IPS Academy, Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

Scheme Based on AICTE Flexible Curricula (B. Tech)

Electrical and Electronics Engineering Department

(For Batches admitted in 2022-23)

IV Semester

w.e.f. Jan 2024

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours/ Week			Total Credits
				Theory			Practical			L	T	P	
				End Sem.	Mid Sem. Exam	Quiz/ Assign ment	End Sem.	Lab Work & Sessional					
1	BSC-MA03 (a)	BSC	Probability and Statistics	60	25	15	-	-	100	2	1	-	3
2	PCC-EE05	PCC	Electrical Machine-I	60	25	15	-	-	100	2	1	-	3
3	PCC-EE06	PCC	Analog and Digital Communication Systems	60	25	15	-	-	100	2	1	-	3
4	PCC-EE07	PCC	Signals and Systems	60	25	15	-	-	100	2	1	-	3
5	PCC-EE08	PCC	Electromagnetic Fields	60	25	15	-	-	100	2	1	-	3
6	HSMC- HS04	HSMC	Entrepreneurship and Principles of Management	60	25	15	-	-	100	1	-	-	1
7	IFC-CI001	IFC	Interdisciplinary Foundation Course-I	60	25	15			100	2	-	0	2
8	LC- EE05(P)	LC	Electrical Machine-I Lab	-	-	-	60	40	100	-	-	2	1
9	LC -EE06(P)	LC	Communication Lab	-	-	-	60	40	100	-	-	2	1
10	SBC- EE02(P)	SBC	Simulation Lab - I	-	-	-	60	40	100	-	-	2	1
11	MLC 02	MLC	Constitution of India	60	25	15	-		100	1	-	-	NC
Total				**420**	**175**	**105**	**240**	**260**	**1200**				**21**

- **Interdisciplinary Foundation Course-I, IFC-CI001**

(Offered by Computer Science Engineering Department).

1 Hr. Lecture	1 Hr. Tutorial	2 Hr. Practical
1 Credit	1 Credit	1 Credit

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Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
BSC-MA03 (a)	Probability and Statistics	2:1:0	3	CIE	ESE
				40	60

Course Objectives: To teach students basic principle of operation, construction and application of static and rotating electrical machines.

Pre Requisite:- Fundamentals of electrical engineering

Module 1: (Hrs.)

Transformer-I: Working principle, e.mf. equation, construction, phasor diagrams, equivalent circuit, voltage regulation, losses, separation of hysteresis and eddy current losses, efficiency, tests: open circuit and short circuit, load, Sumpner's test, Condition for maximum efficiency and regulation, Power and distribution transformer, all day efficiency. Autotransformer: working, advantages.

Module 2: (Hrs.)

Transformer-II: Three phase transformer: its construction, groups and connections, their working and applications; Scott connection; Parallel operation of Transformers: application, advantages, requirement and load sharing; Tap changers, cooling, conservator and breather.

Module 3: (Hrs.)

Three phase Induction Motor- I: Working principle, construction, comparison of slip ring and squirrel cage motors, steady state analysis, phasor diagram and equivalent circuit, power flow diagram, torque-speed and power-speed characteristics, Losses and efficiency, No load and block rotor test. Starting of squirrel cage and slip ring motors, power factor control, Cogging & Crawling.

Module 4: (Hrs.) Three phase Induction Motor- II: Double cage &Deep bar Indication Motor, impact of unbalanced supply and harmonics on performance, speed control, braking, Induction Generator.

Module 5: (Hrs.)

Single Phase Motors: Single Phase Induction motor; double revolving field theory, equivalent circuit and its determination, performance calculation, starting methods and types of single phase Induction motors: their working principle and applications, comparison with three phases Induction Motor.

Course Outcomes: Students will be able to:

CO1. Illustrate the working principle, construction, operation and testing of Single Phase Transformer.

CO2. Illustrate the working principle, construction, operation and testing of Three Phase Transformer.

CO3. Illustrate the working principle, construction, operation and testing of Three Phase Induction Motor.

CO4. Discuss the starting and control of Induction Motor.

CO5. Illustrate the working principle, construction, operation and testing of Single Phase Induction Motor.

Textbooks/ References

1. Electrical Machines by Nagrath and Kothari, McGraw-Hill
2. Electrical Machines by P.S. Bimbhra, Khanna Publishers
3. V.Del Toro, “Electrical Machines & Power Systems”, 1985, Prentice-Hall, Inc., Englewood Cliffs.
4. Ashfaq Hussain, Electrical Machines, Dhanpat Rai & Co.

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC-EE05	Electrical Machine - I	2:1:0	3	CIE	ESE
				40	60

Course Objectives: To teach students basic principle of operation, construction and application of static and rotating electrical machines.

Pre Requisite:- Fundamentals of electrical engineering

Module 1: (Hrs.)

Transformer-I: Working principle, e.mf. equation, construction, phasor diagrams, equivalent circuit, voltage regulation, losses, separation of hysteresis and eddy current losses, efficiency, tests: open circuit and short circuit, load, Sumpner's test, Condition for maximum efficiency and regulation, Power and distribution transformer, allday efficiency. Autotransformer: working, advantages.

Module 2: (Hrs.)

Transformer-II: Three phase transformer: its construction, groups and connections, their working and applications; Scott connection; Parallel operation of Transformers: application, advantages, requirement and load sharing; Tap changers, cooling, conservator and breather.

Module 3: (Hrs.)

Three phase Induction Motor- I:Working principle, construction, comparison of slip ring and squirrel cage motors, steady state analysis, phasor diagram and equivalent circuit, power flow diagram, torque-speed and power-speed characteristics, Losses and efficiency, No load and block rotor test. Starting of squirrel cage and slip ring motors, power factor control, Cogging & Crawling.

Module 4: (Hrs.) Three phase Induction Motor- II: Double cage &Deep bar Indication Motor, impact of unbalanced supply and harmonics on performance, speed control, braking, Induction Generator.

Module 5: (Hrs.)

Single Phase Motors: Single Phase Induction motor; double revolving field theory, equivalent circuit and its determination, performance calculation, starting methods and types of single phase Induction motors: their working principle and applications, comparison with three phases Induction Motor.

Course Outcomes: Students will be able to:

CO1. Illustrate the working principle, construction, operation and testing of Single Phase Transformer.

CO2. Illustrate the working principle, construction, operation and testing of Three Phase Transformer.

CO3. Illustrate the working principle, construction, operation and testing of Three Phase Induction Motor.

CO4. Discuss the starting and control of Induction Motor.

CO5. Illustrate the working principle, construction, operation and testing of Single Phase Induction Motor.

Textbooks/ References

1. Electrical Machines by Nagrath and Kothari, McGraw-Hill
2. Electrical Machines by P.S. Bimbhra, Khanna Publishers
3. V.Del Toro, “Electrical Machines & Power Systems”, 1985, Prentice-Hall, Inc., Englewood Cliffs.
4. Ashfaq Hussain, Electrical Machines, Dhanpat Rai & Co

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC-EE06	Analog & Digital Communication System	2:1:0	3	CIE	ESE
				40	60

Course Objective:-Objective of this course is to introduce the students with basic concepts of analog and digital communication System.

Pre Requisite:-Basic concept of signals and systems.

Module 1 (06hrs.)

Review of Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power density (Parseval's theorem), Base band signal, need of modulation, Introduction of modulations techniques, Typical Communication Systems

Module 2 (11hrs.)

Amplitude modulation, Equation and its frequency domain representation, Bandwidth, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection, Frequency and phase modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques.

Module 3 (10hrs.)

Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Channel Bandwidth for PAM-TDM signal Type of sampling instantaneous, Natural and flat top, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Quantization error, Pulse code modulation, signal to noise ratio, Companding,

Module 4 (06hrs.)

Digital modulations techniques, Generation, detection, equation and Bandwidth of amplitude shift keying (ASK) Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non offset quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift
Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation (QAM), MODEM, Introduction to probability of error.

Module5 (07hrs.)

Information theory and coding- Information, entropies (Marginal and conditional), Model of a communication system, Mathematical representation of source, channel and receiver characteristics, Mutual information, channel capacity efficiency of noise free channel Binary symmetric channel (BSC) Binary erasure channel (BEC), Repetition of signal, NM symmetric Binary channel, Shannon theorem, Shanon-Hartley theorem (S/N-BW trade off)Source encoding code properties; Shanon, Fano and Huffman coding methods and their efficiency error control coding.

Course Outcomes:-After successful completion of course students will be able to:

CO 1: Compute Fourier Transform and analyze different types of signals and systems.
CO2: Understand the need of modulation and different types of Analog modulation schemes.
CO 3: Analyze different aspects of PCM techniques.
CO 4: Identify and describe different types of digital modulations
CO 5: Understand and analyze the source and channel coding.

Text/ Reference books:

1. Singh &Sapre, Communication System, TMH
2. Taub& shilling, Communication System, TMH
3. B.P. Lathi, Modern Digital and analog communication system,
4. Simon Haykins, Communication System. John Willy

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC-EE07	Signal & System	2:1:0	3	CIE	ESE
				40	60

Course Objective:-

The course will provide strong foundation on signals and systems which will be useful for creating foundation of communication and signal processing. The students will learn basic continuous time and discrete time signals and systems. Student will understand application of various transforms for analysis of signals and systems both continuous time and discrete time.

Pre Requisite:- Should have knowledge of mathematics, differential equations and difference equation, Laplace transform and Fourier series.

Module 1 (11 Hrs.)

Introduction of signals and systems: Some special continuous time signals (CT signals) & discrete time signals (DT signals) - Step, ramp, pulse, impulse, sinusoidal and exponentialsignals, basic operations on signals, classifications of CT and DT signals- Periodic and aperiodicsignals, energy and power signals, random & deterministic signal, even & odd signal, causal &non causal signal, Classification of system - CT systems and DT systems – Static & Dynamic,Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.

Module 2 (08 Hrs.)

Analysis of continuous time signals: Time and frequency domain analysis, Fourier seriesanalysis, spectrum of CT signals, Fourier transform and Laplace transform, region of convergence.

Module 3 (07 Hrs.)

Linear time invariant continuous time systems: Differential equations representation, blockdiagram representation, state variable representation and matrix representation of systems,impulse response, step response, frequency response, reliability of systems, analog filters.

Module 4 (07 Hrs.)

Analysis of discrete time signals: Convolution sum and properties, sampling of CT signals and aliasing, DTFT and properties, Z transform and properties, inverse Z transform.

Module 5 (07 Hrs.)

Linear time invariant discrete time systems: Difference equations representation, block diagram representation, state variable equations and matrix representation of systems, impulse response, analysis of DT LTI systems using DTFT and Z transform, Digital filters"

Course Outcomes: Students will be able to:

CO1. Classify different types of commonly used signals & systems and describe how to perform mathematical operations on signals.

CO2. Analyze continuous time signals in time domain and frequency domain.

CO3. Analyze linear time invariant continuous time systems using differential question, block diagram and state variable representations**.**

CO4. Analyze discrete time signal using Z transform and convolution.

CO5. Analyze DT LTI systems using DTFT and Z-Transform.

Textbooks/ References

1. Alan V. Oppenheim, Alan S. Willsky, S Hamid Nawab, 'Signals and systems', 2ndedition 2015 Pearson New International Edition.
2. Anand Kumar, Signals and Systems, PHI, III edition, 2015 Pearson Education
3. MahmoodNahvi, Signals and Systems, McGraw Hil
4. Tarun Kumar Rawat, ' Signals & Systems', Oxford University Press

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC-EE08	Electromagnetic Fields	2:1:0	3	CIE	ESE
				40	60

Course Objectives: To introduce the basic mathematical concepts related to electromagnetic vector fields. To impart knowledge on the concepts of electrostatics and magneto statics fields.

Pre Requisite:- Fundamentals of electrical engineering and should have basic knowledge of Ordinary differential equations, Matrix, Laplace and Fourier Series & transform

Course Contents (Module 1 to 5):

Module 1: (Hrs.)

Cartesian, cylindrical & spherical co-ordinate systems, scalar & vector fields. Electrostatic Fields – Coulomb's law, electric field intensity due to different charge distribution viz. line charge, sheet charge, Field due to continuous volume – electric potential, properties of potential function, potential gradient equipotential surfaces, line of force, Gauss law, applications of Gauss law, Gauss law in point form. Divergence theorem.

Module 2: (Hrs.)

Laplace's & Poisson's equations, solution of Laplace's equation, Electric dipole, dipole moment, potential & electric field intensity due to dipole, Behavior of conductors in an electric field. Conductor & insulator, electric field inside a dielectric, polarization, Boundary value conditions for electric Field, Capacitance & Capacitances of various types of capacitors, Energy stored and energy density in static electric field, Current density, conduction & convection current density ohms law in point form, equation of continuity.

Module 3: (Hrs.)

Static Magnetic Field, Biot-Savart's law, Magnetic Field intensity due to straight current carrying filament, circular, square and solenoidal current carrying wire & Stokes's theorem. Relationship between magnetic flux, flux density & magnetic Field intensity; Ampere's circuital law and its

applications, magnetic, curl of a vector field, Ampere's circuital law in point form, Magnetic force, moving charge in a magnetic field, Lorentz Force on straight and long current carrying conductors in magnetic field, force between two long & parallel current carrying conductors. Magnetic dipole & dipole moment, a differential current loop as dipole, torque on a current carrying loop in magnetic field, Magnetic Boundary conditions.

Module 4: (Hrs.)

Scalar magnetic potential and its limitations, Vector magnetic potential and its properties. Energy stored in magnetic Field & energy density, Faraday's Law, transformer & motional EMFs, Displacement current, Maxwell's equations as Generalization of circuit equations, Maxwell's equation in free space, Maxwell's equation for harmonically varying Field, static and steady fields, Maxwell's equations in differential & integral form.

Module 5: (Hrs.)

Electro Magnetic Waves : Uniform plane wave in time domain in free space, Sinusoidally time varying uniform plane wave in free space, Wave equation and solution for material medium, Uniform plane wave in dielectrics and conductors, Pointing Vector theorem, instantaneous, average and complex poynting vector, power loss in a plane conductor.

Course Outcomes: Students will be able to:

CO1: Solve the problems in different EM field with the help of Cartesian, Cylindrical, Spherical Coordinate systems and various laws of electrostatic fields.

CO2: Explain the behavior of conductor in electrostatic fields and boundary value conditions for electric field.

CO3: Explain the concept of magneto static field and its various laws.

CO4: Solve Electromagnetic problems using Maxwell equations (Differential & integral form).

CO5: Analyze electromagnetic wave equation in time domain in free space, dielectric, conductor and its solution for material medium.

Textbooks/ References

1. Mathew N.O Sadiku; Elements of Electromagnetic; Oxford.
2. William H. Hayt; Engineering Electromagnetic; TMH.
3. N.N. Rao; Element of Engineering Electromagnetic; PHI.
4. S.P. Seth; Electromagnetic Field ;Dhanpat Rai & Sons.
5. David K. Cheng; Fields and Wave Electromagnetic; Addison Wesley.

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
HSMC-HS04	Entrepreneurship and principles of Management	1:0:0	1	CIE	ESE
				40	60

Course Objectives:

- Explain Entrepreneurship and its importance
- Describe the importance E-commerce
- Explain the importance Digital Marketing in current scenario.
- Describe the importance of planning and organization Structure.
- Discuss the control process and its elements

Pre Requisite:- Nil

Course Contents (Module 1 to 5):

Module 1: (8 Hrs.)

Entrepreneurship: Definition, requirements to be an entrepreneur, entrepreneur and intrapreneur, entrepreneur and manager, growth of entrepreneurship in India, Types of Enterprises and Ownership Structure**.**

Module 2: (10 Hrs.)

E-commerce and its Technological Aspects: Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Benefits and limitations of E-Commerce

Module 3: (8 Hrs.)

Introduction to Digital Marketing: Evolution of Digital Marketing from traditional to modern era, Role of Internet, Search Engine Advertising, Display marketing, Social Media Marketing

Module 4: (8 Hrs.)

Business Management: Definition, Functions, Process, Scope and Significance of Management. Nature of Management, Managerial Roles, Managerial Skills and Activities, Propritership, Ltd., Pvt. Ltd.,

Company act registration, Startup India, DPIIT, Yukti Portal, Gumasta Lisences, Indian startup policy, MP startup policy, Closing a company, Leadership aspects.

Module 5: (10 Hrs.)

Management Functions: Nature, Scope, Objective and Significance, Elements and Steps of Planning & organizing, Delegation and Decentralization. Formal and Informal Organizations

Directing: Effective Directing, Supervision, Different Theories of Motivation,

Controlling and Coordinating: Elements of Managerial Control, Control Systems, Management Control Techniques, Coordination Concept, Importance, Principles and Techniques of Coordination.

Course Outcomes: After completion of the course student will be able to:

CO1: Understanding of basic concepts, principles and practices entrepreneurship.

CO2: Understanding of basic concepts & Importance of e-commerce.

CO3: Understanding of basic concepts of digital marketing

CO4: Understanding the planning and organizing & organization Structures.

CO5: Importance of Management Control Techniques

Textbooks/ References

1. Chhabra T.N., Principles and Practice of Management. 10th ed Year 2018.
2. Murton- Gulab, Management Today. 3th ed.1998
3. KoontzH. and O"DonnelH., Essential of Management, 8th ed., McGraw-Hill, New Delhi, 2009.
4. Robbins, S. Fundamentals of Management. 5th ed., Pearson Education, Canada, 2008.
5. Mohanty SK; Fundamental of Entrepreneurship; PHI, 2005.
6. Prasad L M, Principles and Practices of Management, S. Chand and Sons, New Delhi ,2018
7. Terry & Francklin, Principles of Management, Richard– Erwin.18th Ed. 1982

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
IFC-CI001	Interdisciplinary Foundation Course-I Basics of Computer Science	2:0:0	2	CIE	ESE
				40	60

Course Objectives: The objective of this course is to understand fundamental of Data Structures and Operating System

Pre Requisite:- Nil

Course Contents (Module 1 to 5):

Module 1: (4 Hrs.)

Review of C programming language. Introduction to Data Structure: Concepts of Data and Information, Classification of Data structures, Abstract Data Types, Introduction to linear data structures- Arrays, String, representation & Operations, Linked List: Representation of linked list in memory.

Module 2: (4 Hrs.)

Stacks: Stacks as ADT, Application of Stack: Conversion of infix to postfix notation using stack, evaluation of postfix expression, Queues: Queues as ADT, Application of queues.

Module 3: (4 Hrs.)

Tree: Definitions - Height, depth, order, degree etc. Binary Search Tree - Operations, Traversal, Search, Heap, Applications and comparison of various types of tree.

Module 4: (4 Hrs.)

Introduction to Operating Systems: Function, Different Types, Desirable Characteristics and features of an O/S, Operating Systems Services: Types of Services, Different ways of providing these Services , Operating System Structure.

Module 5: (5Hrs.)

CPU Scheduling : Process Concept, Scheduling Concepts, Types of Schedulers, Scheduling Criteria, Process State Diagram, Introduction to Deadlocks. Memory Management: Different Memory Management Techniques – Partitioning, Swapping.

Course Outcomes: After completion of the course student will be able to:

CO1: Understand basic data structures such as arrays, linked lists .

CO2: Introduce the concept of stacks and queues.

CO3: Understand the basic concept of trees .

CO4: State the core concepts of operating system and types of operating system.

CO5: Describe the concept of process, deadlock and memory.

Textbooks/ References

1. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Data Structures” Computer Science Press.
2. Mark Allen Weiss “Algorithms, Data Structures, and Problem Solving with C++” , Pearson Education (US) 1996
3. R. G. Dromey “How to Solve it by Computer”, 2nd Impression by, PHI
4. AM Tanenbaum, Y Langsam& MJ Augustein, “Data structure using C and C++”, 2nd Ed., 2006 , Prentice Hall India.
5. Avi Silberschatz, Peter Galvin, Greg Gagne, “Operating System Concepts Essentials”, Wiley Asia Student Edition, 10th Edition, 2018.
6. William Stallings, “Operating Systems: Internals and Design Principles”, Prentice Hallof India, 5th Edition, 2005.

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC-EE05(P)	Electric Machine I Lab	0:0:2	1	CIE	ESE
				40	60

Course Objective:- To teach students basic principle of operation, construction and application of static and rotating electrical machines.

Pre Requisite:- Fundamentals of electrical engineering.

List of Experiments

1. Perform turn ratio and polarity test on1-phasetransformer
2. Perform load test on a 1-phase transformer and plot its load characteristic.
3. Perform OC and SC tests on a 1-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.
4. Perform OC and SC tests on a 3-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.
5. Perform Sumpner's test on two 1-phase transformer and determine its efficiency at various load.
6. Perform No-load and block rotor test on a 3- phase IM and determine its equivalent circuit.
7. Perform load test on a 3- phase IM and plot its performance characteristics.
8. Study various types of starters used for 3-IMs.
9. Perform No-load and block rotor test on a 1- phase IM and determine its equivalent circuit.
10. Perform stepper motor for 90 degree in forward and 90 degree in reverse in 20 sec using PLC.

Course Outcomes: Students will be able to:

CO1. Illustrate the working principle, construction, operation and testing of Single Phase Transformer.

CO2. Illustrate the working principle, construction, operation and testing of Three Phase Transformer.

CO3. Illustrate the working principle, construction, operation and testing of Three Phase Induction Motor.

CO4. Discuss the starting and control of Induction Motor.

CO5. Illustrate the working principle, construction, operation and testing of Single Phase Induction Motor.

Textbooks/ References

1. Electrical Machines by Nagrath and Kothari, McGraw-Hill
2. Electrical Machines by P.S. Bimbhra, Khanna Publishers.

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC-EE06(P)	Communication Lab	0:0:2	1	CIE	ESE
				40	60

Course Objective:-Objective of this course is to introduce the students with basic concepts of analog and digital communication System.
Pre Requisite:-Basic concept of signals and systems.

List of Experiments

1. To study different types of signals and their properties
2. To perform and analyze experiment of Amplitude modulation (DSB Signal)
3. To perform and analyze experiment of Amplitude Demodulation (DSB Signal)
4. To perform and analyze experiment of Frequency Modulation & demodulation.
5. To perform and analyze experiment of Pulse amplitude Modulation & Demodulation
6. To perform and analyze experiment of time division multiplexing.
7. To perform and analyze experiment of pulse code modulation & demodulation
8. To perform and analyze experiment of BPSK & QPSK modulation

Course Outcomes:-After successful completion of course students will be able to:

CO 1: Compute Fourier Transform and analyze different types of signals and systems.
CO2: Understand the need of modulation and different types of Analog modulation schemes.
CO 3: Analyze different aspects of PCM techniques.
CO 4: Identify and describe different types of digital modulations
CO 5: Understand and analyze the source and channel coding.

Text/ Reference books:

1. Singh &Sapre, Communication System, TMH
2. Taub& shilling, Communication System, TMH
3. B.P. Lathi, Modern Digital and analog communication system,
4. Simon Haykins, Communication System. John Willy

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
SBC-EE02 (P)	Simulation Lab - I	0:0:2	1	CIE	ESE
				40	60

Course Objectives: Summarize the knowledge about MATLAB Simulation Process.

Pre Requisite:- Basic of MATLAB and fundamental of Electrical Engineering.

List of Experiments

1. Introduction to Basic SIMULINK Modeling & Analysis.
2. Introduction of PSIM (Power Simulation Software) for power Electronics.
3. Simulation and of Uncontrolled Rectifier Circuits.
4. Simulation and of Controlled Rectifier Circuits.
5. Simulation of One Quadrant Chopper Circuit.
6. Simulation of Fourth Quadrant Chopper Circuit.
7. Simulation of Single Phase Half Wave Inverter.
8. Simulation of Single Phase Full Wave Inverter.
9. Simulation of AC Voltage Controller Circuit using MATLAB & PSIM.
10. Simulation and Analysis of Three Phase 120 Degree Inverter Circuit.

Course Outcomes: Students will be able to:

CO1. Analyzing operation of different power electronic converters .

CO2. Analyzing waveforms exhibited at the input and output ports of the converters.

CO3. Measure of input and outputs of converters.

Textbooks/ References

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Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
MLC 02	Constitution of India	2:1:0	3	CIE	ESE
				40	60