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 (CIVIL, CSE, ECE, EEE, IT, 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			Category
						CA	ES	Total	
Theory Course									
1901MA301	Engineering Mathematics – III (Transforms and Linear algebra)	3	2	0	4	40	60	100	BSC
1901GEX04	Biology for Engineers	3	0	0	3	40	60	100	ESC
1902CS306	Object Oriented Programming and Data Structures	2	0	2	3	50	50	100	ESC
1902EC301	Electron Devices	3	0	0	3	40	60	100	PCC
1902EC302	Circuits and Networks	2	2	0	3	40	60	100	PCC
1902EC303	Digital Electronics	2	0	2	3	50	50	100	PCC
Laboratory Course									
1902EC351	Devices & Circuits Laboratory	0	0	2	1	50	50	100	PCC
1904GE351	Life Skills: Verbal ability	2	0	0	1	100	-	100	EEC
1901MCX02	Constitution of India	2	0	0	0	100	-	100	MC
Total		**19**	**4**	**6**	**21**	**510**	**390**	**900**	

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

1901MA301		TRANSFORMS AND LINEAR ALGEBRA	L	T	P	C
			3	1	0	4
		ENGINEERING MATHEMATICS - III				

PREREQUISITE :	
	1. Basic knowledge in Differentiation
	2. Basic knowledge in Integration

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.

MODULE I	**VECTOR SPACES**	**12 Hours**
Vector spaces – Subspaces – Linear combinations and system of Linear equations – Linear independence and Linear dependence – Bases and Dimensions		
MODULE II	**LINEAR TRANSFORMATIONS**	**12 Hours**
Linear combination system of linear equation – algebra of transformation – Linear transformation of matrices – Linear functional – transpose of linear transformation		
MODULE III	**FOURIER SERIES**	**12 Hours**
Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series – Half range cosine series – Parseval's identity – Harmonic analysis.		
MODULE IV	**FOURIER TRANSFORMS**	**12 Hours**
Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity		
MODULEV	**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 :	
	1. Numerical Solution of non-homogeneous partial differential equations

COURSE OUTCOMES:	
	After completion of the course, Student will be able to
CO1	Use vector spaces using algebraic methods (K2)
CO2	Solve system of linear equations by matrix operations (K3)
CO3	Use Fourier series analysis which is central to many applications in engineering (K2)
CO4	Apply Fourier transform techniques used in wide variety of situations.(K3)
CO5	Apply Z transform techniques for discrete time systems (K3)

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.,ManicavachagomPillay.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

1901GEX04		**BIOLOGY FOR ENGINEERS**	**L**	**T**	**P**	**C**
			3	**0**	**0**	**3**

COURSE OBJECTIVES:	The objective of this course is to enable learners to understand the basic concepts of biology and its applications in engineering.
COURSE OUTCOMES:	Upon completion of this course, students will be able to 1. Describe how biological observations of 18th Century that lead to major discoveries. 2. Classify biology based on morphological, biochemical and ecological matters 3. Describe the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring 4. Analyze biological processes at the reductionistic level 5. Describe about all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine 6. Classify enzymes and distinguish between different mechanisms of enzyme action. 7. Describe DNA as a genetic material in the molecular basis of information transfer. 8. Apply thermodynamic principles to biological systems. 9. Classify microorganisms. 10. Describe about bio-inspired engineering.

Module I	Biology Introduction and its Classification	**7 Hours**

Introduction to Biology, fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Exciting aspect of biology - need to study biology- Discussion about biological observations of 18th Century - major discoveries. Examples from Brownian motion and the origin of thermodynamics - original observation of Robert Brown and Julius Mayor.

Classification - morphological, biochemical or ecological. Hierarchy of life forms at phenomenological level. classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. Model organisms for the study of biology- E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus

Module II	Genetics and Macromolecular analysis	**10 Hours**

Genetics - Newton's laws to Physical Sciences"- Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis - part of genetics. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Single gene disorders in humans. Complementation using human genetics.

Macromolecular analysis: analyses of biological processes at the reductionistic level Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

Module III	Biomolecules and Enzymes	**10 Hours**

Biomolecules - Molecules of life. monomeric units and polymeric structures. Sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

Enzymes - monitor enzyme catalyzed reactions. Enzyme catalyzereactions. Enzyme classification. Mechanism of enzyme action -two examples. Enzyme kinetics and kinetic parameters. RNA catalysis.

Information Transfer - The molecular basis of coding and decoding genetic information - universal Molecular basis of information transfer. DNA - genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Gene in terms of

complementation and recombination.

Module IV	Metabolism and Microbiology	**8 Hours**

Metabolism: principles of energy transactions. Thermodynamics to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP - energy currency. Breakdown of glucose to CO2 + H2O (Glycolysis and Krebs cycle) - synthesis of glucose from CO2 and H2O (Photosynthesis). Energy yielding and energy consuming reactions. Concept of Energy charge

Microbiology Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

Module V	Bio-inspired Engineering	**10 Hours**

Introduction to biologically-inspired designs (BID for Biomedical and Non-biomedical applications): Human-organs-on-chips; Muscular Biopolymers; Bio-optics; Nanostructures for Drug Delivery; Genetic Algorithms; Artificial neural networks; Swarm intelligence algorithms; Biosensors: role in medical diagnostics (Sensium digital plaster); environmental monitoring; Bio-filters; Bio-robotics; 3D Bio-printing; Self healing concrete.

	Total:	**45 Hours**

REFERENCES:

1. Biology for Engineers, Rajiv Singal , CBS Publishers and Distributors Pvt Ltd; First Edition edition (4 June 2019).
2. Biology for Engineers, Wiley Editorial, Wiley (2018).
3. Principles of Soft Computing, S. N. Sivanandam, S. N. Deepa, Wiley; Third edition (2018).
4. Computational Medicine: Tools and Challenges, Zlatko Trajanoski, Springer; 2012 edition (19 September 2012).
5. Health Informatics - E-Book: An Interprofessional Approach, Ramona Nelson, Nancy Staggers, Elsevier; 2 edition (December 8, 2016).
6. Biology for Engineers, G.K..Suraishkumar, Oxford University Press
7. Biology for Engineers, Arthur T. Johnson, CRC Press

1902CS306		OBJECT ORIENTED PROGRAMMING & DATA STRUCTURES	L	T	P	C
		2nd Year / 3rd Semester	2	0	2	4
		(Department of Electronics and Communication Engineering)				

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.

Module I	**OBJECT ORIENTED PROGRAMMING**	**9Hours**

Evolution of Programming methodologies - Introduction to OOP -Basic features - Structure of C++ Program- Compiling and Executing C++ Program - Data types - Operators - Expressions - Control statements & Iteration statements in C++ - Arrays-Structures-Pointers

Module II	**FUNCTIONS & CONSTRUCTORS**	**9Hours**

Functions - Passing Data to Functions - Scope and Visibility of variables in Functions - Dynamic Binding - data members - member functions - this Pointer - Friend Functions - Friend Classes - Constructors and Destructors.

Module 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

Module 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,–Red black tree – Graph and its representations – Graph Traversals – Representation of Graphs – Breadth-first search – Depth-first search - Connected components.

Module 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:	**(A)**	**45 Hours**

Further Reading:

JAVA Program
Advanced Sorting Algorithms.

Course Outcomes:

After completion of the course, Student will be able to

1. Understand the various programming methodologies and OOPs Concepts.
2. Understand the scope of Functions in Real time Problems.
3. Design algorithms to solve real life problems using data structures
4. Recognize the usage of Non-Linear Data structures such as Binary Search tree, AVL search tree and Heap tree in applications
5. Analyze various sorting and searching 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.

List of Experiments (Lab) :

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. Queue ADT – Array and linked list implementations
7. Search Tree ADT - Binary Search Tree
8. Real Time Implementation of Stack ADT
9. Program for Linear and Binary Search.
10. Program for Sorting the data in array. **Lab(B) : 15 Hours**

Total Hours (A+B) = 60 Hours

1902EC301	ELECTRON DEVICES	L	T	P	C
		3	0	0	3

Course Objectives:

1. To familiarize the student with the principal of operation, analysis and design of junction diode .BJT and FET transistors and amplifier circuits.
2. To understand diode as a rectifier.
3. To study basic principal of filter of circuits and various types

MODULE I	SEMICONDUCTOR DIODE	9 Hours

PN Junction Diode : Construction of PN junction diodes – VI characteristics – Quantitative theory of PN diode – Transition and diffusion capacitances – Applications: Clipping and clamping circuits, Voltage multipliers - Zener diode – Characteristics of Zener diode

MODULE II	BIPOLAR JUNCTION TRANSISTOR	9 Hours

NPN - PNP – Junctions - Early effect - Current equations – Input and Output characteristics of CE, CB, CC - Hybrid - π model

MODULE III	FIELD EFFECT TRANSISTORS	9 Hours

JFETs – Drain and Transfer characteristics - Current equations - Pinch off voltage and its significance – MOSFET - Characteristics - Threshold voltage, D-MOSFET, E-MOSFET- Current equation

MODULE IV	SPECIAL SEMICONDUCTOR DEVICES ,	9 Hours

Special Diodes : UJT -Tunnel diode –PIN diode – IGBT - SCR – TRIAC – DIAC – Photodiodes - LED, LCD - Photo transistors - Photo voltaic cell - Photo conductive cell

MODULE V	RECTIFIERS & POWER SUPPLIES	9 Hours

Full-wave: Centre tapped and bridge rectifiers with resistive load -Analysis for Vdc and ripple voltage with C, C-L, L-C and C-L-C filters. Voltage regulators, Switched mode power supply

Total:	45 Hours

Further Reading:

Switched mode power supply Implementation of combinational logic circuits using PLDs: PROM, PLA and PAL.

Course Outcomes:

After completion of the course, Student will be able to

1. Apply The Concepts Of Semiconductor
2. Comprehend The Construction And Characteristics Of Various Electronic Devices
3. Understand Various Special Devices
4. Design And Analyse Various Power Supply
5. Design Simple Application Circuits Using Various Electronic Circuits

TEXT BOOKS:

1. Salivahanan .S and Sureshkumar .N, ―Electronic Devices & Circuits‖, 3rd Edition, Tata McGraw- Hill, New Delhi, 2011, ISBN : 9781259006418

2.Electronic Devices and Circuits Fifth Edition, DAVID A. BELL, OXFORD UNIVERSITY PRESS, YMCA Library Building, Jai Singh Road, New Delhi 110001, © Oxford University Press, 2008, ISBN-13: 978-0-19-569340-9 ISBN-10: 0-19-569340-X

3.Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory", Pearson Prentice Hall, 11th edition, 2013.

4. Dr. Sanjay Sharma, "Basic Electronics", First Edition, S.K. Kataria & Sons, 2012.

References:

1.Jacob Millman, Christos C. Halkias―Electronic Devices and Circuits‖, 3rdEdition, McGraw Hill Education (India) Private Limited, 2010, ISBN :9780070700215

1902EC302		**CIRCUITS AND NETWORKS**	**L**	**T**	**P**	**C**
			2	**1**	**0**	**3**

Course Objectives:	
	1. ToApply the knowledge of basic circuital law and simplify the network
	2. To Infer and evaluate transient response, Steady state response, network functions
	3. To Evaluate two-port network parameters

MODULE I	**BASIC ELECTRIC CIRCUITS**	**9 Hours**

Basic of electric circuits, Ohms law- Thevinin theorem-Norton theorem-Maximum power transfer theorem- KCL and KVL, Nodal analysis and Mesh analysis with dependant and independent Current & Voltage Sources, Analysis of ladder and lattice networks - Tuned circuits

MODULE II	**RLC CIRCUITS**	**9 Hours**

Voltage current relationship of Capacitor- Inductor- Resistor, First order RL,RC circuits- Laplace transformation-S domain- Source free and step response of RL-RC-Tank Circuit, Second order RLC- Source free and step response of RLC serial & parallel

MODULE III	**AC POWER ANALYSIS**	**9 Hours**

Sinusoidal waves- Phasor-Impedance and Admittance in AC-Phasor based circuit analysis-Power and Energy calculation, Self-inductance – Mutual Inductance- Ideal transformers, Frequency response and resonance

MODULE IV	**TWO PORT NETWORK**	**9 Hours**

Network functions - Poles and Zeros of network functions - Complex frequency - Two port parameters Z,Y,H and ABCD - Scaling network functions - Interrelationships between the parameters-T and π equivalent circuits- Bridged networks- Coupled circuits as two port network

MODULE V	**NETWORKS AND GRAPHS**	**9 Hours**

Loop Impedance and Node Admittance Matrices, Duality in Electrical Networks, Network graph-Tie set-Cut set-Duality

	Total:	**45Hours**

Further Reading:	
	Lattice networks - Image parameters, Stability of active networks, Simulation of general and ladder networks, Filters- Simulation of RL, RC and LC network- Simulation of Attenuators & Equalizers.

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Solve the complexity electric circuit using network theorems
	2. Obtain steady state and source free response of circuits
	3. Determine the transient response of circuits
	4. Modify circuit to two port network and Analyse its responses
	5. Use of graph theory to understand the circuit functions

References:

1. David A Bell "Electric Circuits, (7thEdition, 2011)". Oxford press.
2. Franklin F.Kuo, "Network Analysis and Synthesis (5th Edition ,2012)" Wiley International;2010
3. A.V.Bakshi, U.A.Bakshi "Circuit Theory" (First edition, 2009), Technical Publications
4. A Nagoorkani "Circuit theory" (Third Edition 2016) Mcgraw hill education
5. S. Salivahanan, N.Suresh Kumar, Electronic devices and ciruits (Second edition, 2011), Mcgraw hill Education
6. M.E.VanValkenberg, "Introduction to Modern Network Synthesis", Wiley Eastern.

1902EC303		DIGITAL ELECTRONICS	L	T	P	C
			2	0	0	2

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

MODULE I	NUMBER SYSTEMS, BOOLEAN ALGEBRAANDLOGICGATES	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-McCluskey method of minimization.

Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR, Implementation of logic functions using gates - NAND and NOR implementation.

MODULE II	COMBINATIONAL LOGIC CIRCUITS	9 Hours

Introduction - Designprocedure–Halfadder–FullAdder–Halfsubtractor–Fullsubtractor–Parallel binary adder, parallel binary Subtractor - Carry Look Ahead adder–Serial Adder/Subtractor- BCDadder–BinaryMultiplier–BinaryDivider-Multiplexer/Demultiplexer–D ecoder-E ncoder– Parity generators- Parity checker–Code converters –Magnitude Comparator.

MODULE III	SYNCHRONOUS SEQUENTIALLOGIC CIRCUITS	9 Hours

Latches, Flip-flops-SR, JK, D, T and Master-Slave–Characteristic table and equation–Application table–Edge triggering–Level Triggering–Analysis of clocked sequential circuits- State diagram- State table–State minimization–State assignment-Excitation table and maps. Synchronouscounters–SynchronousUp/Downcounters–Programmablecounters-Modulo–ncounter, Registers– Shift registers-Universal shift registers.

MODULE IV	ASYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS	9 Hours

Modes of operation– Analysis of Asynchronous sequential circuits–Design Procedure–Reduction of state and flow tables–Problems in Asynchronous Circuits–Races and Hazards.

MODULE V	PROGRAMMABLE LOGIC DEVICES AND HDL PROGRAMMING	9 Hours

Programmable Logic Devices: PROM– 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:

TTL and CMOS Logic and their characteristics –Tristate gates.

Course Outcomes:

After completion of the course, Student will be able to simplify the Boolean functions

1. Simplify the digital logic circuits using Boolean Algebra, K- map and Tabulation method.
2. Demonstrate different types of combinational circuits.
3. Implement various synchronous sequential circuits.
4. Practice several types of asynchronous counters.
5. Explain the basics of memory and programmable logic devices.
6. Practice HDL program in digital circuits.

References:

1. M.MorrisMano,"DigitalDesign",4th Edition,PrenticeHallofIndiaPvt.Ltd.,2008/Pearson Education (Singapore) Pvt.Ltd., NewDelhi,2003
2. S.Salivahanan and S.Arivazhagan "Digital Electronics", Ist Edition, Vikas Publishing House pvt Ltd, 2012.
3. Ronald J. Tocci, Neal S. Widmer & Gregory L. Moss, "Digital Systems: Principles and Applications", 10th Edition, Pearson Prentice Hall, 2007
4. Joseph Cavanagh, "Verilog HDL: Digital Design and Modeling", Taylor & Francis, 2007
5. John F.Wakerly, "Digital Design",Fourth Edition,Pearson/PHI,2008
6. John.MYarbrough, "Digital Logic Applications and Design",Thomson Learning, 2006
7. Charles H.Roth. "FundamentalsofLogicDesign",6thEdition,ThomsonLearning,2013

1902EC351		**DEVICES & CIRCUITS LABORATORY**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Objectives:	
	1. To Be exposed to the characteristics of basic electronic devices
	2. To gain hands on experience in designing electronic circuits.
	3. To learn simulation software used in circuit design.

List of Experiments:
1.Characteristics of PN Junction Diode and Zener diode
2.Characteristic of Rectifiers, clippers and clampers
3.Characteristics of BJT (common emitter configuration) and determination of h parameters
4.Characteristics of JFET and MOSFET
5.Characteristics of SCR and UJT
6.Characteristics of TRIAC
7. Verification of Ohm‘s Law and Kirchoff‘s Laws.
8. Verification of Thevenin‘s and Norton‘s Theorem.
9.Verification of Superposition Theorem, Maximum Power Transfer Theorem
10.Simulation of Transient Response of RL and RC circuits using PSPICE
Mini Project • Design of Power supply. • Design of Regulators using zener diode.

	Total:	**45 Hours**

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Interpret the Characteristics Of Various Electronic Devices
	2. Analyze Electric Circuits Using Various Theorems
	3. Perform Simulation Using PSPICE

1902EC303	**DIGITAL ELECTRONICS LABORATORY**	**L**	**T**	**P**	**C**
	(Common to B.E / B.Tech – CSE, IT, Bio Medical& ECE)	**0**	**0**	**2**	**1**

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. Study and Verification of Boolean Theorems using basic gates
2. Design, Simulate and implementation of 4 bit code converters using logic gates
3. Design, Simulate and implementation of 4 bit binary Adder/ Subtractor and BCD adder
4. Design, Simulate and implementation of 4:1Multiplexerand De-multiplexer using logic gates
5. Design, Simulate and implementation of 4 to 2 encoder and decoder using logic gates
6. Design, Simulate and implementation of 4 bit parity generator and checker
7. Design, Simulate and implementation of 2 bit Magnitude Comparator
8. Construction and verification of 4 bit synchronous up/down counter and Mod-9/Mod-14 Ripple counters (Both simulation and implementation)
9. Simulation and Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip- flops
10. Simulation of 4 bit multiplier and Random number generator using HDL

Total: 45 Hours

Additional Experiments:

1. Design and Implementation of seven segment display using basic logic gates
2. Simulation of 4 bit parallel divider and state machine problems

Course Outcomes:

After completion of the course, Student will be able to

1. Demonstrate different types of combinational circuits to satisfy the user requirements
2. Implement various synchronous sequential circuits
3. Design several types of asynchronous counters
4. Design the HDL Program for combinational circuits
5. Design 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

1904GE351		**LIFE SKILLS: VERBAL ABILITY**	**L**	**T**	**P**	**C**
			2	**0**	**0**	**1**

Course Objectives:	
	1. To comprehend and use vocabulary words in day to day communication.
	2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings.
	3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production.
	4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice
	5. To Apply the principles of effective business writing to hone communication skills

Unit I	**VOCABULARY USAGE**	**6 Hours**
Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.		
Unit II	**COMPREHENSION ABILITY**	**6 Hours**
Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages		
Unit III	**BASIC GRAMMAR AND ERROR DETECTION**	**6 Hours**
Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.		
Unit IV	**REARRANGEMENT AND GENERAL USAGE**	**6 Hours**
Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.		
Unit V	**APPLICATION OF VERBAL ABILITY**	**6 Hours**
Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.		
	Total:	**30 Hours**

Further Reading:	
	TOEFL IELTS Preparation books

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Quote newly learned words in their day to day communication.
	2. Recognize the information swiftly while reading passages.
	3. Practice better oral and written communication.
	4. Rephrase the sentences and able to identify the voice of the sentence.
	5. Establish the knowledge of the best practices to craft effective business documents
	6. Make use of the etiquette in business.

References:

1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007

1901MCX02		**CONSTITUTION OF INDIA**	**L**	**T**	**P**	**C**
			1	**0**	**0**	**0**

Course Objectives:

1. Toknow about Indian constitution.
2. To know about central and state government functionalities in India.
3. To know about Indian society

Unit I **INTRODUCTION** **6 Hours**

Historical Background - Constituent Assembly of India - Philosophical foundations of the Indian Constitution - Preamble - Fundamental Rights - Directive Principles of State Policy - Fundamental Duties - Citizenship - Constitutional Remedies for citizens.

Unit II **STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT** **6 Hours**

Union Government - Structures of the Union Government and Functions - President- Vice President- Prime Minister - Cabinet - Parliament - Supreme Court of India - Judiciary view.

Unit III **STRUCTURE AND FUNCTION OF STATE GOVERNMENT** **6 Hours**

State Government-Structure and Functions - Governor - Chief minister-Cabinet-State Legislature- Judicial System in States -High Courts and other sub ordinate Courts.

Unit IV **CONSTITUTION FUNCTIONS** **6 Hours**

Indian Federal System -Center -State Relations- Constitutional Amendments - Constitutional Functionaries - Assessment of working of Parliamentary System in India.

Unit V **INDIAN SOCIETY** **6 Hours**

Society: Nature, Meaning and definition; India Political Structure; Caste, Religion, Languages in India;Constitutional Remedies for citizens-Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections

Total: **30 Hours**

Further Reading:

Indian penal codes.

Course Outcomes:

After completion of the course, Student will be able to

1. Understand the functions of Indian government
2. Understand and abide rules of the Indian constitution.
3. Understand and appreciate diversity of Indian Culture

References:

1. Durga Das Baslli 'Introduction to the Constitution of India " Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) 'Indian Political System', S.Chand and Company, New Delhi.
3. Maciver and Page, • Society: An Introduction Analysis " Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) 'Social Stratification in India: Issues and Themes', Jawaharlal NehruUniversity, New Delhi.