

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai
Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002



B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

Second Year – Third Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701MA302	Linear Algebra and Partial Differential Equations	3	2	0	4	40	60	100
1702EC301	Network Analysis and Synthesis	3	2	0	4	40	60	100
1702EC302	Engineering Electromagnetics	3	0	0	3	40	60	100
1702EC303	Digital Circuits and Systems	3	0	0	3	40	60	100
1702EC304	Electronics Circuits	3	0	0	3	40	60	100
1702CS306	Data Structures and C++	3	0	0	3	40	60	100
Laboratory Course								
1702EC351	Digital Electronics Laboratory	0	0	4	2	50	50	100
1702EC352	Electronic Circuits Laboratory	0	0	4	2	50	50	100
1702CS351	Data Structures Laboratory	0	0	2	1	50	50	100
1704GE351	Life Skills: Soft Skills	0	0	2	0	100	0	100

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1701MA302

**LINEAR ALGEBRA AND PARTIAL
DIFFERENTIAL EQUATIONS**

L	T	P	C
3	2	0	4

PREREQUISITE :

1. Engineering mathematics I
2. Engineering Mathematics II

COURSE OBJECTIVES:

1. To introduce solving systems of linear equations, Matrix operations.
2. To familiarize Vector spaces and subspaces; linear independence and span of a set of vectors, basis and dimension; the standard bases for common vector spaces.
3. To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I VECTOR SPACES

12 Hours

Vector spaces – Subspaces – Linear combinations and system of Linear equations – Linear independence and Linear dependence – Bases and Dimensions

UNIT II LINEAR TRANSFORMATIONS

12 Hours

Linear transformations - Null spaces - Range - Matrix representation of linear transformation – Eigen values - Eigenvectors - Diagonalization.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS

12 Hours

Formation of partial differential equations – Singular integrals — Solutions of standard types of first order partial differential equations – Lagrange’s linear equation — Linear partial differential equations of second order with constant coefficients of homogeneous type- Applications

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

12 Hours

Classification of PDE – Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction.

UNIT V Z – TRANSFORMS AND DIFFERENCE EQUATIONS

12 Hours

Z - Transforms – Elementary properties – Inverse Z – transform (using partial fraction and residues) – Convolution theorem – Formation of difference equations – Solution of difference equations using Z – transform.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Numerical Solution of non-homogeneous partial differential equations

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Use vector spaces using algebraic methods
- CO2 Solve system of linear equations by matrix operations
- CO3 Compute the solution of partial differential equations
- CO4 Solve boundary value problem using partial differential equation
- CO5 Apply Z transform techniques for discrete time systems

REFERENCES:

1. Friedberg, A.H., Insel, A.J. and Spence, L., —Linear Algebra, Prentice - Hall of India, New Delhi, 2004.
2. Veerarajan. T., “Transforms and Partial Differential Equations”, Second reprint, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012
3. Kumaresan, S., —Linear Algebra – A geometric approach, Prentice – Hall of India, New Delhi, Reprint, 2010.
4. Grewal. B.S., “Higher Engineering Mathematics”, 42nd Edition, Khanna Publishers, Delhi, 2012.
5. Bali.N.P and Manish Goyal, “A Textbook of Engineering Mathematics”, 7th Edition, Laxmi Publications Pvt Ltd , 2007
6. Ramana.B.V., “Higher Engineering Mathematics”, Tata Mc-GrawHill Publishing Company Limited, New Delhi, 2008.
7. Narayanan.S., Manicavachagom Pillay.T.K and Ramanaiah.G “Advanced Mathematics for Engineering Students” Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998.
8. www.nptelvideos.in/2012/11/mathematics-iii.html

1702EC301	NETWORK ANALYSIS AND SYNTHESIS	L	T	P	C
		3	1	0	4

PREREQUISITE :

Circuit Theory

COURSE OBJECTIVES:

1. Apply the knowledge of basic circuit law and simplify the network using reduction techniques
2. Analyze the circuit using Kirchhoff's law and Network simplification theorems
3. Infer and evaluate transient response, Steady state response, network functions
4. Obtain the maximum power transfer to the load , and Analyze the series resonant and parallel resonant circuit
5. Evaluate two-port network parameters , design attenuators and equalizer

UNIT I INTRODUCTION TO GRAPH THEORY 12 Hours

Linear Graphs in Electrical Networks, Basic Definitions, Incidence, Loop and cut-set matrices, Fundamental Loop and Fundamental Cut-Set Matrices, Graph Theoretic version of KCL and KVL, Loop Impedance and Node Admittance Matrices, Duality in Electrical Networks.

UNIT II TWO PORT NETWORK 12 Hours

Network functions - Poles and Zeros of network functions - Complex frequency - Two port parameters Z,Y,H and ABCD - Scaling network functions -T and π equivalent circuits - Bridged networks - Analysis of ladder and lattice networks - Coupled circuits as two port network - Tuned circuits.

UNIT III TRANSIENT RESPONSE OF RLC CIRCUITS 12 Hours

Transient response of RL,RC,RLC, circuit for DC input and AC input with sinusoidal excitation.

UNIT IV TRANSFER FUNCTION SYNTHESIS 12 Hours

Properties of LC,RL,RC driving point functions, Synthesis of driving point LC,RC and RL functions - Foster and Cauer forms- Synthesis of transfer admittance, transfer impedance with a one ohm termination - Synthesis of constant-resistance network.

UNIT V DESIGN OF FILTER 12 Hours

Design of filters -Low pass filters, high pass filters, band pass filters, band reject filters, Butterworth filters, m-derived filters, constant k-filters.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Interrelationships between the parameters, Lattice networks - Image parameters, Stability of active networks, Simulation of general and ladder network , Simulation of RL, RC, LC network , Simulation of filters design, Simulation of Attenuators & Equalizers.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Analyze the electric circuit using network theorems
- CO2 Understand and Obtain Transient & Forced response
- CO3 Determine Sinusoidal steady state response; understand the real time applications of maximum power transfer theorem and equalizer
- CO4 Understand the two-port network parameters, are able to find out two-port network parameters &DC response for interconnection of two-port networks and RLC circuits.
- CO5 Synthesize of Initial and final value theorem, Heaviside's expansion theorem.

REFERENCES:

1. Franklin F.Kuo, "Network Analysis and Synthesis (5th Edition ,2012)" Wiley International;2010
2. Andreas Antoniou," Digital filters (Analysis, Design and Application)", McGraw-Hill; 2nd edition (May 15, 2000)
3. M.E.VanValkenberg, "Introduction to Modern Network Synthesis", Wiley Eastern.
4. Umesh Sinha "Network Analysis and Synthesis"SatyaPrakashan Publishers , 4th Edition 2013
5. David A Bell,"Electric Circuits Oxford Press, ", (7thEdition, 2011).

1702EC302	ENGINEERING ELECTROMAGNETICS	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Engineering Mathematics I & II
2. Basic Electrical and Instrumentation Engineering
3. Circuit Theory

COURSE OBJECTIVES:

1. To impart knowledge on the basics of static electric and magnetic fields and the associated laws.
2. To give insight into the propagation of EM waves and also to introduce the methods in computational electromagnetic.
3. To analyze the time varying fields.

UNIT I STATIC ELECTRIC FIELDS **9 Hours**

Co-ordinate system – Rectangular – Cylindrical and spherical co-ordinate system – Line – Surface and volume integrals – Definition of curl – Divergence and gradient – Meaning of Stokes theorem and divergence theorem – Coulomb's law in vector form – Definition of electric field intensity – Principle of superposition – Electric field due to discrete charges – Electric field due to continuous charge distribution – Electric field due to charges distributed uniformly on an infinite and finite line – Electric field on the axis of a uniformly charged circular disc – Electric field due to an infinite uniformly charged sheet – Electric scalar potential – Relationship between potential and electric field – Potential due to infinite uniformly charged line – Potential due to electrical dipole – Electric flux Density – Gauss law – Proof of Gauss law – Applications.

UNIT II STATIC MAGNETIC FIELDS **9 Hours**

The Biot – Savart law in vector form – Magnetic field intensity due to a finite and infinite wire carrying a current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere's circuital law and simple applications – Magnetic flux density – The Lorentz force equation for a moving charge and applications – Force on a wire carrying a current I placed in a magnetic field – Torque on a loop carrying a current I – Magnetic moment – Magnetic vector potential.

UNIT III ELECTRIC AND MAGNETIC FIELDS IN MATERIALS **9 Hours**

Poisson's and Laplace's equation – Electric polarization – Nature of dielectric materials – Definition of capacitance – Capacitance of various geometries using Laplace's equation – Electrostatic energy and energy density – Boundary conditions for electric fields – Electric current – Current density – Point form of Ohm's law – Continuity equation for current – Definition of inductance – Inductance of loops and solenoids – Definition of mutual inductance – Simple examples – Energy density in magnetic fields.

UNIT IV TIME VARYING ELECTRIC AND MAGNETIC FIELDS **9 Hours**

Faraday's law – Maxwell's second equation in integral form from Faraday's law – Equation expressed in point form – Displacement current – Ampere's circuital law in integral form – Modified form of Ampere's circuital law – Maxwell's first equation in integral form – Equation expressed in point form – Maxwell's four equations in integral form and differential form – Poynting vector and the flow of power – Power flow in a co-axial cable – Instantaneous average and complex Poynting vector.

UNIT V ELECTROMAGNETIC WAVES **9 Hours**

Derivation of wave equation – Uniform plane waves – Maxwell's equation in phasor form – Wave equation in phasor form – Plane waves in free space and in a homogeneous material – Wave equation for a conducting medium – Plane waves in lossy dielectrics – Propagation in good conductors – Skin effect – Linear elliptical and circular polarization – Reflection of plane wave from a conductor – Normal incidence – Reflection of plane waves by a perfect dielectric – Normal and oblique incidence – Dependence on polarization – Brewster angle.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Vector analysis - Vector Calculus - Principle of Superposition theorem - Nature of magnetic materials – Magnetization and permeability – Magnetic boundary conditions.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Explain the fundamentals of electromagnetic.
- CO2 Analyze field potentials due to static charges and static magnetic fields.
- CO3 Explain how materials affect electric and magnetic fields.
- CO4 Analyze the relation between the fields under time varying situations.
- CO5 Discuss the principles of propagation of uniform plane waves.

REFERENCES:

1. Hayt, W.H. and Buck, J.A., "Engineering Electromagnetics", 7th Edition, TMH, 2007.
2. Jordan, E.C., and Balmain, K. G., "Electromagnetic Waves and Radiating Systems", 4th Edition, Pearson Education/PHI, 2006.
3. Mathew N.O. Sadiku, "Elements of Engineering Electromagnetics", 4th Edition, Oxford University Press, 2007.
4. Narayana Rao, N., "Elements of Engineering Electromagnetics", 6th Edition, Pearson Education, 2006.
5. Ramo, Whinnery and Van Duzer., "Fields and Waves in Communication Electronics", 3rd Edition, John Wiley and Sons, 2003.

1702EC303	DIGITAL CIRCUITS AND SYSTEMS	L	T	P	C
		3	0	0	3

PREREQUISITE :

Basic Electrical and Instrumentation Engineering

COURSE OBJECTIVES:

1. To train the students in basics of digital functions
2. To impart the students in the designing ability of combinational and sequential circuits
3. To educate the students about different types of memory and programmable devices
4. To teach the students about software skill in VHDL/Verilog HDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES **9 Hours**

Boolean Algebra: Number systems – Boolean postulates and laws – De-Morgan’s Theorem – Principle of Duality - Boolean expression – Minimization of Boolean expressions — Minterm – Maxterm-Sum of Products (SOP)–Product of Sums (POS) – Karnaugh map Minimization – Quine – Mc Cluskey method of minimization.

Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive – OR and Exclusive – NOR Implementations of Logic Functions using gates, NAND – NOR implementations – Multi level gate implementations – Multi output gate implementations. TTL and CMOS Logic and their characteristics – Tristate gates

UNIT II COMBINATIONAL LOGICS **9 Hours**

Introduction – Design procedure – Half adder – Full Adder – Half subtractor – Full subtractor – Parallel binary adder, parallel binary Subtractor– Fast Adder-Carry Look Ahead adder – Serial Adder / Subtractor – BCD adder – Binary Multiplier – Binary Divider – Multiplexer / Demultiplexer – decoder - encoder– parity generators – parity checker – code converters – Magnitude Comparator

UNIT III SYNCHRONOUS SEQUENTIAL LOGICS **9 Hours**

Latches, Flip – flops - SR, JK, D, T, and Master – Slave – Characteristic table and equation – Application table – Edge triggering – Level Triggering – Realization of one flip flop using other flip flops – serial adder / subtractor – Synchronous counters – Synchronous Up / Down counters – Programmable counters – Design of Synchronous counters : state diagram - State table – State minimization – State assignment - Excitation table and maps – Circuit implementation – Modulo – n counter, Registers – shift registers – Universal shift registers

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGICS **9 Hours**

Design of fundamental mode and pulse mode circuits – Asynchronous Ripple or serial counter–Asynchronous Up / Down counter – State Machines – Problems in Asynchronous Circuits – Static and Dynamic Hazards – Design of Hazard Free Switching circuits

UNIT V PROGRAMMABLE LOGIC DEVICES AND HDL PROGRAMMING **9 Hours**

Programmable Logic Devices: Classification of memories – ROM - ROM organization – PROM – EPROM – EEPROM – EAPROM, RAM – Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using ROM, PLA, PAL

Verilog HDL Programming: Introduction – Data flow model – behavioral model – structural model – HDL programs for combinational logic – HDL program for sequential logic

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Design of seven segment display using basic logic gates

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Use different methods which are used to simplify the Boolean functions
- CO2 Demonstrate different types of combinational circuits to satisfy the user requirements
- CO3 Implement various synchronous sequential circuits
- CO4 Practice several types of asynchronous counters
- CO5 Explain the basics of memory and programmable logic devices
- CO6 Discuss the HDL Program for combinational and sequential circuits

REFERENCES:

1. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, “Digital Systems: Principles and Applications”, 10th Edition, Pearson Prentice Hall, 2007
2. M.MorrisMano, “Digital Design”, 4th Edition, Prentice Hall of India Pvt. Ltd., 2008/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003
3. Joseph Cavanagh, “Verilog HDL: Digital Design and Modeling”, Taylor & Francis, 2007
4. John F. Wakerly, “Digital Design”, Fourth Edition, Pearson/PHI, 2008
5. John. M Yarbrough, “Digital Logic Applications and Design”, Thomson Learning, 2006

6. Charles H.Roth. "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
7. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006
8. Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011
9. Donald D. Givone, "Digital Principles and Design", TMH, 2003
10. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "Digital Systems: Principles and Applications", 10th Edition, Pearson Prentice Hall, 2007

1702EC304

ELECTRONIC CIRCUITS

L	T	P	C
3	0	0	3

PREREQUISITE :

Basic Electrical and Instrumentation Engineering
Circuit Theory

COURSE OBJECTIVES:

1. To familiar with the theory, construction, and operation of Basic electronic devices.
2. To Learn about biasing of BJTs and MOSFETs
3. To Study high frequency response of all amplifiers
4. To understand the analysis and design of Feedback amplifiers, LC and RC oscillators, amplifiers, multivibrators, and time base generators.

UNIT I ELECTRONIC DEVICES

9 Hours

BJT:NPN-PNP-Current Equations-Input and Output characteristics of CE,CB,CC-Hybrid π Model- h parameter model- FET: JFETs – Characteristics-MOSFET- Characteristics – D –MOSFET- E-MOSFET-MESFET- Schottky Barrier Diode – Varactor Diode –Zener Diode – Tunnel Diode – Gunn Diode - LDR-UJT-SCR-LED-LCD- Optocoupler- Solar Cell

UNIT II TRANSISTOR BIASING AND SMALL SIGNAL LOW FREQUENCY MODEL **9 Hours**

DC Load line, operating point, Various biasing methods for BJT-Design-Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET-BJT: Analysis of transistor amplifier CE,CC&CB Configuration using h parameters, Simplified Hybrid Model for CB, CE & CC configurations, Comparison of transistor amplifier configurations, Darlington Pair. FET: Voltage Gain, Small Signal Equivalent Circuit model, Transconductance, T Equivalent Circuit Model

UNIT III HIGH FREQUENCY MODELS

9 Hours

BJT: Behavior of Transistor at High Frequency, The High Frequency T Model, The Hybrid pi Common Emitter Transistor Model, - CB & CE Short Circuit Current Frequency response, Frequency Response of the CE Amplifier. FET: The Gate Capacitive effect, High Frequency MOSFET Model, Unity Gain Frequency, Frequency Response of CS Amplifier.

UNIT IV FEEDBACK AMPLIFIERS AND OSCILLATORS

9 Hours

Feedback amplifiers - Current Series, Voltage Shunt, Current shunt and Voltage Series-Classification, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators - Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators - phase shift –Wien bridge - Twin-T Oscillators, Quartz Crystal Construction

UNIT V TUNED AMPLIFIERS AND WAVE SHAPING CIRCUITS

9 Hours

Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers - Analysis of capacitor coupled single tuned amplifier – double tuned amplifier-Stagger tuned amplifiers – large signal tuned amplifiers – Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier-RC & RL Integrator and Differentiator circuits-Diode clippers, Diode comparator – Clampers-Collector coupled and Emitter coupled Astable multivibrator – Monostable multivibrator – Bistable multivibrators - Schmitt trigger circuit.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. UJT saw tooth waveform generator
2. Blocking Oscillator
3. Time base circuits

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Explain the theory, construction, and operation of basic electronic devices.
- CO2 Analyze parametric values for different biasing methods of BJT and FET.
- CO3 Analyze the behaviour of Bipolar Junction Transistors and Field Effect Transistors at different frequency conditions.
- CO4 Design and analyze feedback amplifiers and oscillators.
- CO5 Design of tuned amplifiers and Multivibrators

REFERENCES:

1. Jacob Millman, C. Halkias and SatyabrataJit Electronic Devices and Circuits, 3rd Edition, Tata Mc Graw - Hill, 2011
2. David A. Bell, “Electronic Devices and Circuits”, Fifth Edition, Oxford University Press, 2008.
3. Donald A Neaman, “Semiconductor Physics and Devices”, Third Edition, Tata Mc GrawHill Inc. 2007.
4. Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd Edition,Tata Mc Graw
5. Hill, 2009.

6. Adel .S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", 6th Edition, Oxford University Press, 2010
7. Robert L. Boylestad and Louis Nasheresky, "Electronic Devices and Circuit Theory", 10th Edition, Pearson Education / PHI, 2008
8. Jacob Millman, C. Halkias and SatyabrataJit Electronic Devices and Circuits, 3rd Edition, Tata Mc Graw - Hill, 2011

1702CS306

DATA STRUCTURES AND C++

L	T	P	C
3	0	0	3

PREREQUISITE :

Programming in C

COURSE OBJECTIVES:

1. To comprehend the fundamentals of object oriented programming, particularly in C++.
2. To use object oriented programming to implement data structures.
3. To introduce linear, non-linear data structures and their applications.

UNIT I DATA ABSTRACTION & OVERLOADING

9 Hours

Overview of C++ – Structures – Class Scope and Accessing Class Members – Reference Variables – Initialization – Constructors – Destructors – Member Functions and Classes – Friend Function – Dynamic Memory Allocation – Static Class Members – Container Classes and Integrators – Proxy Classes – Overloading: Function overloading and Operator Overloading.

UNIT II INHERITANCE & POLYMORPHISM

9 Hours

Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived – Class Object To Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.

UNIT III LINEAR DATA STRUCTURES

9 Hours

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – singly linked lists – Polynomial Manipulation - Stack ADT – Queue ADT - Evaluating arithmetic expressions

UNIT IV NON-LINEAR DATA STRUCTURES

9 Hours

Trees – Binary Tree-Binary search trees -Tree traversal -Expression manipulation -Symbol table construction -AVL trees: Rotation, Insertion, Deletion,–Redblack tree – Graph and its representations – Graph Traversals – Representation of Graphs – Breadth-first search – Depth-first search - Connected components.

UNIT V SORTING and SEARCHING

9 Hours

Sorting Techniques-Selection, Bubble, Insertion, Merge, Heap, Quick, and Radix sort -Address calculation - Linear search -Binary search -Hash table methods.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. B-Trees, Splay trees
2. Floyd - Warshall algorithm.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Identify the model of Abstract Data Type, calculation of algorithm efficiency and designing of recursive algorithms.
- CO2 Design algorithms to solve real life problems using data structures.
- CO3 Analyze various sorting and searching algorithms.
- CO4 Recognize the usage of Non-Linear Data structures such as Binary Search tree, AVL search tree and Heap tree in applications.
- CO5 Solve real life problems using minimum spanning tree and shortest path algorithms.

REFERENCES:

1. Deitel and Deitel, “C++, How To Program”, Seventh Edition, Pearson Education, 2013.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Fourth Edition, Addison-Wesley, 2013.
3. Bhushan Trivedi, “Programming with ANSI C++, A Step-By-Step approach”, Oxford University Press, 2010.
4. Goodrich, Michael T., Roberto Tamassia, David Mount, “Data Structures and Algorithms in C++”, 7th Edition, Wiley, 2016.
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, Mc Graw Hill, 2009.
6. Bjarne Stroustrup, “The C++ Programming Language”, 3rd Edition, Pearson Education, 2007.
7. Ellis Horowitz, SartajSahni and Dinesh Mehta, “Fundamentals of Data Structures in C++”, Galgotia Publications, 2007.

1702EC351	DIGITAL ELECTRONICS LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE :

Basic Electrical and Electronics Engineering Lab

COURSE OBJECTIVES:

1. To impart the students in the designing ability of combinational and sequential circuits
2. To educate the students in the designing ability of synchronous and asynchronous sequential circuits To educate the students about different types of memory and programmable devices
3. To teach the students about software skill in VHDL/Verilog HDL

LIST OF EXPERIMENTS:

1. Verification of Boolean Theorems using basic gates
2. Design and implementation of code converters using logic gates
3. Design and implementation of 4 bit binary Adder/ Subtractor and BCD adder
4. Design and implementation of Multiplexer and De-multiplexer using logic gates
5. Design and implementation of encoder and decoder using logic gates
6. Design and implementation of parity generator and checker
7. Design and implementation of Magnitude Comparator
8. Construction and verification of 4 bit ripple counter and Mod-10/Mod-12 Ripple counters
9. Design and implementation of 3-bit synchronous up/down counter
10. Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip- flops
11. Design of combinational circuits using HDL
12. Design of sequential circuits using HDL

TOTAL:45 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS:

1. Design and Implementation of seven segment display using basic logic gates
2. One mini project using logic gates

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Demonstrate different types of combinational circuits to satisfy the user requirements
- CO2 Implement various synchronous sequential circuits
- CO3 Design several types of asynchronous counters
- CO4 Write the HDL Program for combinational circuits
- CO5 Write the HDL Program for sequential circuits

REFERENCES:

1. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "Digital Systems: Principles and Applications", 10th Edition, Pearson Prentice Hall, 2007
2. M.Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India Pvt. Ltd., 2008/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003
3. Joseph Cavanagh, "Verilog HDL: Digital Design and Modeling", Taylor & Francis, 2007
4. John F. Wakerly, "Digital Design", Fourth Edition, Pearson/PHI, 2008
5. John. M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
6. Charles H. Roth. "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
7. Donald P. Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006
8. Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011
9. Donald D. Givone, "Digital Principles and Design", TMH, 2003

1702EC352

ELECTRONICS CIRCUITS LABORATORY

L	T	P	C
0	0	4	2

PREREQUISITE :

1. Basic Electrical and Instrumentation Engineering
2. Circuit Theory

COURSE OBJECTIVES:

1. To Be exposed to the characteristics of basic electronic devices
2. To Study the characteristic of CE,CB and CS Amplifier
3. To gain hands on experience in designing electronic circuits.
4. To learn simulation software used in circuit design.

LIST OF EXPERIMENTS:

1. Characteristics of PN Junction diode and Zener Diode, FET,SCR
2. Input and Output Characteristics of CE / CB Configuration
3. Design and analysis of CE/CB/CS, Darlington Amplifier
4. Design of Series and Shunt feedback amplifiers-Frequency response, Input and output impedance calculation.
5. Design of RC Phase shift oscillator and Wien Bridge Oscillator
6. Design of Hartley Oscillator and Colpitts Oscillator
7. Design of Single Tuned Amplifier
8. Design of Clipper, Clamper, RC Integrator, Differentiator and Multivibrator circuits
9. Simulation of CE,CS amplifiers, Twin-T Oscillator and Wein Bridge Oscillator
10. Simulation of Double and Stagger tuned Amplifier
11. Simulation of Monostable Multivibrator

TOTAL:45 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS:

1. Design of Power inverter.
2. Design of Function Generator

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Able to Learn the characteristics and frequency response of basic electronic devices
- CO2 Able to Analyze various types of feedback amplifiers
- CO3 Able to Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators.
- CO4 Able to Simulate amplifiers and oscillators using Spice

REFERENCES:

1. Donald A Neaman, "Semiconductor Physics and Devices", Third Edition, Tata Mc GrawHill Inc. 2007.
2. Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd Edition,Tata Mc Graw Hill, 2009.
3. Adel .S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", 6th Edition, Oxford University Press, 2010
4. Jacob Millman, C. Halkias and SatyabrataJit Electronic Devices and Circuits, 3rd Edition, Tata McGraw-Hill, 2011

1702CS351

DATA STRUCTURES LABORATORY

L	T	P	C
0	0	4	2

PREREQUISITE :

Programming in C

COURSE OBJECTIVES:

1. Learn C++ programming language.
2. Be exposed to the different data structures
3. Be familiar with applications using different data structures

List of Experiments:

1. Basic Programs for C++ Concepts
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Stack ADT - Array and linked list implementations
6. The next two exercises are to be done by implementing the following source files
 - i. Program source files for Stack Application 1
 - ii. Array implementation of Stack ADT
 - iii. Linked list implementation of Stack ADT
 - iv. Program source files for Stack Application 2
 - v. An appropriate header file for the Stack ADT should be included in (i) and (iv)
7. Implement any Stack Application using array implementation of Stack ADT (by implementing files (i) and (ii) given above) and then using linked list
8. Implementation of Stack ADT (by using files (i) and implementing file (iii))
9. Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (iv) and using file (ii), and then by using files(iii) and (iv)
10. Queue ADT – Array and linked list implementations
11. Search Tree ADT - Binary Search Tree
12. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.

TOTAL: 45 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS:

1. Hash table implementation
2. Graph traversals

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Identify the model of Abstract Data Type, calculation of algorithm efficiency and designing of recursive algorithms.
- CO2 Design algorithms to solve real life problems using data structures.
- CO3 Analyze various sorting and searching algorithms.
- CO4 Recognize the usage of Non-Linear Data structures such as Binary Search tree, AVL search tree and Heap tree in applications.

REFERENCES:

1. F.RichardGilberg, A.Behrouz. Forouzan, Data Structures, A Pseudocode Approach with C. Thomson, 2007.
2. M. A. Weiss, Data Structures and Algorithm Analysis in C, Pearson Education, 2009.
3. Y.Langsam, M. J.Augenstein and A. M.Tenenbaum, Data Structures using C, Pearson Education,2004.
4. A. M.AhoHopcroft and J.D. Ullman, Data Structures and Algorithms, Pearson education, 2000.

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LIFE SKILLS : SOFT SKILLS
(Common to all B.E / B.Tech Degree Programmes)

L	T	P	C
0	0	2	0

PREREQUISITE :

1. Technical English
2. Communicative English

COURSE OBJECTIVES:

1. To develop the students basic soft skills and enable them to get a job.
2. To develop the students' interpersonal skills and to enable them to respond effectively.
3. To develop the students selling skills and to enable them to apply in their interview process.
4. To develop the students' Corporate Etiquettes and enable them to respond effectively.
5. To develop the students' learning by practice of giving different situations.

UNIT I INTRODUCTION TO SOFT SKILLS

6 Hours

Soft Skills an Overview - Basics of Communication – Body Language – Positive attitude –Improving Perception and forming values – Communicating with others.

UNIT II TEAM Vs TRUST

6 Hours

Interpersonal skills – Understanding others – Art of Listening - Group Dynamics – Networking - Individual and group presentations - Group interactions – Improved work Relationship .

UNIT III SELLING ONESELF

6 Hours

How to brand oneself – social media – job hunting – Resume writing – Group Discussion – Mock G.D - Interview skills – Mock Interview

UNIT IV CORPORATE ETIQUETTES

6 Hours

What is Etiquette – Key Factors – Greetings – Meeting etiquettes – Telephone etiquettes – email etiquettes – Dining etiquettes – Dressing etiquettes – Rest room etiquettes – Life etiquettes.

UNIT V LEARNING BY PRACTICE

6 Hours

1. My family. Myself. 2. Meeting people. Making Contacts. 3. A city. Getting about town. 4. Our flat. Home life.5. Travelling. Going abroad. 6. Going through Customs. 7. At a hotel. 8. Shopping. 9. Eating out. 10. Making a phone call. 11. A modern office.12 Discussing business.

TOTAL: 30 HOURS

ASSESSMENT PATTERN

1. Two assignments (2 x 25 marks = 50 marks)
2. Pragmatic assessment (50 marks)

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Communicate effectively in their business environment.
- CO2 Improve their interpersonal skills which are mandatory in a corporate world.
- CO3 Brand themselves to acquire a job.
- CO4 Involve in corporate etiquettes.
- CO5 Survive in the different situations.

REFERENCES:

1. Dr.K.Alex, 'Soft Skills' Third Edition, S.Chand & Publishing Pvt Limited, 2009
2. Aruna Koneru, 'Professional Communication' Second Edition, Tata McGraw-Hill Education, 2008
3. D.K.Sarma, 'You & Your Career' First Edition, Wheeler Publishing & Co Ltd, 1999
4. Shiv Khera 'You Can Win' Third Edition, Mac Millan Publisher India Pvt Limited, 2005