SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU
(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)

Syllabus for the Academic Year – 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: POWER ELECTRONICS

Subject Code: PC-18EE501 **L-T-P-C: 3-1-0-4**

Course Objectives:

1. To understand the structure, characteristics and operation of Power semiconductor devices.
2. To apply the knowledge of operating principles and modulation strategies for power converters.
3. To analyze power converter circuits and select suitable power electronic devices by assessing the requirements of application fields.
4. To design power electronic converters exhibiting high-performance operation.

UNIT	Description	Hours
I	**Power Semiconductor Devices:** Introduction to Power Electronics, Power semiconductor devices, Introduction to wide bandgap semiconductor devices, Control Characteristics, Typesof power electronic converters. **Power MOSFET:** Structure, operation, steady state characteristics, switching characteristics, Gating Circuits.	**10**
II	**IGBT**: Structure, operation, steady state characteristics, switching characteristics, Gating Circuits. **Thyristors:** Structure, Two Transistor Model, steady state characteristics, switching characteristics, di/dt and dv/dt protection.	**10**
III	**Controlled Rectifiers:** Principle of phase controlled converter operation, Single- phase half wave and Full wave converters, Three-phase half-wave and Three-phase full-wave converters. (Continuous conduction mode only)	**10**
IV	**Inverters:** Principle of operation, Performance parameters, Single-phase half wave and full bridge inverters, Three phase inverters (180 and 120 degree conduction mode), SPWM technique for single phase and three phase inverter.	**11**
V	**AC Voltage Controllers:** Principle of ON-OFF and phase control, Single-phase bi-directional controllers with Resistive load. **Choppers:** Principle of step-down and step-up chopper with R and R-L load, Performance parameters, Chopper classification.	**11**

Course Outcomes:

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

1. Understand the structure, characteristics and operation of Power semiconductor devices.
2. Apply the knowledge of operating principles and modulation strategies for power converters.
3. Analyze power converter circuits and select suitable power electronic devices by assessing the requirements of application fields.
4. Design power electronic converters exhibiting high-performance operation.

Text Book:

Power Electronics, M H Rashid, 3rdEdition, 2006

Reference Books:

1. Power Electronic Converters, Applications and Design, Ned Mohan, Tore M Undeland, and William Robins, 3rd Edition, 2008
2. Power Electronics, M D Singh and Khan Chandani K B, 2nd Edition, 2001
3. Power Electronics A Simplified Approach, R S Ananda Murthy and V Nattarasu, Pearson & Sanguine Technical Publishers
4. Power Electronics Essentials and Applications, L Umanand, Reprint,2010

Syllabus for the Academic Year – 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: SIGNALS & SYSTEMS

Subject Code: PC-18EEI502 **L-T-P-C: 3-0-2-4**

Course Objectives:

1. To understand signals and systems in terms of both the time and frequency domains.
2. To apply Fourier analysis to continuous time and discrete time signals, Z-Transform to time domain signals.
3. To analyze system properties based on impulse response, Fourier analysis and Z Transform.
4. To design linear time-invariant (LTI) systems and compute its response.

UNIT	Description	Hours
I	**Introduction:** Definition of Signals and Systems, Classification of Signals, Basic operation on Signals, Elementary signals, Properties of Systems.	**8**
II	**Continuous Time LTI system:** Representation for CT LTI system in terms of impulse response, convolution integral for CT LTI system, properties of convolution, Differential equation representation for CT LTI system, Block diagram representation.	**8**
III	**Discrete Time LTI system:** Representation for DT LTI system in terms of impulse response, convolution sum, Causal signal response to DT-LTI systems. Differential equation representation for DT LTI system, Block diagram representation.	**8**
IV	**Fourier Representation of Signals:** Continuous-time periodic signal (Fourier Series), Discrete-time periodic signal (Discrete Time Fourier Series) and their properties.	**7**
V	**Z-Transform:**Z-transform, Properties of ROC, Properties of Z-transform, inverse Z-transform. Unilateral Z-Transform and its applications, Solution of Difference Equations.	**8**

List of experiments

Write a MATLAB code to
1)Generate different types of Signals.
2) Perform an Arithmetic operation on signals- Addition, Subtraction, Multiplication and Division.
3) Perform signal processing operations: Time shifting, Time scaling, and Time inversion.
4) Perform Convolution of two signals.
5) Determine Z-transform and plot its poles and zeros in z-plane.

Course Outcomes:

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

1. Understand signals and systems in terms of both the time and frequency domains.
2. Apply Fourier analysis tools like Fourier Series continuous time and discrete time signals, Z-Transform to time domain signals.
3. Analyze system properties based on impulse response, Fourier analysis and Z Transform.
4. Design linear time-invariant (LTI) systems and compute its response.

Text Book:

Signals and Systems, Simon Haykin and Barry Van VeenJohn Wiley & sons, 2001.Reprint 2002.

Reference Books:

1. Signals and Systems, Ganesh Rao and Satish Tunga, Sanguine Technical Publishers, 2004.
2. Signals and Systems, Alan V Oppenheim, Alan S, Wilsky and A Hamid Nawab, 2nd edition, 1997. Indian Reprint 2002.

Department: Electrical & Electronics Engineering

Semester: V

Subject Name:ELECTRICAL MACHINE DESIGN

Subject Code: PC-18EE503 **L-T-P-C: 3-1-0-4**

Course Objectives:

1. To understand the fundamentals of electrical machine design.
2. To apply the design aspects in Electrical machines.
3. To analyze the number of slots in AC & DC machines.
4. To design the overall dimension of Electrical machines.

UNIT	Description	Hours
I	**Fundamentals of Design:** Introduction, considerations for the design of electrical machines, limitations. Different types of materials and insulators used in electrical machines. **Design of DC Machines:** Output equation, choice of specific loadings, choice of number of poles, design of main dimensions, design of armature & slot dimensions. Dimensions of the pole body & estimation of number of turns in the field winding. (Excluding the design of inter poles)	**11**
II	**Design of Single Phase Transformers:** Output equation, choice of specific loadings, expression for volts / turn, determination of main dimensions of the core, estimation of number of turns and cross sectional area of primary and secondary coil, estimation of no load current.	**10**
III	**Design of Three Phase Transformers:** Output Equation, choice of specific loadings. Determination of main dimensions of the core, estimation of number of turns and cross sectional area of primary and secondary coil, tank design, number of tubes.	**10**
IV	**Design of Induction Motors:** Output equation, choice of specific loading, main dimensions of 3-phase induction motor, stator winding design, choice of length of the airgap, estimation of number of slots for the squirrel cage rotor, design of rotor bars & end ring, design of slip ring induction motor. Estimation of no load current of induction motor, introduction to single phase induction motor design; main dimensions, main and starting winding design, rotor design.	**10**
V	**Design of Synchronous Machines:** Output equations, choice of specific loadings, short circuit ratio, number of slots for the stator, design of main dimensions, armature winding, slot details for the stator of salient & non salient pole, synchronous machines design, design of rotor of salient pole synchronous machines-dimensions of the pole body, estimation of height and number of turns for the field winding, design of rotor of non-salient pole machine.	**11**

Course Outcomes:

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

1. Understand the fundamentals of electrical machine design.
2. Apply the design aspects in Electrical machines.
3. Analyze the number of slots in AC & DC machines.
4. Design the overall dimension of Electrical machines.

Text Book:

A Course in Electrical Machine Design, A K Sawhney, 6th edition, 2014, Dhanpat Rai & Sons.

Reference Books:

1. A Simplified Text in Electrical Machine Design, A NagoorKani, RBA Publications, 2nd edition.
2. Design of Electrical Machines, V N Mittle, Standard Publishers, 4th edition.

Semester: V

Subject Name: MICROCONTROLLER & ITS APPLICATIONS

Subject Code: PC-18EE504 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the basics of Microprocessor, 8051 Microcontroller with architecture, hardware and programming
2. To apply Assembly language & C language programming skills for real time applications
3. To analyze programmable interfacing modules with microcontrollers
4. To design interfacing circuits for various applications of 8051 Microcontroller

UNIT	Description	Hours
I	**Microprocessors and Microcontrollers:** Introduction, Comparison between Microprocessors and Microcontrollers, RISCandCISCCPU architectures,HarvardandVon-NeumannCPUarchitecture. **The 8051Architecture:** Introduction, Architecture of 8051 Microcontroller, Pin diagram of 8051, Memory organization, External memory interface, Stacks.	**07**
II	**AddressingModes:**Introduction, Addressingmodes, Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Indexed addressing, Instruction set, Instruction timings, 8051 instructions, Data transfer instructions, Arithmetic instructions, Logical instructions, Bit manipulation instruction, Illustrative assembly language programs.	**08**
III	**JumpandCallInstructions:** TheJUMPandCALLprogramrange,Jumps, Calls and Subroutines, Interrupts and returns, Assembly language programs. **8051 Programming in C:** Introduction, Illustrative programs in C. **Timer/Counterprogrammingin8051:**Programming8051timers,Counter Programming,Programmingtimers0and1in8051C.	**08**
IV	**8051 Serial Communication:**Basics of Serial Communication, 8051 connections to RS-232, 8051 serial communication programming. **Interrupts Programming:** 8051 Interrupts, Programming timer interrupts, Programming external hardware interrupts, Programming the serial communication interrupts, Interrupt priority in the 8051.(Excluding programs)	**08**
V	**8051Interfacingand Applications:**Interfacing8051toLCD,Keyboard, Parallelandserial ADC,DAC,Steppermotorinterfacing and DCmotor interfacing.	**08**

Course Outcomes:

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

1. Understand the basics of Microprocessor, 8051 Microcontroller with architecture, hardware and programming.
2. Apply Assembly language & C language programming skillsfor real time applications.
3. Analyze programmable interfacing modules with microcontrollers
4. Design interfacing circuits for various applications of 8051 Microcontroller.

Text Book:

The 8051 Microcontroller and Embedded Systems using assembly and C, Muhammad Ali Mazidi, and Janice Gilles pie, Mazidi and Rollin D, Mc Kinlay, PHI, 2 nd edition, 2016.

Reference Books:

1. The 8051 Microcontroller Architecture, Programming & Applications, Kenneth J Ayala, 2 nd edition, Penram, International, 1996/Thomson, Learning, 2005.
2. The 8051 Microcontroller, V Udayashankar and MallikarjunaSwamy, Tata McGraw-Hill, New Delhi, 2009.
3. Microcontrollers: Architecture,Programming, Interfacing and System Design, Raj Kamal, Pearson Education, 2005

Semester: V

Subject Name: ADVANCED CONTROL SYSTEMS

Subject Code: PE-18EE5PE51 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the concept of state variable analysis, state equations and nonlinear system.
2. To apply the concept of matrix fundamentals and compute Eigen values, Eigen vectors and state transition matrix.
3. To analyze the system controllability and observability.
4. To design State feedback controller and state observer.

UNIT	Description	Hours
I	**Controllers:** P, PI, PD and PID. **State Variable analysis & Design:** Introduction, concept of state, state variables and state model of linear systems.	**08**
II	**State space representation:** Physical variables, phase variables and canonical variables. Derivation of transfer function from state model, Eigen values, Eigen vectors, generalized Eigen vectors, diagonalization/linear transformation.	**08**
III	**Solution of state equation:** state transition matrix & its properties, computation using Laplace transformation, power series method, Cayley-Hamilton method, concept of controllability & observability-Methods.	**08**
IV	**Non-Linear System:** Introduction, behavior of non-linear system, common physical non-linearities, saturation, friction, backlash, dead zone, relay, Phase-Plane method (Basic concepts), nodal point, saddle point, focus point singular points, Stability of non-linear systems, limit cycles. (Construction of phase-trajectories- excluded)	**07**
V	**Pole placement techniques:** State feedback controller design-direct substitution method and by using Ackramann's formula, full order state observer design- direct substitution method and by using Ackramann's formula.	**08**

Course Outcomes:

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

1. Understand the concept of state variable analysis, state equations and nonlinear system.
2. Apply the concept of matrix fundamentals and compute Eigen values, Eigen vectors and state transition matrix.
3. Analyze the system controllability and observability.
4. Design State feedback controller and state observer.

Text Books:

1. Digital Control & State Variable Methods, M Gopal, TMH, 2nd edition, 2003
2. State Space Analysis of Control systems, Katsuhiko Ogata, PHI, 2007.

Reference Books:

1. Automatic Control Systems, Benjamin C Kuo&FaridGolnaraghi, John Wiley & Sons, 8th edition, 2003.
2. Control Systems Engineering, J. Nagrath, M. Gopal, New Age International Publishers,6th Multi Color Edition, 2017

Semester: V

Subject Name:ILLUMINATION ENGINEERING

Subject Code: PE-18EE5PE52 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the concepts of Illumination.
2. To apply the concepts and various factors considered for illumination.
3. To analyze illumination schemes for various applications.
4. To design different lighting systems as per the requirement of customers.

UNIT	Description	Hours
I	**Introduction to lighting system:** Eye and Vision, Electromagnetic Spectrum, Visible Spectrum, Components of Eye and functions of each, Vision functions, accommodation, adaptation and convergence, luminance contrast and color contrast.	**8**
II	**Illumination systems, Light sources:** EN 12464-1,2(illumination standards), Day light, Incandescent, electric discharge, fluorescent, arc lamps.	**7**
III	**Laws of Illumination:** Illumination from point, line and surface sources, Photometry, spectro photometry, photocells, environment and glare. General Illumination design, Interior lighting, residential lighting, office departmental sources, theatre, hospitals.	**8**
IV	**Interior Lighting Design:** lighting design objectives, safety and health performance appearance and comfort lighting design flow chart, lighting for commercial buildings and public buildings such as offices, hotels, teaching establishments, theaters and hospital lighting.	**8**
V	**Exterior Lighting Design:** Flood lighting, street lighting, Aviation and Transport lighting, Lighting for displays and signaling neon signs, LED-LCD displays and lighting for surveillance.	**8**

Course Outcomes:

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

1. Understand the concepts of Illumination.
2. Apply the concepts and various factors considered for illumination.
3. Analyze the illumination schemes for various applications.
4. Design different lighting systems as per the requirement of customers.

Text Books:

1. M A Cayless and A M Marsden, "Lamps and Lighting", Oxford and IBH Publishing, 4th Edition, 1996
2. J B Gupta, "Utilization of Electrical Power", Dhanpat Rai and Sons, New Delhi.

Reference Books:

1. Ronald N Helms, "Illumination Engineering for Energy Efficiency Luminous Environment", PHI, 1980.
2. Brain Fitt and Joe Thornily, "Lighting by Design"- A Technical Guide, Focal Press, Boston, 1992..

*** Visit to industry is mandatory and subsequent submission of report carries 10% of the CIE marks.**

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Department: Electrical & Electronics Engineering

Semester: V

Subject Name: Linear Integrated Circuits.

Subject Code: PE-18EE5PE53 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the basic concepts of op-amps and as AC and DC amplifiers.
2. To analyze frequency response and compensation techniques of op-amps.
3. To evaluate the performance of op-amps as signal generation and signal processing circuits.
4. To design linear and nonlinear circuits using op-amps.

UNIT	Description	Hours
I	**Operational Amplifier Fundamentals**: Introduction to operational amplifiers, Op-amp parameters – Input and output voltage, CMRR and PSRR, offset voltages and currents, Input and output impedances, Slew rate and Frequency limitations; Op-amps as DC Amplifiers- Biasing Op-amps, Direct coupled -Voltage Followers, Non-inverting Amplifiers, Inverting amplifiers, Summing amplifiers, Difference amplifier. **Op-amps as AC Amplifiers:** Capacitor coupled voltage follower, Capacitor coupled Non-inverting amplifier, High Zin capacitor coupled Non-inverting amplifier, Capacitor coupled inverting amplifier, setting upper cutoff frequency.	**08**
II	**Op-amps frequency Response and Compensation:** Op-amp circuit stability, frequency and phase response, frequency compensating methods, op-amp circuit bandwidth, Slew rate effects, Stray capacitance effects, Load capacitance effects, circuit stability precautions	**08**
III	**Signal Processing circuits:** Current amplifiers, instrumentation amplifier, Precision half wave and full wave rectifiers, limiting circuits, clamping circuits, peak detectors, sample-and-Hold circuit**.**	**08**
IV	**Op-amps and nonlinear circuits:** Op-amps in switching circuits, zero crossing detectors, Inverting and non-inverting Schmitt trigger circuits, Astableand Monostablemultivibrator. V to I and I to V converters, Log and antilog amplifiers, Multiplier and divider.	**08**
V	**Signal generator:**Active Filters –First and second order Low pass & High pass filters. Triangular/Rectangular wave generator, waveform generator design, Phase shift oscillator, oscillator amplitude stabilization, Wein bridge oscillator, Signal generator.	**07**

Course Outcomes:

Department of Electrical & Electronics Engineering.

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

1. Understand the basic concepts of op-amps as AC and DC amplifiers.
2. Analyze frequency response and compensation techniques of op-amps.
3. Evaluate the performance of op-amps as signal generation and signal processing circuits.
4. Design linear and nonlinear circuits using op-amps.

Text Books:

1. Operation Amplifiers and Linear IC's, David A. Bell, 2nd Edition, PHI/Pearson, 2004
2. Linear Integrated Circuits, D. Roy Choudhury and Shail B. Jain. 2nd Edition, New Age International,2006

Reference Books:

1. Op Amps and Linear Integrated Circuits-Concepts and Applications, James M.Fiore Cengage Learning, 2009.
2. Operational amplifiers and linear IC's, Stanley William D, 4th edition, Pearson Education

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Syllabus for the Academic Year – 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: ENERGY CONVERSION TECHNIQUES

Subject Code: OE-18EE5OE61 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the concepts of energy conversion from one form to another.
2. To apply energy conversion techniques for different energy conversion systems.
3. To analyze the concept of energy conversion techniques in energy conversion systems.
4. To evaluate conversion techniques in energy conversion systems.

UNIT	Description	Hours
I	**Energy Conversion in Machines:** History of energy conversion, Energy resources and environment. **Conversion of mechanical energy to Electrical Energy:** DC generator principle, types, applications. **Conversion of Electrical to Mechanical Energy:** DC motor, Principle, types, characteristics and applications. **Energy conversion techniques in AC machines:** 3-phase induction motor, principle, types, slip, frequency, torque, torque-slip characteristics and applications.	**8**
II	**Non-Conventional Energy Sources:** **Solar energy:** Principle of solar energy, beam and diffuse radiation, solar electric power generation, solar water heating, solar pump, solar pond, applications. **Wind energy:** Principles of WECS, basic components of WECS, wind energy collectors. **Bio-gas plants:** Principle, classification, conversion techniques, KVIC digester.	**8**
III	**Nuclear energy:** Nuclear energy conversion techniques, principle, types, working of nuclear reactor, applications. **Battery energy:** Battery energy conversion techniques, Principle, working, types and applications.	**8**
IV	**Hybrid Electric Vehicles:** Introduction to electric vehicles, hybrid electric vehicles, series hybrid vehicles, parallel hybrid vehicles, applications. **Traction motors:** Types and construction, classification, dc and ac series motors, linear induction motor, applications.	**8**

V	**Special Machines:** Construction, working and applications of Universal motor, Stepper motor, BLDC motor and Reluctance motor. **Transducers :** **C**lassification, characteristics and applications of transducers-Strain gauge, LVDT, Thermocouples.	**7**

Course Outcomes:

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

1. Understand the concepts of energy conversion from one form to another.
2. Apply energy conversion techniques for different energy conversion systems.
3. Analyze the concept of energy conversion techniques in energy conversion systems.
4. Evaluate the conversion techniques in energy conversion systems.

Text Books:

1. Principles of Electric Machines, V. K. Mehta, and Rohith Mehta, S Chand, 2nd Edition, 2009
2. Non-conventional Energy Sources, G. D. Rai, Khanna, 5th edition, 2014

Reference Books:

1. Special Electrical Machines, E. G. Janardhan, PHI, I Edition, 2014
2. Electric and Hybrid Vehicles Design Fundamentals, Iqbal Husain, CRC Press, E Book-PDF, 2nd Edition, 2011.
3. Transducers and Instrumentation, D V S Murthy, PHI, E Book- PDF 2nd Edition.
4. Fundamentals of Advanced Energy Conversion (Nuclear) Prof. Jefferson W. Tester Open Course Ware

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Syllabus for the Academic Year – 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: FUNDAMENTALS OF ILLUMINATION ENGINEERING

Subject Code: OE-18EE5OE62 **L-T-P-C: 3-0-0-3**

Course Objectives:

1. To understand the concepts of Illumination.
2. To apply the concept and various factors considered for illumination.
3. To analyze illumination schemes for various applications.
4. To design different lighting systems as per the requirement of customers.

UNIT	Description	Hours
I	**Introduction to lighting system:** Eye and Vision, Electromagnetic Spectrum, Visible Spectrum, Components of Eye and functions of each, Vision functions, accommodation, adaptation and convergence, luminance contrast and color contrast.	**8**
II	**Illumination systems, Light sources:** Day light, Incandescent, electric discharge, fluorescent, arc lamps.	**7**
III	**Laws of Illumination:** Illumination from point, line and surface sources, Photometry, spectro photometry, photocells, environment and glare. General Illumination design, Interior lighting, residential lighting, office departmental sources.	**8**
IV	**Interior Lighting Design:** lighting design objectives, safety and health performance appearance and comfort lighting design flow chart, lighting for commercial buildings and public buildings such as offices, hotels, teaching establishments (Class room and Seminar halls).	**8**
V	**Exterior Lighting Design:** Flood lighting, street lighting, Aviation and Transport lighting, Lighting for displays and signaling neon signs, LED-LCD displays.	**8**

Course Outcomes:

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

1. Understand the concepts of Illumination.
2. Apply the concept and various factors considered for illumination.
3. Analyze the illumination schemes for various applications.
4. Design different lighting systems as per the requirement of customers.

Text Books:

1. M A Cayless and A M Marsden, "Lamps and Lighting", Oxford and IBH Publishing, 4th Edition, 1996
2. J B Gupta, "Utilization of Electrical Power", Dhanpat Rai and Sons, New Delhi.

Reference Books:

1. Ronald N Helms, "Illumination Engineering for Energy Efficiency Luminous Environment", PHI, 1980.
2. Brain Fitt and Joe Thornily, "Lighting by Design"- A Technical Guide, Focal Press, Boston, 1992..

*** Visit to industry is mandatory and subsequent submission of report carries 10% of the CIE marks.**

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Syllabus for the Academic Year 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: POWER ELECTRONICS LABORATORY

Subject Code: PC-18EE507 **L-T-P-C: 0-0-2-1**

Course Objectives:

1. To understand the Concept of Power Semiconductor devices and switching characteristics.
2. To analyze the operation and characteristics of Converters.
3. Design of firing circuits for SCR.

SL. NO.	Description
I	Static characteristics of SCR and TRIAC.
II	Static characteristics of MOSFET and IGBT.
III	Single-phase controlled full-wave rectifier with R and R-L loads.
IV	Simulation of single phase fully controlled converter for R and RL load using MATLAB/SIMULINK.
V	A.C. voltage controller using TRIAC and DIAC combination connected to R and R-L loads.
VI	Simulation of single phase A.C. voltage controller for R and RL load using MATLAB/SIMULINK.
VII	a) Step down chopper feeding R and RL load. b) Step up chopper feeding R and RL load.
VIII	a) Simulation of Step down chopper for R and RL load using MATLAB/SIMULINK. b) Simulation of Step up chopper for R and RL load using MATLAB/SIMULINK.
IX	IGBT based single-phase full-bridge inverter feeding R load.
X	a) Simulation of single phase full bridge inverter for R and RL load using MATLAB/SIMULINK. b) Simulation of three phase full bridge inverter for R and RL load using MATLAB/SIMULINK.

Course Outcomes:

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

1. Understand the Concept of Power Semiconductor devices and switching characteristics.
2. Analyze the operation and characteristics of Converters.
3. Design of firing circuits for SCR.

Syllabus for the Academic Year 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: V

Subject Name: MICROCONTROLLER LABORATORY

Subject Code: PC-18EE508 **L-T-P-C: 0-0-2-1**

Course Objectives:

1. To analyze and execute assembly language program using 8051 microcontroller addressing modes and instructions set
2. To execute C program for various applications of 8051 microcontroller using interfacing devices

SL. NO.	Description
	PART-A: PROGRAMMING
I	Data Transfer - Block movement, Exchange, Sorting, Finding largest element in an array.
II	Arithmetic Instructions - Addition/subtraction, multiplication/division, square and cube of a number (16 bits Arithmetic operations bit addressable).
III	Counters.
IV	Boolean & Logical Instructions (Bit manipulations).
V	Conditional CALL & RETURN.
VI	Code conversion: BCD ASCII; ASCII Decimal; Decimal - ASCII; HEX - Decimal and Decimal -HEX.
VII	Programs to generate delay, Programs using serial port and on- Chip timer / counter.
	PART-B: INTERFACING
VIII	Simple Calculator using 6 digit seven segment displays and Hex Keyboard interface to 8051
IX	Alphanumeric LCD panel and Hex keypad input interface to 8051
X	Generate different waveforms Sine, Square, Triangular, Ramp etc. using DAC interface to 8051.
XI	Stepper motor and DC motor control interface to 8051.
XII	Elevator interface to 8051.

Course Outcomes:

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

1. Analyze and execute assembly language program using 8051 microcontroller addressing modes and instructions set
2. Execute C program for various applications of 8051 microcontroller using interfacing devices.