Bachelor of Technology
(Electronics & Communication Engineering)

Scheme & Syllabus
(III Sem & IV Sem)
w.e.f. 2021-22

Department of Electronics & Communication Engg.
Guru Jambheshwar University of Science & Technology
HISAR- 125001 (HARYANA)

INDEX

B.Tech., ECE, Semester-3							
Course Code	**Course Name**	**Teaching Schedule**			**Hours/ Week**	**Credits**	**Duration of Exam (Hrs)**
		L	**T**	**P**			
BSC201-T	Mathematics-III	3	0	0	3	3	3
PCC-ECE201-T	Signals & Systems	3	0	0	3	3	3
PCC-ECE203-T	Digital Electronics	3	0	0	3	3	3
PCC-ECE205-T	Analog Electronics- I	3	0	0	3	3	3
ESC-ECE207-T	Network Analysis and Synthesis	3	0	0	3	3	3
ESC-ME202-T	Elements of Mechanical Engineering	3	0	0	3	3	3
PCC-ECE203-P	Digital Electronics Lab	0	0	2	2	1	3
PCC-ECE205-P	Analog Electronics- I Lab	0	0	4	4	2	3
ESC-ECE207-P	Network Analysis and Synthesis Lab	0	0	2	2	1	3
*MC103-T	Indian Constitution	3	0	0	3	0	3
Total		21	0	8	29	22	

*MC-Mandatory Course, which will be a non-credit course and the student has to get pass marks in order to qualify for the award of degree.

Note: Students will be allowed to use the scientific calculator only.

B.Tech., ECE, Semester-4							
Course Code	Course Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs)
PCC-ECE202-T	Sensors and Measuring Instruments	3	0	0	3	3	3
PCC-ECE204-T	Analog and Digital Communication	3	0	0	3	3	3
PCC-ECE206-T	Analog Electronics II	3	0	0	3	3	3
PCC-ECE208-T	Electromagnetic Theory	3	0	0	3	3	3
PCC-ECE202-P	Sensors and Measuring Instruments Lab	0	0	2	2	1	3
PCC-ECE204-P	Analog & Digital Communication Lab	0	0	2	2	1	3
PCC-ECE206-P	Analog Electronics -II Lab	0	0	4	4	2	3
PCC-ECE208-P	Python & Its Application in Electronics	0	0	2	2	1	3
*MC104-T	Essence of Indian Traditional knowledge	3	0	0	3	0	3
**HSMC201-T	~~Personality Development and~~ Human Values and Personality Development	3	0	0	3	0	3
Total		15	0	10	25	17	

Note: The students will have to undergo Practical Training -I of 4 to 6 weeks duration during summer vacations which will be evaluated in 5th sem.

*MC-Mandatory Course which will be a non-credit course and the student has to get pass marks in order to qualify for the award of degree.

**HSMC201-T is a non-credit qualifying course. The assessment will be completely internal.

Note: Students will be allowed to use the scientific calculator only.

14/1/21

Detailed Syllabus

of

B.Tech.(ECE)

3rd Semester

MATHEMATICS-III

BSC201-T

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Define** concepts and terminology of Fourier series and Fourier transforms, Functions of complex variables, Power Series and, Probability distributions and hypothesis testing.	LOTS: L1 (Remember)
CO2	**Solve** problems using Fourier transforms in domains like digital electronics and image processing.	LOTS: L3 (Apply)
CO3	**Apply** mathematical principles to solve computational problems.	LOTS: L3 (Apply)
CO4	**Compare** various probability distributions.	HOTS: L4 (Analyse)
CO5	**Select** suitable hypothesis testing methods for given problems and interpret the respective outcomes.	HOTS: L5 (Evaluate)
CO6	**Integrate** the knowledge of Fourier series and Fourier transforms, Functions of complex variables, Power Series and, Probability distributions and hypothesis testing for solving real world problems,	HOTS: L6 (Create)

Course Contents

UNIT- I

Fourier Series and Fourier Transforms: Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

UNIT-II

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac delta function.

UNIT-III

Functions of Complex Variable: Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity. Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions.

UNIT-IV

Complex integral, Cauchy Gaursat theorem (without proof), Cauchy integral formula (without proof), Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi-circle only).

Text and Reference Books:

1. F. Kreyszig, Advanced Engineering Mathematics, 10th edition, Wiley, 2015.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th edition, 1965.
3. R.K. Jain, S.R.K. Iyenger. Advance Engineering. Mathematics, 4th edition, Narosa Publishing House, 2012.
4. Michael D. Greenberg, Advanced Engineering Mathematics,2nd edition, Pearson Education, 2002
5. Johnson and Miller Probability and statistics for Engineers, 8th edition, Pearson Education India, 2015.

CO-PO Articulation Matrix Mathematics III (BSC201-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Define concepts and terminology of Fourier series and Fourier transforms, Functions of complex variables, Power Series and, Probability distributions and hypothesis testing. **LOTS: L1 (Remember)**	1	-	-	-	-	-	-	-	-	-	-	-	2	2	2
CO2. Solve problems using Fourier transforms in domains like digital electronics and image processing. **LOTS: L3 (Apply)**	2	2	2	2	-	-	-	-	-	-	-	-	3	2	2
CO3. Apply mathematical principles to solve computational problems. **LOTS: L3 (Apply)**	2	2	2	2	-	-	-	-	-	-	-	-	3	2	3
CO4. Compare various probability distributions **HOTS: L4 (Analyse).**	3	3	2	3	-	-	-	-	-	-	-	-	3	2	3
CO5. Select suitable hypothesis testing methods for given problems and interpret the respective outcomes. **HOTS: L5 (Evaluate)**	3	3	2	3	-	-	-	-	-	-	-	-	3	2	3
CO6. Integrate the knowledge of Fourier series and Fourier transforms, Functions of complex variables, Power Series and, Probability distributions and hypothesis testing for solving real world problems. **HOTS: L6 (Create)**	3	3	2	3	-	-	-	-	-	-	-	-	2	2	3
Level of attainment:															

SIGNALS & SYSTEMS

PCC-ECE201-T

General Course Information

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks

Pre-requisites: Physics, Maths.

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Define & describe** terminology and categorization related to signals, systems and transformation techniques.	LOTS: L1 (Remember)
CO2	**Understand & explain** properties of various signals & systems along with concept of conversion/transformation of signals like analog to digital conversion, time to frequency transformation.	LOTS: L2 (Understand)
CO3	**Apply** signal properties and transformation techniques on various periodic/aperiodic analog/discrete signal.	LOTS: L3 (Apply)
CO4	**Analyse & evaluate** LTI system response using transformation techniques.	HOTS: L4 & L5 (Analyze & Evaluate)
CO5	**Compare** the properties of various signals and systems along with transformation techniques and their convergence region.	HOTS: L5 (Evaluate)

Course Contents

UNIT-1

INTRODUCTION TO SIGNALS: Signal definition, classification of signals, basic/singularity continuous and discrete-time signals, basic operations: time shifting, time reversal, time scaling on signals, signal representation in terms of singular functions, correlation of signals and its properties, representation of a continuous-time signal by its samples: the sampling theorem, reconstruction, aliasing.

UNIT-II

SYSTEM & ITS PROPERTIES: system, classification of systems: linear & nonlinear systems; static & dynamic systems, causal & non-causal system, invertible & non-invertible, stable & unstable system, time variant & time invariant systems with examples, linear time-invariant systems: definition and properties, impulse response, convolution sum and its properties, representation of LTI systems using differential and difference equations.

UNIT –III

FOURIER SERIES & FOURIER TRANSFORM: Introduction to Frequency domain Representation, Fourier Series Representation of Periodic Signals, Properties of Fourier Series, Fourier Transform for periodic and Aperiodic signals, Convergence of Fourier Transform, Properties of Fourier Transform, Applications of Fourier Transform.

DISCRETE-TIME FOURIER TRANSFORM: Fourier Transform representation for Discrete-Time Aperiodic & Periodic Signals, Properties of Discrete-Time Fourier Transform.

UNIT-IV

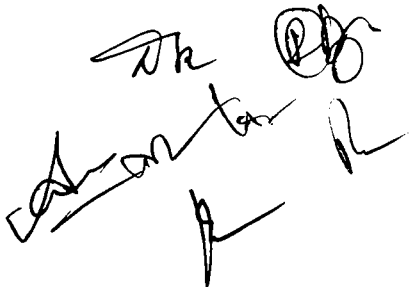
Z-TRANSFORM: Introduction to Z-Transform, Region of Convergence (ROC) for Z-Transform, Z-Transform Properties, Inverse Z-Transform, Analysis of LTI Systems Using Z-Transform, Application of Z transform, Introduction to Hilbert Transform.

TEXT BOOKS:

1. Oppenheim, A. S. Willsky, with S. Nawab "Signals & Systems", Prentice –Hall India.
2. Tarun K. Rawat, "Signal & Systems", Oxford University Press.
3. Farooq Husain, "Signals & Systems", Umesh Publications.

REFERENCE BOOKS:

1. S. Salivahanan, A. Vallavraj, C. Gnanapriya, "Digital Signal Processing", Tata McGraw Hill.
2. J. G. Proakis, D. G. Manolakis, "Digital Signal Processing, Principles, Algorithms, & Applications", Prentice-Hall India.
3. B. Kumar, "Signals and Systems", New Age International Publishers.



CO-PO Articulation Matrix Signals & Systems (PCC-ECE201-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Define & describe terminology and categorization related to signals, systems and transformation techniques. **LOTS: L1 (Remember)**	3	3	2	1	1	-	-	-	-	-	-	1	2	2	2
CO2. Understand & explain properties of various signals & systems along with concept of conversion/transformation of signals like analog to digital conversion, time to frequency transformation. **LOTS: L2 (Understand)**	3	3	2	1	1	-	-	-	-	-	-	1	2	2	2
CO3. Apply signal properties and transformation techniques on various periodic/aperiodic analog/discrete signal. **LOTS: L3 (Apply)**	3	3	2	1	1	1	-	-	-	-	-	2	2	2	2
CO4. Analyze & evaluate LTI system response using transformation techniques. **HOTS: L4 & L5 (Analyze & Evaluate)**	3	3	3	2	2	2	-	-	-	-	-	2	3	3	3
CO5. Compare the properties of various signals and systems along with transformation techniques and their convergence region. **HOTS: L5 (Evaluate)**	3	3	2	2	2	2	-	-	-	-	-	2	3	3	3
Level of Attainment:															

DIGITAL ELECTRONICS

PCC-ECE203-T

General Course Information

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Pre-requisites: Basics of Electronics

Sr. No.	Course outcomes At the end of the course students will be able to:	RBT Level
CO1	**Outline** the general concepts and terminology related to logic gates, number systems, logic families, combinatorial and sequential logic circuits.	LOTS: L1 (Remember)
CO2	**Discuss** the basic analog/digital components and their interconnections in logic families, combinatorial and sequential circuits.	LOTS: L2 (Understand)
CO3	**Apply** different methods/techniques to design various digital circuits.	LOTS: L3 (Apply)
CO4	**Analyse** day to day problems and industrial problems for their solutions using digital circuits.	HOTS: L4 (Analyse)
CO5	**Contrast** different types of digital circuits and their designing methods.	HOTS: L5 (Evaluate)
CO6	**Design** digital circuit for various practical problems.	HOTS: L6 (Create)

Course Content

UNIT-I

Digital signals & logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Binary arithmetic, Error detection and correction codes. Karnaugh map and Quine Mcluskey methods of simplification

Digital Logic Families: Switching mode operation of p-n junction, bipolar and MOS devices. Bipolar logic families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic

UNIT-II

Combinational Circuit Design: Circuit design using gates, adder, subtractor, comparator, BCD to seven segment, code converters etc.

Design Using MSI Devices: Multiplexers and Demultiplexers and their use as logic elements, Decoders, Encoders, Adders / Subtractors, BCD arithmetic circuits.

UNIT-III

Flip Flops: S-R, J-K, T, D, master-slave, edge triggered, flip flop conversions Shift registers, bidirectional shift register, sequence generators, Ring counters and Johnson Counter, Design of Asynchronous and Synchronous Counters

Finite State Machines: Timing diagrams (synchronous FSMs), Moore versus Mealy, FSM design procedure-State diagram, State-transition table, State minimisation, State encoding, Next-state logic minimisation, Implement the design

UNIT IV

A/D and D/A Convertors: Weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters. A/D converters: Quantisation, parallel -comparator, successive approximation, counting type, dual-slope ADC, specifications of ADCs

PLDs: ROM, PLA, PAL, FPGA and CPLDs, Implementation of combinational circuits using ROM, PLA and PAL

TEXT BOOK:

1. Modern Digital Electronics (Edition III): R. P. Jain; TMH

REFERENCE BOOKS:

1. Digital Integrated Electronics: Taub & Schilling; MGH
2. Digital Principles and Applications: Malvino & Leach; McGraw Hill.
3. Digital Design: Morris Mano; PHI.

CO-PO Articulation Matrix Digital Electronics (PCC-ECE203-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Outline the general concepts and terminology related to logic gates, number systems, logic families, combinatorial and sequential logic circuits. **LOTS: L1 (Remember)**	2	2	2	2	2	-	-	-	1	-	-	2	3	3	3
CO2. Discuss the basic analog/digital components and their interconnections in logic families, combinatorial and sequential circuits. **LOTS: L2 (Understand)**	2	2	2	2	2	-	-	-	1	-	-	2	3	3	3
CO3. Apply different methods/techniques to design various digital circuits. **LOTS: L3 (Apply)**	2	2	2	2	2	1	-	-	1	-	-	2	3	3	3
CO4. Analyse day to day problems and industrial problems for their solutions using digital circuits. **HOTS: L4 (Analyse)**	2	2	2	2	2	1	-	-	1	-	2	3	3	3	3
CO5. Contrast different types of digital circuits and their designing methods. **HOTS: L5 (Evaluate)**	3	3	3	3	2	1	-	-	1	-	2	3	3	3	3
CO6. Design of digital circuits for various practical problems. **HOTS: L6 (Create)**	3	3	3	3	2	1	-	-	-	-	2	3	3	3	3
Level of Attainments:															

ANALOG ELECTRONICS-I

PCC-ECE205-T

General Course Information

Course Credits: 3.0 Mode: Lectures (L) Teaching schedule L T P: 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks

Pre-requisites: Physics

Course Outcomes

Sr. No.	Course Outcomes **At the end of the semester, students will be able to:**	RBT Level
CO1	**Define** & **describe** the terminology and fundamental principles related to the construction & characteristics of the semiconductor, diodes, BJT and BJT amplifiers.	LOTS: L1(Remember)
CO2	**Understand** & **explain** various models, methods/techniques for analysis and synthesis of analog circuits.	LOTS: L2 (Understand)
CO3	**Apply** various models, methods/techniques to solve and synthesize related Analog Circuits.	LOTS: L3 (Apply)
CO4	**Analyse** & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desired parameters.	HOTS: L4 & L5 (Analyze & Evaluate)
CO5	**Design** basic analog circuits for a given/desirable set of circuit/device parameters.	HOTS: L6 (Create)

Course Contents

UNIT-1

Semiconductors: Intrinsic Semiconductors, Doped Semiconductors, Current Flow in Semiconductors, PN Junction structure and operation with open circuit Terminals, The PN Junction with an Applied Voltage, Capacitive Effects in the PN Junction

Diodes: Terminal Characteristics of junction diodes, Zener diode, Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifier with a filter capacitor, Limiter circuits, Clamping circuits, voltage doubler.

UNIT-II

BJT: Device Structure and Physical Operation, Current-Voltage Characteristics, Early Effect, BJT as an Amplifier, Effect of Bias Point location on Allowable Signal swing, BJT operation as a switch, BJT circuits at DC

BJT Biasing: Load Line, Operating Point, Voltage divider Bias, Collector to base bias, Biasing using Constant current source

UNIT –III

BJT Small-Signal Operation and Models: The Collector Current and the Transconductance, The Base Current and the Input Resistance at the Base, The Emitter Current and the Input Resistance at the Emitter, Voltage Gain, Separating the Signal and the DC Quantities, The Hybrid-π Model, The T Model, Application of the Small-Signal Equivalent Circuits, Small-Signal Models with Early Effect.

BJT Amplifiers Configurations: Common Base amplifier, Common Emitter Amplifier, Common Emitter Amplifier with Emitter Resistance, Common Collector Amplifier or Emitter Follower, Comparisons

UNIT-IV

Frequency Response of Common Emitter Amplifier: The Three Frequency Bands, High-Frequency Response, Low-Frequency Response, Transistor breakdown and temperature effects.

Regulated Power Supplies: General Filter Considerations, Capacitor Filter, RC Filter, Series voltage regulators, shunt voltage regulators, IC voltage regulator

TEXT BOOKS:

1. Microelectronics Circuits, theory and applications: Sedra & Smith; OXFORD
2. Electronic Devices & Circuits: Boylestad & Nashelsky; Pearson
3. Electronic devices and Circuits (4e): Millman, Halkias and Jit; McGraw Hill

REFERENCE BOOKS:

1. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH.
2. Electronics Principles: Malvino; McGrawHill
3. Electronics Circuits: Donald L. Schilling & Charles Belove; McGrawHill

CO-PO Articulation Matrix Analog Electronics-I (PCC-ECE205-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Define & **describe** the terminology and fundamental principles related to the construction & characteristics of the semiconductor, diodes, BJT and BJT amplifiers **LOTS: L1 (Remember)**	2	2	2	1	1	_	_	_	1	_	_	_	2	2	2
CO2. Understand & **explain** various models, methods/techniques for analysis and synthesis of Analog Circuits **LOTS: L2 (Understand)**	2	3	3	1	1	_	_	_	1	_	_	_	2	2	2
CO3. Apply various models, methods/techniques to solve and synthesise related Analog Circuits **LOTS: L3 (Apply)**	2	3	3	2	1	1	_	_	1	_	_	2	2	2	2
CO4. Analyse & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desired parameters. **HOTS: L4 & L5 (Analyse & Evaluate)**	3	3	3	2	1	1	_	_	1	_	_	2	3	3	3
CO5. Design basic analog circuits for a given/desirable set of circuit/device parameters **HOTS: L6 (Create)**	3	3	3	3	2	2	_	_	1	_	_	3	3	3	3
Level of Attainment:															

NETWORK ANALYSIS & SYNTHESIS

ESC-ECE207-T

General Course Information

Course Credits: 3.0 Mode: Lectures (L) Teaching schedule L T P: 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks

Pre-requisites: Mathematics, Physics, Electrical Technology

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Define & describe** the terminology and fundamental principles related to electric networks, their representation and synthesis.	LOTS: L1 (Remember)
CO2	**Understand & explain** various theorems and methods/techniques for analysis and synthesis of electric networks.	LOTS: L2 (Understand)
CO3	**Apply** Laplace transform, transient response approach, network functions/parameters and graphical approach to solve and synthesize various electric networks.	LOTS: L3 (Apply)
CO4	**Analyze & evaluate** the electric networks, including filters in terms of their realizability, time and frequency domain behavior and stability.	HOTS: L4 & L5 (Analyze & Evaluate)
CO5	**Design** basic electric networks for a given / desirable set of network parameters.	HOTS: L6 (Create)

Course Contents

UNIT-I

LAPLACE TRANSFORM: Introduction to Laplace transform & its properties, Laplace transform of special signal waveforms, Inverse Laplace transform, Use of Laplace Transform in solving electrical networks.

TRANSIENT RESPONSE: Initial Conditions of resistive, inductive & capacitive Elements, Time-domain analysis of simple linear circuits: Transient & Steady-state Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

UNIT-II

NETWORK FUNCTIONS: Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero locations for driving point functions and transfer functions, Time domain behaviour from the pole-zero plot.

PARAMETERS OF TWO PORT NETWORKS: Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two- port networks.

UNIT-III

NETWORK SYNTHESIS: Concept & significance of Positive real functions, concept of network synthesis, driving point immittance function and structure of LC network, LC network synthesis using Foster and Cauer form, driving point immittance function and structure of RC & RL network, RC & RL network synthesis by Foster and Cauer form.

UNIT-IV

NETWORK GRAPH THEORY: Concept of network graph, Terminology used in network graph, relation between Twigs and Links, properties of tree in a graph, formation of incidence Matrix, number of trees in a graph, Graph matrices: cut-set matrix, tie set matrix, formulation of network equilibrium equations, network analysis using graph theory.

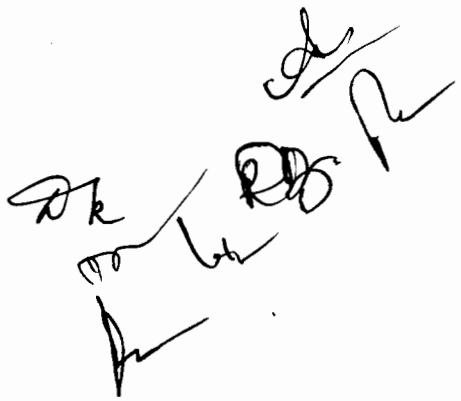
FILTERS: Introduction to filters, Characteristics of filters, Filter Classification, Passive Filters: Analysis & Design of prototype HPF, LPF, BPF, & BSF, introduction to m-derived filters, Active Filters: Introduction of active filters.

TEXT BOOKS:

1. Circuit Theory: A Chakrabarty; Dhanpat Rai Publication.
2. Network Analysis: Van Valkenburg; Pearson Education.
3. Engineering Network Analysis & Filter Design: G.G Bhise, P.R Chadha, D.C Kulshreshtha; Umesh Publication.

REFERENCE BOOKS:

1. Engineering Circuit Analysis: W H Hayt, Kemmerly, Durbin; McGraw Hill Publication
2. Network Analysis & Synthesis: S.P Ghosh; McGraw Hill.
3. Network Analysis & Synthesis: K.M. Soni; S.K Kataria & Sons Publication.
4. Network Analysis & Synthesis: F.F. Kuo; John Wiley & Sons Inc.



CO-PO Articulation Matrix Network Analysis & Synthesis (ESC-ECE207-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Define & describe the terminology and fundamental principles related to electric networks, their representation and synthesis. **LOTS: L1 (Remember)**	1	1	1	1	_	_	_	_	1	_	_	1	2	2	2
CO2. Understand & explain various theorems and methods / techniques for analysis and synthesis of electric networks. **LOTS: L2 (Understand)**	1	1	1	1	_	_	_	_	1	_	_	1	2	2	2
CO3. Apply Laplace transform, transient response approach, network functions / parameters and graphical approach to solve and synthesise various electric networks. **LOTS: L3 (Apply)**	2	2	2	2	1	_	-	_	1	_	_	2	2	2	2
CO4. Analyse & evaluate the electric networks including filters in terms of their realizability, time and frequency domain behavior and stability. **HOTS: L4 & L5 (Analyse & Evaluate)**	3	3	3	3	1	_	2	_	1	_	_	3	3	3	3
CO5. Design basic electric networks for a given / desirable set of network parameters. **HOTS: L6 (Create)**	3	3	3	3	2	_	2	_	2	_	_	3	3	3	3
Level of Attainment:															

ELEMENTS OF MECHANICAL ENGINEERING

ESC-ME202-T

General Course Information

Course Credits: 3.0 Mode: Lectures (L) Teaching schedule L T P: 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Identify** various mechanical machines and their components.	LOTS: L1 (Remember)
CO2	**Explain** construction and working of mechanical systems.	LOTS: L2 (Understand)
CO3	**Solve** problems related to mechanical machines and their parts.	LOTS: L3 (Apply)
CO4	**Analyze & Evaluate** the comparative performance of mechanical devices and their applications in various areas.	HOTS: L4 & L5 (Analyse & Evaluate)

Course Contents

UNIT-I

Internal Combustion Engines (ICE): ICE terminology, Engine parts and Functions, Construction details and working of two-stroke and four-stroke diesel and petrol engines, Comparison of petrol and diesel engines

Water Turbines and Pumps: Introduction to turbines and pumps, Construction details and working of Pelton, Francis and Kaplan turbines, Construction details and working of centrifugal and reciprocating pumps

UNIT-II

Simple Lifting Machines: Basic concepts of machines, Reversible and irreversible machines, Laws of machines, Simple wheel and axle, Single and double purchase winch crabs, Simple and differential screw jacks

Mechanical Components: Importance of mechanical components in various systems, Belts and Pulleys, Chains and Sprockets, Brakes and Clutches, Couplings and Joints, Springs, Gears

UNIT-III

Engineering Mechanics: Laws of Mechanics, Moment of force, General equations of equilibrium, Free body diagrams, First moment of area and centroid, Velocity, and acceleration of particles

Stresses and Strains: Concept of stresses and strains, Elastic limit, Hooks law, Stress-Strain diagram, Factor of safety, Poison's ratio, Elastic constants and their relationships, Thermal stresses

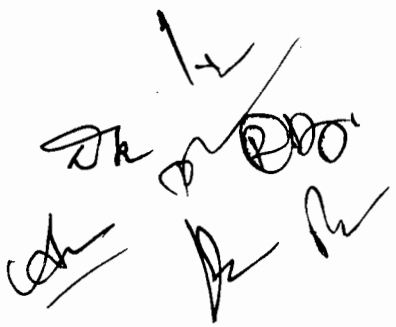
UNIT-IV

Automation: Necessity of automation, Architecture of industrial automation systems, Effects of modern developments in automation on global competitiveness. Functions of mechatronics system and their stepwise design procedure.

Computer Numerical Control (CNC) Machines: Basics of CNC mechanisms, Fundamentals of CNC programming, Tooling systems for CNC Machines, Numeric control (NC), CNC and DNC (Direct NC) Systems.

TEXT AND REFERENCE BOOKS:

1. Elements of Mechanical Engineering - Mahesh Kumar, I.K. International, 2013
2. Elements of Mechanical Engineering- R.K. Rajput, Laxmi Publication.
3. Basics of Mechanical Engineering - Mridual Singal and R. K. Singal, I K International.
4. Basics of Mechanical Engineering- D.S. Kumar, Pub. - Kataria & Sons, New Delhi.
5. Basics of Mechanical Engineering - Sadhu Singh, S. Chand
6. Hydraulic Machines - Jagdish Lal, Metropolitan, Allahabad.
7. Thermal Science and Engineering - D.S. Kumar, Kataria & Sons, New Delhi.
8. Automation, Production Systems and Computer Integrated Manufacturing. Groover M.P, Prentice Hall of India.
9. Thomas R. Kurfess, "Robotics and Automation Handbook", CRC Press, 2004, ISBN 0-8493-1804-1



CO-PO Articulation Matrix Elements of Mechanical Engineering (ESC-ME202-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Identify various mechanical machines and their components. **LOTS: L1 (Remember)**	1	1	1	1	–	–	–	–	1	–	–	1	3	2	1
CO2. Explain construction and working of mechanical systems. **LOTS:** L2 **(Understand)**	1	3	1	1	–	–	–	–	1	–	–	1	3	2	1
CO3. Solve problems related to mechanical machines and their parts. **LOTS: L3 (Apply)**	3	3	2	2	1	1	1	–	1	–	–	1	3	2	2
CO4.Analyze & Evaluate the comparative performance of mechanical devices and their applications in various areas **HOTS: L4 & L5 (Analyse & Evaluate)**	3	3	3	2	1	1	1	–	1	–	–	1	3	2	2
Level of Attainments:															

DIGITAL ELECTRONICS LAB

PCC-ECE203-P

General Course Information

Course Credits: 1 Contact Hours: 2/week (L-T-P: 0-0-2) Mode : Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

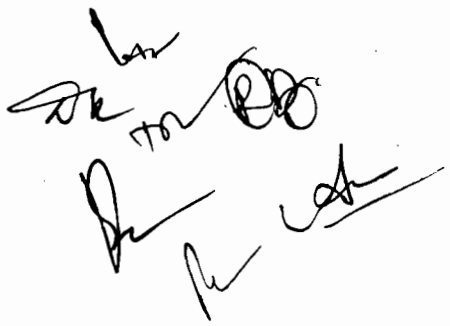
Pre-requisites: Basic Electronics

Sr. No.	Course outcomes At the end of the course students will be able to:	RBT* Level
CO1	**Perform** Experimental work and acquire sound technical knowledge to solve field problems of Digital Electronics.	HOTS: L4 (Analyse)
CO2	**Evaluate** and analyse truth tables/function tables, characteristics and performance of the given digital components.	HOTS: L5 (Evaluate)
CO3	**Design** and of combinational and sequential circuits.	HOTS: L6 (Create)
CO4	**Create** reports based on experiments performed with effective demonstration and analysis of results.	HOTS: L6 (Create)
CO5	**Inculcate** ethical practices while performing experiments individually and in groups.	LOTS: L3 (Apply)

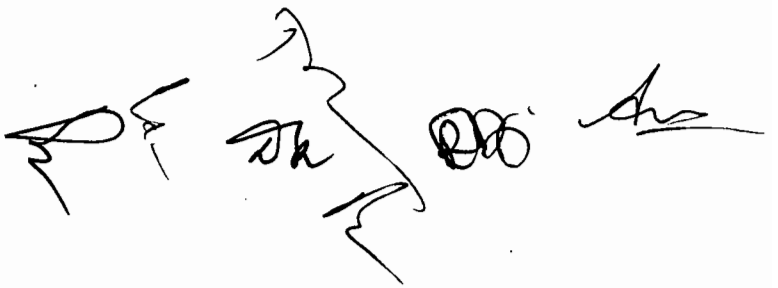
LIST OF EXPERIMENTS

1. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR. Realisation of basic gates using Universal logic gates.
2. Design & realise a given function using K-maps and verify its performance.
3. Design and realise adder and subtractor circuits.
4. Design and realise comparator and parity generator circuits.
5. Design and realise 3-bit binary to gray code converter.
6. Implementation of multiplexer/encoder using logic gates.
7. Implementation and verification of Decoder/De-multiplexer
8. To verify the truth tables of S-R, J-K, T & D type flip flops.
9. Design a 4-bit shift-register and verify its operation.
10. To verify the operation of 4-bit synchronous and 4-bit asynchronous counters.
11. Design, and verify the 4-bit ring counter and twisted ring counter.
12. Mini Project. Implementation of any digital circuit on multipurpose board.

Note: At least eight experiments are to be performed in the semester, out of which atleast six experiments should be performed from the given list. The remaining two experiments may either be performed from the list or designed & setup by the concerned institution as per the scope of the syllabus. The students must prepare Mini Project (Ex. No. 12) in the group of two-three students before the semester ends.



CO-PO Articulation Matrix Digital Electronics Lab (PCC-ECE203-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Perform Experimental work and acquire sound technical knowledge to solve field problems of Digital Electronics **HOTS: L4 (Analyse)**	2	2	2	2	2	-	1	-	3	-	-	2	2	2	2
CO2. Evaluate and analyse truth tables/function tables, characteristics and performance of the given digital components. **HOTS: L5 (Evaluate)**	3	3	3	3	3	-	1	-	-	-	-	3	3	3	3
CO3. Design of combinational and sequential circuits. **HOTS: L6 (Create)**	3	3	3	3	3	-	1	-	-	-	2	3	3	3	3
CO4. Create reports based on experiments performed with effective demonstration and analysis of results. **HOTS: L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	-	-	-	-
CO5. Inculcate ethical practices while performing experiments individually and in groups. **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	-	-	-	
Level of Attainments:															



ANALOG ELECTRONICS-I LAB

PCC-ECE205-P

General Course Information

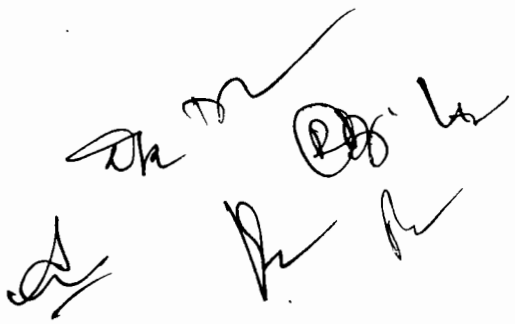
Course Credits: 2 Contact Hours: 4/week (L-T-P: 0-0-4) Mode: Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students.The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

Sr. No.	Course outcomes At the end of the course students will be able to:	RBT Level
CO1	**Examine** the characteristics of devices/circuits.	LOTS: L3 Apply
CO2	**Analyse & evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters.	HOTS: L4 & L5 (Analyse & Evaluate)
CO3	**Design** analog circuits for a given/desirable set of circuit/device parameters.	HOTS: L6 (Create)
CO4	**Create** written records for the given experiments with problem definition, solution, observations and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while performing lab experiments individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS

1. To study and verify V-I characteristics of P N junction diode.
2. To study and verify V-I characteristics of Zener diode.
3. To study and verify the characteristics of half wave rectifier with filter circuit.
4. To study and verify the characteristics of full wave rectifiers with filter circuit.
5. To design clipper circuit and observe their output waveforms.
6. To design the clamper circuit and observe their output waveforms.
7. To design the voltage doubler circuit.
8. To study and verify the characteristics of Common Base configurations of a transistor.
9. To study and verify the characteristics of Common Emitter configurations of a transistor.
10. To study and verify the characteristics of Common Collector configurations of a transistor.
11. Design series Voltage regulator circuit.
12. Design shunt Voltage regulator circuit.
13. To study IC voltage regulator.
14. To design a constant current source circuit using BJT.
15. Project (Any topic related to the scope of the course).

Note: At least 10 experiments are to be performed in the semester, out of which minimum 7 experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed and set by concerned institution as per the scope of the syllabus. The students must prepare Mini Project (Ex. No. 15) in the group of two-three students before the semester ends.



CO-PO Articulation Matrix Analog Electronics-I Lab (PCC-ECE205-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Examine characteristics of devices/ circuits. **LOTS: L3 (Apply)**	3	2	2	-	1	1	-	1	2	-	-	1	3	3	3
CO2. Analyse & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters. **HOTS: L4 & L5 (Analyse & Evaluate)**	3	2	2	-	1	1	-	1	2	-	-	1	3	3	3
CO3. Design basic analog circuits for a given / desirable set of circuit/device parameters. **HOTS: L6 (Create)**	3	3	3	1	2	2	1	2	3	-	3	2	3	3	3
CO4. Create written records for the given experiments with problem definition, solution, observations and conclusions. **HOTS: L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	2	-	-	-
CO5. Demonstrate ethical practices while performing lab experiments individually or in groups. **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	3	-	-	-
Level of Attainments:															

NETWORK ANALYSIS & SYNTHESIS LAB

ESC-ECE207-P

General Course Information

Course Credits: 1 Contact Hours: 2/week (L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

Pre-requisites: Electrical Technology.

S.No.	Course Outcomes: At the end of the semester, students will be able to:	RBT Level
CO1	**Apply** theoritical concepts related to electric circuits and two port network parameters on hardware.	LOTS: L3 (Apply)
CO2	**Analyze and evaluate** the transient response, frequency response and two port network representation in practical manner.	HOTS: L4 & L5 (Analyze & Evaluate)
CO3	**Integrate** knowledge of electric circuits like two port networks and filters and **design** basic circuits for a given set of network parameters.	HOTS: L6 (Create)
CO4	**Create** written records for the given experiments with problem definition, solution, observations and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while performing lab experiments individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS

1. To study the step response of series RC circuit.
2. To study the step response of series RL circuit.
3. To study of phenomenon of resonance in RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To calculate and verify "ABCD" parameters of a two port network.
7. To calculate and verify "H" parameters of a two port network.
8. To determine equivalent parameter of parallel connections of two port network.
9. To plot the frequency responses of low pass filter (LPF) and determine half-power frequency.
10. To plot the frequency responses of high pass filter (HPF) and determine the half- power frequency.
11. To plot the frequency responses of band-pass filters (BPF) and determine the band- width.
12. To synthesise a network of a given network function and verify its response.

Note: At least eight experiments are to be performed in the semester, out of which atleast six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned course coordinator/institution as per the scope of the syllabus.

CO-PO Articulation Matrix: Network Analysis & Synthesis Lab (ESC-ECE207-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Apply theoritical concepts related to electric circuits and two port network parameters on hardware. **LOTS:L3 (Apply)**	2	2	2	-	1	1	1	-	-	-	1	1	2	2	2
CO2. Analyze and evaluate the transient response, frequency response and two port network representation in practical manner. **HOTS: L4 & L5 (Analyze & Evaluate)**	3	3	3	2	1	1	1	-	-	-	1	1	3	3	3
CO3. Integrate knowledge of electric circuits like two port networks and filters and **design** basic circuits for a given set of network parameters. **HOTS L6 (Create)**	3	3	3	2	2	2	1	-	-	-	1	2	3	3	3
CO4. Create written records for the given experiments with problem definition, solution, observations and conclusions. **HOTS L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	2	-	-	-
CO5. Demonstrate ethical practices while performing lab experiments individually or in groups **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	3	-	-	-
Level of Attainments															

Course code	**MC103-T**				
Category	**Mandatory Courses**				
Course title	**Indian Constitution**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	
	3	**0**	**0**	**0.0**	
Pre-requisites (if any)	-				
Course Assessment Methods (Internal: 30; External: 70)	**Internal examination:** • **Two minor tests each of 20 marks** • **Class Performance measured through percentage of lectures attended (4 marks)** • **Assignments, quiz etc. (6 marks)** **End semester examination:** • **Nine questions are to be set by the examiner.** • **Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions.** • **Rest of the eight questions is to be set with a fair weightage of all the units.** • **All questions will carry equal marks.** • **The Students will be required to attempt 05 questions in all.**				

Course Contents- Basic features and fundamental principles

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

Detailed Syllabus

of

B.Tech(ECE)

4th Semester

SENSORS AND MEASURING INSTRUMENTS

PCC-ECE202-T

General Course Information

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Pre-requisites: Analog and Digital Electronics

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Define and describe** the terminologies and fundamental principles related to measuring instruments, signal conditioners, sensors and transducers.	LOTS: L1 (Remember)
CO2	**Understand and explain** the operation of different sensors, transducers, signal conditioners and measurement tools.	LOTS: L2 (Understand)
CO3	**Apply** the working principles of the measuring instruments, sensors, transducers and signal conditioning elements for some application design.	LOTS: L3 (Apply)
CO4	**Analyze and evaluate** the instruments, transducers, sensors and signal conditioning elements required for any application design.	HOTS: L4 & L5 (Analyze and Evaluate)

Course Contents

UNIT-I

Introduction: Introduction to Measurement, Classification of measurement errors, Static characteristic of Instrument: Accuracy, Precision, Resolution, Sensitivity, Range, Span, Significant Figures, Digital measurement instruments: Multimeter, Frequency Meter, Capacitance Meter, Phase Meter, Tachometer, pH meter, Q meter, General Microprocessor-based impedance measuring instrument, IEEE 488 Bus.

UNIT -II

Signal Generators and Analyzers: Signal generators, Audio generators, Function generators, Pulse generators, R.F Signal generators, Random noise generator, Sweep frequency generators, Frequency synthesizer, Basic wave analyzer, Frequency selective wave analyzer, Heterodyne wave analyzer, Harmonic distortion analyzers, Spectrum analyzer, Digital Storage Oscilloscope (DSO).

UNIT -III

Transducers: Introduction, Electrical transducers, Selection criteria of transducers, Resistive transducer, Resistive position transducer, Strain gauge inductive transducer, Differential output transformer, LVDT, **Capacitive transducer, load cell, Thermal transducers, thermistor, thermocouple, RTD, Photoelectric transducer, Photoconductive cells (LDR), Photovoltaic cell, IR transmitter-receiver, Photodiode, Phototransistor,** Piezoelectric transducers.

UNIT -IV

Sensors and their applications: Introduction to Automotive Sensors, Sensors for manufacturing, Aerospace sensors, Medical diagnostic sensors, Sensors for environmental monitoring, Proximity sensor for robotics and its characteristics.

Signal conditioning: Introduction, Types of signal conditioning, Amplifier, Differential amplifier, Instrumentation amplifier, Filters, A/D conversion, D/A conversion, Signal transmission, LM358 transducer amplifier, LM 386 Audio power amplifier.

TEXT BOOKS:

1. Electronic Instrumentation and Measurements, David A. Bell, Oxford, 3rd Edition.
2. Electronic Instrumentation, H. S. Kalsi, TMH, 2nd Edition.
3. Sensors and Transducers, D. Patranabis, Prentice-Hall, 2nd Edition.
4. Measurement, Instrumentation, and Sensors Handbook, John G. Webster, CRC Press, 1st Edition.

REFERENCE BOOKS:

1. Electronic Instrumentation and Measuring Techniques, W. D. Cooper, PHI.
2. Modern Electronic Instrumentation & Measuring Techniques, Helfrick & Copper, PHI.
3. Measurement Systems, E. O. Doebilin, McGraw Hill.
4. Sensors and signaling conditioning, R. Pallas & J. G. Webster, John Wiley & Sons.

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CO-PO Articulation Matrix Sensors and Measuring Instruments (PCC-ECE202-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Define and **describe** the terminology and fundamental principles related to measuring instruments, signal conditioners, sensors and transducers. **LOTS: L1 (Remember)**	2	2	1	1	2	1	-	-	-	-	-	1	2	2	2
CO2. Understand and explain the operation of different sensors, transducers, signal conditioners, and measurement tools. **LOTS: L2 (Understand)**	2	2	2	1	2	1	-	-	-	-	-	1	2	2	2
CO3. Apply the working principles of the measuring instruments, sensors, transducers and signal conditioning elements for some application design. **LOTS: L3 (Apply)**	3	2	2	1	2	1	-	-	-	1	-	2	2	2	2
CO4. Analyze and evaluate the instruments, transducers, sensors and signal conditioning elements required for any application design. **HOTS: L4 & L5 (Analyze and Evaluate)**	3	3	3	1	2	1	-	-	-	1	-	2	2	2	2
Level of attainments:															

ANALOG AND DIGITAL COMMUNICATION

PCC-ECE204-T

General Course Information

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks). Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Pre-requisites: Basics of Electronic circuits and introductory concepts of Communication systems.

Sr. No	Course Outcomes **At the end of the semester, students will be able to:**	RBT Level
CO1	**Outline & recall** the terminology, general principles and application areas of analog and digital communication.	LOTS: L1 (Remember)
CO2	**Understand & interpret** the working of communication systems with the help of mathematical expressions, block diagrams and circuit diagrams.	LOTS: L2 (Understand)
CO3	**Apply** the knowledge gained to predict the behavior of communication systems in the presence of distortion and noise.	LOTS: L3 (Apply)
CO4	**Analyze & evaluate** the performance of various communication systems.	HOTS: L4 & L5 (Analyze & Evaluate)

Course Contents

UNIT-I

AMPLITUDE MODULATION: Elements of Communication system, Concept of Modulation, Theory of Amplitude Modulation, various forms of AM: DSB-SC, SSB, VSB and their generation, AM Envelope Detector, concept of Coherent Detection, Super-heterodyne receiver.

UNIT-II

ANGLE MODULATION: Theory of FM and PM, Frequency spectrum of FM wave, Relation between FM and PM, Narrow Band and Wideband FM, Generation of FM using Direct and Indirect methods, FM Demodulators: Slope detector, Balanced Slope Detector, Foster-Seeley Discriminator, Ratio Detector, PLL demodulator, Noise and FM, Pre-emphasis and De-emphasis, Comparison of AM, FM and PM.

UNIT –III

PULSE MODULATION: Sampling Process, PAM, PWM, PPM, Quantization, PCM, DPCM, Delta modulation, Quantization noise in PCM System, Companding.

NOISE ANALYSIS: External Noise, Internal Noise, White Noise, Noise Figure, Noise Temperature, Narrow Band Noise and its representation in terms of In-phase and Quadrature Components, Noise in AM and FM receivers.

UNIT-IV

DIGITAL MODULATION: General description of ASK, FSK and PSK. Transmission, Reception and Signal space representation: BPSK, DPSK, QPSK, M-ary PSK, ASK, QASK, BFSK, M-ary FSK, MSK; Power spectra of digitally modulated signals, Comparison of different digital modulation schemes.

TEXT BOOKS:

1. Electronic Communication Systems, George Kennedy, Bernard Davis & SRM Prasanna, McGraw Hill.
2. Communication Systems, Simon Haykin, John Wiley & Sons.
3. Principles of Communication, Taub & Schilling, McGraw Hill.

REFERENCE BOOKS:

1. Modern Digital & Analog Communication Systems, B.P. Lathi, Oxford University Press.
2. Communication Systems, A. Bruce Carlson, P.B Crilly, J.C Rutledge, McGraw Hill.
3. Digital Communication, John G. Proakis, PHI.

CO-PO Articulation Matrix: Analog & Digital Communication (PCC-ECE204-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1: Outline & recall the terminology, general principles and application areas of analog and digital communication. **LOTS: L1 (Remember)**	3	1	1	1	1	1	-	-	-	-	-	1	3	1	1
CO2: Understand & interpret the working of communication systems with the help of mathematical expressions, block diagrams and circuit diagrams. **LOTS: L2 (Understand)**	3	2	2	1	1	1	-	-	-	-	-	1	3	1	1
CO3: Apply the knowledge gained to predict the behavior of communication systems in the presence of distortion and noise. **LOTS: L3 (Apply)**	3	3	2	2	1	1	1	-	-	-	-	2	3	3	3
CO4: Analyze & evaluate the performance of various communication systems. **HOTS: L4 & L5 (Analyze & Evaluate)**	3	3	3	2	1	1	1	-	-	-	-	2	3	3	3
Level of Attainments:															

ANALOG ELECTRONICS-II

PCC-ECE206-T

General Course Information

Course Credits: 3 Mode: Lectures (L) Teaching schedule L T P : 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Pre-requisites: Analog Electronics-I

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Define** & **describe** the terminology and fundamental principles related to construction & characteristics of MOSFET, amplifiers and oscillators.	LOTS: L1 (Remember)
CO2	**Understand** & **explain** various models, methods/techniques for analysis and synthesis of analog circuits.	LOTS: L2 (Understand)
CO3	**Apply** various models, methods/techniques to solve and synthesize related Analog Circuits.	LOTS: L3 (Apply)
CO4	**Analyze** & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters.	HOTS: L4 & L5: (Analyze & Evaluate)
CO5	**Design** basic analog circuits networks for a given/desirable set of circuit/device parameters.	HOTS: L6 (Create)

Course Contents

UNIT-1

MOSFET: Device Structure and Physical Operation, MOS Capacitor, Current–Voltage Characteristics, Body Effect, MOSFET as an Amplifier, MOSFET operation as a switch, MOSFET circuits at DC.

MOSFET Biasing: Biasing by Fixing V_{GS}, Biasing by Fixing V_G and connecting a resistance in source, Drain to Gate Feedback resistor bias, Biasing using Constant current source.

UNIT-II

MOSFET Small Signal Operation and Models: DC Bias Point, Signal Current in the Drain Terminal, Voltage Gain, Small-Signal Equivalent-Circuit Models, Transconductance g_m, T Equivalent-Circuit Model.

MOSFET Amplifiers Configurations: Common Gate amplifier, Common Source Amplifier, Common Source Amplifier with a source Resistance, Common Drain Amplifier, Comparisons

UNIT –III

Output Stages and Power Amplifiers: Classification of Output Stages-Class A, B, and C operations; Class A large signal amplifiers, Second and higher order harmonic distortion, efficiency, transformer coupled power amplifier, Class B amplifier: efficiency & distortion, push-pull amplifiers, Class C amplifier, Class AB operation.

UNIT-IV

Feedback Amplifiers: Classification of amplifiers, Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

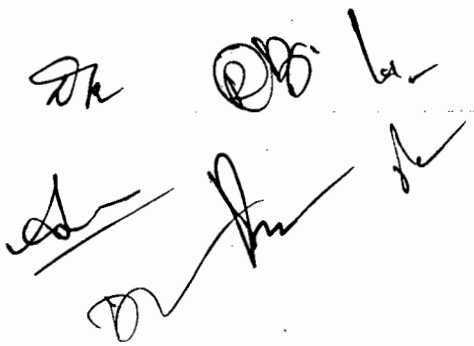
OSCILLATORS: General form of oscillator circuit, Barkhausen's criteria, R-C phase shift oscillator, Hartley oscillator, Colpitts oscillator, Wien-bridge oscillator, Crystal oscillator.

TEXT BOOKS:

1. Microelectronics Circuits, theory and applications:Sedra & Smith; OXFORD
2. Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson
3. Electronics devices and Circuits(4e): Millman, Halkias and Jit; McGrawHill

REFERENCE BOOKS:

1. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH.
2. Electronics Principles: Malvino; McGrawHill
3. Electronics Circuits: Donald L. Schilling & Charles Belove; McGrawHill



CO-PO Articulation Matrix Analog Electronics-II Course (PCC-ECE206-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. **Define & describe** the terminology and fundamental principles related to construction & characteristics of MOSFET, amplifiers and oscillators. **LOTS: L1 (Remember)**	1	1	2	1	1	-	-	-	-	-	-	1	3	2	2
CO2. Understand and explain various models, methods/ techniques for analysis and synthesis of analog circuits **LOTS: L2 (Understand)**	1	3	2	1	2	-	-	-	-	-	-	1	3	2	1
CO3. **Apply** various models, methods /techniques to solve and synthesize related Analog Circuits. **LOTS: L3 (Apply)**	2	3	2	2	2	-	-	-	-	-	-	1	3	2	2
CO4. **Analyze & Evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters. **HOTS: L4 & L5 (Analyze and Evaluate)**	3	3	3	2	2	-	1	-	-	-	-	3	3	2	2
CO5. **Design** basic analog circuits networks for a given/desirable set of circuit/device parameters. **HOTS L6: (Create)**	3	3	3	3	2	-	1	-	-	-	-	3	3	2	3
Level of Attainments															

ELECTROMAGNETIC THEORY

PCC-ECE208-T

General Course Information

Course Credits: 3.0 Mode: Lectures (L) Teaching schedule L T P: 3 0 0 Examination Duration: 03 Hours	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Three minor tests, each of 20 marks, will be conducted. The third minor will be conducted in open book mode by the Course Coordinator. No date sheet will be issued for the third minor at the level of the Departments. For the purpose of internal assessment, the average of the highest marks obtained by a student in any two minor examinations will be considered. All the minor examination question papers will be prepared and evaluated by following the Outcome Based Education framework. Class Performance will be measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks). The end semester examination will be of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Pre-requisites: Communication Engineering

Sr. No.	Course Outcomes **At the end of the semester, students will be able to:**	RBT Level
CO1	**Memorize** & **define** different electromagnetic laws and fundamental principles related to electromagnetic wave propagation, transmission line theory, and waveguides.	LOTS: L1 (Remember)
CO2	**Derive & explain** theorems related to vector algebra, electrostatics, magnetostatics, and electromagnetic wave propagation.	LOTS: L2 (Understand)
CO3	**Apply** the laws to solve problems related to electrostatics, magnetostatics, electromagnetic wave propagation, vector algebra, transmission lines and waveguides.	LOTS: L3 (Apply)
CO4	**Analyze** all the laws and theorem and evaluate their utility in solving practical problems.	HOTS: L4 & L5 (Analyze & Evaluate)

Course Contents

UNIT-I

VECTOR ALGEBRA: Cartesian coordinates, cylindrical coordinates, spherical coordinates, Vector calculus: Differential length, area and volume, line, surface and volume integrals and their significance, Del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stokes's theorem, classification of vector fields.

REVIEW OF ELECTRIC FIELDS: Coulomb's law and electric field intensity, field due to a continuous charge distribution: field of a line charge, field of a sheet of charge, electric flux density, Gauss's law and applications, electric potential, relationship between E and V, electric dipole, energy density in electrostatic fields.

UNIT-II

REVIEW OF MAGNETIC FIELDS: Convection and conduction currents, conductors, dielectric constant, continuity equation, boundary conditions, Poisson's, and Laplace's equations, capacitance, Biot-Savart's Law, Ampere's circuit Law, magnetic flux density, Maxwell's equation for static fields, magnetic scalar and vector potentials, forces due to magnetic field, magnetic torque, magnetic boundary conditions, inductor, magnetic energy,

UNIT-III

TIME VARYING FIELDS AND MAXWELL'S EQUATIONS: Faraday's law, displacement current, Maxwell's equations in point form and integral form, retarded potentials.

ELECTROMAGNETIC WAVE PROPAGATION: Three-dimensional wave equations, Plane Waves & its Properties, Propagation of Plane Waves in : free space, lossy dielectrics, lossless dielectrics, Good Conductors. Power and Poynting Vector.

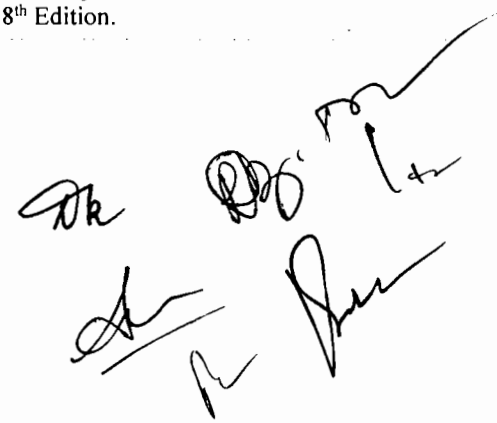
UNIT-IV

ELECTROMAGNETIC WAVE PROPERTIES: Skin Effect, Wave Polarization, Reflection of Uniform Plane Waves (Normal Incidence).

TRANSMISSION LINES: Transmission line parameters, transmission line equations, input impedance, standing wave ratio, and power, Smith chart.

REFERENCE BOOKS:

1. Elements of Electromagnetics, Matthew N. O. Sadiku, Oxford University Press, 7th Edition.
2. Electromagnetic Waves and Radiating Systems, E. C. Jordan and K. G. Balmain, PHI, 3rd Edition.
3. Field and Wave Electromagnetics, David K. Chang, Addison Wesley, 3rd Edition.
4. Engineering Electromagnetics, W. H. Hayt, Tata Mc-Graw, 8th Edition.



CO-PO Articulation Matrix Electromagnetic Theory (PCC-ECE208-T)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Memorize & define different electromagnetic laws and fundamental principles related to electromagnetic wave propagation, transmission line theory, and waveguides.	3	1	1	1	1	1	-	-	-	-	-	1	3	1	1
CO2. Derive & explain theorems related to vector algebra, electrostatics, magnetostatics, and electromagnetic wave propagation.	3	2	2	1	1	1	-	-	-	-	-	1	3	1	1
CO3. Apply the laws to solve problems related to electrostatics, magnetostatics, electromagnetic wave propagation, vector algebra, transmission lines and waveguides.	3	3	2	2	1	1	1	-	-	-	-	2	3	3	3
CO4. Analyze all the laws and theorem and evaluate their utility in solving practical problems.	3	3	3	2	1	1	1-	-	-	-	-	2	3	2	3
Level of Attainments:															

SENSORS AND MEASURING INSTRUMENTS LAB

PCC-ECE202-P

General Course Information

Course Credits: 1 Contact Hours: 2/week (L-T-P: 0-0-2) Mode : Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

Pre-requisites: Analog and Digital Circuits

S. No.	**Course Outcomes:** **At the end of the semester, students will be able to:**	**RBT Level**
CO1	**Apply** theoretical concepts related to measurement instruments, signalling conditioning elements, transducers on hardware.	LOTS: L3 (Apply)
CO2	**Analyze and evaluate** the working principles and performance of the devices/instruments used in experiment.	HOTS: L4 & L5 (Analyze & Evaluate)
CO3	**Integrate** knowledge of signal conditioning elements and transducers to **design** basic circuits for a given application.	HOTS: L6 (Create)
CO4	**Create** written records for the given experiments with problem definition, solution, observations and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while performing lab experiments individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS

1. To familiarize with the control panel and various measurements using DSO and Function Generator.
2. To familiarize with the control panel and various measurements using spectrum analyzer.
3. To study the lissajous pattern for frequency and phase measurement.
4. To measure values of different components and Q of a coil using LCR-Q meter.
5. To find the least count of a micrometer.
6. To determine the thickness of a given object using LVDT.
7. To measure linear displacement using LVDT.
8. To measure the distance using LDR.
9. To study the working principle of RTD and use it for temperature measurement..
10. To study the characteristics of thermocouple and use it for temperature measurement.
11. To measure the variation of pressure using Strain Gauge.
12. To study the piezo-electric transducer and its characteristics.
13. To measure the angular displacement using Capacitive Pick-up.
14. To measure linear displacement using Inductive Pick-up.
15. To measure speed using photoelectric and magnetic sensor kit.
16. Implementation of Simple project (Any topic related to the scope of the course).

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

CO-PO Articulation Matrix Sensors and Measuring Instruments Lab (PCC-ECE202-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. **Apply** theoretical concepts related to measurement instruments, signalling conditioning elements, transducers on hardware. **LOTS: L3 (Apply)**	3	1	1	-	1	1	-	-	2	-	-	1	3	2	1
CO2. **Analyze & evaluate** the working of devices/instruments used in experimental work. **HOTS: L4 & L5 (Analyze & Evaluate)**	2	2	1	-	1	1	-	-	2	-	-	1	3	2	1
CO3. **Integrate** knowledge of signal conditioning elements and transducers to **design** basic circuits for a given application. **HOTS: L6 (Create)**	2	1	3	1	2	2	1	-	3	-	2	2	3	2	3
CO4. **Create** written records for the given experiments with problem definition, solution, observations and conclusions. **HOTS: L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	2	-	-	2
CO5. **Demonstrate** ethical practices while performing lab experiments individually or in groups. **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	3	-	-	2
Level of Attainments:															

ANALOG AND DIGITAL COMMUNICATION LAB

PCC-ECE204-P

General Course Information

Course Credits: 1 Contact Hours: 2/week (L-T-P: 0-0-2) Mode : Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

Pre-requisites: Analog and Digital Circuits

Sr. No.	Course Outcomes: **By the end of the lab course a student would be able to:**	RBT Level
CO1	**Apply** theoretical concepts related to analog, digital and pulse modulation/demodulation techniques on hardware.	LOTS: L3 (Apply)
CO2	**Analyze and compare** the time domain response of various modulation/demodulation techniques in practical manner.	HOTS: L4 (Analyze)
CO3	**Evaluate** the performance of various modulation/demodulation techniques.	HOTS: L5 (Evaluate)
CO4	**Create** written records for the given assignments with problem definition, design of solution and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while performing lab experiments individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS

1. To familiarize with the control panel and various measurements using CRO/DSO & Function Generator.
2. **To study Amplitude Modulation & Demodulation and determination of Modulation index.**
3. **To study Frequency Modulation and Demodulation.**
4. **To study Pulse Amplitude Modulation and Demodulation.**
5. **To study Pulse Width Modulation and Demodulation.**
6. To study Pulse Code Modulation.
7. **To study ASK Modulation Technique.**
8. **To study FSK Modulation Technique.**
9. **To study BPSK Modulation Technique.**
10. To study QPSK Modulation Technique
11. Simple project (Any topic related to the scope of the course).

Note: Atleast eight experiments are to be performed in the semester, out of which minimum six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed and set by concerned institution as per the scope of the syllabus.

CO-PO Articulation Matrix: Analog And Digital Communication Lab (PCC-ECE204-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Apply theoretical concepts related to analog, digital and pulse modulation/demodulation techniques on hardware. **LOTS: L3 (Apply)**	3	2	2	-	3	1	-	1	2	-	-	1	3	2	2
CO2. Analyze and compare the time domain response of various modulation/demodulation techniques in practical manner. **HOTS: L4 (Analyze)**	2	2	2	-	3	1	-	1	2	-	-	1	3	2	2
CO3. Evaluate the performance of various modulation/demodulation techniques. **HOTS: L5 (Evaluate)**	2	2	2	-	3	1	-	1	2	-	-	1	2	2	2
CO4. Create written records for the given assignments with problem definition, design of solution and conclusions. **HOTS: L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	2	-	-	2
CO5. Demonstrate ethical practices while performing lab experiments individually or in groups. **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	3	-	-	2
Level of Attainments:															

ANALOG ELECTRONICS-II LAB

PCC-ECE206-P

General Course Information

Course Credits: 2 Contact Hours: 4/week (L-T-P: 0-0-4) Mode : Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

Sr. No.	Course Outcomes At the end of the semester, students will be able to:	RBT Level
CO1	**Examine** the characteristics of devices/circuits	LOTS: L3 (Apply)
CO2	**Analyze** & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters.	HOTS: L4 & L5 (Analyze & Evaluate)
CO3	**Design** basic analog circuits for a given/desirable set of circuit/device parameters.	HOTS: L6 (Create)
CO4	**Create** written records for the given experiments with problem definition, solution, observations and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while performing lab experiments individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS

1. To study and design Class A power amplifier and determine its efficiency.
2. To study and design Class B power amplifier and determine its efficiency.
3. To study and design Class C power amplifier and determine its efficiency.
4. To Design the RC phase shift oscillator circuit.
5. To Design the Wein bridge oscillator circuit.
6. To Design the Hartley oscillator circuit.
7. To Design the Colpitts oscillator circuit.
8. To study the effect of BJT voltage series feedback amplifier and determine the gain, frequency response, input and output impedance with and without feedback
9. To study the effect of FET voltage series feedback amplifier and determine the gain, frequency response, input and output impedance with and without feedback.
10. To study the V-I characteristics of MOSFET in Common Gate configurations .
11. To study the V-I characteristics of MOSFET in Common Source configurations .
12. To study the V-I characteristics of MOSFET in Common Drain configurations .
13. To design a R-C coupled single stage amplifier and determine Gain, Bandwidth, Input impedance and output impedance.
14. To design a BJT Darlington Emitter Follower and determine Gain, Bandwidth, Input impedance and output impedance.
15. Project (Any topic related to the scope of the course).

Note: At least 10 experiments are to be performed in the semester, out of which minimum 7 experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed and set by concerned institution as per the scope of the syllabus. The students must prepare Mini Project (Ex. No. 15) in the group of two-three students before the semester ends.

CO-PO Articulation Matrix Analog Electronics-II Lab (PCC-ECE206-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Examine characteristics of devices/ circuits. **LOTS: L3 (Apply)**	3	1	1	-	1	1	-	1	2	-	-	1	3	2	1
CO2. Analyse & **evaluate** the analog devices and circuits in terms of their gain, bandwidth, efficiency, impedance, V-I characteristics and other desirable parameters. **HOTS: L4 & L5 (Analyse & Evaluate)**	2	2	1	-	1	1	-	1	2	-	-	1	3	2	1
CO3. Design basic analog circuits for a given/desirable set of circuit/device parameters. **HOTS: L6 (Create)**	2	1	3	1	2	2	1	2	3	-	1	2	3	2	3
CO4. Create written records for the given experiments with problem definition, solution, observations and conclusions. **HOTS: L6 (Create)**	-	-	-	-	-	2	1	3	3	3	3	2	-	-	2
CO5. Demonstrate ethical practices while performing lab experiments individually or in groups. **LOTS: L3 (Apply)**	-	-	-	-	-	2	1	3	3	3	3	3	-	-	2
Level of Attainments:															

PYTHON & ITS APPLICATION IN ELECTRONICS

PCC-ECE208-P

General Course Information

Course Credits: 1 Contact Hours: 2/week (L-T-P: 0-0-2) Mode : Lab Work	**Course Assessment Methods (Internal: 50; External: 50)** The internal and external assessment is based on the level of participation in laboratory sessions, timely submission of experiments/assignments, the quality of solutions designed for the assignments, the performance in VIVA-VOCE, the quality of laboratory file and ethical practices followed. There will be a continuous process for laboratory course evaluation. Two internal examinations (each of 50 marks) for the laboratory courses (Minor Laboratory Evaluations: MLE I and MLE II) will be conducted in the week before or after the internal examinations for the theory courses. The overall internal marks will be calculated as the average of the two minor laboratory course evaluations. The course coordinator will conduct these minor evaluations in the slots assigned to them as per their timetable. The Chairperson of the Department will only notify the week for the internal laboratory course evaluations. The marks for MLE I and MLE II must be submitted within a week of the conduct of these laboratory course evaluations. The external examination will be conducted by external examiner appointed by the Controller of Examination along with the internal examiner, preferably the lab course coordinator, appointed by the Chairperson of the Department. The final practical examination of duration three hours will be conducted only in groups of 20-25 students. The Course Coordinator / Internal Examiners/ External Examiners will maintain and submit the bifurcation of marks obtained by the students in their respective internal/external evaluations in the specified proformas (attached herewith as Annexures I and II) to the respective departments in addition to the submitting and uploading of overall marks on the university portal as per the requirement of the result branch. The laboratory course coordinator will also conduct laboratory course exit survey and, compute and submit the attainment levels of the laboratory course based on direct and indirect evaluation components and submit it to the Chairperson office along with the internal assessment marks.

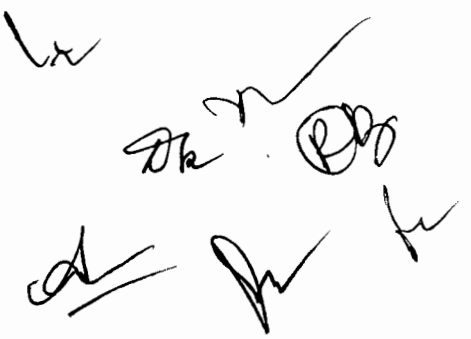
Pre-requisites: Basic Programming Skills

S.No.	Course Outcomes: By the end of the lab course a student would be able to:	RBT Level
CO1	**Apply** Python programming skills to implement solutions to the given assignments in Python.	LOTS:L3 (Apply)
CO2	**Analyze and Evaluate** the output of data analysis and machine learning models using various Python packages.	HOTS:L4 & L5 (Analyse & Evaluate)
CO3	**Devise** software solutions for common problems of data analysis and machine learning	HOTS:L6 (Create)
CO4	**Create** written records for the given assignments with problem definition, design of solution and conclusions.	HOTS: L6 (Create)
CO5	**Demonstrate** ethical practices while solving problems individually or in groups.	LOTS: L3 (Apply)

LIST OF EXPERIMENTS/ASSIGNMENTS

1. Install Python and explore various popular IDE like IDLE, PyCharm, and Anaconda.
2. Write a program to perform various number operations:
    a) Check number is even or odd
    b) Check number is prime or not
    c) Print first N prime numbers
3. Write a program to compute GCD of two numbers.
4. Write a program to compute LCM of two numbers.
5. Write a program to compute Euclidean distance between two points.
6. Write a program to perform various operations on Strings like creation, deletion, concatenation.
7. Write a program to create a List and demonstrate operations like insert and delete numbers from the list; sum of all numbers in the list.
8. Write a program to create a Dictionary and perform operations like insert and delete an entry; clear the dictionary; check whether a key is present; update the value of a key.
9. Write a program to demonstrate the usage of Numpy package.
10. Write a program to demonstrate the usage of Pandas package.
11. Write a program to demonstrate the usage of Matplotlib package.
12. Write a program to demonstrate the usage of Scikit-Learn package.
13. Write a program to compute Fourier Transform of a signal using Scipy package.
14. Write a program to implement and demonstrate the functions of a simple calculator.
15. Write a program demonstrating file handling that how data is read and written to a file.

Note: At least eight experiments/assignments are to be performed in the semester. One experiment/assignment should be designed to be done in groups of two or three students. The assignments must meet the objective of the course and the levels of the given course outcomes. The teacher will cover the fundamentals or basic concepts of python programming language during the Lab hours only.



CO-PO Articulation Matrix Python & Its Application in Electronics (PCC-ECE208-P)															
List of Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1. Apply Python programming skills to implement solutions to the given assignments in Python.	2	2	2	1	3	1	–	–	–	–	–	–	2	2	2
CO2. Analyze and Evaluate the output of data analysis and machine learning models using various Python packages.	2	2	2	3	3	1	–	–	–	–	–	–	2	2	2
CO3. Devise software solutions for common problems of data analysis and machine learning	3	3	2	3	3	1	–	–	–	–	–	–	2	2	2
CO4. Create written records for the given assignments with problem definition, design of solution and conclusions.	–	–	–	–	–	2	1	3	3	3	3	–	-	-	2
CO5. Demonstrate ethical practices while solving problems individually or in groups.	–	–	–	–	–	2	1	3	3	3	3	-	–	–	2
Level of Attainments															

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Group A*(ECE, EE, EEE, PT, PKG, P&P, ME, Agri, Aero, Auto)* : 4th Semester
Group B*(CSE, IT, BME, FT, Civil)* : 5th Semester

General Course Information	
Course Code: MC104-T Course Credit: 0	**Course Assessment Methods; Max. Marks: 100 (Internal: 30; External: 70)** Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.
Contact Hours: 2/week, (L-T-P:2-0-0)	For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers
Mode: Lectures Examination Duration: 3 Hours	type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

About the Course: This course is designed to acquaint students with Indian knowledge traditions. It introduces students to Vedic period, Post Vedic period, Sufi and Bhakti Movement in India, the ancient scientists of India and social reform movements of 19th century in India.

Course Outcomes: By the end of the course students will be able to:

- **CO1. Recognize the forms and sources of Indian traditional knowledge. (LOTS: Level 1: Remember)**
- **CO2. Identify the contribution of the great ancient Indian scientists and spiritual leaders to the world of knowledge. (LOTS: Level 2: Understand)**
- **CO3. Apply the reasoning based on objectivity and contextual knowledge to address the social and cultural issues prevalent in Indian society. (LOTS: Level 3: Apply)**
- **CO4. Differentiate the myths, superstitions from reality in context of traditional knowledge to protect the physical and social environment. (LOTS: Level 4: Evaluate)**
- **CO5. Suggest means of creating a just and fair social environment that is free from any prejudices and intolerance for different opinions and cultures. (LOTS: Level 6: Create)**

UNIT-I

Introduction to Indian Tradition Knowledge: Defining traditional knowledge, forms, sources and dissemination of traditional knowledge. **Vedic Period:** Vedas and Upanishads, Yogsutras of Patanjali **Post Vedic Period:** Budhism, Janism and Indian Materialism: Bhartiya Darshan

18/7/19

UNIT-II

Sufi and Bhakti Movement (14th to 17th century): सगुण-निर्गुण भक्ति, Sufism and Sufi saints, Kabir, Dadu, Soordas, Tulsidas, Nanak and Guru Jambheshwar ji Maharaj etc., Composite Culture of Indian sub-continent.

UNIT-III

Jyotirao Phule, Savitri Bai Phule, Arvind, Vivekanand and other 18th & 19th Century Social Reform Movements; India's cultural heritage.

UNIT-IV

India's Contribution to the world of knowledge:प्राचीन भारत के महान वैज्ञानिक: बौधायन, चरक, कौमारभृत्यजीवन, सुश्रुत, आर्यभट, बराहमिहिर, ब्रह्मगुप्त, नागार्जुन, वाग्भट; Astrology and Astronomy, Myths and Reality

Text and Reference Books:

1. A. L. Bhansam, The *Wonder That was India, A Survey of the Culture of the, Indian Sub-Continent before, the Coming of the Muslims*, Vol 1, Groove Press, New York, 1959.
2. S. A. A. Rizvi, *Wonder That was India, A Survey of the History and Culture of the Indian Sub-Continent from the Coming of the Muslims to the British Conquest* 1200-1700, Vol 2, Rupa and Co. 2001.
3. Jambhvani Mool Sanjivini Vyakhya
4. *प्रतियोगितादर्पणअतिरिक्ताकसीरीज–5*भारतीयकलाएवंसंस्कृति,
5. गुणाकरमूले, *प्राचीनभारतकेमहानवैज्ञानिक*, ज्ञानविज्ञानप्रकाशन, नईदिल्ली, 1990.
6. B. V. Subbarayappa, *A Historical Perspective of Science in India*, Rupa Publications, New Delhi, 2013.
7. KR Bishnoi, NR Bishnoi, Religion and Environment, Vol 1,2 & 3
8. ThichNhat Hanh, Nguyen Thi Hop, MobiHo , *Old Path White Clouds: Walking in the Footsteps of the Buddha*, Parallax Press, 1991.
9. Hermann Hesse, *Siddhartha*, Simon & Brown, 2017.
10. सावित्रीचंद्रशोभा, *हिन्दीभक्तिसाहित्यमेंसामाजिकमूल्यएवंसहिष्णुतावाद*, नेशनलबुकट्रस्ट, इंडिया, 2007.
11. Rosalind O' Hanlon, *Caste Conflict and Ideology, Mahatma JyotiraoPhule and low caste protest in nineteen century*, Western India, Camridge University Press, 2009.
12. Melanie P. Kumar, SavitribaiPhule: *Forgotten liberator*, Infochange, 2009.
13. Leah Verghese, Ranjna, and MedhaSundar, *Savitribai, Journey of a Trailblazer*, Azim Prem Ji University, 2014.

16/7/19

18/7/19

CO-PO Articulation Matrix Essence of Indian Traditional Knowledge (MC104-T)

List of Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO13	PSO14	PSO15
CO1. Recognise the forms and sources of Indian traditional knowledge. (LOTS: Level 1: Remember)	-	1		-	-	-	-	-	-	-	-	1	-	-	-
CO2. Identify the contribution of the great ancient Indian scientists and spiritual leaders to the world of knowledge. (LOTS: Level 2: Understand)	-	2	1	-	-	3	-	-	-	-	-	1	-	-	-
CO3. Apply the reasoning based on objectivity and contextual knowledge to address the social and cultural issues prevalent in Indian society. (LOTS: Level 3: Apply)	-	3	3	2	-	3	-	-	-	-	-	3	-	-	-
CO4. Differentiate the myths, superstitions from reality in context of traditional knowledge to protect the physical and social environment. (LOTS: Level 4: Evaluate)	-	2	3	3	-	3	1	-	-	-	-	3	-	-	-
CO5. Suggest means of creating a just and fair social environment that is free from any prejudices and intolerance for different opinions and cultures. (LOTS: Level 6: Create)	-	3	3	3	-	3	-	-	-	-	-	3	-	-	-
Level of Attainments MC104-T															

~~Personality Development and~~ Human Values and Personality Development

General Course Information

Course Code: HSMC201-T	**Course Assessment Methods: Total Marks:100**
Course Credit: Non- Credit	**(Internal evaluation only)**
Type: Humanities and Social Sciences	It is a non-credit qualifying course only. The assessment will be completely internal. The course coordinator will make two internal assessments out of 30 marks. The assessment for 70 marks will be made through interview/VIVA-VOCE mode by a committee of two faculty members including the course coordinator and a faculty member appointed by the Chairperson of the concern Department.
Contact Hours: 03 hours/week	
Mode: Lectures (L), Group Discussions, Workshops	

Pre-requisites: None

About the Course: This course is designed to develop a holistic perspective based on self-exploration and co-existence in society and nature. The focus is on to understand harmony and being in harmony with the society and the environment around us. The students will nurture a habit of self-reflection and courage to act. This course includes practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking).

Course Outcomes: By the end of the course students will be able to:

CO1: Exhibit awareness about oneself, one's surroundings and goals in one's life.
CO2: Stay in harmony with society and nature.
CO3: Developing healthy and harmonious relationships.
CO4: Understand groups and develop team spirit.
CO5: Manage stress effectively.
CO6: Exhibit leadership qualities.
CO7: Excel in personal and professional life.

Course Content

Unit 1

Understanding the concept of self. Exploration of self with JOHARI-Window. Self-Esteem, Characteristics of individuals with low and high self-esteem. Self Confidence, strategies of building self-confidence.

Personality: Definition, Types & Traits; Relevance & Importance of nature and nurture in the development of personality.

14/X/21

9/10/21

Unit 2

Nature of Socialization: Socialization process. Contributing to society and nation. Importance of discipline and hardwork. Ecological responsibility of Engineers. Professional Ethics: Competence in Professional values and ethics. Personal and Professional Excellence: Identifying long-term choices and goals.

Unit 3

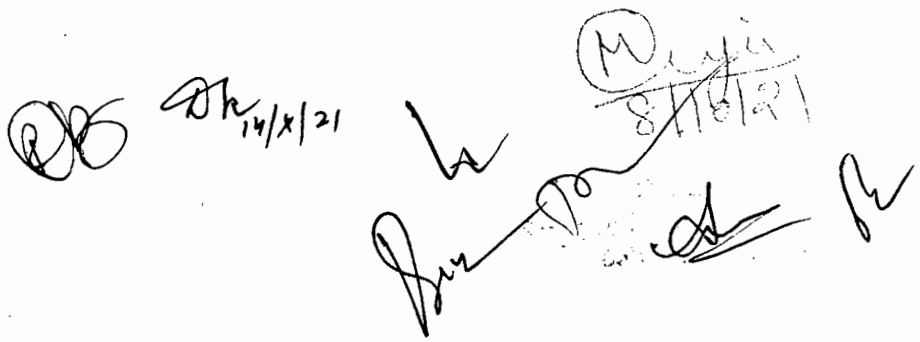
Meaning and nature of teams, External and internal factors affecting team building. Leadership Meaning, Nature and Functions. leadership styles in organization. Meaning and nature of stress, causes, effects and management.

Unit 4

Meaning and importance of human rights, Human rights awareness. Harmony in nature, understanding co-existence, harmony at all levels of existence. Understanding the concept of happiness and well-being. Role and importance of positive emotions: Gratitude, hope and optimism.

Text and Reference Books:

1. Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour.
2. Dressler, David and Cans, Donald: The Study of Human Interaction.
3. Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
4. Organizational Behaviour, Davis, K.
5. Hoover, Judhith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
6. Dick, McCann & Margerison, Charles: Team Management, 1992 Edition, viva books
7. Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
8. Dressler, David and Cans, Donald: The Study of Human Interaction
9. Pestonjee, D.M, Pareek, Udai, Agarwal Rita; Studies in Stress And its Management
10. Pestonjee, D.M.; Stress and Coping: The Indian Experience
11. Clegg, Brian; Instant Stress Management – Bring calm to your life now.



Annexure I

Office of the Dean Faculty of Engineering and Technology
Guru Jambheshwar University of Science and Technology
Hisar-125001
(Established by State Legislative Act 17 of 1995)
'A' GRADE NAAC Accredited

Faculty of Engineering and Technology
Guru Jambheshwar University of Science and Technology, Hisar-125001

Internal Laboratory Course Evaluation Proforma

Minor Laboratory Course Evaluation-I (MLE-I) / Minor Laboratory Course Evaluation-II (MLE-II)

Name of the Programme:
Semester:
Nomenclature of the Course:
Course Code:

SR. No.	Roll. No.	Written work and /or Conduct of Experiment(s)	(VIVA-VOCE) based on laboratory Course Outcomes CO-1 to CO-3			Laboratory Record/File	Class Performance (Attendance/Ethical practices followed, Self-Learning and Team Spirit)	Total Marks
		CO-1	CO-1	CO-2	CO-3	CO-4	CO-5	50
1								
2								
3								
.								
.								
Total No. of Students:			Present:			Absent		

Name of the Course Coordinator

Signature of the Course Coordinator

14/X/21

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Guru Jambheshwar University of Science and Technology, Hisar-125001

External Laboratory Course Evaluation Proforma

Nomenclature of the Course:
Course Code:
Name of the Internal Examiner:
Name of the External Examiner:

SR. No.	Roll. No.	Conduct of Experiment(s) (20)	(VIVA-VOCE) (20)	Laboratory Record/Practical writeup (10)	Total Marks (50)
1					
2					
3					

Total No. of Students:	Present:	Absent:
Signature of the Internal Examiner Name of the Internal Examiner	Signature of the External Examiner Name of the External Examiner	