Estd:1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)
Accredited by NAAC with 'A' Grade, All UG Programmes are Accredited by NBA
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

ELECTRICAL AND ELECTRONICS ENGINEERING

(Accredited by NBA)

SCHEME OF INSTRUCTION & EXAMINATION

(Regulation R19)

II/IV B.TECH

I-SEMESTER

(With effect from **2019-2020**Admitted Batch onwards**)**

Subject Code	Name of the Subject	Category	Cr	L	T	P	Internal Marks	External Marks	Total Marks
B19 EC 2101	Electronic Devices and Circuits	ES	3	3	--	--	25	75	100
B19 BS2102	Mathematics-IV	BS	3	3	--	--	25	75	100
B19 EE 2101	Electrical Measurements and Instrumentation	PC	3	3	--	--	25	75	100
B19 EE 2102	Network Analysis and Synthesis	PC	3	3	--	--	25	75	100
B19 EE 2103	Electro Magnetic Field Theory	PC	3	3	--	--	25	75	100
B19 CS 2108	Data Structures	ES	3	3	--	--	25	75	100
B19 EE 2104	Networks Lab	PC	1.5	--	--	3	20	30	50
B19 EC 2105	Electronic Devices and Circuits Lab (with Simulation)	ES	1.5	--	--	3	20	30	50
B19 MC 2102	Essence of Indian Traditional Knowledge	MC	0	3	--	--	--	--	--
		TOTAL	**21**	**21**	**0**	**6**	**190**	**510**	**700**

Subject Code	Category	L	T	P	C	I.M	E.M	Exam
B19EC2101	**ES**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE & EEE)

Course Objectives: Students are expected to learn

1.	To analyze the modeling, characteristics and electrical parameters of Diode, BJT, JFET and MOSFET.
2.	To illustrate the concepts of biasing in BJT, JFET and MOSFET.
3.	To analyze single stage and multistage amplifier circuits using equivalent circuits.
4.	To illustrate the application of diode in rectifiers and regulated power supply.
5.	To analyze the frequency response of small signal amplifiers.

Course Outcomes

S.No	Outcome	Knowledge Level
1.	Analyze the characteristics and operation of Diode, BJT, JFET and MOSFET.	K4
2.	Analyze the biasing circuits of BJT and JFET.	K4
3.	Analyze the performance of small signal BJT and FET single stage amplifiers.	K4
4.	Apply the gained knowledge in the design of simple Electronic circuits.	K3

SYLLABUS

UNIT-I (12 Hrs)	**Semiconductor diode and its applications:** Potential variation in graded semiconductors. Open circuited PN junction, current components in a PN diode, V-I characteristics and its temperature dependence, transition capacitance, charge control description of a diode, diffusion capacitance, junction diode switching times, characteristics of Tunnel diode and Zener diode. Half wave, Full wave and Bridge Rectifiers with and without filters, Ripple factor and regulation characteristics.
UNIT-II (10 Hrs)	**Bipolar junction transistors:** Operation of a transistor and transistor biasing for different operating conditions, transistor current components, transistor amplification factors: α,β,γ relation between α and β,γ early effect or base-width modulation, common base configuration and its input and output characteristics, common emitter configuration and its input and output characteristics, common collector configuration and its input and output characteristics, Comparison of CE, CB and CC Configurations, Break- down in transistors, Photo Transistor..
UNIT-III (09 Hrs)	**Transistor Biasing Circuits:** The operating point, Bias stability, different types of biasing techniques, stabilization gainst variation in I_{co} , $V_{BE,}$ & β. Bias compensation, thermal runaway, thermal stability.
UNIT-IV (9 Hrs)	**Field Effect transistors:** JFET and its characteristics, pinch off voltage, FET small signal model, MOSFET and its characteristics, Biasing of FETs.

UNIT-V (10 Hrs)	**Transistors at low and High frequencies:** Transistor hybrid model, H-parameters, Analysis of transistor amplifier circuits using h-parameters, comparison of transistor amplifier configurations, analysis of single stage amplifier, effects of bypass and coupling capacitors, frequency response of CE amplifier, Emitter follower, High frequency model of transistor.

Text Books:	
1.	Integrated Electronics: Analog and Digital Circuits and Systems: Jacob Millman, C Halkias, Chetan D Parikh. McGraw – Hill.
2.	Electronic Devices and Circuits: N Salivahanan and Suresh Kumar, Third edition, TMH.
Reference Books:	
1.	Electronic Devices and Circuits Theory, Boylsted, 10th Edition, Pearson.
2.	Electronic Principles: Albert Paul Malvino, McGraw-Hill.
E - Resources:	
1.	**http://www.cs.tut.fi/kurssit/TLT-8016/Chapter3.pdf**
2.	**http://ee.sharif.edu/~faez/Chapter_6.pdf**
3.	**http://aries.ucsd.edu/najmabadi/CLASS/ECE60L/03-W/NOTES/BJT2.pdf**
4.	**http://aries.ucsd.edu/NAJMABADI/CLASS/ECE65/12-W/Slides/ECE65_W12-Amp.pdf**

Code	Category	L	T	P	C	I.M	E.M	Exam
B19BS2102	**BS**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

MATHEMATICS IV

(Complex Variables & Statistical Methods)

(Common to CE & EEE)

Pre-requisites: Basic concepts of Probability theory and Baye's Theorem

Course Objectives:

1.	Learn the concept of Analytic function and its implications. Applications in Electrostatics and fluid flow problems.
2.	Learn the concepts in complex integration and evaluation of real definite integrals.
3.	Formulate and solve linear difference equations.
4.	Learn important concepts of Z-transform and their use to solve linear difference equations.
5.	Know the concepts of discrete and continuous random variables, learn a few important discrete / continuous probability distributions
6.	Learn Concepts of Sampling theory and develop a framework for testing of hypothesis for getting inferences about Population Parameters.

Course Outcomes:

S.No	Outcome	Knowledge Level
1.	Comprehend the concept of Analytic function and apply in Electrostatics and Fluid dynamics	K2
2.	Determine Laurent series of functions about isolated singularities, and determine residues. Use the residue theorem to evaluate certain real definite integrals.	K3
3.	Formulate and solve linear difference equations.	K2
4.	Use Z-transforms to solve linear difference equations with constant coefficients.	K3
5.	Identify a random variable as discrete/continuous, find its expected value and also fit a probability distribution for a given frequency distribution.	K3
6.	Decide the test applicable and apply it for giving inference about Population Parameter based on sample statistic for some large samples and small samples.	K3

SYLLABUS

UNIT-I (12 Hrs)	**Functions of a Complex Variable** **Review-** Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n, e^z, sin z, sinh z and log z **(no questions may be set on the review portion).** Limit and continuity of a function of a complex variable, derivative, analytic function, entire function, Cauchy- Riemann equations, determine an analytic function based onthe knowledge of its real and imaginary parts, Milne-Thomson method, Applications of analytic function to flow problems, and in Electrostatics. Conformal mapping: thetransformations defined by w = z+c, w = cz, w = 1/z. The Bilinear transformation.
UNIT-II (10 Hrs)	**Complex Integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula. Expansion of a function in a Taylor series, McLaren series and Laurent series. Types of singularities, Residues, Cauchy's residue theorem. Evaluation of real definite integrals -integration around unit circle (Theorems without proofs).

UNIT-III (14 Hrs)	**Difference equations and Z-transforms :** Formation of a difference equation, Rules for finding complimentary function and particular integral for linear difference equations. Definition of Z- transform, some standard Z- transforms, properties, transform of a function multiplied by n, initial value theorem and final value theorem(without proof), evaluation of inverse Z- transforms, convolution theorem (without proof), solution of linear difference equations by the use of Z- transforms.
UNIT-IV (10 Hrs)	**Probability Distributions :** A brief review of random variables, Binomial, Poisson and Normal distributions, definitions of pmf/ pdf, notation, mean, variance, moment generating function. Fitting of Binomial or Poisson distributions for a given frequency distribution.
UNIT-V (12 Hrs)	**Sampling theory and Testing of Hypothesis :** **Sampling theory:** Introduction, population and samples, Sampling distribution, standard error, central limit theorem (without proof), level of significance, procedure of testing of hypothesis. **Large samples:** Testing of hypothesis for single proportion and two proportions. **Small samples:** Degrees of freedom, Students' t- distribution, t-test for single mean, two means; Chi- squared distribution, test for goodness of a fit.

Text Books:	
1.	Scope and Treatment as in "Higher Engineering Mathematics", by Dr.B.S.Grewal, 43rd Edition, Khanna Publishers.
2.	Probability and statistics for Engineers, Miller and Freund, 7th edition, Pearson 2008.
Reference Books:	
1.	Fundamentals of Mathematical Statistics by S.C.Gupta and V.K.Kapoor, Sultan Chand & Sons Publishers
2.	Probability and statistics for Engineers and Scientists by Ronald E. Walpole, Sharon L. Myers and Keying Ye, Eighth edition,8th edition, Pearson Education, 2007.
3.	Advanced Engineering Mathematics, by Erwin Kreyszig,Wiley
4.	Higher Engineering Mathematics, by B.V.Ramana, Tata Mc Graw Hill Company.
5.	A text book of Engineering Mathematics, by N.P.Bali and Dr. Manish Goyal, Lakshmi Publications.
6.	Advanced Engineering Mathematics, by H.K.Dass, S.ChandCompany.
7.	Higher Engineering Mathematics, by Dr. M.K.Venkatraman, the National Publishing Company

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2101	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

1.	To impart the knowledge of working of various meters and instruments used for the measurement of various engineering parameters.
2.	To select and determine the usage of the measuring instrument for various applications and projects.

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Examine** the operation of different meters for measuring electrical quantities with their applications.	K3	PO1
2.	**Apply** the knowledge of instrument transformers to use them for accurate measurements.	K3	PO1
3.	**Analyse** the usage of different bridges for the measurement of Resistance, Capacitance, Inductance and Frequency.	K4	PO2
4.	**Examine** the operation of different transducers for measuring non-electrical quantities with their applications.	K3	PO1
5.	**Interpret** the usage of CRO, ADC, DAC & Digital Voltmeters.	K3	PO1

SYLLABUS

UNIT-I (12 Hrs)	**Measuring Instruments** Classification, Error Analysis, Deflecting, Controlling and Damping torques, Moving Coil, Moving iron type instruments, Expression for the torque, Errors, and compensations. Extension of range using shunts and Multipliers, Introduction to CT & PT, Errors and compensation, Applications, comparison between C.T. and P.T.
UNIT-II (10 Hrs)	**Measurement of Power and Energy** Dynamometer type wattmeter – Torque expression, Errors. Energy meters, Calibration of energy meters. Measurement of power using Instrument Transformers, Power factor meter.
UNIT-III (10 Hrs)	**AC & DC Bridges** Methods of Measuring Low, Medium, and High Resistance, Kelvin's Double Bridge, Wheat Stone's Bridge, Loss of Charge Method, Methods of Measuring Inductance, Capacitance, and Frequency-Maxwell's Bridges, Anderson's Bridge, Hay's Bridge, Owen's Bridge, Schering Bridge, Wein's Bridge.
UNIT-IV (10 Hrs)	Measurement of Non-Electrical Quantities Transducers – Classifications, Principle of operation of Resistance, Inductive and capacitive Transducers, LVDT, Strain Gauge, and Piezo-Electric Transducers. Measurement of Pressure and Displacement, Measurement of Temperature -Thermocouple.

UNIT-V (10 Hrs)	**Digital Measurement and CRO** Digital Voltmeter –Dual Slope Type, Successive Approximation Type. CRO- Calibration, Measurement of Different Quantities, Lissajous Patterns. ADC- Flash Type, DAC- R2R ladder, Weighted Resistor Type.
Text Books:	
1.	Sawhney, .A.K., "A Course in Electrical & Electronic Measurement and Instrumentation," Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.
2.	Golding, E.W., and Widdis, F.C., "Electrical Measurements and Measuring Instruments," A H Wheeler & Company, Calcutta, 5th edition, 2003.
Reference Books:	
1.	Doeblin, E.O., "Measurement Systems: Application And Design," 5th Edition, Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 2004.
2.	Rangan, C.S., Sharma, G.R., Mani, V.S., "Instrumentation Devices and Systems," Tata McGraw-Hill Publishing Company, New Delhi, 2nd Edition, 2002.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2102	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

NETWORK ANALYSIS AND SYNTHESIS

Course Objectives:

1.	To familiarize the three phase circuits, application of Laplace transforms to electrical circuit.
2.	To impart knowledge on DC transients and Two port network parameters.
3.	To Understand basics of network synthesis.

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Explain** three-phase balanced and unbalanced electric circuits.	K3	PO1
2.	**Analyze** the transient behavior of circuits by applying first and second order differential equations.	K4	PO2
3.	**Apply** Laplace transform techniques to electrical circuits.	K3	PO1
4.	**Analyze** and **model** two port network based on its parameters.	K4	PO2
5.	**Synthesize** an electrical network from a given impedance/admittance function.	K4	PO2

SYLLABUS

UNIT-I (10 Hrs)	**THREE-PHASE CIRCUITS**: Advantages of Three Phase Circuits, Relation between Line and Phase Quantities in Star and delta connected circuits, Analysis of Balanced & Unbalanced Three Phase Circuits, Three-Phase Power Measurements (2-Wattmeter method)
UNIT-II (10 Hrs)	**DC Transients:** Inductor, Capacitor, Source free RL, RC and RLC Response, Evaluation of Initial conditions, application of Unit-step Function to RL, RC and RLC Circuits (Differential equations), Concepts of Natural, Forced and Complete Response
UNIT-III (10 Hrs)	**Laplace Transform Techniques:** Transforms of Typical Signals, Response of Simple Circuits to Unit – Step, sinusoidal and other signal waveforms, Initial and Final Value Theorem.
UNIT-IV (10 Hrs)	**Network Functions & Two Port Network Parameters** Network functions, Concept of Poles and Zeroes, Restriction of Poles and Zeroes for Driving point and transfer function. Two port network parameters – Z, Y, ABCD and Hybrid parameters and Interrelationship between different parameters, and Interconnections of various networks.
UNIT-V (10 Hrs)	**Network Synthesis**: Hurwitz Polynomial. Positive real function - basic synthesis procedure - Foster and Cauer forms of LC, RC and RL networks.

Text Books:

1.	Engineering Circuit Analysis, William H.Hayt Jr. and Jack E. Kemmerley, 5th Edition, McGraw Hill International Edition.
2.	Introduction to Modern Network Synthesis ,Van Valkenburg; John Wiley

Reference Books:	
1.	Network Analysis &Synthesis ,F.F.Kuo; John Wiley & Sons Inc.
2.	Circuit Theory Analysis and Synthesis., Edition 2014 Abhijit Chakrabarthi,DhanpatRai& Co.
3.	Charles K. Alexander, Matthew N. O. Sadiku, Fundamentals of Electric Circuit, fifth edition, McGraw-Hill

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2103	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

ELECTRO MAGNETIC FIELD THEORY

Course Objectives:

1.	To acquire the knowledge of basic laws and theorems that calculate electric and magnetic fields
2.	To understand the concepts about the effects of electric and magnetic fields on conductors, insulators and their boundary conditions.
3.	Tounderstand Maxwell's equations and their application to Electromagnetic Wave Propagation

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Apply** vector calculus to findthe electrostatic and magneto static fields for given charge/ current configurations.	K3	PO1
2.	**Apply** basic principles/ theorems/ laws to estimate the effect of electric and magnetic fields.	K3	PO1
3.	**Analyze** theboundary conditions, calculate parameters like energy, Inductance, Capacitance, forces	K4	PO2
4.	**Analyze** theMaxwell's equations for both static and time varying fields.	K4	PO2
5.	**Analyze** the EM wave in different domains and compute average power density	K4	PO2

SYLLABUS

UNIT-I (10 Hrs)	**Electrostatics** Rectangular, cylindrical and spherical coordinate systems, Coulomb's law and superposition principle, different types of charge configurations, electric flux, electric field intensity and electric flux density, electric field intensity and electric flux density due to different charge configurations, Gauss's law in integral form and point form in terms of D, applications of Gauss' law, Divergence theorem
UNIT-II (12 Hrs)	**Electric potential, Energy & Dielectrics** Electric potential, calculation of electric potential for given charge configuration, electrostatic energy, Electrostatic boundary conditions, basic properties of conductors in electrostatic fields, capacitance, Poisons and Laplace's equations, solutions of Laplace's equations for single variables, uniqueness theorem, electric dipoles, polarization of dielectrics.
UNIT-III (10 Hrs)	**Magneto statics** Biot-savart's law, determination of magnetic field intensity and magnetic flux density due to various steady current configurations, continuity equation, curl of H, Ampere's circuits law in integral and differential form, applications of Ampere's law, Stokes theorem
UNIT-IV (10 Hrs)	**Magnetic Potential & Energy** Calculation of scalar and vector magnetic potential, magnetostatics boundary conditions. The magnetic dipole, magnetization, bound current, inductance and energy in magnetic fields, Lorentz force equation.

UNIT-V (10 Hrs)	**Time varying fields & Electromagnetic waves** Faraday's laws, Lenz's law, Maxwell's equations, modification of ampere's circuital law for time varying fields – displacement current and current density, the uniform plane wave, plane wave propagation, skin depth, the pointing vector, poynting theorem and power considerations.
Text Books:	
1.	Engineering electromagnetics by William H. Hayt, John A. Buck McGraw-Hill Publishing Co. 8th edition.
2.	Principles of Electromagnetics by Mathew N.O. Sadiku, Oxford; 4th edition.
Reference Books:	
1.	Introduction to electro dynamics by D.J. Griffiths, PHI Learning; 3rd Edition (2012).

Code	Category	L	T	P	C	I.M	E.M	Exam
B19 CS 2108	**ES**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

DATA STRUCTURES

(Common to ECE & EEE)

Course Objectives:

1.	To be familiar with basic techniques handling problems with Data structures
2.	Solve problems using data structures such as linear lists, stacks, queues, hash tables
3.	Create and traverse different types of trees and graphs.
4.	To practice different searching algorithms.

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Apply** advanced data structure strategies for exploring complex data structures and implement data structures like stacks, queues	K3	PO1
2.	**Implement**& perform operations on dynamic linear data structures like linked lists.	K3	PO1
3.	**Apply** different operations on trees and graphs.	K3	PO1
4.	**Implement**& analyze various searching &sorting algorithms	K3, k4	PO1, PO2

SYLLABUS

UNIT-I (10 Hrs)	**Linear Data Structures: Arrays, Stacks and Queues** Data Structures -Operations-Abstract Data Types-Complexity of Algorithms-Time and SpaceArrays-Representation of Arrays-Linear Arrays-Insertion–Deletion and Traversal of a LinearArray-Array as an Abstract Data Type-Multi-Dimensional arrays-Strings-String OperationsStoring Strings-String as an Abstract Data Type Stack -Array Representation of Stack-Stack Abstract Data Type-Applications of Stacks: PrefixInfix and Postfix Arithmetic Expressions-Conversion-Evaluation of Postfix ExpressionsRecursion-Towers of Hanoi-Queues-Definition-Array Representation of Queue-TheQueueAbstract Data Type-Circular Queues-Dequeues-Priority Queues.
UNIT-II (10 Hrs)	**Linked Lists** Pointers-Pointer Arrays-Linked Lists-Node Representation-Single Linked List-Traversing andSearching a Single Linked List-Insertion into and Deletion from a Single Linked List-HeaderLinked Lists-Circularly Linked Lists-Doubly Linked Lists-Linked Stacks and QueuesPolynomials-Polynomial Representation-Sparse Matrices.
UNIT-III (10 Hrs)	**Trees** Terminology-Representation of Trees-Binary Trees-Properties of Binary Trees-Binary Tree Representations-Binary Tree Traversal-Preorder-Inorder and Postorder Traversal-ThreadsThread Binary Trees-Balanced Binary Trees-Heaps-Max Heap-Insertion into and Deletionfroma Max Heap-Binary Search Trees-Searching-Insertion and Deletion from a Binary Search TreeHeight of Binary Search Tree, m-way Search Trees, B-Trees.
UNIT-IV (08 Hrs)	**Graphs** Graph Theory Terminology-Graph Representation-Graph Operations-Depth First Search-BreadthFirst Search-Connected Components-Spanning Trees-Biconnected Components-

	MinimumCostSpanning Trees-Kruskal's Algorithm-Prism's Algorithm-Shortest Paths-Transitive Closure-AllPairs Shortest Path-Warshall's Algorithm
UNIT-V (12 Hrs)	**SearchingAndSorting** Searching -Linear Search-Binary Search-Fibonacci Search-Hashing-Sorting-Definition-BubbleSort-Insertion sort-Selection Sort-Quick Sort-Merging-Merge Sort-Iterative and RecursiveMerge Sort-Shell Sort-Radix Sort-Heap Sort.

Text Books:	
1.	Fundamentals of Data Structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson Freed, Universities Press Pvt. Ltd.
2.	Data Structures With C, Seymour Lipschutz, Schaum's Outlines, Tata McGraw Hill.
Reference Books:	
1.	Data Structures using C by Aaron M. Tenenbaum,Y. Langsam and M.J. Augenstein, Pearson Education, 2009.
2.	Data Structures using C by R. KrishnaMoorthy G. Indirani Kumaravel, TMH, New Delhi,2008.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2104	**PC**	**--**	**--**	**3**	**1.5**	**20**	**30**	**3 Hrs.**

NETWORKS LAB

Course Objectives:

1.	To make simple electric circuits by using different sources, loads and Components.
2.	To Experimentally verify various theorems and verify basic laws of electric circuits.
3.	Learn to find circuit parameters for choke coil and two-port networks.
4.	To Measure three phase power and understand resonance phenomenon in electric Circuits.

Course Outcomes

S.No	Outcome	KL	PO'S
1.	Inspect Maximum power transfer, superposition, Thevinins & Nortons Theorems	K3,K4	PO2, PO9, PO10
2.	Analyze resonance condition in R-L-C series circuit and draw locus diagrams for RL,RC series circuits.	K3,K4	PO2, PO9, PO10
3.	Examine power in 3- phase circuits in 3-phase balanced load.	K3,K4	PO2, PO9, PO10
4.	Verify the Ohm's law, Kirchhoff's current's law, Kirchhoff's voltage's law.	K3,K4	PO2, PO9, PO10
5.	Evaluate Two port network parameters and parameters of choke coil	K3,K4	PO4, PO9, PO10

LIST OF EXPERIMENTS

1.	Kirchhoff's Laws.
2.	Verification of Ohms Law and Resistance of a filament Lamp.
3.	Maximum Power Transfer Theorem.
4.	Superposition Theorem.
5.	Thevenin's Theorem.
6.	Verification of Norton's Theorem
7.	Two Port Network Parameters.
8.	Series Resonance.
9.	Parameters of choke coil.
10.	Measurement of power using 2-wattmeter method
11.	Locus Diagrams of RL and RC SeriesCircuits

Reference Books:

1.	Engineering Circuit Analysis, William H.Hayt Jr. and Jack E. Kemmerley, 5th Edition, McGraw Hill International Edition.
2.	Network Analysis &Synthesis ,F.F.Kuo; John Wiley & Sons Inc.
3.	Circuit Theory Analysis and Synthesis., Edition 2014 Abhijit Chakrabarthi, DhanpatRai& Co.
4.	Charles K. Alexander, Matthew N. O. Sadiku, Fundamentals of Electric Circuit, fifth edition, McGraw-Hill.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EC2105	**ES**	**--**	**--**	**3**	**1.5**	**20**	**30**	**3 Hrs.**

ELECTRONIC DEVICES & CIRCUITS - LAB (WITH SIMULATION)

(**Common to ECE & EEE**)

Course Objectives:

1.	To analyze the modeling, characteristics and electrical parameters of Diode, BJT, JFET and MOSFET.
2.	To illustrate the concepts of biasing in BJT, JFET and MOSFET.
3.	To illustrate the application of diode in rectifiers and regulated power supply.
4.	To analyze single stage amplifier circuits using equivalent circuits.

Course Outcomes

S.No	Outcome	Knowledge Level
1.	Apply the concepts of different electronic devices to verify their characteristics and measure the important parameters.	**K3**
2.	Analyze the performance of rectifier circuits with and without filters.	**K4**
3.	Analyze the performance of BJT and FET amplifier circuits.	**K4**
4.	Simulation and Design of small electronic circuits using BJT and FET.	**K4**

LIST OF EXPERIMENTS

1.	Study and Analyze V-I Characteristics of Semiconductor Diode (Ge & Si), LED and Zener Diode.
2.	Determination of Ripple Factor and Regulation Characteristics of Half Wave and Full Wave Rectifier With and Without Filter.
3.	Study and Analyze The Characteristics of BJT in CE Configuration and determination of h-parameters.
4.	Study and Analyze The JFET Characteristics.
5.	Design of Biasing Circuits for BJT and FET.
6.	Design of simple amplifier circuits using BJT.
7.	Design of electronic circuits using FET.

LIST OF SIMULATION EXPERIMENTS

1.	Simulation of V-I Characteristics of Semiconductor Diode, LED and Zener Diode.
2.	Simulation of Regulation Characteristics of Zener Diode.
3.	Simulation of CC Amplifier.
4.	Simulation of JFET Characteristics.
5.	Simulation of BJT Characteristics in CB Configuration.
6.	Simulation of JFET Amplifier.
7.	Simulation of Characteristics of Tunnel Diode.

Reference Books:

1.	Lab manual

Code	Category	L	T	P	C	I.M	E.M	Exam
B19MC2102	**MC**	**3**	**--**	**--**	**--**	**--**	**--**	**--**

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

(Common to ECE & EEE)

Course Objectives:

1.	To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the importance of knowledge system.
2.	To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3.	To focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4.	To know the student traditional knowledge in different sector.

Course Outcomes: At the end of the semester/course, the student will be able to have a clear knowledge on the following:

1.	Understand the concept of Traditional knowledge and its importance.
2.	Know the need and importance of protecting traditional knowledge.
3.	Know the various enactments related to the protection of traditional knowledge.
4.	Understand the concepts of Intellectual property to protect the traditional knowledge .

SYLLABUS

UNIT-I (8Hrs)	**Introduction to traditional knowledge:** Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge.
UNIT-II (8 Hrs)	**Protection of traditional knowledge:** Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.
UNIT-III (8 Hrs)	**Legal frame work and TK:** A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.
UNIT-IV (8 Hrs)	**Traditional knowledge and intellectual property:** Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V (8 Hrs)	**Traditional knowledge in different sectors:** Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Textbooks:	
1.	Traditional Knowledge System in India, by Amit Jha, 2009.
2.	Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
References:	
1.	Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.
2.	"Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino.

Estd:1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi)
Accredited by NAAC with 'A' Grade, All UG Programmes are Accredited by NBA
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

ELECTRICAL & ELECTRONICS ENGINEERING
(Accredited by NBA)

SCHEME OF INSTRUCTION & EXAMINATION
(Regulation R19)
II/IV B.TECH
II-SEMESTER
(With effect from **2019-2020**Admitted Batch onwards**)**

Subject Code	Name of the Subject	Category	Cr	L	T	P	Internal Marks	External Marks	Total Marks
B19 EE 2201	Electrical Machines- I	PC	3	3	--	--	25	75	100
B19 EE 2202	Digital Electronics and Logic Design	PC	3	3	--	--	25	75	100
B19 EE 2203	Signals and Systems	PC	3	3	--	--	25	75	100
B19 ME 2207	Prime Movers and Pumps	ES	3	3	--	--	25	75	100
B19 CS 2209	OOPs through JAVA	ES	3	3	--	--	25	75	100
B19 HS 2201	Management and Organizational Behavior	HS	3	3	--	--	25	75	100
B19 EE 2204	Electrical Measurements and Instrumentation Lab	PC	1.5	--	--	3	20	30	50
B19 ME 2208	Thermal Prime movers Lab	ES	1.5	--	--	3	20	30	50
B19 MC 2202	Professional Ethics and Human Values	MC	0	3	--	--	--	--	--
		TOTAL	**21**	**21**	**0**	**6**	**190**	**510**	**700**

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2201	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

ELECTRICAL MACHINES-I

Course Objectives:

1.	Electro-mechanical energy conversions in D.C. machines and energy transfer in transformers.
2.	Principle of operation of DC machines and transformers
3.	Speed control methods of DC motors and parallel operation, testing of DC machines and transformers.
4.	Different types of three phase transformer connections

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	Identify the concepts of electromechanical energy conversion. Describe the concepts of construction, operating principle of DC machines.	K4	PO2
2.	Discriminate different types of DC machines and transformers, efficiency on DC machine and parallel operation of DC generators and transformers.	K4	PO2
3.	Interpret the characteristics of DC machines	K4	PO4
4.	Discriminate different types of speed control methods of DC motors and different types of transformer connections	K4	PO4
5.	Examine the performance of DC machines and transformers by different testing methods.	K4	PO2, PO4

SYLLABUS

UNIT-I (10 Hrs)	**Electromechanical energy conversion:** Basic principles of energy, force and torque in singly and multiply excited systems. Construction and working principle of DC machines and methods of excitation.
UNIT-II (10 Hrs)	**D.C. Machines** D.C generators-emf equation, armature reaction, commutation. Compensating winding, characteristics of various types of generators, applications. D.C. motors- torque equation, D.C. shunt, series and compound motors– characteristics & applications
UNIT-III (10 Hrs)	**Starting &Speed control** Starting methods and speed control of D.C. shunt and series motors testing of D.C motors - direct and regenerative methods to test D.C. machines. Swinburne's test, field's test and separation of losses.
UNIT-IV (10 Hrs)	**Transformers:** Principle, construction and operation of single-phase transformers, phasor diagram, equivalent circuit, voltage regulation, losses and efficiency. Testing- open & short circuit tests, Sumpner‟s test. Autotransformers- construction, principle, applications and comparison with two winding transformer.

UNIT-V (10 Hrs)	**Three phase transformers:** Construction, various types of connection and their comparative features. Parallel operation of single phase and three phase transformers. Three phase transformer connections. Scott connection, Cooling methods of transformers.

Text Books:	
1.	Kothari.D.P and Nagrath.I.J., "Electrical machines", McGraw Hill Education; 4 edition 2010).
2.	Bimbhra.P.S, Electrical Machinery, Khanna Publishers, 2011.
3.	Irving L. Kosow, "Electrical Machines & Transformers", Prentice Hall; 2nd Revised edition 1990.
Reference Books:	
1.	Clayton. A.E,,,Performance and Design of direct current machines" CBS; 1ST edition (2004).
2.	Mg Say, theory, "Performance& Design of A.C Machines", CBS publishers.
3.	Fitgerald, A.E., Charles Kingselyjr. Stephen D.Umans, "electric machinery"McGraw-Hill; 6th edition (2005).
4.	Hill Stephen, Chapman.j, "Electric Machinery Fundamentals", McGraw-Hill Higher Education; 4 edition (2004).

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2202	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

DIGITAL ELECTRONICS AND LOGIC DESGIN

Course Objectives:

1.	To provide insight of number systems and minimization of Boolean functions
2.	To learn the simplification of Boolean functions using different methods and its logic diagram
3.	To learn the design of various combinational circuits and their applications
4.	To learn the design of various sequential circuits and their applications
5.	To learn the realization of logic gates by switching devices like diodes & transistors

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Apply** the concepts of Boolean Algebra for the analysis and minimization of Boolean expressions and apply the knowledge of number systems to perform arithmetic operations and error corrections.	K3	PO1
2.	**Deduce** the Boolean expressions by K-maps and implement logic circuits using logic gates.	K4	PO2
3.	**Design** and analyze the combinational logic circuits.	K4	PO2, PO3
4.	**Design** and analyze the sequential logic circuits.	K4	PO2, PO3
5.	**Design** and analyze the logic gates using diodes and transistors.	K4	PO2, PO3

SYLLABUS

UNIT-I (10 Hrs)	**NUMBERING SYSTEMS, CODES AND BOOLEAN ALGEBRA:** Number Systems, Base Conversion Methods, Complements of Numbers, Binary arithmetic, Signed Binary numbers, Binary Codes-BCD, Excess-3, 2421, 8421 codes. Even and Odd parity, Gray code, Hamming code, Error detecting and Error correcting codes.Fundamentals of Boolean algebra, Basic theorem and Properties, Simplification of Boolean functions using Boolean theorems.
UNIT-II (8 Hrs)	**LOGIC GATES AND GATE-LEVEL MINIMIZATION:** Fundamentals of Logic Gates – AND, OR, NOT, NAND, NOR and XOR and its truth tables. SOP & POS Simplifications for Boolean expression, Canonical and Standard Forms, Karnaugh map (K-map) with maximum of 4 variables, Don't Care Conditions. Function Implementation using AND-OR logic, NAND and NOR Logic diagram.
UNIT-III (12 Hrs)	**COMBINATIONAL LOGIC CIRCUITS AND DESIGN:** Logic Design of Combinational circuits – Binary Additions, Subtractions, Multiplexers, Demultiplexers, Decoders, Encoders, Code Conversion, PLDs.
UNIT-IV (12 Hrs)	**SEQUENTIAL LOGIC CIRCUITS AND DESIGN:** The Flip-flops: SR, RS and JK Flip-Flops, Race around problem, MSJK, T and D-Flip-flops. Flip Flops with preset and clear inputs. Excitation tables of all Flip- Flops and conversions from one type to another. Operations of Shift Registers and universal shift register. Digital Counters-Ripple Counter design, Synchronous Counter design with T, D and J.K. Flip-flops.

UNIT-V (6 Hrs)	**REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS:** AND, OR and NOT Gates using Diodes and Transistors, RTL, DTL, TTL and CML Logic Families and its comparison.

Text Books:	
1.	Digital Design, 3rd Edition, M. Morris Mano, Pearson Education, Inc., 2002
2.	Switching Theory and Logic Design , A.Anand Kumar, 3rd Edition, PHI Learning Pvt.Ltd.
Reference Books:	
1.	Fundamentals of Logic Design, Charles H. Roth, Thomson Publications, 5th Edition, 2009
2.	An Approach to Digital Design, William I. Fletcher, PHI.Engineering
3.	Switching and Finite Automata Theory, 2nd Edition, ZviKohavi, Tata McGraw-Hill, 1978.
4.	Introduction to Switching Theory and Logic Design , Frederick J. Hill and Gerald R. Peterson, John Wiley & sons, Inc. New York, 3rd edition, 1981.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19EE2203	**PC**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

SIGNALS AND SYSTEMS

Course Objectives:

1.	To understand the properties of signals & systems and their classification.
2.	To study convolution and differential/difference equation approach for LTI system analysis in time domain.
3.	To understand the Fourier analysis for representation and analysis of periodic/aperiodic signals and systems in frequency domain.
4.	To gain familiarity with sampling of CT signals and the significance of sampling rate.
5.	To understand the Z-transform approach for analyzing DT systems.

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Apply** the properties of continuous time and discrete time signals and systems to classify them.	K3	PO1
2.	**Apply** convolution to analyze CT and DT systems in the Time domain.	K3	PO1
3.	**Analyze** the spectral characteristics of periodic and aperiodic signal using Fourier analysis.	K4	PO2
4.	**Apply** sampling theorem for signal conversion.	K3	PO1
5.	**Analyze** DT signals and systems using Z Transform.	K4	PO2

SYLLABUS

UNIT-I (10 Hrs)	**Introduction to Continuous –Time and Discrete –Time signals and systems** Basic continuous time and discrete time signals, Signal Energy and Power, Transformations of the independent variable, Periodic Signals, Even and odd Signals, Complex Exponential signals, The Unit Impulse and Unit step Functions, Classification of systems, Basic system properties.
UNIT-II (10 Hrs)	**Linear Time – Invariant (LTI) Systems:** Representation of signals in terms of impulses, Convolution sum and Convolution integral. Systems described by differential and difference equations. Block diagram representation of LTI systems, Singularity functions. Analogy between vectors and signals, Approximation of a function by a set of mutually orthogonal functions.
UNIT-III (10 Hrs)	**Fourier Series Representation of Periodic Signals** Response of LTI systems to Complex Exponentials – the Continuous time and Discrete time Fourier series, Trigonometric and Exponential Fourier series, Convergence of Fourier series, Properties of Fourier Series
UNIT-IV (10 Hrs)	**Continuous and Discrete time Fourier Transform** Fourier transform of continuous time and discrete time Aperiodic signals and periodic signals, properties of continuous time and discrete time Fourier transforms. Frequency response characterized by linear constant coefficient differential and difference equations. First order and Second order systems.

UNIT-V (10 Hrs)	**Sampling and Z-transform** Representation of a CT signal by its samples, The Sampling theorem, Reconstruction of a signal from its samples, Effect of Under sampling, Discrete time processing of continuous time signals. The Z-transform, Region of Convergence, relation between Z-transform and Fourier transform, Properties of z-transform, Inverse z-transform, determination of transfer function and impulse response of an LTI system, poles and zeros, system stability.

Text Books:	
1.	Signals and Systems, Alan V. Oppenheim, Alan S. Willsky and Ian T. Young, Prentice-Hall.

Reference Books:	
1.	Principles of LINEAR SYSTEMS and SIGNALS B. P. Lathi., Oxford University Press.
2.	Signals and Systems, H.P.Hsu, Schaum's Outlines, McGraw Hill

Code	Category	L	T	P	C	I.M	E.M	Exam
B19ME2207	**ES**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

PRIME MOVERS AND PUMPS

Course Objectives:

1.	To make the students understand the various types of prime movers which can be connected to generators for power production
2.	To make the student learn about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines.
3.	To train the student in the aspects of steam formation and its utilities through the standard steam data tables and chart.
4.	To impart the knowledge of various types of hydraulic pumps.

Course Outcomes:

S.No	Outcome	KL	PO'S
1.	**Compute** the performance parameters of Internal combustion engines	K4	PO2
2.	**Compute** the efficiencies of steam & gas power plants to improve their performance.	K4	PO2
3.	**Apply** the concepts of mechanics to solve the hydrodynamic force of jets.	K3, k4	PO1, PO2
4.	**Apply** the concepts of fluid mechanics to solve the performance parameters of turbines and pumps	K3, K4	PO1, PO2

SYLLABUS

UNIT-I (10 Hrs)	**I.C Engines** Classification, working principles – valve and port timing diagrams – air standard cycles :Otto, Diesel-P-V and T-S diagram ,thermal efficiency– Engine systems line fuel injection, carburetion, ignition, cooling. Engine performance evaluation.
UNIT-II (08 Hrs)	**Generation of steam:** Dryness fraction and properties of steam, function of boilers, working principle of Lancashire boiler, Babcock and Wilcox boiler, boiler mounting and accessories. **Steam engines**: Rankine and Modified Rankine cycle for steam engines.
UNIT-III (12 Hrs)	**Steam turbines**: Classification of steam turbines, compounding of steam turbines, pressure compounding, velocity compounding, and pressure-velocity compounding. **Gas turbine**: Classification of gas turbine-constant pressure combustion cycle, closed cycle and constant volume combustion gas turbine plants.
UNIT-IV (08 Hrs)	**Fluid Mechanics:** Newtonian and Non-Newtonian Fluids, viscosity, types of fluid flows, continuity, momentum and energy equations, Bernoulli's equation and its applications, laminar and turbulent flows, Reynolds number and its significance. **Pumps:** Types of pumps, **Centrifugal pumps:** Main components, Working principle, multistage pumps, Performance and characteristic curve.
UNIT-V (12 Hrs)	**Hydraulic Turbines**: Classification of turbines; Working principle, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.

Text Books:	
1.	Thermal Engineering by Rajput, Lakshmi publications.
2.	Thermal engineering by M.L.Mathur and F.S.Mehta, Jain Brothers.
3.	Hydraulics & Fluid Mechanics", P.N. Modi and S.M. Seth, TEXT BOOKS House, Delhi.
4.	Fluid Mechanics & Hydraulic Machinery" A.K.Jain, Khanna Publishers, Delhi.
Reference Books:	
1.	Thermodynamics & Heat Engines – by B.Yadav, Central Book Depot, Allahabad.
2.	I C Engines – by V Ganeshan, Tata McGraw-Hill Companies.
3.	Fluid Mechanics & Fluid power Engineering", Dr D.S.Kumar

Code	Category	L	T	P	C	I.M	E.M	Exam
B19CS2209	**ES**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

OOPS THROUGH JAVA

(Common to ECE & EEE)

Course Objectives:

1.	Understanding the OOPS concepts, classes and objects, threads, files, applets, swings and act.
2.	This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
3.	Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using Java for network level programming and middleware development

Course Outcomes:

S.No	Outcome	K L	PO'S
1.	**Apply** object-oriented programming principles and various java programming constructs and develop java programs.	K2	PO1,PO2
2.	**Apply** the concepts of Inheritance, Polymorphism and String handling methods in developing java programs	K3	PO1,PO2 ,PO3
3.	**Apply** the concepts like interfaces, packages, exception handling and multithreading in programming to develop error free programs.	K3	PO1,PO2 ,PO3
4.	**Develop** the GUI applications for the end users using applets with event handling.	K4	PO1,PO2 ,PO3

SYLLABUS

UNIT-I (10 Hrs)	**INTRODUCTION TO JAVA:** Introduction to OOP, procedural programming language and object-oriented language, principles of OOP, applications of OOP, history of java, java features, JVM, program structure. Variables, primitive data types, identifiers, literals, operators, expressions, precedence rules and associativity, primitive type conversion and casting, flow of control.
UNIT-II (10 Hrs)	**OBJECTS AND CLASSES:** Classes and objects, class declaration, creating objects, methods, constructors and constructor overloading, garbage collector, importance of static keyword and examples, this keyword, arrays, command line arguments, nested classes.
UNIT-III (10 Hrs)	**INHERITANCE:** Inheritance, types of inheritance, super keyword, final keyword, overriding and abstract class. Interfaces, creating the packages, using packages, importance of CLASSPATH and java. Lang package. Exception handling, importance of try, catch, throw, throws and finally block, user defined exceptions, Assertions.
UNIT-IV (10 Hrs)	**MULTITHREADING:** Introduction, thread life cycle, creation of threads, thread priorities, thread synchronization, communication between threads. Reading data from files and writing data to files, random access file.

UNIT-V (10 Hrs)	**APPLETS AND AWT CLASSES:** Applet class, Applet structure, Applet life cycle, sample Applet programs. Event handling: event delegation model, sources of event, Event Listeners, adapter classes, inner classes. AWT: introduction, components and containers, Button, Label, Checkbox, Radio Buttons, List Boxes, Choice Boxes, Container class, Layouts, Menu and Scrollbar.

Text Books:	
1.	The complete Reference Java, 8th edition, Herbert Schildt, TMH.
2.	Programming in JAVA, Sachin Malhotra, Saurabh Choudary, Oxford.
Reference Books:	
1.	Swing: Introduction, JFrame, JApplet, JPanel, Componets in Swings, Layout Managers in
2.	Swings, JList and JScrollPane, Split Pane, JTabbedPane, JTree, JTable, Dialog Box.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19HS2201	**HS**	**3**	**--**	**--**	**3**	**25**	**75**	**3 Hrs.**

MANAGEMENT AND ORGANIZATIONAL BEHAVIOR

(Common to ECE & EEE)

Course Objectives:

1.	To familiarize with the concept of management, functions and principles
2.	To provide conceptual knowledge on functional management that is on Human resource management and Marketingmanagement
3.	To provide basic insight into contemporary management practices and StrategicManagement
4.	To learn theories of motivation and also deals with individual behavior, their attitude and perception ofindividuals
5.	To understand about organizations groups that affect the climate of an entire organizations which helps employees in stressmanagement.

Course Outcomes:

S.No	Outcome	KL
1.	Explain management functions andprinciples	K2
2.	Will be able to describe the concepts of functional management that is HRM and Marketing functions	K2
3.	Will be able to get discuss about vision, mission, goal, objective and a strategy based on which the corporate planning depends	K2
4.	The learner is able to recognise strategically contemporary managementpractices and describe corporate planning process	K2
5.	The learner can discuss about individual behaviour and motivationaltheories	K2
6.	The student can explain about ways in managing conflicts and stress	K2

SYLLABUS

UNIT-I (10 Hrs)	**Introduction to Management:** **Management:** Concept, Nature and importance of Management, Functions of management, Evolution of Management thought, Taylor's Scientific Management, Fayol's principles of Management, Social Responsibility of Business.
UNIT-II (10 Hrs)	**Functional Management:** **Human Resource Management(HRM)**: Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Compensation & Performance Appraisal. **Marketing Management:** Concept, Functions of marketing; Marketing Mix - Product, Price, Place & Promotion; Marketing strategies based on Product life cycle, Channels of distribution.
UNIT-III (10 Hrs)	**Strategic Management:** Vision, Mission, Goal, Objective, Policy, Strategy. Elements of Corporate planning process; Environmental scanning; SWOT analysis; steps in Strategy formulation, implementation, evaluation & control;Bench Marking; Balanced Score Card.

UNIT-IV (10 Hrs)	**Organizational Behavior:** Individual Behavior: Perception-Perceptual process;Attitude-Attitutidinalchange,Organizational Change, Factors Influencing Change, Types of Change. **Motivation**: Meaning, Theories of Motivation - Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation.
UNIT-V (10 Hrs)	**Group Dynamics:** Types of Groups, Stages of Group development; **Organizationalconflicts** -Reasons for Conflicts, Consequences of Conflicts in Organization, Types of Conflicts, Strategies for Managing Conflicts, Stress - Causes and effects, coping strategies of stress.

Text Books:	
1.	Subba Rao.PManagement &Organizational Behaviour, Himalaya PublishingHouse.Mumbai
2.	A.R Aryasri - Management Science Mcgraw Hill Pvt Ltd, New Delhi

Reference Books:	
1.	Fred Luthans Organizational Behaviour, TMH, NewDelhi.
2.	Robins, Stephen P., Fundamentals of Management, Pearson,India.
3.	Kotler Philip & Keller Kevin Lane: Marketing Management 12/e, PHI,
4.	Koontz & Weihrich: Essentials of Management, 6/e, TMH

Code	Category	L	T	P	C	I.M	E.M	Exam
B19 EE 2204	**PC**	**--**	**--**	**3**	**1.5**	**20**	**30**	**3**

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB

Course Objectives:

1.	To know the procedures for measuring Resistance, Inductance and Capacitance
2.	To perform experiments to measure three phase power using different methods.
3.	To design experiments for calibration of energy meter and wattmeter
4.	To perform experiment for the measurement of power using Voltmeter and ammeter methods**.**

Course Outcomes

S.No	Outcome	KL	PO'S
1.	**Calibrate** Wattmeter and Energy Meter.	K3, K4	PO2, PO9
2.	**Select** the suitable method for measurement of active, reactive powers and energy.	K3, K4	PO2, PO9
3.	**Apply** various transducers used for the measurement of various physical quantities.	K3, K4	PO2, PO9
4.	**Apply** the suitable method for measurement of resistance, inductance, and capacitance.	K3, K4	PO4, PO9
5.	**Test** the dielectric strength of oil	K3, K4	PO2, PO9

LIST OF EXPERIMENTS

1.	Measurement of Parameters of Iron Core Inductor.
2.	Measurement of Power By 3-Voltmeter Method.
3.	Measurement of Power Using 3-Ammeter Method.
4.	Measurement of Low Resistance using Kelvin Double bridge.
5.	Measurement of Inductance using Anderson bridge.
6.	Measurement of Inductance using Maxwell bridge.
7.	Measurement of Capacitance using Schering bridge.
8.	Calibration of Single-Phase Wattmeter.
9.	Calibration of Single-Phase Energy Meter using Phantom Loading.
10.	Measurement of Power using Two Wattmeter Method.
11.	Measurement of Power using Three Wattmeter Method.
12.	Testing of Dielectric Strength of Oil.
13.	Study of LVDT and Capacitance Pickup-Characteristics and Calibration.
14.	Resistance Strain Gauge-Strain Measurement and Calibration.

Reference Books:

1.	Sawhney, .A.K., "A Course in Electrical & Electronic Measurement and Instrumentation," Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.
2.	Golding, E.W., and Widdis, F.C., "Electrical Measurements and Measuring Instruments," A H Wheeler & Com Company, Calcutta, 5th edition, 2003.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19ME2208	**ES**	**--**	**--**	**3**	**1.5**	**20**	**30**	**3 Hrs.**

THERMAL PRIME MOVERS LAB

Course Objectives:

1.	To understand the principle and functioning of various IC engines.
2.	Ability to understand the working of two stroke and four stroke engines.
3.	Acquiring the knowledge of operation of a turbines and pumps.
4.	The way of determination of flash and fire points of oil samples and their importance isacquired.
5.	The procedure for determination of viscosities of oil samples can be understood.

Course Outcomes

S.No	Outcome	KL	PO'S
1.	Assess the environmental, societal safety and health issue through determining the flash & fire point of various lubricating oils as well as fuels, engine performance characteristics, along with computing the viscosity of lubricating oils.	K4	PO6, PO7, PO12
2.	Functioning and communicating as an individual in a team to write and prepare effective reports on experiments conducted in the laboratory.	K4	PO9, PO10, PO12

LIST OF EXPERIMENTS

1.	Drawing of VTD for four-stroke and PTD of two-stroke engines.
2.	Determination of flash and fire points.
3.	Determination of the kinematic and absolute viscosity of the given sample oils.
4.	Load test and smoke test on I.C. engines.
5.	Morse test on multi-cylinder engine.
6.	Heat balance sheet on I.C. engines.
7.	Study of multi-cylinder engines and determination of its firing order.
8.	Economical speed test on IC engines.
9.	Study on impulse and reaction turbines.
10.	Study on reciprocating and centrifugal pumps.

Reference Books:

1.	Thermal Engineering, by R. K. Rajput, Lakshmi Publications.
2.	Thermal Science and Engineering by D.S. Kumar, S.K. Kataria and Sons.
3.	I.C engines by V. Ganesan, Mc Graw Hill Publications.

Code	Category	L	T	P	C	I.M	E.M	Exam
B19MC2202	**MC**	**3**	**--**	**--**	**--**	**--**	**--**	**--**

PROFESSIONAL ETHICS AND HUMAN VALUES

(Common to CE & EEE)

Course Objectives:

1.	To create an awareness on Engineering Ethics and Human Values.
2.	To instill Moral and Social Values and Loyalty.
3.	To appreciate the rights of others.
4.	To create awareness on assessment of safety and risk.

Course Outcomes: Students will be able to:		**Knowledge Level**
1.	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships and field work.	K1&K2
2.	Identifythemultipleethicalinterestsatstakeinareal-worldsituationorpractice and Articulatewhat makesaparticularcourseofactionethicallydefensible.	K1&K2
3.	Assess their own ethical values and the social context of problems.	K3
4.	Identify ethical concerns in research and intellectual contexts, including academic integrity,useandcitationofsources,theobjectivepresentationofdata,andthetreatment of humansubjects.	K3
5.	Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.	K4

SYLLABUS

UNIT-I (8 Hrs)	**Human Values:** Morals,ValuesandEthics-Integrity-WorkEthic-ServicelearningCivicVirtue Respect for others Living Peacefully Caring Sharing Honesty -Courage-Cooperation Commitment Empathy Self Confidence CharacterSpirituality.
UNIT-II (8 Hrs)	**Engineering Ethics:** Senses of 'Engineering Ethics-Variety of moral issued- Types of inquiry Moral dilemmas Moral autonomy- Kohlberg's theory- Gilligan's theory-Consensus and controversy Models of professional roles-Theories about right action-Self-interest -Customs and religion Uses of Ethical theories Valuing time Cooperation Commitment.
UNIT-III (8 Hrs)	**Engineering as Social Experimentation:** Engineering AsSocialExperimentation- Framing the problem- Determiningthefacts codesofEthics- ClarifyingConcepts- Application issues Common Ground -General Principles- Utilitarian thinking respect forpersons.
UNIT-IV (8 Hrs)	**Engineers Responsibility for Safety and Risk:** Safety and risk Assessment of safety and risk. Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety- Intellectual Property rights(IPR).

UNIT-V (8Hrs)	**Global Issues:** Globalization- Cross-culture issues-Environmental Ethics- Computer Ethics Computers as the instrument of Unethical behavior Computers as the object of Unethical acts Autonomous Computers-Computer codes of Ethics- Weapons Development -Ethics and Research Analyzing Ethical Problems in research.

1.	"Engineering Ethics includes Human Values" by M.Govindarajan, S.Natarajan- and, V.S.Senthil Kumar-PHI Learning Pvt Ltd-2009.
2.	"Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
3.	"Ethics in Engineering" by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill-2003.
4.	"Professional Ethics and Morals" by Prof.A.R.Aryasri, DhanikotaSuyodhana-Maruthi Publications.
5.	"Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran-LaxmiPublications.
6.	"Professional Ethics and Human Values" by Prof.D.R.Kiran-
7.	"Indian Culture, Values and Professional Ethics" by PSR Murthy- BS Publication.
8.	Professional Ethics by R.Subramaniam - Oxford publications, New Delhi.