

Course No.	Course Name	L-T-P - Credits	Year of Introduction
MA201	LINEAR ALGEBRA AND COMPLEX ANALYSIS	3-1-0-4	2016
<b>Prerequisite : Nil</b>			
<b>Course Objectives</b> <b>COURSE OBJECTIVES</b> <ul style="list-style-type: none"> <li>To equip the students with methods of solving a general system of linear equations.</li> <li>To familiarize them with the concept of Eigen values and diagonalization of a matrix which have many applications in Engineering.</li> <li>To understand the basic theory of functions of a complex variable and conformal Transformations.</li> </ul>			
<b>Syllabus</b> Analyticity of complex functions-Complex differentiation-Conformal mappings-Complex integration-System of linear equations-Eigen value problem			
<b>Expected outcome .</b> At the end of the course students will be able to (i) solve any given system of linear equations (ii) find the Eigen values of a matrix and how to diagonalize a matrix (iii) identify analytic functions and Harmonic functions. (iv) evaluate real definite Integrals as application of Residue Theorem (v) identify conformal mappings (vi) find regions that are mapped under certain Transformations			
<b>Text Book:</b> Erwin Kreyszig: Advanced Engineering Mathematics, 10 <sup>th</sup> ed. Wiley			
<b>References:</b> 1.Dennis g Zill&Patric D Shanahan-A first Course in Complex Analysis with Applications-Jones&Bartlet Publishers 2.B. S. Grewal. Higher Engineering Mathematics, Khanna Publishers, New Delhi. 3.Lipschutz, Linear Algebra,3e ( Schaums <b>Series</b> )McGraw Hill Education India 2005 4.Complex variables introduction and applications-second edition-Mark.J.Owitz-Cambridge Publication			
<b>Course Plan</b>			
Module	Contents	Hours	Sem. Exam Marks
<b>I</b>	Complex differentiation Text 1[13.3,13.4] Limit, continuity and derivative of complex functions	3	15%
	Analytic Functions	2	
	Cauchy–Riemann Equation(Proof of sufficient condition of analyticity & C R Equations in polar form not required)-Laplace’s Equation	2	
	Harmonic functions, Harmonic Conjugate	2	
<b>II</b>	Conformal mapping: Text 1[17.1-17.4] Geometry of Analytic functions Conformal Mapping,	1	15%
	Mapping $w = z^2$ conformality of $w = e^z$ .	2	

	<p>The mapping <math>w = z + \frac{1}{z}</math></p> <p>Properties of <math>w = \frac{1}{z}</math></p> <p>Circles and straight lines, extended complex plane, fixed points</p> <p>Special linear fractional Transformations, Cross Ratio, Cross Ratio property-Mapping of disks and half planes</p> <p>Conformal mapping by <math>w = \sin z</math> &amp; <math>w = \cos z</math></p> <p>(Assignment: Application of analytic functions in Engineering)</p>	<p>1</p> <p>3</p> <p>3</p>	
<b>FIRST INTERNAL EXAMINATION</b>			
<b>III</b>	<p><u>Complex Integration. Text 1[14.1-14.4] [15.4&amp;16.1]</u></p> <p>Definition Complex Line Integrals, First Evaluation Method, Second Evaluation Method</p> <p>Cauchy's Integral Theorem(without proof), Independence of path(without proof), Cauchy's Integral Theorem for Multiply Connected Domains (without proof)</p> <p>Cauchy's Integral Formula- Derivatives of Analytic Functions(without proof)Application of derivative of Analytical Functions</p> <p>Taylor and Maclaurin series(without proof), Power series as Taylor series, Practical methods(without proof)</p> <p>Laurent's series (without proof)</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	15%
<b>IV</b>	<p><u>Residue Integration Text 1 [16.2-16.4]</u></p> <p>Singularities, Zeros, Poles, Essential singularity, Zeros of analytic functions</p> <p>Residue Integration Method, Formulas for Residues, Several singularities inside the contour Residue Theorem.</p> <p>Evaluation of Real Integrals (i) Integrals of rational functions of <math>\sin \theta</math> and <math>\cos \theta</math> (ii) Integrals of the type <math>\int_{-\infty}^{\infty} f(x)dx</math> (Type I, Integrals from 0 to <math>\infty</math>)</p> <p>( Assignment : Application of Complex integration in Engineering)</p>	<p>2</p> <p>4</p> <p>3</p>	15%
<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	<p>Linear system of Equations Text 1(7.3-7.5)</p> <p>Linear systems of Equations, Coefficient Matrix, Augmented Matrix</p> <p>Gauss Elimination and back substitution, Elementary row operations, Row equivalent systems, Gauss elimination-Three possible cases, Row Echelon form and Information from it.</p>	<p>1</p> <p>5</p>	20%

	Linear independence-rank of a matrix Vector Space-Dimension-basis-vector space $\mathbf{R}^3$	2	
	Solution of linear systems, Fundamental theorem of non-homogeneous linear systems(Without proof)-Homogeneous linear systems (Theory only)	1	
<b>VI</b>	Matrix Eigen value Problem Text 1.(8.1,8.3 &8.4)  Determination of Eigen values and Eigen vectors-Eigen space  Symmetric, Skew Symmetric and Orthogonal matrices –simple properties (without proof)  Basis of Eigen vectors- Similar matrices Diagonalization of a matrix- Quadratic forms- Principal axis theorem(without proof)  (Assignment-Some applications of Eigen values(8.2))	3  2  4	20%
<b>END SEMESTER EXAM</b>			

### QUESTION PAPER PATTERN:

Maximum Marks : 100

Exam Duration: 3 hours

The question paper will consist of 3 parts.

Part A will have 3 questions of 15 marks each uniformly covering modules I and II. Each question may have two sub questions.

Part B will have 3 questions of 15 marks each uniformly covering modules III and IV. Each question may have two sub questions.

Part C will have 3 questions of 20 marks each uniformly covering modules V and VI. Each question may have three sub questions.

Any two questions from each part have to be answered.

Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE201	CIRCUITS AND NETWORKS	3-1-0-4	2016
<b>Prerequisite: Nil</b>			
<b>Course Objectives:</b> To learn about various techniques available to solve various types of circuits and networks To gain the capability to synthesize a circuit for a particular purpose.			
<b>Syllabus</b> AC Circuit Analysis(Steady State AC Analysis), Network topology, Transient analysis, Laplace transform– properties , Transformed circuits, Two port networks, Symmetrical two port reactive networks as filters, Network functions, Network Synthesis			
<b>Expected outcome.</b> Ability to solve any DC and AC circuits Ability to apply graph theory in solving networks Ability to apply Laplace Transform to find transient response Ability to synthesize networks			
<b>Text Book:</b> <ol style="list-style-type: none"> <li>Hayt and Kemmerly :Engineering Circuit Analysis, 8e, Mc Graw Hill Education , New Delhi, 2013.</li> <li>Sudhakar and Shyam Mohan- Circuits and Networks: Analysis and Synthesis, 5e, Mc Graw Hill Education,</li> </ol>			
<b>Data Book ( Approved for use in the examination): Nil</b>			
<b>References:</b> <ol style="list-style-type: none"> <li>Siskand C.S : Electrical Circuits ,McGraw Hill</li> <li>Joseph. A. Edminister: Theory and problems of Electric circuits, TMH</li> <li>D Roy Chaudhuri: Networks and Systems, New Age Publishers</li> <li>A . Chakrabarti : Circuit Theory (Analysis and Synthesis),Dhanpat Rai &amp;Co</li> <li>Valkenberg : Network Analysis ,Prentice Hall of India</li> <li>B.R. Gupta: Network Systems and Analysis, S.Chand &amp; Company Ltd</li> </ol>			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Network theorems – Superposition theorem – Thevenin's theorem – Norton's theorem – Reciprocity Theorem – Maximum power transfer theorem – dc and ac steady state analysis – dependent and independent sources	9 hours	15%
II	Network topology – graph, tree, incidence matrix – properties of incidence matrix – fundamental cut sets – cut set matrix – tie sets – fundamental tie sets – tie set matrix – relationships among incidence matrix, cut set matrix & tie set matrix – Kirchoff's laws in terms of network topological matrices – formulation and solution of network equations using topological methods	9 hours	15%

<b>FIRST INTERNAL EXAMINATION</b>			
<b>III</b>	Steady state and transient response – DC response & sinusoidal response of RL, RC and RLC series circuits	<b>9 hours</b>	15%
<b>IV</b>	Application of Laplace transform in transient analysis – RL, RC and RLC circuits (Series and Parallel circuits) – step and sinusoidal response  Transformed circuits – coupled circuits - dot convention - transform impedance/admittance of RLC circuits with mutual coupling – mesh analysis and node analysis of transformed circuits – solution of transformed circuits including mutually coupled circuits in s-domain	<b>10 hours</b>	15%
<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	Two port networks – Z, Y, h, T parameters – relationship between parameter sets – condition for symmetry & reciprocity – interconnections of two port networks – driving point and transfer immittance – T- $\pi$ transformation.	<b>9 hours</b>	20%
<b>VI</b>	Network functions–Network synthesis-positive real functions and Hurwitz polynomial-synthesis of one port network with two kinds of elements-Foster form I&II-Cauer form I&II.	<b>8 hours</b>	20%
<b>END SEMESTER EXAM</b>			

### **QUESTION PAPER PATTERN (End semester exam)**

**Part A:** 8 questions.

One question from each module of Module I - IV; and two each from Module V & VI.  
Student has to answer all questions. (8 x 5)=40

**Part B:** 3 questions uniformly covering modules I&II

Student has to answer any 2 questions: (2 x 10) =20

**Part C:** 3 questions uniformly covering modules III&IV

Student has to answer any 2 questions: (2 x 10) =20

**Part D:** 3 questions uniformly covering modules V&VI

Student has to answer any 2 questions: (2 x 10) =20

**Note:** Each question can have maximum of 4 sub questions, if needed.



Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE203	ANALOG ELECTRONICS CIRCUITS	3-1-0-4	2016
<b>Prerequisite : Nil</b>			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>To impart an in depth knowledge in electronic semiconductor devices &amp; circuits giving importance to the various aspects of design &amp; analysis.</li> <li>To provide knowledge about different types amplifier &amp; oscillator circuits and their design.</li> <li>To provide a thorough understanding of the operational amplifier circuits and their functions.</li> </ul>			
<b>Prerequisites:</b> Nil			
<b>Syllabus</b> Diode clipping and clamping circuits and Zener voltage regulators, BJT biasing, AC Equivalent Circuit of BJT and CE amplifier analysis, Biasing of JFET and MOSFET, Frequency response of BJT and FET amplifiers, Power amplifiers using BJT, Feedback amplifiers & Oscillator Circuits Operational Amplifier basics and OP-AMP Circuits, Wave form generation using Op-Amp, Multivibrators using Timer IC 555.			
<b>Expected outcome:</b> Upon successful completion of the course the students will be able to <ol style="list-style-type: none"> <li>Design biasing scheme for transistor circuits</li> <li>Model BJT and FET amplifier circuits</li> <li>Choose a power amplifier with appropriate specifications for electronic circuit applications</li> <li>Design &amp; analyse oscillator circuits using BJT</li> <li>Choose Operational amplifier(OPAMP) for specific applications including waveform generation.</li> <li>Design &amp; implement analog circuits using OPAMPs</li> </ol>			
<b>Text Book:</b> <ol style="list-style-type: none"> <li>Malvino A. and D. J. Bates, Electronic Principles 7/e, Tata McGraw Hill, 2010.</li> <li>Boylestad R. L. and L. Nashelsky, Electronic Devices and Circuit Theory, 10/e, Pearson Education India, 2009.</li> <li>Choudhury R., Linear Integrated Circuits, New Age International Publishers. 2008.</li> </ol>			
<b>Data Book ( Approved for use in the examination): Nil</b>			
<b>References:</b> <ol style="list-style-type: none"> <li>Floyd T. L., Fundamentals of Analog Circuits,, Pearson Education, 2012.</li> <li><u>Robert T. Paynter</u> and <u>John Clemons</u>, Paynter's Introductory electronic devices &amp; circuits, Prentice Hall Career &amp; Technology, New Jersey.</li> <li>Bell D. A., Electronic Devices and Circuits, Prentice Hall of India, 2007.</li> <li>Millman J. and C. C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, Tata McGraw-Hill, 2010.</li> <li>Streetman B. G. and S. Banerjee, Solid State Electronic Devices, Pearson Education Asia, 2006.</li> <li>Gayakward R. A., Op-Amps and Linear Integrated Circuits, PHI Learning Pvt. Ltd., 2012.</li> </ol>			

Course Plan			
Module	Contents	Hours	Sem.ExamMarks
I	<p><b>Diode Circuits:</b> Diode clipping circuits - Single level and two level clippers - Clamping circuits – Design of Zener Voltage Regulators.</p> <p><b>Bipolar Junction Transistors :</b> Review of BJT characteristics- Operating point of a BJT – Factors affecting stability of Q point and DC Biasing – Biasing circuits: fixed bias, collector to base bias, voltage division bias and self bias. (Derivation of stability factors for Voltage Divider Biasing only) –Bias compensation using diode and thermistor.</p> <p>Low frequency equivalent circuit of BJT. Common Emitter amplifier - AC Equivalent Circuit – Role of coupling and emitter bypass capacitors – h parameter model of BJT -Amplifier gains and impedances calculations using h equivalent circuit.</p>	9 hours	15%
II	<p><b>Field Effect Transistors :</b> Review of JFET and MOSFET construction, working and characteristics- Biasing a JFET and MOSFET using voltage divider bias-- CS and CD amplifiers – small signal models-FET as switch and voltage controlled resistance.</p> <p><b>Frequency response of Amplifiers :</b> Miller's Theorem-BJT Internal Capacitances at high frequency operations-High frequency analysis of CE Amplifier using hybrid Pi Model -Low Frequency Response of Common Emitter amplifier -- CE High frequency response-Gain bandwidth product- —Low and High Frequency response of FET amplifiers</p>	9 hours	15%
<b>FIRST INTERNAL EXAMINATION</b>			
III	<p><b>Multistage amplifiers :</b> Direct, RC, transformer coupled amplifiers –</p> <p><b>Power amplifiers using BJT :</b> Class A, Class B and Class AB and class C- Conversion efficiency and distortion in power amplifiers.</p> <p><b>Feedback Amplifiers-</b> Effect of positive and negative feedbacks- Basic feedback topologies and their properties</p>	8 hours	15%
IV	<p><b>Oscillators :</b> Bark Hausen's criterion – RC oscillators (RC Phase shift oscillator and Wein Bridge oscillator) –LC oscillators (Hartley and Colpitt's)- Derivation of frequency of oscillation for the above mentioned oscillators- Crystal oscillator.</p>	8 hours	15%

	<b>Operational Amplifiers:</b> Review of Operational Amplifier basics - Analysis of fundamental differential amplifier- Properties of ideal and practical Op-Amp - Gain, CMRR and Slew rate of IC 741 and LM 301– Drift and frequency compensation in OP Amps- Open loop and Closed loop Configurations-Concept of virtual short and its relation to negative feedback		
<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	<b>OP-AMP Circuits :</b> Review of inverting and non-inverting amplifier circuits- Summing and difference amplifiers, Differentiator and Integrator circuits- Logarithmic amplifier- Half Wave Precision rectifier - Instrumentation amplifier.  Comparators: Zero crossing and voltage level detectors, Schmitt trigger.	8hours	20%
<b>VI</b>	<b>Wave form generation using Op-Amps:</b> Square, triangular and ramp generator circuits using Op-Amp - Effect of slew rate on waveform generation.  <b>Timer 555 IC :</b> Internal diagram of 555 IC– Astable and Monostable multivibrators using 555 IC.  <b>Oscillator circuits using Op-amps :</b> RC Phase shift oscillator, Wein Bridge oscillator, LC Oscillators- (Derivation not required) - Crystal oscillator.	8 hours	20%
<b>END SEMESTER EXAM</b>			

### QUESTION PAPER PATTERN (End semester exam)

**Part A:** 8 questions.

One question from each module of Module I - IV; and two each from Module V & VI.  
Student has to answer all questions. (8 x 5)=40

**Part B:** 3 questions uniformly covering modules I&II

Student has to answer any 2 questions: (2 x 10) =20

**Part C:** 3 questions uniformly covering modules III&IV

Student has to answer any 2 questions: (2 x 10) =20

**Part D:** 3 questions uniformly covering modules V&VI

Student has to answer any 2 questions: (2 x 10) =20

**Note:** Each question can have maximum of 4 sub questions, if needed.



Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE205	DC MACHINES AND TRANSFORMERS	3-1-0-4	2016

**Prerequisite : Nil**

**Course Objectives**

To give exposure to the students about the concepts of direct current machines and transformers, including their constructional details, principle of operation and performance analysis.

**Syllabus:**

Electromagnetic principles for Machines, electrodynamic equations and their solution, Magnetic Circuits for Machines, construction of DC machines, DC generators, DC motor, Transformers - single phase and three phase, Construction of single phase and three phase transformers, losses and efficiency, equivalent circuit, testing. Transformer connections.

**Expected outcome.**

After the successful completion of this course, the students will be able to

1. identify dc generator types, and appreciate their performance
2. describe the principle of operation of dc motor and select appropriate motor types for different applications.
3. analyse the performance of different types of dc motors
4. describe the principle of operation of single phase transformers
5. analyse the performance of single phase transformers
6. familiarize with the principle of operation and performance of three phase transformers.

**Text Book**

1. Bimbra P. S., *Electrical Machinery*, 7/e, Khanna Publishers, 2011.
2. Nagrath J. and D. P. Kothari, *Theory of AC Machines*, Tata McGraw Hill, 2006.

**Reference Books**

1. Fitzgerald A. E., C. Kingsley and S. Umans, *Electric Machinery*, 5/e, McGraw Hill, 1990.
2. Langsdorf M. N., *Theory of Alternating Current Machinery*, Tata McGraw Hill, 2001.
3. Abhijith Chakrabarti, Sudipta Debnath, *Electrical Machines*, McGraw Hill Education, New Delhi 2015.
4. Deshpande M. V., *Electrical Machines*, Prentice Hall India, New Delhi, 2011.
5. Theodore Wilde, *Electrical Machines, Drives and Power System*, Pearson Ed. Asia 2001.

**Data Book ( Approved for use in the examination): Nil**

Course Plan			
Module	Contents	Hours	Semester Exam Marks
I	Electromagnetic principles for Machines Electro dynamical equations and their solution – rotational motion system – mutually coupled coils – construction of DC machines – energy conversion in rotating electrical machines – eddy currents and eddy current losses – flux distribution curve in the airgap – armature windings – lap and wave windings – selection criteria – equalizer rings – dummy coils.	9 hours	15%
II	DC generators – EMF equation – methods of excitation – separately and self excited – shunt, series, compound – armature reaction – effects of armature reaction – demagnetizing & cross magnetizing ampere-turns – compensating windings – interpoles – commutation – methods to improve commutation – voltage build-up – no load	9 hours	15%

	characteristics – load characteristics – losses and efficiency – power flow diagram – parallel operation – applications of dc generators.		
<b>FIRST INTERNAL EXAMINATION</b>			
<b>III</b>	DC motor – principle of operation – back emf – classification – torque equation – losses and efficiency – power flow diagram – performance characteristics of shunt, series and compound motors – starting of dc motors – necessity and types of starters – speed control – methods of speed control – testing – Swinburne’s test – Hopkinson’s test – separation of losses – retardation test – applications of dc motors.	9 hours	15%
<b>IV</b>	Transformers – principle of operation – types and construction, core type and shell type construction, dry type transformers, cooling of transformers – ideal transformer – transformation ratio – dot convention – polarity test – practical transformer – kVA rating – equivalent circuit – phasor diagram.	9 hours	15%
<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	Transformer losses and efficiency – voltage regulation – OC & SC test – Sumpner’s test – all day efficiency Autotransformer – saving of copper – current rating and kVA rating of autotransformers, parallel operation of single phase transformers, necessary and desirable conditions of parallel operation, on load and off load tap changers.	9 hours	20%
<b>VI</b>	3-phase transformer – 3-phase transformer connections – $\Delta$ - $\Delta$ , Y-Y, $\Delta$ -Y, Y- $\Delta$ , V-V – vector groupings Yy0, Dd0, Yd1, Yd11, Dy1, Dy11 – Scott connection – three winding transformer – tertiary winding – percentage and per unit impedance – parallel operation of three phase transformers.	9 hours	20%
<b>END SEMESTER EXAM</b>			

### QUESTION PAPER PATTERN (End semester exam)

**Part A:** 8 questions.

One question from each module of Module I - IV; and two each from Module V & VI.  
Student has to answer all questions.  $(8 \times 5) = 40$

**Part B:** 3 questions uniformly covering modules I&II  
Student has to answer any 2 questions:  $(2 \times 10) = 20$

**Part C:** 3 questions uniformly covering modules III&IV  
Student has to answer any 2 questions:  $(2 \times 10) = 20$

**Part D:** 3 questions uniformly covering modules V&VI  
Student has to answer any 2 questions:  $(2 \times 10) = 20$

**Note:** Each question can have maximum of 4 sub questions, if needed.

Course No.	Course Name	L-T-P -Credits	Year of Introduction
EE207	COMPUTER PROGRAMMING	2-1-0-3	2016
<b>Course Objectives</b> To impart knowledge about programming in C To learn basics of PYTHON.			
<b>Syllabus</b> Introduction to Programming, Basic elements of C, Control statements in C, Arrays and Strings, Functions, Storage classes, Structures and Pointers, File Management in C, Introduction to Python			
<b>Expected outcome.</b> 1. Ability to design programs using C language 2. Ability to develop simple programs using Python			
<b>Text Book:</b> 1) E. Balaguruswamy, <i>Programming in ANSI C</i> , Tata McGraw Hill, New Delhi 2) John V Guttag, <i>Introduction to Computation and programming using Python</i> , PHI Learning, New Delhi.			
<b>Data Book ( Approved for use in the examination): Nil</b>			
<b>References:</b> 1. P. Norton, <i>Peter Norton's Introduction to Computers</i> , Tata McGraw Hill, New Delhi 2. Byron S. Gottfried, <i>Programming with C</i> , Schaun Outlines –McGraw Hill. 3. Ashok Kamthane, <i>Programming with ANSI &amp; Turbo C</i> - Pearson education 4. K.R Venugopal and S.R Prasad, <i>Mastering C</i> - Tata McGraw Hill 5. Kelley, Al & Pohl, <i>A Book on C- Programming in C</i> , 4th Ed., Pearson Education			
<b>Course Plan</b>			
Module	Contents	Hours	Sem.ExamMarks
I	<b>Introduction to Programming:</b> Machine language, assembly language, and high level language. Compilers and assemblers. Flow chart and algorithm – Development of algorithms for simple problems. <b>Basic elements of C:</b> Structure of C program –Keywords, Identifiers, data types, Operators and expressions – Input and Output functions	5hours	15%
II	<b>Control statements in C:</b> <i>if, if-else, while, do-while and for statements, switch, break, continue, go to, and labels. Programming examples.</i>	7 hours	15%
<b>FIRST INTERNAL EXAMINATION</b>			
III	<b>Arrays and Strings:</b> Declaration, initialisation, processing arrays and strings– two dimensional and multidimensional arrays –application of arrays. Example programs.	7 hours	15%
IV	<b>Functions :</b> Functions – declaring, defining, and accessing functions –parameter passing methods – – passing arrays to functions , Recursion . <b>Storage classes</b> – extern, auto, register and static. Example programs.	7 hours	15%
<b>SECOND INTERNAL EXAMINATION</b>			

<b>V</b>	<b>Structures</b> – declaration, definition and initialization of structures, unions <b>Pointers:</b> Concepts, declaration, initialization of pointer variables, Accessing a Variable through its Pointer Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, examples	<b>8 hours</b>	20%
<b>VI</b>	<b>File Management</b> – File operations, Input/Output Operations on Files, Random Access to Files ,File pointer. <b>Introduction to Python</b> :Basic Syntax, Operators, control statements, functions-examples.	<b>8hours</b>	20%
<b>END SEMESTER EXAM</b>			

### QUESTION PAPER PATTERN (End semester exam)

**Part A:** 8 questions.

One question from each module of Module I - IV; and two each from Module V & VI.  
Student has to answer all questions. (8 x5)=40

**Part B:** 3 questions uniformly covering modules I&II

Student has to answer any 2 questions: (2 x 10) =20

**Part C:** 3 questions uniformly covering modules III&IV

Student has to answer any 2 questions: (2 x 10) =20

**Part D:** 3 questions uniformly covering modules V&VI

Student has to answer any 2 questions: (2 x 10) =20

**Note:** Each question can have maximum of 4 sub questions, if needed.

Course code	Course Name	L-T-P - Credits	Year of Introduction
HS200	Business Economics	3-0-0-3	2016
<b>Prerequisite: Nil</b>			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>To familiarize the prospective engineers with elementary Principles of Economics and Business Economics.</li> <li>To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability;</li> <li>To apply business analysis to the “firm” under different market conditions;</li> <li>To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues</li> <li>To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate;</li> <li>To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level</li> </ul>			
<b>Syllabus</b> Business Economics - basic concepts, tools and analysis, scarcity and choices , resource allocation, marginal analysis, opportunity costs and production possibility curve. Fundamentals of microeconomics - Demand and Supply Analysis, equilibrium, elasticity, production and production function, cost analysis, break-even analysis and markets. Basics of macroeconomics - the circular flow models, national income analysis, inflation, trade cycles, money and credit, and monetary policy. Business decisions - investment analysis, Capital Budgeting decisions, forecasting techniques and elementary Balance Sheet and taxation, business financing, international investments			
<b>Expected outcome .</b> A student who has undergone this course would be able to <ol style="list-style-type: none"> <li>make investment decisions based on capital budgeting methods in alignment with microeconomic and macroeconomic theories.</li> <li>able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.</li> <li>gain knowledge on Monetary theory, measures by RBI in controlling interest rate and emerging concepts like Bit Coin.</li> <li>gain knowledge of elementary accounting concepts used for preparing balance sheet and interpretation of balance sheet</li> </ol>			
<b>Text Books</b> <ol style="list-style-type: none"> <li>Geetika, Piyali Ghosh and Chodhury, <i>Managerial Economics</i>, Tata McGraw Hill, 2015</li> <li>Gregory Mankiw, <i>Principles of Macroeconomics</i>, Cengage Learning, 2006.</li> <li>M.Kasi Reddy and S.Saraswathi, <i>Economics and Financial Accounting</i>. Prentice Hall of India. New Delhi.</li> </ol>			



**References:**

1. Dornbusch, Fischer and Startz, *Macroeconomics*, McGraw Hill, 11th edition, 2010.
2. Khan M Y, *Indian Financial System*, Tata McGraw Hill, 7th edition, 2011.
3. Samuelson, *Managerial Economics*, 6<sup>th</sup> edition, Wiley
4. Snyder C and Nicholson W, *Fundamentals of Microeconomics*, Cengage Learning (India), 2010.
5. Truett, *Managerial Economics: Analysis, Problems, Cases*, 8<sup>th</sup> Edition, Wiley
6. Welch, *Economics: Theory and Practice* 7<sup>th</sup> Edition, Wiley
7. Uma Kapila, *Indian Economy Since Independence, 26th Edition: A Comprehensive and Critical Analysis of India's Economy, 1947-2015*
8. C Rangarajan, *Indian Economy, Essays on monetary and finance*, UBS Publishers'Distributors, 1998
9. A.Ramachandra Aryasri, *Managerial Economics and Financial Analysis*, Tata McGraw-Hill, New Delhi.
10. Dominick Salvatore, *Managerial Economics in Global Economy*, Thomas Western College Publishing, Singapore.
11. I.M .Pandey, *Financial Management*, Vikas Publishing House. New Delhi.
12. Dominick Salvatore, *Theory and Problems of Micro Economic Theory*. Tata Mac Graw-Hill, New Delhi.
13. T.N.Hajela.*Money, Banking and Public Finance*. Anne Books. New Delhi.
14. G.S.Gupta. *Macro Economics-Theory and Applications*. Tata Mac Graw- Hill, New Delhi.
15. Yogesh, Maheswari, *Management Economics* , PHI learning, NewDelhi, 2012
16. Timothy Taylor , *Principles of Economics*, 3<sup>rd</sup>edition, TEXTBOOK MEDIA.
17. Varshney and Maheshwari. *Managerial Economics*. Sultan Chand. New Delhi

**Course Plan**

Module	Contents	Hours	Sem. Exam Marks
I	<b>Business Economics</b> and its role in managerial decision making-meaning-scope-relevance-economic problems-scarcity Vs choice (2 Hrs)-Basic concepts in economics-scarcity, choice, resource allocation- Trade-off-opportunity cost-marginal analysis- marginal utility theory, Law of diminishing marginal utility -production possibility curve (2 Hrs)	4	15%
II	<b>Basics of Micro Economics I</b> Demand and Supply analysis-equilibrium-elasticity (demand and supply) (3 Hrs.) -Production concepts-average product-marginal product-law of variable proportions- Production function-Cobb Douglas function-problems (3 Hrs.)	6	15%
<b>FIRST INTERNAL EXAMINATION</b>			
III	<b>Basics of Micro Economics II</b> Concept of costs-marginal, average, fixed, variable costs-cost curves-shut down point-long run and short run (3 Hrs.)- Break Even Analysis-Problem-Markets-Perfect Competition, Monopoly and Monopolistic Competition, Oligopoly-Cartel and collusion (3 Hrs.).	6	15%
IV	<b>Basics of Macro Economics</b> - Circular flow of income-two sector and multi-sector models- National Income Concepts-Measurement methods-problems-Inflation, deflation (4 Hrs.)-Trade cycles-Money-stock and flow concept-Quantity theory of money-Fischer's Equation and Cambridge Equation -velocity of circulation of money-credit control methods-SLR, CRR, Open Market Operations-Repo and Reverse Repo rate-emerging concepts in money-bit coin (4 Hrs.).	8	15%

<b>SECOND INTERNAL EXAMINATION</b>			
<b>V</b>	<b>Business Decisions I</b> -Investment analysis-Capital Budgeting-NPV, IRR, Profitability Index, ARR, Payback Period (5 Hrs.)- Business decisions under certainty-uncertainty-selection of alternatives-risk and sensitivity- cost benefit analysis-resource management (4 Hrs.).	9	20%
<b>VI</b>	<b>Business Decisions II</b> Balance sheet preparation-principles and interpretation-forecasting techniques (7 Hrs.)-business financing-sources of capital- Capital and money markets-international financing-FDI, FPI, FII-Basic Principles of taxation-direct tax, indirect tax-GST (2 hrs.).	9	20%
<b>END SEMESTER EXAM</b>			

### Question Paper Pattern

Max. marks: 100, Time: 3 hours

The question paper shall consist of three parts

#### Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks  
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

#### Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks  
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

#### Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks  
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

**Note:** In all parts, each question can have a maximum of four sub questions, if needed.



Course code	Course Name	L-T-P-Credits	Year of Introduction
HS210	LIFE SKILLS	2-0-2	2016
<b>Prerequisite : Nil</b>			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>To develop communication competence in prospective engineers.</li> <li>To enable them to convey thoughts and ideas with clarity and focus.</li> <li>To develop report writing skills.</li> <li>To equip them to face interview &amp; Group Discussion.</li> <li>To inculcate critical thinking process.</li> <li>To prepare them on problem solving skills.</li> <li>To provide symbolic, verbal, and graphical interpretations of statements in a problem description.</li> <li>To understand team dynamics &amp; effectiveness.</li> <li>To create an awareness on Engineering Ethics and Human Values.</li> <li>To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.</li> <li>To learn leadership qualities and practice them.</li> </ul>			
<b>Syllabus</b> <b>Communication Skill:</b> Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication. <b>Critical Thinking &amp; Problem Solving:</b> Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats, Mind Mapping & Analytical Thinking. <b>Teamwork:</b> Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts. <b>Ethics, Moral &amp; Professional Values:</b> Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE. <b>Leadership Skills:</b> Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.			
<b>Expected outcome</b> The students will be able to <ul style="list-style-type: none"> <li>Communicate effectively.</li> <li>Make effective presentations.</li> <li>Write different types of reports.</li> <li>Face interview &amp; group discussion.</li> <li>Critically think on a particular problem.</li> <li>Solve problems.</li> <li>Work in Group &amp; Teams</li> <li>Handle Engineering Ethics and Human Values.</li> <li>Become an effective leader.</li> </ul>			

**Resource Book:**

*Life Skills for Engineers*, Compiled by ICT Academy of Kerala, McGraw Hill Education (India) Private Ltd., 2016

**References:**

- Barun K. Mitra; (2011), “*Personality Development & Soft Skills*”, First Edition; Oxford Publishers.
- Kalyana; (2015) “*Soft Skill for Managers*”; First Edition; Wiley Publishing Ltd.
- Larry James (2016); “*The First Book of Life Skills*”; First Edition; Embassy Books.
- Shalini Verma (2014); “*Development of Life Skills and Professional Practice*”; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); “*The 5 Levels of Leadership*”, Centre Street, A division of Hachette Book Group Inc.

**Course Plan**

Module	Contents	Hours L-T-P		Sem. Exam Marks
		L	P	
I	Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures,	2		See evaluation scheme
	Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills.		2	
	<b>Technical Writing:</b> Differences between technical and literary style, Elements of style; Common Errors, <b>Letter Writing:</b> Formal, informal and demi-official letters; business letters, <b>Job Application:</b> Cover letter, Differences between bio-data, CV and Resume, <b>Report Writing:</b> Basics of Report Writing; Structure of a report; Types of reports.		4	
	<b>Non-verbal Communication and Body Language:</b> Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language	3		
	<b>Interview Skills:</b> Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, <b>Group Discussion:</b> Differences between group discussion and debate; Ensuring success in group discussions, <b>Presentation Skills:</b> Oral presentation and public speaking skills; business presentations, <b>Technology-based Communication:</b> Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.		4	



II	Need for Creativity in the 21 <sup>st</sup> century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity	2		
	Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.		2	
	Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections.  Problem Solving strategies, Analytical Thinking and quantitative reasoning expressed in written form, Numeric, symbolic, and graphic reasoning, Solving application problems.	2		2
III	Introduction to Groups and Teams, Team Composition, Managing Team Performance, Importance of Group, Stages of Group, Group Cycle, Group thinking, getting acquainted, Clarifying expectations.	3		
	Group Problem Solving, Achieving Group Consensus.		2	
	Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams.	3		
IV	Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.		2	
	Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully.	3		
	Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character		2	
	Spirituality, Senses of 'Engineering Ethics', variety of moral issues, 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, application of ethical theories.	3		
	Engineering as experimentation, engineers as responsible experimenters, Codes of ethics, Balanced outlook on.	3		
	The challenger case study, Multinational corporations, Environmental ethics, computer ethics,		2	



	Weapons development, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.	3		
V	Introduction, a framework for considering leadership, entrepreneurial and moral leadership, vision, people selection and development, cultural dimensions of leadership, style, followers, crises.	4		
	Growing as a leader, turnaround leadership, gaining control, trust, managing diverse stakeholders, crisis management		2	
	Implications of national culture and multicultural leadership Types of Leadership, Leadership Traits.	2		
	Leadership Styles, VUCA Leadership, DART Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders, making of a Leader, Formulate Leadership		2	
<b>END SEMESTER EXAM</b>				

## EVALUATION SCHEME

### Internal Evaluation

*(Conducted by the College)*

**Total Marks: 100**

### Part – A

*(To be started after completion of Module 1 and to be completed by 30<sup>th</sup> working day of the semester)*

1. Group Discussion – Create groups of about 10 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation is as follows;

- |       |                        |   |          |
|-------|------------------------|---|----------|
| (i)   | Communication Skills   | – | 10 marks |
| (ii)  | Subject Clarity        | – | 10 marks |
| (iii) | Group Dynamics         | - | 10 marks |
| (iv)  | Behaviors & Mannerisms | - | 10 marks |

*(Marks: 40)*

## Part – B

*(To be started from 31<sup>st</sup> working day and to be completed before 60<sup>th</sup> working day of the semester)*

2. Presentation Skills – Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation is as follows;

(i)	Communication Skills*	-	10 marks
(ii)	Platform Skills**	-	10 marks
(iii)	Subject Clarity/Knowledge	-	10 marks

*(Marks: 30)*

\* Language fluency, auditability, voice modulation, rate of speech, listening, summarizes key learnings etc.

\*\* Postures/Gestures, Smiles/Expressions, Movements, usage of floor area etc.

## Part – C

*(To be conducted before the termination of semester)*

3. Sample Letter writing or report writing following the guidelines and procedures. Parameters to be used for evaluation is as follows;

(i)	Usage of English & Grammar	-	10 marks
(ii)	Following the format	-	10 marks
(iii)	Content clarity	-	10 marks

*(Marks: 30)*

## External Evaluation

*(Conducted by the University)*

Total Marks: 50

Time: 2 hrs.

## Part – A

### Short Answer questions

There will be one question from each area (five questions in total). Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows;

- (i) Content Clarity/Subject Knowledge
- (ii) Presentation style
- (iii) Organization of content

*(Marks: 5 x 6 = 30)*

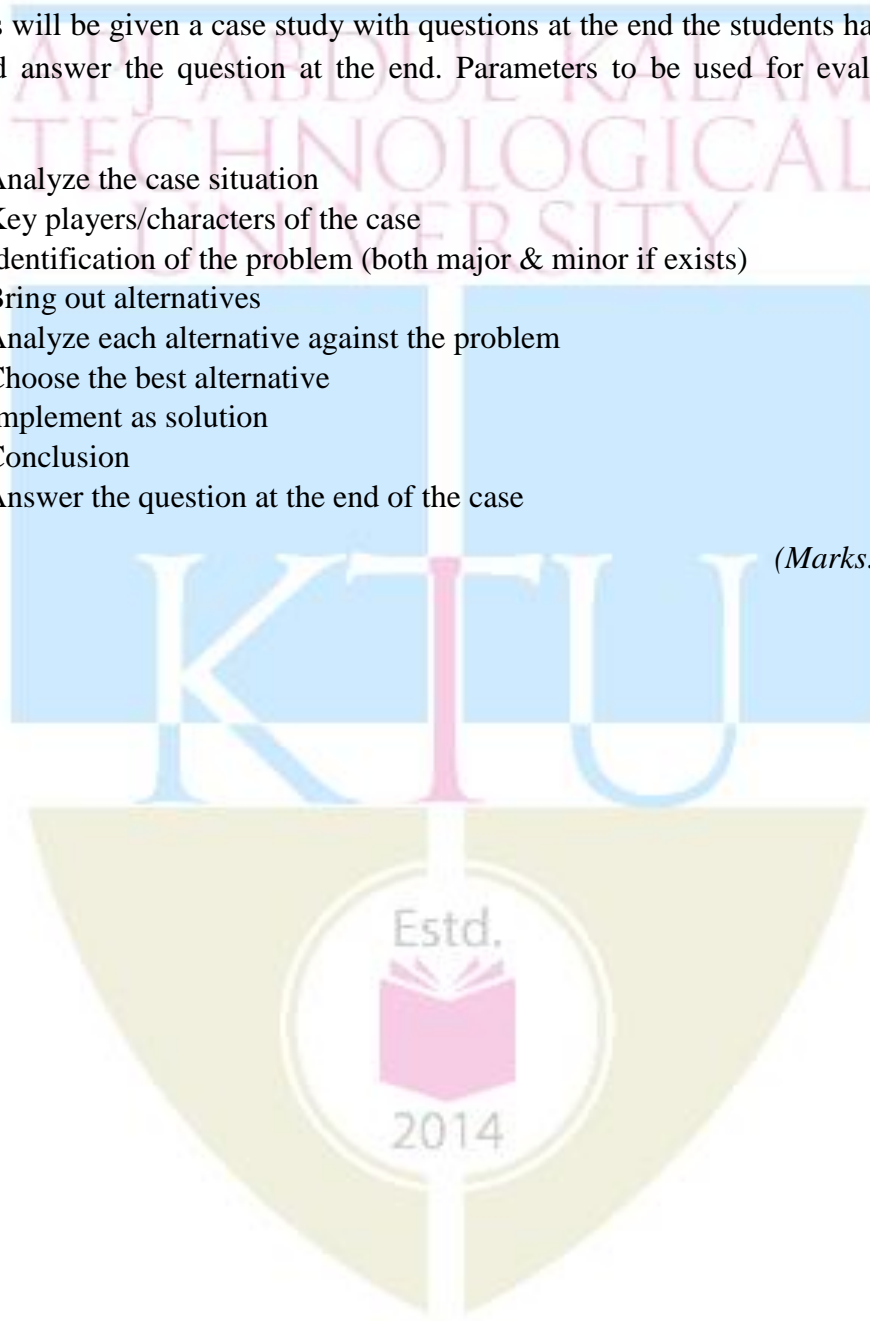
## **Part – B**

### **Case Study**

The students will be given a case study with questions at the end the students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows;

- (i) Analyze the case situation
- (ii) Key players/characters of the case
- (iii) Identification of the problem (both major & minor if exists)
- (iv) Bring out alternatives
- (v) Analyze each alternative against the problem
- (vi) Choose the best alternative
- (vii) Implement as solution
- (viii) Conclusion
- (ix) Answer the question at the end of the case

*(Marks: 1 x 20 = 20)*



Course No.	Course Name	L-T-P - Credits	Year of Introduction
EE231	ELECTRONIC CIRCUITS LAB	0-0-3-1	2016
<b>Course Objectives</b> To design and develop various electronic circuits using discrete components and OPAMPs.			
<b>List of Exercises/Experiments :</b> ( Out of 18 experiments listed, 12 experiments are mandatory. 1.Study & Use of CRO: Measurement of current voltage, frequency and phase shift. 2.Half wave and Full wave (Centre-tapped and bridge) Rectifiers with and without filters- Calculation of Ripple factor, Rectification efficiency, and % regulation. 3. Clipping circuits using diodes 4. Clamping circuits using diodes 5. RC coupled amplifier using BJT in CE configuration- Measurement of gain, input and output impedance and frequency response 6. JFET amplifier- Measurement of voltage gain, current gain, input and output impedance 7.Design and testing of simple zener voltage regulators 8.OPAMP circuits – Design and set up of inverting and non-inverting amplifier, scale changer, adder, integrator, differentiator 9. Precision rectifier using Op-amps 10.Phase shift oscillator using OPAMPs. 11.Wein's Bridge oscillator using OPAMPs. 12.Waveform generation – Square, triangular and sawtooth wave form generation using OPAMPs. 13. Basic comparator and schmitt trigger circuits using Op-amp 14. Design and testing of series voltage regulator using zener diode 15. Astable and monostable circuit using 555 IC 16. RC phase shift oscillator using BJT 17.Introduction to circuit simulation using any circuit simulation software. 18. Introduction to PCB layout software			
<b>Expected outcome.</b> The student should be able to design and implement various electronic circuits using BJTs and OPAMPs.			
<b>Text Book/References:</b> <ol style="list-style-type: none"> <li>1. Malvino A. and D. J. Bates, Electronic Principles 7/e, Tata McGraw Hill, 2010.</li> <li>2. Boylestad R. L. and L. Nashelsky, Electronic Devices and Circuit Theory, 10/e, Pearson Education India, 2009.</li> <li>3. Choudhury R., Linear Integrated Circuits, New Age International Publishers. 2008.</li> <li>4. Millman J. and C. C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, Tata McGraw-Hill, 2010.</li> </ol>			

Course No.	Course Name	L-T-P - Credits	Year of Introduction
EE233	PROGRAMMING LAB	0-0-3-1	2016
<b>Course Objectives</b> <b>To impart knowledge and develop skills in programming</b>			
<b>List of Exercises/Experiments : (Minimum 12 exercises/experiments are mandatory)</b> <ol style="list-style-type: none"> <li>1. At least four simple programs using input output statements (example: area of rectangle, circle, etc)</li> <li>2. At least four Simple programs using decision statements (Example: Even or odd, pass or fail)</li> <li>3. At least four Programs using Control statements and decision statements (Example maximum, minimum of a given set of numbers, hcf, lcm)</li> <li>4. Program to add n numbers</li> <li>5. Programs to print patterns</li> <li>6. Program to check whether a number is prime</li> <li>7. program to generate Fibonaacii series</li> <li>8. Array manipulation (searching, insertion and sorting)</li> <li>9. Few programs using pointers</li> <li>10. Functions Pass by value Pass by reference</li> <li>11. Recursive functions (example: Fibonaacii series and factorial)</li> <li>12. String manipulation – compare, copy, reverse operations</li> <li>13. Matrix operations: addition multiplication, determinant and inverse</li> <li>14. Reading from a file and writing to a file Merging and appending of files.</li> <li>15. Solution of algebraic and transcendental equations: Bisection, Newton- Raphson method- comparison</li> <li>16. Introductory programs using Python</li> <li>17. Function calls in Python</li> </ol>			
<b>Expected outcome.</b> 1. Ability to design programs using C language 2. Ability to develop simple programs using Python			
<b>References:</b> <ol style="list-style-type: none"> <li>1. E. Balaguruswamy, <i>Programming in ANSI C</i>, Tata McGraw Hill, New Delhi</li> <li>2. Kernighan, Brian W., and Dennis M. Ritchie. <i>The C programming language</i>. Vol. 2. Englewood Cliffs: prentice-Hall, 1988.</li> <li>3. Introduction to computation and programming using Python, John V. Guttag, PHI Learning, New Delhi</li> <li>4. Downey, Allen, Jeffrey Elkner, and Chris Meyers. <i>How to think like a computer scientist: learning with python</i>. John Wiley 2015.</li> <li>5. Lambert, Kenneth. <i>Fundamentals of Python: first programs</i>. Cengage Learning, 2011.</li> </ol>			