



MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE

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email Id: principal@msec.edu.in
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

REGULATION – 2013

COURSE OUTCOMES (CO)

MA6351- Transforms and Partial Differential Equations[C201]


C201.1	To Formulate and solve partial differential equations.
C201.2	To Evaluate Fourier series of periodic functions.
C201.3	Apply the method of separation of variables to find the solution of heat and wave equation.
C201.4	Illustrate the Fourier transform techniques.
C201.5	Examine Z transform techniques and solve difference equations.

EE6301-Digital Logic Circuits-[C202]

C202.1	List the various types of number system and compare the digital logic families.
C202.2	Apply K –Map for simplification and implementation of combinational logic circuit.
C202.3	Explain the synchronous Sequential logic circuits and draw the block diagram of Shift Registers.
C202.4	Design asynchronous sequential circuits and describe the operation of Programmable Logic Devices.
C202.5	Develop the VHDL coding for combinational and Sequential logic circuits.

EE6302-Electromagnetic Theory – (C203)

C203.1	Explain the different coordinate systems, and apply Gauss's law
C203.2	Interpret the concepts of Electrostatic fields and apply boundary conditions on Electrostatic field
C203.3	Develop concepts of Magnetostatic fields and apply boundary conditions.
C203.4	Analyze the Maxwell's equations for electromagnetic fields
C203.5	Derive Electromagnetic wave equation and apply the Poynting expression.


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GE6351 – Environmental Science and Engineering (C204)

C204.1	The knowledge gained on flora and fauna in our environment helps to know about social environment
C204.2	The students will gain knowledge on the offensive effects of pollution in day to day life
C204.3	The students will acquire knowledge on the natural resources available and their conservation
C204.4	The students will have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming
C204.5	The students will get knowledge about the problems faced by society due to population explosion

EC6202 - Electronic Devices and Circuits – [C205]

C205.1	Draw the characteristics of various types of Diodes, design half and full wave Rectifiers.
C205.2	Compare the different configurations of BJT, draw its characteristics.
C205.3	Calculate the FET parameters, draw its frequency response characteristics.
C205.4	Design Amplifier circuits and draw frequency response characteristics.
C205.5	Develop the parameters of feedback amplifier circuit, describe different types of oscillator circuits.

EE 6303 – Linear Integrated Circuits & Applications– (C206)

C206.1	Explain the procedure for the fabrication of IC
C206.2	Summarize the DC & AC characteristics of Operational amplifier.
C206.3	Discuss the applications of Operational amplifier
C206.4	Describe the internal functional blocks of special ICs like Timer and PLL.
C206.5	Classify types of voltage regulators and describe the special ICs.

EC6361 - Electronics Laboratory – [C207]

C207.1	Find the breakdown voltage of Diode, draw the V-I characteristics of BJT.
C207.2	Draw the equivalent circuit of JFET and develop the saw tooth waveform generation using UJT
C207.3	Design the Common Emitter amplifier and draw the V-I characteristics of photo diode & photo transistor
C207.4	Compare the theoretical and practical frequency value of oscillators and measure the ripple factor of rectifier
C207.5	Show the frequency response of filters, design the multivibrators


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EE 6311 – Linear and Digital Integrated Circuits Laboratory– (C208)

C208.1	Apply Boolean functions to implement adder, subtractor circuits and convert Excess 3 to BCD, Binary to Gray code and vice versa
C208.2	Test Parity generator and checker and Design encoder decoder circuits
C208.3	Demonstrate 4 bit synchronous, asynchronous counter and Shift registers.
C208.4	Illustrate multiplexer demultiplexer circuit and apply 555 timer in Monostable and Astable operation.
C208.5	Apply OP-AMP to construct Adder, comparator, differentiator, Integrator and describe VCO, PLL characteristics.

MA6459-Numerical Methods-[C209]

C209.1	Have clear perception of the power of numerical techniques ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.
C209.2	Gain knowledge of interpolation-forward and backward.
C209.3	Solve problems in differentiation and integration.
C209.4	solve various types of initial value partial differential Equations
C209.5	Solve various types of Seidal method problems.

EE6401-Electrical Machines -I- [C210]

C210.1	Describe the coupled coil calculate the self and mutually induced emf
C210.2	Analyze the operation of transformer in different loading condition
C210.3	Explain the concept of field energy and co-energy in single and multiple excited systems
C210.4	Demonstrate the construction of D.C machines and operation of DC Generator
C210.5	Derive the performance equation of D.C motor under various load condition and analyze the braking system

CS6456-Object Oriented Programming-[C211]

C211.1	Explain the key attributes of C++ like native types and statements and implement ADT.
C211.2	Develop object oriented programs using polymorphism and data abstraction concepts.
C211.3	Design templates, construct generics and to handle exceptions.
C211.4	Develop the concept of java in creating classes, objects using arrays and control statements.
C211.5	Create packages, handle exceptions and develop multi-threaded programs.

EE 6402 – Transmission and Distribution – (C212)

C212.1	Identify the basic elements of the electric power system, generation, transmission, distribution and describe the role played by each element.
C212.2	Compute the losses, efficiency and parameters of the Transmission line.
C212.3	Analyze the Performance of Transmission Lines.
C212.4	Solve the voltage distribution in insulator strings, cables and methods to improve the same.
C212.5	Design overhead lines both Mechanical and electrical aspects using Sag calculation.

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EE6403-Discrete Time Systems and Signal Processing-[C213]

C213.1	Classify the different types of signals and systems and Explain the sampling process of continuous time signal.
C213.2	Apply z-transform and inverse Z transform and analyze discrete time systems.
C213.3	Apply Radix -2 Decimation in Time (DIT) and Decimation in Frequency (DIF)FFT Algorithm to Compute Discrete Fourier Transform.
C213.4	Explain different types of Infinite Impulse Response (IIR) filters and Finite Impulse Response (FIR) filters.
C213.5	Explain various architectures of Digital signal processors.

EE6404– Measurements and Instrumentation-(C214)

C214.1	Describe the basic functional block elements in Different measuring Instrumentsand the errors in the measurement system.
C214.2	Select the suitable instrument for measuring different electrical and magnetic parameters.
C214.3	Design a suitable Bridge circuit to determine the values of various resistor, inductor and capacitor.
C214.4	Explain the construction and working principle of various types of storage and display devices and compare them.
C214.5	Compare the various types of transducers and explain the function of differentblocks involved in data acquisition systems.

CS 6461- Object Oriented programming Laboratory-[C215]

C215.1	Design C++ programs using functions, classes with objects, member functions and constructors.
C215.2	Develop operator and function overloading and run time polymorphism using C++.
C215.3	Develop file handling techniques in C++ for sequential and random access also use Java code for strings.
C215.4	Construct packages and interfaces in Java.
C215.5	Create threads in Java and handle predefined and user defined exceptions.

EE6411-Electrical Machines Laboratory- I- [C216]

C216.1	Analyze the characteristics of DC shunt generator DC compound generator and calculate critical resistance and critical speed
C216.2	Examine load characteristics of DC shunt, series and compound motor and identify its maximum efficiency operating point
C216.3	Predict the efficiency of DC shunt machine in different methods
C216.4	Explain the load characteristics of single phase and three phase transformer , separate the different losses and to find the efficiency
C216.5	Predetermine the equivalent circuit parameters of single phase transformer by two different methods and compare the results

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EE 6501 – Power System Analysis-[C301]

C301.1	Explain the operation of various power system components, Draw the per unit diagram and form the Y-bus matrix for the power system.
C301.2	Develop the power flow equation for power system problems and Determine the line flows using G-S, N-R and F-D method
C301.3	Illustrate the types of faults and their effects, Calculate the fault currents for symmetrical fault condition.
C301.4	Draw the sequence network for L-G, L-L and L-L-G fault of the power system and Determine the fault current incase of L-G, L-L and D- L-G fault
C301.5	Explain the concept of power system stability, Analyze the stability of single machine infinite bus system.

EE 6502 – Microprocessors and Microcontrollers – (C302)

C302.1	Describe the basic Architecture of 8085 Microprocessor and working of all blocks of the processor, IO and memory interfacing with necessary timing diagrams.
C302.2	Classify the instructions with the help of Addressing modes of 8085 with necessary programs.
C302.3	Explain the basic Architecture of 8051 Microcontroller with working of various blocks of the controller like Interrupts, Timer, IO ports etc. with necessary timing diagram and compare the programming concepts with 8085.
C302.4	Analyze the architecture of various Interfacing Devices like 8255 PPI, 8259 PIC, 8251 USART, 8279, 8253, ADC and DAC and Programming of all the Interfacing IC's.
C302.5	Apply the knowledge of programming concepts of 8051 Microcontroller for various applications like keyboard display interface, servo motor etc

ME 6701 – Power Plant Engineering – (C303)

C303.1	Explain the layout, construction and working of the components inside a thermal power plant
C303.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
C303.3	Explain the layout, construction and working of the components inside nuclear power plants.
C303.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
C303.5	Explain the layout, construction and working of the components inside Renewable energy power plants.

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EE6503 - Power Electronics - [C304]

C304.1	Explain the significance of switching devices and its application to power converters and demonstrate the triggering circuit and snubber circuits.
C304.2	Compare the operation of two, three Pulse Converters and draw output waveforms with and without source and load inductance.
C304.3	Classify the operation of Choppers and outline the application of SMPS.
C304.4	Analyze the operation of single phase and three phase Inverters with and without PWM techniques.
C304.5	Illustrate the operation of AC voltage controller and cycloconverter and its application.

EE6504-Electrical Machines-II-[C305]

C305.1	Draw the constructional details and explain the performance of salient and non –salient type synchronous generators.
C305.2	Draw and explain the Principle of operation and performance of synchronous motor.
C305.3	Draw and describe the construction, principle of operation and performance of induction machines.
C305.4	Describe the starting and speed control of three-phase induction motors.
C305.5	Explain the construction, principle of operation and performance of single phase induction motors and special machines.

IC6501- Control systems – (C306)

C306.1	Discuss the use of transfer function models for analysis of physical systems and the control system components.
C306.2	Analyze the time response of systems and steady state error.
C306.3	Use the basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
C306.4	Explain the stability analysis and types of compensators.
C306.5	Describe the state variable representation of physical systems and the effect of state feedback.


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EE6511- Control and Instrumentation Laboratory – (C307)

C307.1	Determine the characteristics of P, PI and PID controllers experimentally and analyze the stability of the control system by (i) Bode plot (ii) Root Locus Plot and (iii) Nyquist plot using MATLAB.
C307.2	Compute the transfer function of a Field controlled DC motor experimentally and Design the Lag, Lead and Lag-Lead Compensators for the given specifications and hook up it using RC networks.
C307.3	Draw the transient response of Position Control system experimentally, Determine the Characteristics of Synchro-Transmitter- Receiver and Use the MATLAB for the Simulation of Control Systems.
C307.4	Calculate the unknown Capacitance, Inductance and Resistance using AC and DC Bridges experimentally and Analyze the Dynamics of Sensors/Transducers (a) Temperature (b) Pressure (c) Displacement (d) Optical (e) Strain and (f) Flow.
C307.5	Measure the Power and Energy experimentally; Analyze the Signal Conditioning units (a) Instrumentation Amplifier (b) ADC and DACs and Use the MATLAB for Process Simulation.

GE6563- Communication Skills – Laboratory based – (C308)

C308.1	Apply appropriate communication skills across settings, purposes and audiences.
C308.2	Demonstrate knowledge of communication theory and applications.
C308.3	Practice critical thinking to develop innovative and well-founded perspectives related to the students emphasis. Build and maintain healthy and effective relationships.
C308.4	Use technology to communicate effectively in various settings and contexts.
C308.5	Demonstrate appropriate and professional ethical behavior.

EE6512-Electrical Machines Laboratory-II - [C309]

C309.1	Determine the voltage regulation of three phase alternator in different methods and compare the results
C309.2	Determine the voltage regulation of salient pole synchronous machine and find negative & zero sequence components
C309.3	Explain the V and inverted V characteristics of three phase synchronous machine at different load condition
C309.4	Determine and pre determine performance characteristics of three phase induction motor
C309.5	Determine and pre determine performance characteristics of single phase induction motor


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EC6651-Communication Engineering - (C310)

C310.1	Explain the operation of Amplitude Modulation , draw the frequency spectrum and vector representation of AM
C310.2	Compare the different methods of QPSK, BFSK and GMSK
C310.3	Analyze how information is transmitted to receiver using the Huffman coding
C310.4	Discuss about the various types of multiple access techniques
C310.5	Distinguish between INTELSAT and INSAT

EE6601– Solid State Drives – (C311)

C311.1	Classify the various types of drives and load torque characteristics and Apply themulti quadrant dynamics in hoist load system.
C311.2	Analyze the operation of steady state analysis of single phase and three phase fully controlled converter and Chopper fed separately excited dc motor drives and discuss the various control strategies of converter.
C311.3	Explain the operation and characteristics of various methods of solid state speed control of induction motor.
C311.4	Describe the operation of various modes of V/f control of synchronous motor drivesand different types of permanent magnet synchronous motor drives.
C311.5	Design a current and speed controller and develop the transfer function for DCmotor, load and converter, closed loop control with current and speed feedback.

EE 6602 – Embedded Systems – (C312)

C312.1	Analyze the basic build process of embedded systems, structural units in embedded processor and selection of processor and memory devices depending upon the applications.
C312.2	Classify the types of I/O device ports and buses and different interfaces for data transfer.
C312.3	Model the Embedded Product Development Life Cycle (EDLC) by using different techniques like state machine model, sequential program model and concurrent model
C312.4	Analyze the basic concept of Real Time Operating Systems and plan to schedulingof different task and compare the features of different types of Real Time Operating Systems
C312.5	Apply the knowledge of programming concepts of Embedded Systems for various applications like Washing Machine automotive and Smart Card System applications


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EE 6603 – Power System Operation and Control - (C313)

C313.1	Analyze the various load characteristics with load curve and load duration curve.
C313.2	Describe modeling of power-frequency dynamics and design power-frequency controller
C313.3	Explain the modeling of reactive power-voltage interaction and the control actions
C313.4	Solve economic dispatch problems and unit commitment problems in power systems
C313.5	Explain the need of computer controls to energy management using SCADA

EE 6604 - Design of Electrical Machines [C314]

C314.1	Compare Electrical Engineering materials; determine heat dissipation due to Conduction, convection and radiation.
C314.2	Calculate mmf for slots and teeth, apparent flux density, main dimensions and winding details of DC machines.
C314.3	Design core, yoke, winding and cooling system of transformers.
C314.4	Develop output equation of AC machines, design stator and rotor of induction machines.
C314.5	Design stator and rotor of synchronous machines analyze their thermal behavior, design field systems for turbo alternators.

EE6002-Power System Transients - (C315E3)

C315E3.1	Explain the concept of transients and Compute the solution of transient current equation for RL and RLC system.
C315E3.2	Illustrate the importance of switching transients, Explain the concept of resistance switching, load switching and capacitance switching.
C315E3.3	Explain the concept of lightning mechanism, Describe the interaction between lightning and power system
C315E3.4	Apply the concept of reflection and refraction, Draw the Bewley Latticediagram for different systems.
C315E3.5	Analyze the concept of short line (or) Kilometric fault and justify the EMTPfor transient computation.

EE6611-Power Electronics and Drives Laboratory – (C316)

C316.1	Draw the VI characteristics of SCR and generate the Gate Pulse using R, RC and UJT.
C316.2	Plot the characteristics of MOSFET and IGBT
C316.3	Simulate a single phase AC to DC half and fully controlled converter.
C316.4	Draw the output response of step up and step down MOSFET based chopper and simulate a single phase IGBT based PWM inverter.
C316.5	Plot the output response of AC voltage controller and simulate the Power Electronic Circuits.

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EE 6612 – Microprocessors and Microcontrollers Laboratory – (C317)

C317.1	Predict the smallest/ largest number from a given array and to Perform various mathematical operations using 8085 processor
C317.2	Convert the given analog input to digital value and to control the traffic signals using 8085 programming
C317.3	Develop coding to display the given word using keyboard and display controller and for serial communication
C317.4	Manipulate the basic operations involving jumps and loops using 8051 Microcontroller and to interface stepper motor and other devices
C317.5	Design circuits for implementing real time applications

EE 6613 – Presentation Skills and Technical Seminar – (C318)

C318.1	Present seminar in the field of electrical and electronics engineering subjects studied.
C318.2	Solve objective type questions in the field of electrical and electronics engineering.
C318.3	Communicate effectively, the subjects learned in the form of seminar presentation.
C318.4	Communicate effectively, the modern trends in the field of electrical and electronics engineering.
C318.5	Answer effectively during technical interviews.

EE6701- High Voltage Engineering- (C401)

C401.1	Identify the causes of over voltage and its effects in power system.
C401.2	Classify the breakdown Mechanisms in Solid, Liquid, gases and Composite dielectrics
C401.3	Design different type of Generating circuit for high voltage D.C and high voltage A.C
C401.4	Measure A.C and D.C high voltage and current using appropriate method
C401.5	Test the transformer ,insulator , circuit breakers, surge diverters and cables also discuss the insulation coordination


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EE6702- Protection and Switchgear - [C402]

C402.1	Summarize the causes and effects of faults in power system and explain the necessity of protection in power system.
C402.2	Describe the operation of electromagnetic relays and draw their characteristic curves.
C402.3	List out the various faults that can occur on alternator, transformer, busbar and transmission line and select the suitable protection schemes.
C402.4	Synthesize the static relays using comparators and explain numerical relays.
C402.5	Derive the expression for RRRV, critical resistance value and compare the various types of circuit breakers.

EE6703-Special Electrical Machines - [C403]

C403.1	Explain the necessity to improve the saliency of synchronous reluctance motor and its characteristics
C403.2	Compare the various methods of excitation of different types of stepper motor and its driver circuits
C403.3	Describe the operation of switched reluctance motor with and without sensors
C403.4	Explain the electronic commutation of permanent magnet brushless D.C. motors and develop the torque equation.
C403.5	Develop the expression for emf and torque of permanent magnet synchronous motors and discuss power controller for permanent magnet synchronous motors.

MG6851-Principles of Management - [C404]

C404.1	An understanding of the managerial functions like planning, organizing, staffing, leading & controlling
C404.2	The basic knowledge on international aspect of management
C404.3	The basic knowledge on management and its evolution
C404.4	A knowledge on budgetary control and their strategies
C404.5	A understanding of the motivational theories existing in the management


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EI 6704 – Biomedical Instrumentation – (C405E2)

C405E2.1	Identify the functions of human nervous system and describe the basic components of biomedical system.
C405E2.2	Illustrate the measurement of non-electrical parameters in human body system.
C405E2.3 A	Apply different electrodes and amplifiers in physiological measurements (EEG, ECG, EMG etc.)
C405E2.4	Explain the basic principles of imaging techniques and patient monitoring system.
C405E2.	Describe the functions of life assisting and therapeutic equipments

EE6008 – Micro Controller Based System Design – [C406E4]

C406E4.1	Describe the basic architecture of PIC16cxx and apply the instruction set for simple operations.
C406E4.2	Explain about the PIC micro controllers interrupts and write the interrupt programs
C406E4.3	Apply the program to interface I/O devices with controller like LCD, Keyboard, and Sensors etc.,
C406E4.4 D	Develop simple applications using ARM assembly language programs
C406E4.5 A	Analyze ARM Organization and ARM Coprocessor interface

EE 6711 – Power System Simulation Laboratory – [C407]

C407.1	Determine the bus impedance and admittance matrices using C and MATLAB
C407.2	Apply numerical methods for solving load flow problems and verify using C and MATLAB
C407.3	Analyze various faults occurring in power system and simulate the faults using PSCAD.
C407.4	Analyze small signal stability of Single Machine Infinite Bus (SMIB) system and draw the swing curve using AUPOWER Lab and MATLAB.
C407.5	Generate the coding for economic dispatch problems and load frequency dynamics problems using MATLAB.

EE6712 -Comprehension- [C408]

C408.1	Describe the basic concepts of electrical and electronics subjects.
C408.2	Solve objective type questions in the field of electrical and electronics engineering
C408.3	Review, prepare and present technological developments
C408.4	Analyze the modern trends in the field of electrical and electronics engineering.
C408.5	Answer effectively during technical interviews.


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EE6801-Electric Energy Generation, Utilization and Conservation – [C409]


C409.1	Evaluate tractive effort for the propulsion of train, name the traction motors, list the traction motor control, track equipment and collection gear.
C409.2	Categorize different light sources and design various illumination systems for the indoor lighting schemes, factory lighting, halls, outdoor lighting schemes, floodlighting, street lighting.
C409.3	Compare the different methods of electric heating and types of electric welding.
C409.4	Estimate average solar radiation and illustrate the physical principles of the conversion of solar radiation into heat.
C409.5	Analyze aerodynamic forces acting on the blade and draw basic components of a WECS.

EE 6009 – Power Electronics for Renewable Energy Systems – (C410E1)

C410E1.1	Discuss and analyze the various types of renewable energy sources
C410E1.2	Analyze the performance of IG, PMSG, SCIG and DFIG
C410E1.3	Design different power converters namely AC to DC, DC to DC and AC to AC converters for renewable energy systems.
C410E1.4	Analyze various operating modes of wind electrical generators and solar energy systems.
C410E1.5	Develop maximum power point tracking algorithms.

EE6811 – Project work [C412]

C412.1	Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electrical and electronics engineering and allied applications.
C412.2	Apply appropriate techniques and modern engineering hardware and software tools in electrical and electronics engineering and allied applications.
C412.3	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues with societal and environmental context, applying ethical principles in the field of electrical and electronics engineering and allied applications.
C412.4	Function effectively as an individual and as a member or leader in diverse teams in multidisciplinary settings and make effective presentation, and communicate effectively.
C412.5	Demonstrate the understanding of the engineering and management principles in multidisciplinary environments to engage in lifelong learning in the broadest context of technological change.


HOD


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