SRI SIVANI COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE OUTCOMES

A.Y.: 2023 - 24

……..

Year/Sem: II - I

Name of the Course: MATHEMATICS-IV (C201)

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

C201.01: apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic.
C201.02: find the differentiation and integration of complex functions used in engineering problems.
C201.03: make use of the Cauchy residue theorem to evaluate certain integrals.
C201.04: apply discrete and continuous probability distributions.
C201.05: design the components of a classical hypothesis test.
C201.06: infer the statistical inferential methods based on small and large sampling tests.

Name of the Course: ELECTRONIC DEVICES AND CIRCUITS (C202)

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

C202.01: understand the basic concepts of semiconductor physics.
C202.02: understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation
C202.03: know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
C202.04: understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
C202.05: know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
C202.06: perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

Name of the Course: ELECTRICAL CIRCUIT ANALYSIS – II (C203)

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

C203.01: understand the concepts of balanced and unbalanced three-phase circuits.
C203.02: know the transient behavior of electrical networks with DC excitations.

C203.03: learn the transient behavior of electrical networks with AC excitations using differential equations.
C203.04: learn the transient behavior of electrical networks with AC excitations using laplace transforms.
C203.05: estimate various parameters of a two-port network.
C203.06: understand the significance of filters in electrical networks.

Name of the Course: DC MACHINES AND TRANSFORMERS (C204)

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

C204.01: assimilate the concepts of electromechanical energy conversion.
C204.02: mitigate the ill-effects of armature reaction and improve commutation in dc machines.
C204.03: understand the torque production mechanism and control the speed of dc motors.
C204.04: analyze the performance of single-phase transformers.
C204.05: predetermine regulation, losses and efficiency of single-phase transformers.
C204.06: parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.

Name of the Course: ELECTRO MAGNETIC FIELDS (C205)

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

C205.01: compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions.
C205.02: calculate the capacitance and energy stored in dielectrics.
C205.03: calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.
C205.04: understand magnetic force, force on a current element in a magnetic field and Lorentz force equation.
C205.05: estimate self and mutual inductances and the energy stored in the magnetic field.
C205.06: understand the concepts of displacement current and Poynting theorem and Poynting vector.

Name of the Course: ELECTRICAL CIRCUITS LAB (C206)

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

C206.01: apply various theorems
C206.02: determination of self and mutual inductances
C206.03: two port parameters of a given electric circuits

C206.04: draw locus diagrams
C206.05: draw Waveforms and phasor diagrams for lagging and leading networks

Name of the Course: DC MACHINES AND TRANSFORMERS LAB (C207)

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

C207.01: Determine and predetermine the performance of DC machines and Transformers.
C207.02: Control the speed of DC motor.
C207.03: Obtain three phase to two phase transformation.

Name of the Course: ELECTRONIC DEVICES AND CIRCUITS LAB (C208)

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

C208.01: Analyze the characteristics of diodes, transistors and other devices.
C208.02: Design and implement the rectifier circuits, SCR and UJT in the hardware circuits.
C208.03: Design the biasing and amplifiers of BJT and FET amplifiers
C208.04: Measure electrical quantities using CRO in the experimentation.

Name of the Course: SKILL ORIENTED COURSE DESIGN OF ELECTRICAL CIRCUITS USING ENGINEERING SOFTWARE TOOLS (C209)

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

C209.01: write the MATLAB programs to simulate the electrical circuit problems.
C209.02: simulate various circuits for electrical parameters.
C209.03: simulate various wave form for determination of wave form parameters.
C209.04: simulate RLC series and parallel resonance circuits for resonant parameters.
C209.05: simulate magnetic circuits for determination of self and mutual inductances.

Year/Sem: II - II

Name of the Course: PYTHON PROGRAMMING (C210)

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

C210.01: understand PYTHON environment and basic data types.
C210.02: be fluent in the use of procedural statements, assignments, conditional statements, loops, method calls and arrays.
C210.03: understand about lists and dictionaries in python.
C210.04: know about file systems and modules.
C210.05: read and write config files in python and understand the concepts of object-oriented programming.
C210.06: understand types of errors and exceptions during execution of code.

Name of the Course: DIGITAL ELECTRONICS (C211)

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

C211.01: classify different number systems and apply to generate various codes.
C211.02: use the concept of Boolean algebra in minimization of switching functions
C211.03: design different types of combinational logic circuits.
C211.04: understand PROM, PAL, PLA – basic structures.
C211.05: apply knowledge of flip-flops in designing of Registers and counters.
C211.06: the operation and design methodology for synchronous sequential circuits and algorithmic state machines.

Name of the Course: POWER SYSTEMS – I (C212)

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

C212.01: identify the different components of thermal power plants.
C212.02: identify the different components of nuclear Power plants.
C212.03: identify the different components of air insulated substations.
C212.04: identify the different components of gas insulated substations.
C212.05: identify single core and three core cables with different insulating materials.
C212.06: analyze the different economic factors of power generation and tariffs.

Name of the Course: INDUCTION AND SYNCHRONOUS MACHINES (C213)

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

C213.01: explain the operation and performance of three phase induction motor.
C213.02: analyze the torque-speed relation, performance of induction motor and induction generator.
C213.03: implement the starting of three-phase induction motors.
C213.04: implement the starting of single-phase induction motors.
C213.05: develop winding design and predetermine the regulation of synchronous generators.
C213.06: implement methods of staring and correction of power factor with synchronous motor.

Name of the Course: MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS (C214)

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

C214.01: estimate the Demand and demand elasticities for a product.
C214.02: understand the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
C214.03: understand the nature of different markets and Price output determination under various market conditions.
C214.04: understand different Business cycles.
C214.05: prepare Financial Statements and the usage of various accounting tools for Analysis.
C214.06: evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

Name of the Course: PYTHON PROGRAMMING LAB (C215)

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

C215.01: write, Test and Debug Python Programs
C215.02: use Conditionals and Loops for Python Programs
C215.03: use functions and represent Compound data using Lists, Tuples and dictionaries
C215.04: use various applications using python

Name of the Course: INDUCTION AND SYNCHRONOUS MACHINES LAB (C216)

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

C216.01: assess the performance of single phase and three phase induction motors.
C216.02: control the speed of three phase induction motor.
C216.03: predetermine the regulation of three–phase alternator by various methods.
C216.04: find the X_d/X_q ratio of alternator and asses the performance of three–phase synchronous motor.
C216.05: determine the performance of single-phase AC series motor.

Name of the Course: DIGITAL ELECTRONICS LAB (C217)

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

C217.01: learn the basics of gates, filp-flops and counters.
C217.02: construct basic combinational circuits and verify their functionalities
C217.03: apply the design procedures to design basic sequential circuits
C217.04: understand the basic digital circuits and to verify their operation
C217.05: apply Boolean laws to simplify the digital circuits.

Name of the Course: SKILL ORIENTED COURSE IOT APPLICATIONS OF ELECTRICAL ENGINEERING (C218)

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

C218.01: apply various technologies of Internet of Things to real time applications.
C218.02: apply various communication technologies used in the Internet of Things.
C218.03: connect the devices using web and internet in the IoT environment.
C218.04: implement IoT to study Smart Home, Smart city, etc.

Year/Sem: III - I

Name of the Course: POWER SYSTEMS – II (C301)

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

C301.01: calculate parameters of transmission lines for different circuit configurations.
C301.02: determine the performance of short, medium and long transmission lines.
C301.03: analyze the effect of travelling waves on transmission lines.
C301.04: identify termination of lines with different types of conditions.
C301.05: analyze the various voltage control methods and effect of corona.
C301.06: calculate sag and tension of transmission lines and performance of line insulators.

Name of the Course: POWER ELECTRONICS (C302)

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

C302.01: illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT.
C302.02: analyze the operation of phase-controlled rectifiers.
C302.03: analyze the operation of three-phase full–wave converters.
C302.04: analyze the operation of Single-phase AC voltage regulator and cyclo converters.
C302.05: examine the operation and design of different types of DC-DC converters.
C302.06: analyze the operation of PWM inverters for voltage control and harmonic mitigation.

Name of the Course: CONTROL SYSTEMS (C303)

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

C303.01: derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
C303.02: determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and root locus method.
C303.03: analyze the stability of LTI systems using frequency response methods.
C303.04: analyze Nyquist stability criterion.
C303.05: design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams.
C303.06: represent physical systems as state models and determine the response. Understand the concepts of controllability and observability.

Name of the Course: INDUSTRIAL ELECTRONICS (Open Elective – I) (C304)

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

C304.01: understand the concept of DC amplifiers.
C304.02: analyze and design different voltage regulators for real time applications.
C304.03: describe the basis of SCR and Thyristor.
C304.04: understand commutation techniques of Thyristor.
C304.05: determine the performance of DIAC and TRIAC.
C304.06: develop real time application using electronics.

Name of the Course: Utilization of Electrical Energy (Professional Elective – I) (C305)

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

C305.01: identify various illumination methods produced by different illuminating sources.
C305.02: identify a suitable motor for electric drives and industrial applications.
C305.03: identify most appropriate heating techniques for suitable applications.
C305.04: identify most appropriate welding techniques for suitable applications.
C305.05: distinguish various traction system and determine the tractive effort and specific energy consumption.
C305.06: validate the necessity and usage of different energy storage schemes for different applications and comparisons.

Name of the Course: CONTROL SYSTEMS LABORATORY (C306)

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

C306.01: analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros.
C306.02: design P,PI,PD and PID controllers
C306.03: design lag, lead and lag–lead compensators
C306.04: evaluate temperature control of an oven using PID controller
C306.05: determine the transfer function of D.C Motor
C306.06: analyze the performance of D.C and A.C Servo Motor.
C306.07: test the controllability and observability.
C306.08: judge the stability in time and frequency domain.
C306.09: examine different logic gates and Boolean expressions using PLC.

Name of the Course: POWER ELECTRONICS LABORATORY (C307)

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

C307.01: analyze characteristics of various power electronic devices and design firing circuits for SCR.
C307.02: analyze the performance of single–phase dual, three–phase full–wave bridge converters and dual converter with both resistive and inductive loads.
C307.03: examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and inductive loads.
C307.04: differentiate the working and control of Buck converter and Boost converter.
C307.05: differentiate the working & control of Square wave inverter and PWM inverter.

Name of the Course: SOFT SKILL COURSE - EMPLOYABILITY SKILLS (C308)

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

C308.01: follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems.
C308.02: confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
C308.03: analyze, summarize and present information in quantitative forms including table, graphs and formulas.
C308.04: understand the core competencies to succeed in professional and personal life
C308.05: learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.

Year/Sem: III - II

Name of the Course: MICROPROCESSORS AND MICROCONTROLLERS (C309)

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

C309.01: know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors.
C309.02: analyze the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors.
C309.03: analyze the 8255 Microcontroller and interfacing capability.
C309.04: analyze the architecture and interfacing of 8251 USART.
C309.05: describe the architecture and interfacing of 8051 controller.
C309.06: know the concepts of PIC micro controller and its programming.

Name of the Course: ELECTRICAL MEASUREMENTS AND INSTRUMENTATION (C310)

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

C310.01: know the construction and working of various types of analog instruments.
C310.02: describe the construction and working of wattmeter and power factor meters
C310.03: know the construction and working various bridges for the measurement of resistance.
C310.04: know the construction and working various bridges for the measurement of inductance and capacitance.
C310.05: know the operational concepts of various transducers
C310.06: know the construction and operation digital meters

Name of the Course: POWER SYSTEM ANALYSIS (C311)

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

C311.01: draw impedance diagram for a power system network and calculate per unit quantities.
C311.02: apply the load flow solution to a power system using different methods.
C311.03: form Z_{bus} for a power system network and
C311.04: analyze the effect of symmetrical faults.
C311.05: find the sequence components for power system Components and analyze its effects of unsymmetrical faults.
C311.06: analyze the stability concepts of a power system.

Name of the Course: SWITCHGEAR AND PROTECTION (PROFESSIONAL ELECTIVE – II) (C312)

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

C312.01: illustrate the principles of arc interruption for application to high voltage circuit breakers of air - oil - vacuum - SF6 gas type.
C312.02: analyze the working principle and operation of different types of electromagnetic protective relays.
C312.03: acquire knowledge of protective schemes for generator for different fault conditions.
C312.04: acquire knowledge of protective schemes for transformers for different fault conditions.
C312.05: classify various types of protective schemes used for feeders and bus bar protection and Types of static relays.
C312.06: analyze the operation of different types of over voltages protective schemes required for insulation co–ordination and types of neutral grounding.

Name of the Course: IOT AND APPLICATIONS (Open Elective - II) (C313)
Course Outcomes: On completion of the course, the students will be able to

C313.01: understand internet of Things and its architecture.
C313.02: understand elements of IoT and hardware components.
C313.03: design IoT application and software components.
C313.04: interface with Bluetooth smart connectivity.
C313.05: integrate IoT devices and data acquisition and storage.
C313.06: study different IoT case studies of industrial automation.

Name of the Course: ELECTRICAL MEASUREMENTS AND INSRUMENTATION LABORATORY (C314)
Course Outcomes: On completion of the course, the students will be able to

C314.01: know about the phantom loading.
C314.02: learn the calibration process.
C314.03: measure the electrical parameters voltage - current - power - energy and electrical characteristics of resistance - inductance and capacitance.
C314.04: gain the skill knowledge of various brides and their applications.
C314.05: learn the usage of CT's - PT's for measurement purpose.
C314.06: know the characteristics of transducers.
C314.07: measure the strains - frequency and phase difference.

Name of the Course: MICRO PROCESSORS AND MICRO CONTROLLERS LAB (C315)

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

C315.01: write assembly language program using 8086 microprocessor based on arithmetic - logical - number systems and shift operations.
C315.02: write assembly language programs for numeric operations and array handling problems.
C315.03: write a assembly program on string operations.
C315.04: interface 8086 with I/O and other devices.
C315.05: do parallel and serial communication using 8051 & PIC 18 micro controllers.
C315.06: program microprocessors and microcontrollers for real world applications.

Name of the Course: POWER SYSTEMS AND SIMULATION LAB (C316)
Course Outcomes: On completion of the course, the students will be able to

C316.01: estimate the sequence impedances of 3-phase Transformer and Alternators
C316.02: evaluate the performance of transmission lines
C316.03: analyze and simulate power flow methods in power systems
C316.04: analyze and simulate the performance of PI controller for load frequency control.
C316.05: analyze and simulate stability studies of power systems

Name of the Course: SKILL ADVANCED COURSE - MACHINE LEARNING WITH PYTHON (C317)

Course Outcomes: On completion of the course, the students will be able to
C317.01: illustrate and comprehend the basics of Machine Learning with Python.
C317.02: demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions.
C317.03: demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms.
C317.04: evaluate the concepts of binning, pipeline Interfaces with examples.
C317.05: apply the sentiment analysis for various case studies.

Year/Sem: IV - I

Name of the Course: RENEWABLE AND DISTRIBUTED ENERGY TECHNOLOGIES (PROFESSIONAL ELECTIVE – III) (C401)

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

C401.01: illustrate basic concepts of renewable and distributed sources
C401.02: demonstrate the components of wind energy conversion systems.
C401.03: design PV systems and its classifications
C401.04: analyze MPPT Techniques.
C401.05: illustrate the concept of Energy Production from Hydro - Tidal and Geothermal.
C401.06: distinguish between standalone and grid connected DG systems and design hybrid renewable energy systems.

Name of the Course: HYBRID ELECTRIC VEHICLES (PROFESSIONAL ELECTIVE –IV) (C402)

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

C402.01: know the concept of electric vehicles and hybrid electric vehicles.
C402.02: familiar with different configuration of hybrid electric vehicles.
C402.03: choose an effective motor for EV and HEV applications.
C402.04: know the concept of Brushless DC Motor and Switch reluctance motors.
C402.05: understand the power converters used in hybrid electric vehicles
C402.06: know different batteries and other energy storage systems.

Name of the Course: POWER SYSTEM OPERATION AND CONTROL (PROFESSIONAL ELECTIVE –V) (C403)

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

C403.01: compute optimal load scheduling of Generators.
C403.02: formulate hydrothermal scheduling and unit commitment problem.
C403.03: analyze effect of Load Frequency Control for single area systems.
C403.04: understand block diagram representation and steady state analysis.
C403.05: analyze effect of Load Frequency Control for two area systems.
C403.06: describe the effect of reactive power control for transmission lines.

Name of the Course: IC APPLICATIONS (Open Elective - III) (C404)

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

C404.01: analyze the Differential Amplifier with Discrete components
C404.02: describe the Op-Amp and internal Circuitry: 555 Timer, PLL
C404.03: understand the DAC techniques.
C404.04: classify different types of ADCs.
C404.04: use of TTL-74XX, CMOS 40XX series ICs
C404.05: understand D and T Type Flip-Flops & their Conversions.

Name of the Course: INDUSTRIAL ELECTRONICS (Open Elective – IV) (C405)

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

C405.01: understand the concept of DC amplifiers.
C405.02: analyze and design different voltage regulators for real time applications
C405.03: describe the basis of SCR and Thyristor.
C405.04: understand commutation techniques of Thyristor.
C405.05: determine the performance of DIAC and TRIAC
C405.06: develop real time application using electronics

Name of the Course: SKILL ADVANCED COURSE - MACHINE LEARNING WITH PYTHON LAB (C406)

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

C406.01: implement procedures for the machine learning algorithms
C406.02: design and Develop Python programs for various Learning algorithms
C406.03: apply appropriate data sets to the Machine Learning algorithms
C406.04: develop Machine Learning algorithms to solve real world problems

Name of the Course: UNIVERSAL HUMAN VALUES-2: UNDERSTANDING HARMONY (C407)

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

C407.01: discuss a holistic perspective based on self-exploration about themselves, family, society and nature/existence.
C407.02: understand Harmony in the Human Being-Harmony in Myself.
C407.03: understand Harmony in the Family-Harmony in Human Relationship.
C407.04: understand Harmony in the Society.
C407.05: understand Harmony in the Nature and Existence.
C407.06: understand Harmony on Professional Ethics**.**

Year/Sem: IV - II

Name of the Course: Major Project (C408)

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

C408.01: demonstrate a sound technical knowledge of their selected project topic.
C408.02: undertake problem identification, formulation and solution.
C408.03: design engineering solutions to complex problems utilizing a systems approach.
C408.04: conduct an engineering project.
C408.05: communicate with engineers and the community at large in written an oral form.
C408.06: demonstrate the knowledge, skills and attitudes of a professional engineer.