operation and control of Line Commutated HVDC Transmission
C305.5	To explain the d-q control based operation of VSC based HVDC Transmission

C306	EE3016	EMBEDDED SYSTEM DESIGN
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C306.1	The hardware functionals and software strategies required to develop various Embedded systems
C306.2	The basic differences between various Bus communication standards
C306.3	The incorporation of the interface as Interrupt services
C306.4	The various scheduling algorithms through a Real-time operating system.
C306.5	:The various embedded concepts for developing automation applications.



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C307	EE3511	POWER ELECTRONICS LABORATORY
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C307.1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT
C307.2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation.
C307.3	Analyze the voltage waveforms for PWM inverter using various modulation techniques.
C307.4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS.
C307.5	Understand the performance of AC voltage controllers by simulation and experimentation

C308	EE3512	CONTROL AND INSTRUMENTATION LABORATORY
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C308.1	To model and analyze simple physical systems and simulate the performance in analog and digital platform.
C308.2	To design and implement simple controllers in standard forms.
C308.3	To design compensators based on time and frequency domain specifications.
C308.4	To design a complete closed control loop and evaluate its performance for simple physical systems.
C308.5	To analyze the stability of a physical system in both continuous and discrete domain.



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C309	EE3601	PROTECTION AND SWITCHGEAR
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C309.1	Understand and select proper protective scheme and type of earthing
C309.2	Explain the operating principles of various relays.
C309.3	Suggest suitable protective scheme for the protection of various power system apparatus.
C309.4	Analyze the importance of static relays and numerical relays in power system protection.
C309.5	Summarize the merits and demerits and application areas of various circuit breakers.

C310	EE3602	POWER SYSTEM OPERATION AND CONTROL
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C310.1	Understand the day – to – day operation of power system.
C310.2	Model and analyse the control actions that are implemented to meet the minute-tomminute variation of system real power demand.
C310.3	Model and analyze the compensators for reactive power control and various devices used for voltage control.
C310.4	Prepare day ahead and real time economic generation scheduling.
C310.5	Understand the necessity of computer control of power systems.



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C311	OCS353	Data Science Fundamentals
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C311.1	Gain knowledge on data science process
C311.2	Perform data manipulation functions using Numpy and Pandas
C311.3	Understand different types of machine learning approaches
C311.4	Perform data visualization using tools.
C311.5	Handle large volumes of data in practical scenarios

C312	MX3089	Industrial Safety
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C312.1	Understand the basic concept of safety.
C312.2	Obtain knowledge of Statutory Regulations and standards
C312.3	Know about the safety Activities of the Working Place
C312.4	Analyze on the impact of Occupational Exposures and their Remedies
C312.5	Obtain knowledge of Risk Assessment Techniques



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C313	EE3033	Hybrid Energy Technology
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C313.1	Analyze the impacts of hybrid energy technologies on the environment and demonstrate them to harness electrical power.
C313.2	Select a suitable Electrical machine for Wind Energy Conversion Systems and simulate wind energy conversion system
C313.3	Design the power converters such as AC-DC, DC-DC, and AC-AC converters for SPV systems..
C313.4	Analyze the power converters such as AC-DC, DC-DC, and AC-AC converters for Hybrid energy systems. CO5: Interpret the hybrid renewable
C313.5	Interpret the hybrid renewable energy systems.

C314	EE3009	Special Electrical Machines
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C315.1	Ability to model and analyze power electronic systems and equipment using computational software
C315.2	Ability to optimally design magnetics required in special machines based drive systems using FEM based software tools.
C315.3	Ability to analyse the dynamic performance of special electrical machines
C315.4	Ability to understand the operation and characteristics of other special electrical machines.
C315.5	Ability to design and conduct experiments towards research.



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C316	EE3611	POWER SYSTEM LABORATORY
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C316.1	Model and analyze the performance of the transmission lines.
C316.2	Perform power flow, short circuit, and stability analysis for any power system network
C316.3	Understand, design, and analyze the load frequency control mechanism.
C316.4	Perform optimal scheduling of generators and compute the state of the power system.
C316.5	Understand, analyze, and apply the relays for power system protection.



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ANNA UNIVERSITY REGULATIONS: 2021

FINAL YEAR COURSES (VII & VIII SEMESTER)

Course Outcomes (Cos)

C401	EE3701	High Voltage Engineering
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C401.1	Explain various overvoltage's and its effects on power systems
C401.2	Understand the breakdown phenomena in different medium under uniform and non- uniform fields.
C401.3	Explain the methods of generating and measuring High DC, AC, Impulse voltage and currents.
C401.4	Suggest and Conduct suitable HV testing of Electrical power apparatus as per Standards
C401.5	Explain the Industrial Applications of Electrostatic Fields.

C402	GE3791	HUMAN VALUES AND ETHICS
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C402.1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life.
C402.2	Practice democratic and scientific values in both their personal and professional life.
C402.3	Find rational solutions to social problems.
C402.4	Behave in an ethical manner in society.
C402.5	Practice critical thinking and the pursuit of truth.



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C403	GE3751	PRINCIPLES OF MANAGEMENT
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C403.1	Upon completion of the course, students will be able to have clear understanding of managerial function like planning, organizing , staffing, leading & controlling.
C403.2	Have same basic knowledge on international aspect of management.
C403.3	Ability to understand management concept of organizing.
C403.4	Ability to understand management concept of directing
C403.5	Ability to understand management concept of controlling.

C404	EE3032	ENERGY STORAGE SYSTEMS
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C404.1	Understand different types storage technologies
C404.2	Design a thermal storage system
C404.3	Model battery storage system
C404.4	Analyze the thermodynamics of fuel cell
C404.5	Analyze the appropriate storage technologies for different applications
C404.6	Explore the alternate energy storage technologies.



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C405	CME365	RENEWABLE ENERGY TECHNOLOGIES
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C405.1	Discuss the Indian and global energy scenario.
C405.2	Describe the various solar energy technologies and its applications.
C405.3	Explain the various wind energy technologies.
C405.4	Explore the various bio-energy technologies.
C405.5	Discuss the ocean and geothermal technologies.

C406	OBT355	BIOTECHNOLOGY FOR WASTE MANAGEMENT
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C406.1	To learn the various methods biological treatment
C406.2	To know the details of waste biomass and its value addition
C406.3	To develop the bioconversion processes to convert wastes to energy
C406.4	To synthesize the chemicals and enzyme from wastes
C406.5	To produce the biocompost from wastes
C406.6	To apply the theoretical knowledge for the development of value added products



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C407	EE3811	PROJECT WORK/INTERNSHIP
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C407.1	Ability to identify, formulate, design, interpret, analyze and provide solutions to complex engineering and societal issues by applying knowledge gained on basics of science and Engineering
C407.2	Ability to choose, conduct and demonstrate a sound technical knowledge of their selected project topics in the field of power components, protection, high voltage, electronics, process automation, power electronics and drives instrumentation and control by exploring suitable engineering and IT tools
C407.3	Ability to understand, formulate and propose new learning algorithms to solve engineering and societal problems of moderate complexity through multidisciplinary projects understanding commitment towards sustainable development
C407.4	Ability to demonstrate, prepare reports, communicate and work in a team as a member/leader by adhering to ethical responsibilities.
C407.5	Ability to acknowledge the value of continuing education for oneself and to stay up with technology advancements



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