Department of ECE
Course Structure and Syllabus of
B. Tech Electronics & Computer Engineering (ECM) -AR22

II YEAR I SEMESTER **5T+ 4L+1HS**

S.No	Course Code	Category	Course Title	L	T	P	Credits
1	A54024	BS	Probability and Statistics	3	0	0	3
2	A53013	ES	Electronic Devices & Circuits	3	0	0	3
3	A53040	PC	Digital Electronics	2	1	0	3
4	A53025	PC	Data Structures	3	0	0	3
5	A53026	ES	Python Programming	2	0	0	2
6	A53240	ES	Electronics Lab	0	0	4	2
7	A53230	PC	Data Structures Lab	0	0	4	2
8	A53233	ES	Python Programming Lab	0	0	2	1
9	A53209	HS	Soft Skills for Success Lab	0	0	2	1
10	A53007	MC	Environmental Studies	2	0	0	0
			Total	**15**	**01**	**12**	**20**

II YEAR II SEMESTER **5T+ 3L+1HS**

S.No	Course Code	Category	Course Title	L	T	P	Credits
1	A54040	PC	Computer Organization	3	0	0	3
2	A54027	PC	Database Management systems	3	0	0	3
3	A53021	PC	Signals and Systems	3	1	0	4
4	A54021	PC	Electronic Circuit Analysis	3	0	0	3
5	A53023	PC	Object Oriented Programming through JAVA	3	0	0	3
6	A54240	PC	Object Oriented Programming through JAVA Lab	0	0	2	1
7	A54211	PC	Electronic Circuit Analysis lab	0	0	3	1.5
8	A54216	PC	Database Management systems Lab	0	0	3	1.5
9	A54022	MC	Gender Sensitization	2	0	0	0
			Total	**17**	**01**	**08**	**20**

PROBABILITY AND STATISTICS

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54024	HS	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite: Mathematics I & II

Course Objectives

1. To perform various types of averages and dispersion, polynomial curve fitting, general curve fitting and interpolation, various types of Skewness and kurtosis, Correlations.
2. Understand chance cause and random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
3. In the discrete case, study the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
4. Estimation of statistical parameters, testing of hypothesis of few unknown statistical parameters.
5. Understanding the experiments.

UNIT I

Measures of Central tendency, Dispersion, Moments, Skewness and Kurtosis.
Curve fitting by the method of least squares- fitting of straight lines, second degree parabola and more general curves. Correlation, Rank correlation andRegression.

UNIT II

Introduction to Probability, Addition theorem, Multiplication theorem (Two events only), Baye's theorem.Random variables, Discrete and continuous random variable, Definitions of Probability Distribution function, Probability mass function, Probability density function and properties. Definitions of Mathematical expectation, Variance of discrete and continuous random variable.Bivariate distributions and their properties, marginal and conditional distribution.

UNIT III

Discrete Distributions: Bernoulli, Binomial, Poisson distributions (definition and problems) their mean, variance and moment generating function.

Continuous Distribution: Normal distribution, Exponential distribution (definition and problems) related properties.

UNITIV

Testing of Hypothesis: Null & Alternative Hypothesis, Critical region, Type I and Type II errors, level of significance, one tail, two-tail tests.
Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means

UNIT V

Small Sample tests: t-test for single mean, difference of means, paired t-test, F-test.
Chi-square test for goodness of fit and independence of attributes.
ANOVA: Introduction, ANOVA for One way and Two way classification.

TEXT BOOKS

1. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press.

2. Probability and Statistics for Engineers by Richard A Johnson, Pearson Education.

REFERENCE BOOKS

1. Fundamentals of Mathematical Statistics by S.C Gupta and V.K Kapoor Sultan Chand & Sons.

2. Miller and John E. Freund, Probability & Statistics for Engineers, Prentice Hall of India.

3. Montgomery: Design and Analysis of Experiments, Wiley

Course Outcomes

After completing the course, students should be able to

1. To understand the concept of Average and Dispersions, and interpolate using curve fitting and identify the correlation between variables.
2. Identify distribution in certain realistic situation. It is mainly used for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
3. To understand discrete and continuous distributions.
4. Calculate mean and proportions of large sample and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering. To estimate an unknown population parameter.
5. Design their experiment with the basic norms and test their design efficiency. It is useful to all the branches of engineering.

Electronic Devices & Circuits

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53013	ES	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite: APPLIED PHYSICS

Course Objectives

1. To learn the characteristics of diode and how to make use of diode in different applications
2. To explain the operation and characteristics of transistors in different modes
3. To apply different biasing methods to make transistor stable
4. To explain the operation and design of FET amplifiers.
5. To analyse feedback amplifiers

UNIT I

P-N JUNCTION DIODE AND RECTIFIERS: Review of P-N Junction Diode Volt-Ampere Characteristics, Transition and Diffusion Capacitances, Diode Equivalent Circuits, The P-N Junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Inductor Filters, Capacitor Filters, Voltage Regulation Using Zener Diode. Zener Diode Characteristics.

UNIT II

BIPOLAR JUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR: The Junction Transistor, BJT Operation, Common Base, Common Emitter and Common Collector Configurations, Transistor as an Amplifier. The Junction Field Effect Transistor Pinch –Off Voltage –Volt –Ampere Characteristics, MOSFET Operation, MOSFET Characteristics in Enhancement and Depletion Modes.

UNIT III

TRANSISTOR BIASING AND STABILIZATION: Operating Point, The DC and AC Load Lines, Need for Biasing, Types of biasing methods: Fixed Bias, Collector Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against Variation in V_{BE} and β, Bias Compensation Using Diodes and Transistors. Thermal Runway, Thermal Stability.

UNIT IV

BJT AND FET AMPLIFIERS: BJT Hybrid Model, Determination of h-Parameters from Transistor Characteristics, Comparison of CB, CE and CC Amplifier Configurations. The JFET Small Signal Model, FET Common Source Amplifier, Common Drain Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET, The Uni-junction Transistor

UNIT V

FEED BACK AMPLIFIERS: Concepts of feedback. Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Problems.

TEXT BOOKS

1. Integrated Electronics Analog and digital circuits and systems– J. Millman,C.C.Halkias, and SatyabrataJit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition,2006.
3. Introduction to Electronic Devices and Circuits- Rober T. Paynter PE,2005.
4. Electronic Devices and Circuits – A. P. Godse Technical Publications.2009.

REFERENCE BOOKS

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 2003.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 2001.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore,2004,BSP

Course Outcomes

After completing the course, students should be able to

1. Apply the diode concepts in different applications
2. Understand the BJT, FET and revolutionary MOSFET that lead to the development of integrated circuits and study their construction and characteristics
3. Compare different biasing methods and compensation methods to make transistor stable
4. Design and analyse simple basic amplifiers using Hybrid model.
5. Design and analyse feedback amplifiers using BJTs

DIGITAL ELECTRONICS

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53040	PC	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Prerequisite:

Course Objectives

This course provides in-depth knowledge of digital logic and its Verilog representation, which is the basis for design of any digital circuit. The main objectives are:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

2. To understand basics of Boolean algebra and minimization using k-maps

3. To implement simple logical operations using combinational logic circuits.

4. To implement simple logical operations using sequential logic circuits.

5. To understand the concepts of sequential machines, enabling to analyze sequential systems in terms of state machines.

UNIT 1

NUMBER SYSTEMS AND CODES: Number systems, Conversions of number systems, signed, unsigned numbers and complements -1's, 2's, 9's and 10's. Binary arithmetic: addition, subtraction.Binary weighted and non-weighted codes, BCD addition and subtraction, Error detecting and error correcting codes

Introduction to Verilog HDL: Levels of design description, Simulation and Synthesis, Language Constructs (Lexical Tokens).

UNIT II

BOOLEAN ALGEBRA: Logic gates, Postulates and theorems, Duality, Representation of switching functions, SOP and POS, Karnaugh map representations, minimization using k-maps- up to 4 variables, Prime implicants, Essential prime implicants, Redundant prime implicants and selective prime implicants, Tabular method, realization of Boolean functions using universal gates.

UNIT III

COMBINATIONAL CIRCUITS: Introduction, Design procedure**,** Half-Adder, Full-Adder, Half- Subtractor, Full-Subtractor, 4 bit adder/Subtractor, Encoder, Decoder, multiplexer, de-multiplexer, code converters-binary to gray,gray to binary,BCD to excess-3 and

excess-3 to BCD, Comparator, Introduction to PLD's, Logic implementation using PAL & PLA.

UNIT IV

SEQUENTIAL CIRCUITS-I: Introduction, Design procedure, memory elements: latch & flip-flops- SR, D, JK, T, race around condition-Master-Slave JK FF, Flip-Flop operating characteristics, flip-flop conversions, Design of synchronous & asynchronous sequential circuits: binary counters- up, down, up-down, MOD counters, Ring and Johnson Counters, Shift registers- SISO, SIPO, PISO, PIPO.

UNIT V

SEQUENTIAL CIRCUITS-II: Finite state machine, Melay and Moore machines, state equivalence and machine minimization, Minimization of completely specified sequential machines using Partition technique, Introduction to Algorithmic State Machines: Components, salient features and examples.

TEXT BOOKS

1. Digital Logic Computer Design – By M. Morris Mano, PHI.1979
2. Digital Logic Design Principles – By Norman Balbamian and Breadly, John Wiley,2001.
3. S. Palnitkar, "Verilog HDL – A Guide to Digital Design and Synthesis", Pearson, 2003.
4. Digital Fundamentals - Floyd and Jain, Pearson Education,8th Edition, 2005.

REFERENCES

1. Introduction to Switching Theory and Logic Design- By F. J. Hill and Peterson, John Wiley Publications, 1974.
2. Digital Systems Principles, Applications– By Ronald J. Tocci, Pearson Education/Phil, 2011.
3. Switching And Finite Automata Theory – By Kohavi, TMH Edition, 3rd edition, 2009.
4. VerilogHDL Primer -By J.Bhasker BSpublications 2008.

Course Outcomes

After completing the course, students should be able to

1. Understand numeric information in different forms, e.g. different bases, signed integers, various codes such as Gray and BCD.
2. Understand Boolean algebra, minimization of Boolean functions.
3. Design combinational circuits by using building blocks.
4. Design sequential circuits by using sequential functions/building blocks.
5. Design and analyze the circuits using Finite state machines and minimization of state machines.

DATA STRUCTURES

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53025	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite: Programming for Problem Solving I & II

Course Objectives

1. Understand various static and dynamic representations of data structures
2. Understand fundamental algorithmic problems of various nonlinear data structures.
3. To be familiar with Graph representations and traversals.
4. Know the basic concepts of Hashing.

UNIT I

INTRODUCTION: What is data structure, Types of data structures, Static and Dynamic representation of data structure and comparison. Stacks-Definition, Operations, Applications of stacks Representation and evaluation of expressions using Infix, Prefix and Postfix, Algorithms for conversions and evaluations of expressions from infix to prefix and postfix using stack, Towers of Hanoi, Parenthesis checker.

UNIT II

TREES: Basic terminology, Types of trees: Binary Tree: terminology, Complete and Full Binary Tree, Extended Binary Trees, Threaded Binary Trees-Inorder Threading. Representation of Trees using Arrays and Linked lists (advantages and disadvantages). Tree Traversal and Representation of Algebraic expressions; Algorithms for Tree Traversals.

Heaps: Introduction, Types of Heaps Min binary heap, Max binary heap.

UNIT III

ADVANCED CONCEPTS ON TREES: Representation and Creation of Binary Search Trees (BST), Algorithm for inserting, deleting and searching in BST. Representation and advantages of AVL Trees, Algorithms on AVL Trees-Insertion, Rotation and Deletion. Definition and advantages of B-trees, B Tree of Order M, operations-Insertion and Searching, Introduction to Red-Black Trees and Splay Trees.

UNITIV

GRAPHS: Basic terminology, Representation of Graphs: sequential representation (Adjacency, Path Matrix) Linked representation.

Graph Traversals-Breadth First Search, Depth First Search with algorithms. Definition and properties of Spanning Tree, Minimum Spanning Tree, Minimum Spanning Tree Algorithms, Dijkstra Algorithms.

UNIT V

HASHING: General Idea, Hash Functions, Collision Resolution- Separate Chaining, Open Addressing-Linear probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing, Implementation of Dictionaries.

TEXT BOOKS

1. Seymour Lipschutz,Schaum's outlines,.Data structures, Special Second Edition, Tata McGraw-Hill, 2014.

REFERENCE BOOKS

1. Richard F.Gillberg & Behrouz A. Forouzan, Data Structures, A Pseudo code Approach with C, Second Edition, Cengage Learning, India Edition, 2005.
2. Aaron M. Tanenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures Using C and C++, PHI Learning Private Limited, Delhi India, 2001.
3. Horowitz and Sahani, Fundamentals of Data Structures, Galgotia Publications Pvt Ltd. Delhi India, 2015.
4. A.K. Sharma, Data Structure Using C, Pearson Education India, 2011

Course Outcomes

After completing the course, students should be able to

1. Examine Static and Dynamic data structures in implementing Stack applications
2. Apply Tree traversal algorithms in solving real time applications
3. Analyze the concepts of Advanced Trees to generate search efficiently
4. Interpret the importance of Graphs in solving real time applications
5. Examine the concepts of hashing, collision and its resolution methods using hash function

PYTHON PROGRAMMING

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53026	**ES**	L	T	P	C	CIE	SEE	Total
		2	0	0	2	50	50	100

Prerequisite: None

Course Objectives

1. Understand the basics and function of Python Programming Language.
2. Understand the string operation and sequences used in Python Programming Languages.
3. Understand the data structures used in Python Programming Languages.
4. Know the classes and objects in Python Programming Language.
5. Use the reusability concepts in Python Programming Language.

UNIT I

INTRODUCTION TO PYTHON: Features of Python Language, Data Types, Operators, Expressions, Control Statement, Standard I/O Operations.

FUNCTIONS AND MODULES: Declaration and Definition Function Calling, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Doc Strings.

UNIT II

STRINGS AND REGULAR EXPRESSIONS: String Operations, Built-in String Methods and Functions, Comparing Strings, function in Regular Expression.

SEQUENCE: List, Tuples, Dictionaries, Sets.

UNIT III

INTRODUCTION TO OBJECT ORIENTED PROGRAMMING: Features of OOP,Merits and demerits of Object Oriented Programming Languages,Applications of OOP

IMPLEMENTATION OF CLASSES AND OBJECTS IN PYTHON: Classes and Objects, Class Method and Self Argument. The init Method, Class Variables and Object Variables, The del__Method, Public and Private Data Members, Private Methods, Built-in Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection (Destroying Objects).

UNITIV

IMPLEMENTATION OF INHERITANCE IN PYTHON: Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces, Meta class,

IMPLEMENTATION OF OPERATOR OVERLOADING IN PYTHON: Introduction, Implementing Operator Overloading, Overriding Methods

EXCEPTION HANDLING IN PYTHON: Introduction, Exception hierarchy, Handling Exception, Multiple Except Blocks and Multiple Exceptions, Finally Block.

UNIT V

PYTHON NUMPY: NumPy ND array, Data Types, Functions of NumPy Array, NumPy Array Indexing, Mathematical Functions on Arrays in NumPy

PYTHON PANDAS: Pandas Features, Dataset in Pandas, Data Frames, Manipulating the Datasets, Describing a Dataset, group by Function, Filtering, Missing Values in Pandas, Concatenating Data Frames. Import data from csv file. Introduction to Matplotlib :, Plot, Scatterplot, Introduction to Tkinter ,Date and Time Packages

TEXT BOOKS

1. Reema Thareja, Python Programming using Problem Solving Approach, First Edition, Oxford Higher Eduction,2017

2. James Payne, Beginning Python using Python 2.6 and Python 3,1st Edition

REFERENCE BOOKS

1. Charles Dierach, Introduction to Computer Science using Python,2013

2. https://www.programiz.com/python-programming

3. https://www.javatpoint.com/python-tutorial

4. https://www.geeksforgeeks.org/python-programming-language/

Course Outcomes

After completing the course, students should be able to

1. Apply control structures, functions and packages in Problem Solving. (L3)
2. Analyze various String handling functions and data structures(L4)
3. Model the object-oriented problems with classes and objects (L4)
4. Solve the problems by using Inheritance and polymorphism (L3)
5. Illustrate programs on Exception Handling and various packages(L3)

Electronics Lab

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53240	PC Lab	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Objectives

1. To operate and characterize the behavior of devices and circuits.
2. To understand the functionality of semiconductor devices.
3. To design and test rectifiers with and without filters
4. To design and test amplifiers circuits.
5. Implementation of a few experiments using Arduino.

Familiarization of Electronics Components and Equipment's:

1. Identification, Specifications, Testing of R, L, C, Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specification and Testing of Active Devices, Diodes, BJT's, JFET's, MOSFET's, LED's.
3. Study and operation of
   a. Multi-meters (Analog and Digital)
   b. Regulated Power Supplies
   c. Function Generator
   d. CRO

PART A

(For Laboratory Examination – Minimum of 6 experiments)

List of Experiments

1. Forward & Reverse Bias Characteristics of PN Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half and Full WaveRectifier with & without filters.
4. Input & output characteristics of Transistor in CB Configuration with h-parameters measurement
5. Input & output Characteristics of Transistor in CE Configuration with h-parameters measurement
6. FET characteristics.
7. MOS characteristics

8. Current Shunt and Voltage Series Feedback Amplifiers.

PART B

(For Laboratory Examination – Minimum of 4 experiments)

List of Experiments

1. Realization of Logic Gates using Verilog HDL code
2. Realization of Adder and Substractors (Half and Full)
3. Realization of 8x3 Encoder and 3x8 Decoder using Verilog HDL code
4. Realization of 8x1 Multiplexer and 1x8 De-multiplexer using Verilog HDL code
5. Realization of Flip-flops: SR, JK, T, and D
6. Realization of Binary Counter

Requirements

1. Regulated power supplies (RPS)
2. CRO's : 0-20MHZ
3. Function Generator : 0-1 MHZ
4. Multimeters
5. Decade Resistance Boxes / Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) : 0-20μA, 0-50μA, 0-100μA, 0-200μA, 0-10mA
8. Voltmeters (Analog or Digital) : 0-50V,0-100V, 0-250V
9. Electronic Components : Resistors, Capacitors, BJTs, LCDs, FETs, LEDs, MOSFETs, diodes Ge & Si type, Transistors NPN, PNP type
10. Software used Xilinx Vivado ISE

Course Outcomes

After completing the course, students should be able to

1. Understand electronic test equipment to characterize the behavior of devices and circuits.
2. Plot the characteristics of semiconductor devices to understand their functionality.
3. Design and test rectifiers with filters
4. Design and test amplifier circuits and interpret the results.
5. Design and test of Feedback amplifiers circuits and interpret the results.

DATA STRUCTURES LAB

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53230	**PC Lab**	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Prerequisite: Programming for Problem Solving I &II

Data structures course

Course Objective

1. To design and analyze simple linear and non linear data structures.
2. To design and implement various data structure algorithms
3. To identify and apply the suitable data structure for the given real world problem

WEEK 1

1. Review of Stack and Queue Operations using arrays and Linked Lists

WEEK 2

2. Program to convert infix to postfix notation
3. Program to evaluate postfix notations

WEEK 3

4. Program to implement towers of Hanoi
5. Program to implement parenthesis checker

WEEK 4

6. Program to illustrate tree traversals
   a) In order b) Preorder c) Post order

WEEK 5

7. Program to illustrate insertion, deletion and searching in Binary Search Tree

WEEK 6

8. Program to implement Heaps
   a) Min Heap b) Max Heap

WEEK 7

9. Program to illustrate Insertion on AVL Trees
10. Program to illustrate deletion and Rotation on AVL Trees

WEEK 8

11. Program to implement B-Trees
    a) Insertion b) Search c) Display

WEEK 9

12. Program to illustrate Graph traversals

a) Breadth First Search
b) Depth First Search

WEEK 10

13. Program to implement
    a) Prim's algorithm b) Kruskal's algorithm

WEEK 11

14. Program to Implement Dijkstra algorithm

WEEK 12 & 13

15. Program to implement Hashing and collision resolution techniques

WEEK 14

16. Program to implement Dictionaries

WEEK 15

17. Review

Course Outcomes

After completing the course, students should be able to

1. Develop the programs on stacks and its applications.
2. Demonstrate the implementation of various advanced trees.
3. Design and implementation of programs on BST and Graph Traversals.
4. Develop the programs on Hashing and Dictionaries

PYTHON PROGRAMMING LAB

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53233	ES Lab	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Pre requisites: Python Programming

Course Objectives

1. Understand the basics and function of Python Programming Language.
2. Understand the string operation and sequences used in Python Programming Language.
3. Know the Data Structures in Python Programming Language.
4. Use the reusability concepts in Python Programming Language.
5. Use Exception Handling mechanism in Python Programming Language.
6. Know the packages in Python Programming Language

Course Outcomes

At the end of this course, students will be able to:

1. Develop programs on data types, operators and expressions
2. Apply the data structures in real time scenarios
3. Write the programs on strings and functions
4. Implement programs on class and related issues.
5. Use of python exception handling and packages.

Week 1

1. Installation and Environment set up of Python & Programs on Data types

Week 2

2.Programs on Standard I/O, Operators and Expressions

Week 3

Programs on Functions

Week 4

Programs on lists and Tuples

Week 5

Programs on Dictionaries

Week 6

Programs on Strings and string operations

Week 7

Programs on Regular Expressions.

Week 8

Programs on Inheritance and Polymorphism

Week 9

Programs on Exception Handling

Week 10

Demonstration of Numpy Package

Week 11

Demonstration of Pandas Package

Week 12

Demonstration of matplotlib Package and Tkinter Package

Week 13

Demonstration of Date and Time Packages

Week 14 and 15

Review

SOFT SKILLS FOR SUCCESS LAB

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53209	HS Lab	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Introduction: The primary focus of the course is to highlight various categories and applications of Soft Skills through various cases taken from the real field and other research case studies. The fundamental concepts and distinctions between Soft Skills and Hard Skills are discussed. The course is tailored very effectively to introduce various Soft Skill application examples.

Course Objectives

To identify and participate in meaningful conversations

UNIT I

Soft Skills Development: An Introductory Overview - Self-Discovery & Goal Setting - Johari Window

UNIT II

Personality Development - Body Language - Etiquette & Manners

UNIT III

Presentation Skills (Individual & Team) Oral & Written - Teamwork & Leadership Qualities

UNIT IV

Debates - Group Dynamics - Dos & Don'ts -Techniques to participate and conclude

UNIT V

Emotional Intelligence - Conflict Management - Stress Management

Minimum requirements of infrastructural facilities for "Soft Skills for Success" Laboratory:
A spacious room with movable chairs, a Public Address System etc.

REFERENCES

1. Butterfield, Jeff. Soft Skills for Everyone**.** New Delhi: Cengage Learning, 2010.

2. Chauhan, G.S. & Sangeeta Sharma. Soft Skills. New Delhi: Wiley, 2016.

3. Goleman, Daniel. Working with Emotional Intelligence. London: Banton Books,

1998.

4. Hall, Calvin S. et al. Theories of Personality. New Delhi: Wiley, 2011.

5. Holtz, Shel. Corporate Conversations. New Delhi: PHI, 2007.

Course Outcomes

After completing the course, students should be able to

1. Exhibit communication skills in various situations
2. Handle the emotions with peers and classmates
3. Demonstrate respect for the opinions, personal space, and beliefs of others
4. Connect and work with others to achieve a set task
5. Assess and identify the requirements and strengths within the team

ENVIRONMENTAL STUDIES

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53007	MC	L	T	P	C	CIE	SEE	Total
		2	0	0	0	--	--	--

Prerequisites: ENGINEERING CHEMISTRY

Course Objectives

1. To introduce knowledge about the environment.
2. To introduce students to the concepts of pollution, biodiversity
3. To develop an awareness about global environmental problems.
4. To learn to protect environment and awareness on legal issues
5. To learn about importance of sustainable development and role of IT in environment.

UNIT I

Multidisciplinary nature of environmental studies: Definition, scope and importance – need for public awareness.

Ecosystems: Concept of an ecosystem – classification, structure and function of different ecosystems - producers, consumers and decomposers. - energy flow in the ecosystem - ecological succession - food chains, food webs and ecological pyramids.

Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. - bio-geographical classification of India - value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - hot-spots of biodiversity - threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT II

Natural Resources: Renewable and non-renewable – natural resources and associated problems: forest resources – use and over – exploitation, deforestation,– timber extraction, mining, dams and other effects on forest and tribal people: water resources – use and over utilization of surface and groundwater – floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources. - Food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. - Energy resources: growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification. role of an

individual in conservation of natural resources: equitable use of resources for sustainable lifestyles.

UNIT III

Environmental pollution: Definition, cause, effects and control measures of different kinds of pollution (Air, Water, Soil, Marine, Noise, Thermal, Nuclear, e –waste)
Carbon capture & sequestration – different storage sources, major disadvantages, environmental effects
Social issues and the environment: From unsustainable to sustainable development -urban problems related to energy -water conservation, rain water harvesting, and watershed management. -climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

UNIT IV

Waste management technology: Solid waste management: causes, effects and control measures of urban and industrial wastes. - role of an individual in prevention of pollution, disaster management: floods, earthquake, cyclone and landslides. wastewater and sewage treatment technology: primary, secondary and tertiary treatments. bioremediation, phyto-remediation, ZLD (zero liquid discharge), membrane technology. application of GIS and GPS system in environmental science.
Environmental policy, rules and regulations. EIA (Environmental Impact Assessment) & EMP (ENVIRONMENTAL Management Plan) – Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act - Wildlife Protection Act –Forest Conservation Act.- Public awareness. global environmental problems and global efforts.

UNIT V

Towards sustainable future: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. environmental education, conservation of resources. urban sprawl, sustainable cities and sustainable communities, human health. Role of IT in environment, environmental ethics, concept of green building, basic principles of green engineering, clean development mechanism (CDM), low carbon life cycle, polluters-pay principle.

TEXT BOOKS:

1. Erach Bharucha.,"Textbook of Environmental Studies for Undergraduate Courses", University Press Private Limited., Reprinted in 2005.

2. Rajagopalan, R., "Environmental Studies: From Crisis to Cure", 2nd ed, Oxford University Press., 2005.

REFERENCES:

1. Richard T.Wright., "Environmental Science: Towards a Sustainable Future",10th ed, PHL Learning Private Ltd, New Delhi., 2008.

2. Gilbert M.Masters, and Wendell P.Ela.,"Environmental Engineering and Science",4th ed, PHI Learning Pvt. Ltd., 2008

Course Outcomes

After completing the course, students should be able to

1. Understand fundamental physical and biological principles that govern natural processes.
2. Understand fundamental concepts from the social sciences and humanities underlying environmental thought and governance.
3. Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems
4. Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.
5. Design and conduct independent research that contributes to environmental thought and/or problem solving.

COMPUTER ORGANIZATION

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54040	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite: DIGITAL ELECTRONICS

Course Objectives

1. Demonstrate different types of Instructions and addressing modes
2. Describe the concepts of pipelining techniques
3. Compare different Modes of Transfer
4. Summarize the concepts of memory organization
5. Outline Multiprocessor systems and buses

UNIT I

BASIC COMPUTER ORGANIZATION AND DESIGN: Basic Computer Organization and Design: Instruction Code Definition, Instruction cycle, types of instruction formats (Zero, one, two and three address). Addressing modes: mode field, implied, immediate register, register direct, register indirect, auto increment, decrement, indexed, relative, base address mode, Numerical examples and problems.

UNIT II

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT III

INPUT – OUTPUT ORGANIZATION: I/O interface: I/O Bus and Interface modules, I/O versus Memory Bus, isolated vs Memory-mapped I/O. Asynchronous data transfer-strobe control, Hand shaking; Modes of Transfer: Example of programmed I/O, interrupt-initiated I/O, software considerations. Daisy- Chaining priority. DMA: DMA Controller, DMA Transfer, Intel 8089 IOP.

UNITIV

MEMORY ORGANIZATION: Memory Hierarchy, Main memory, memory address map, memory connection to CPU; auxiliary memory, Magnetic disks, magnetic tapes; cache memory, hit and miss ratio, direct, associative and set associative mapping; Micro-programmed control: Control memory, address sequencing

UNIT V

MULTI PROCESSORS: Characteristics of Multiprocessor; Interconnection structures: Time shared common bus, multiport memory, crossbar switch, multi-stage switching network; Inter processor Arbitration; Inter processor Communication and Synchronization.

TEXT BOOKS

1. M. Morris Mano, Computer System Architecture, Third Edition, Pearson/PHI, 2011.

REFERENCE BOOKS

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, Computer Organization, Fifth Edition, McGraw Hill, 2002.
2. William Stallings, Computer Organization and Architecture, Sixth Edition, Pearson/PHI, 2007.

Course Outcomes

After completing the course, students should be able to

1. Analyze Instruction formats and addressing modes
2. Appreciate the concept of pipelining with reference to parallel processing
3. Distinguish various modes of data transfer between CPU and I/O devices
4. Appreciate the organization of Memory hierarchy
5. Implement various interconnection structures of Multiprocessor system

DATABASE MANAGEMENT SYSTEMS

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54027	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite:

Course Objectives

1. Discuss Database management systems, databases and its applications
2. Familiarize the students with a good formal foundation on the relational model.
3. Outline the various systematic database design approaches
4. Describe the concepts of transactions and transaction processing and the issues, techniques related to concurrency and recovery manager.
5. Explore the File organizations, indexing and hashing mechanisms.

UNIT I

INTRODUCTION TO DATABASE SYSTEM CONCEPTS: Database-System Applications, Purpose of Database Systems, View of Data, Database Language, Database Design, Database Architecture, Database Users and Administrators.

INTRODUCTION TO THE RELATION MODELS AND DATABASE DESIGN USING ER MODEL: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams-Unary, Binary, ternary, Aggregation.

UNIT II

INTRODUCTION TO SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Aggregate Functions, Nested Sub queries.

FORMAL RELATIONAL QUERY LANGUAGES: The Relational Algebra, Tuple Relational Calculus.

UNIT III

RELATIONAL DATABASE DESIGN: Features of Good Relational Designs, Atomic Domains and First Normal Form, Functional Dependencies, Closure set of Functional dependencies, Procedure for Computing F^{+}, Boyce Codd Normal form, BCNF Decomposition Algorithm, Third Normal Form, Third Normal Form Decomposition Algorithm

TRANSACTIONS: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Serializability.

UNITIV

CONCURRENCY CONTROL: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols.

RECOVERY SYSTEM: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, ARIES, Remote Backup Systems.

UNIT V

FILE ORGANIZATION: Fixed and variable length records, Sequential file organization, Data Dictionary, Buffer manager.

INDEXING AND HASHING: Basic Concepts, Ordered Indices, B+-Tree Index Files, B+-Tree Extensions, Multiple-Key Access, Static Hashing, Extendible Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Sixth Edition, Tata McGraw-Hill 2006..

REFERENCE BOOKS

1.Raghu Rama Kirshna, Johannes Gchrke, Database Management System, Third Edition, TATA MC Graw Hill, 2003.

2. C J Date, AKannan, S Swamynathan, An Introduction to Database Systems, Eigth Edition
Pearson 2006

3. P Raja Sekhar Reddy, A MallikarjunaReddy, Foundations of Database Management Systems, Lambert Academic Publishing, 2020 (e-Book)

4. https://www.pdfdrive.com/fundamentals-of-database-systems-pdf-e51477130.html

Course Outcomes

After completing the course, students should be able to

1. Model Entity-Relationship diagrams for enterprise level databases[L3]
2. Formulate Queries using SQL and Relational Formal Query Languages[L3]
3. Apply different normal forms to design the Database[L3]
4. Summarize concurrency control protocols and recovery algorithms[L5]
5. Identify suitable Indices and Hashing mechanisms for effective storage and retrieval of Data[L3]

SIGNALS AND SYSTEMS

B. Tech II Year I Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53021	PC	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	60	100

Prerequisite: MATHEMATICS-I

Course Objectives

1.To understand signals and systems representations/classifications and also describe the time and frequency domain analysis of continuous time signals with Fourier series, Fourier transforms and Laplace transforms

2.To understand sampling theorem, with time and frequency domain analysis of discrete time signals using DTFT and Z transforms.

3.To analyze signals in time domain using convolution sum and integral.

4. To analyze Linear Time Invariant (LTI) Systems in time and Frequency domains.

UNIT I

CLASSIFICATION OF SIGNALS AND SYSTEMS: Definition and classification of signals-Continuous, Discrete, Periodic, Aperiodic, Deterministic, Random, Even, Odd, Energy and Power, Elementary Signals-Step, Ramp, Impulse, Sinusoidal, Signum, Real and Complex Exponentials, Operations on Signals-Addition, Multiplication, Scaling, Shifting, Folding, Convolution & Correlation. Definition and classification of systems-Continuous, Discrete, Linear, Non Linear, Causal, Non Causal, Stable, Unstable, Time variant, Time Invariant, LTI systems.

UNIT II

ANALYSIS OF CONTINUOUS TIME SIGNALS: Fourier Series for periodic signals, Properties of Fourier Series, Dirichlet's Conditions, Trigonometric & Exponential Fourier Series, Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals, Laplace Transform-Definition , ROC , Properties , Inverse Laplace transform , The S-plane and BIBO stability , Transfer functions , System response to standard signals.

UNIT III

LTI CONTINUOUS TIME SYSTEMS: Impulse response, Convolution integrals, difference equations, Analysis of continuous time LTI system using Fourier and Laplace transforms, Distortion less transmission through a system, Bandwidth of systems, relation between bandwidth and rise time.

UNIT IV

ANALYSIS OF DISCRETE TIME SIGNALS: Sampling of continuous time signals, Sampling theorem, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Fourier transform of Discrete time signals (DTFT)-Properties, Z Transform-Definition , ROC , Properties , Inverse Z transform.

UNIT I

LTI DISCRETE TIME SYSTEMS: Impulse response, Convolution sum, difference equations, Analysis of discrete time LTI system using Fourier and Z transforms, recursive and non recursive discrete time systems.

TEXT BOOKS

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.

2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.1997.

REFERENCES

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition,2008.

2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.

3. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.Publications, 2nd Edition, 2005.

Course Outcomes

After completing the course, students should be able to

1. Define, represent and differentiate types of signals and systems in continuous, discrete time domains and can perform various mathematical operations on them.
2. Compute/Evaluate Fourier series of periodic signals and determine Fourier transform of various signals.
3. Analyze the properties of continuous time signals and systems using Laplace & Fourier transforms and determine the response of LTI system to known inputs.
4. Illustrate signal sampling and its reconstruction.
5. Analyze the properties of discrete time signals and systems using DTFT & Z transforms and determine the response of LTI system to known inputs.

ELECTRONIC CIRCUIT ANALYSIS

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54021	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisite: ELECTRONIC DEVICES AND CIRCUITS

Course objectives

1. To classify the single stage amplifiers and to understand the distortion in amplifiers and to analyze the amplifiers at Low Frequencies using Approximate Hybrid Model.
2. To learn the concepts of frequency response and analyze the BJT and MOS Amplifiers at Low and High Frequencies. To analyze the CE amplifier with SC current gain and resistive loads at High frequencies using Hybrid-Pi Model.
3. To classify and analyze the multistage amplifiers.
4. To classify the large signal amplifiers and determine the efficiency of each one.
5. To classify and analyze the Tuned amplifiers and Oscillators.

UNIT I

SINGLE STAGE AMPLIFIERS: Classification Of Amplifiers, Distortion In Amplifiers, Analysis Of CB, CE And CC Amplifiers Using Exact and Approximate Hybrid Model, Millers Theorem And Its Dual, Design Of CE Amplifier.

UNIT II

FREQUENCY RESPONSE OF BJT AND MOS AMPLIFIERS -: Frequency Response of BJT and MOS Amplifiers, Analysis At Low And High Frequencies. Hybrid Pi Model of BJT and MOS, CE Short Circuit Current Gain, Alpha, Beta Cut-Off Frequencies.

UNIT III

MULTI STAGE AMPLIFIERS: Different Coupling Schemes Used In Amplifiers- RC Coupled Amplifiers, Transformer Coupled Amplifiers And Direct Coupled Amplifiers. Analysis Of Cascaded RC Coupled BJT Amplifiers, Cascode Amplifiers, Darlington Pair, Effect of cascading on Gain and Bandwidth.

UNIT IV

LARGE SIGNAL AMPLIFIERS: Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifiers, Efficiency of Class A Amplifier,

Class B Amplifier, Efficiency of Class B Amplifier, Class B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Cross-Over Distortion, Heat Sinks.

UNIT V

TUNED AMPLIFIERS AND OSCILLATORS: Classification of Tuned Amplifiers, Quality Factor, Analysis of Single Tuned Amplifiers. OSCILLATORS: Conditions for oscillations, Principle of operation: RC Oscillators (RC Phase Shift Oscillator and Wein Bridge Oscillator), LC Oscillators (Hartley Oscillator and Colpitts Oscillator) and Crystal Oscillator.

TEXT BOOKS:

1. Fundamentals of Micro Electronics by Behzad Razavi, 2nd ed.,2013, Wiley.
2. Electronic devices and circuits - -S.Salivahana, N. Suresh kumar, A vallavaraj, 2nd ed.,2011.
3. Integrated electronic- Jacob Millman & Christor C Halkias, 2 ed.,2008, TMH.

REFERENCES

1. Introductory electronic devices and circuits- Robert T. Paynter, 7th ed.,2009, Pearson Education India.
2. Electronic circuit analysis- K.Lal Kishore , 2004, BSP Publication.
3. Electronic devices & circuit David A Bell-5th ed,.Oxford university press,1999.
4. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

Course outcomes

After completing the course, students should be able to

1. Design and analyse the single stage amplifiers at Low Frequencies using Approximate Hybrid Model.
2. Analyze the BJT Amplifiers at High Frequencies using Hybrid –Pi Model and determine α and β cutoff frequencies.
3. Describe the importance of Multi stage amplifiers and to analyze them to find frequency parameters.
4. Explain the application of Large signal amplifier and the usage of heat sinks.
5. Analyze the effect of cascading Single tuned and double tuned amplifiers on Bandwidth and understand the stability of the tuned amplifiers.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53023	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

Course Objectives of Object-Oriented Programming are to:

1. Impart knowledge of core language features of Java.
2. Appraise the concepts of Inheritance and Polymorphism.
3. Elaborate the use of Packages and Exception Handling.
4. Emphasize collection frameworks and multithreading in Java
5. Familiarize Event Handling and Applets.

UNIT I

Java Basics: History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, static keyword, Garbage collection, Overloading methods and constructors, parameter passing.

UNIT II

Inheritance: Introduction, forms of inheritance- specialization, specification, construction**,** extension, limitation, combination, Member access rules, super uses, using final with inheritance.

Polymorphism: Method overriding, Abstract classes, Object class

UNIT III

Packages and Interfaces: Defining, Creating and Accessing a Package, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams.

Exception Handling - Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

UNIT IV

Package java.util- The Collection Interfaces, The Collection classes: LinkedList Class, HashSet Class. TreeSet Class, String Tokenizer, Date, Random, Scanner.

Multi-Threading: Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT V

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. **Applets** – Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.

TEXT BOOK

1. Herbert Schildt, Java- The Complete Reference, Seventh edition, Tata McGraw Hill,2006.

REFERENCE BOOKS

1. Bruce Eckel, Thinking in Java, Fourth Edition, Prentice Hall, 2006.
2. Y. Daniel Liang, Introduction to Java programming, Tenth Edition, Pearson education, 2014.

Course Outcomes:

At the end of this Object Oriented Programming course, students will be able to:

1.Appraise the basic concepts of java.
2. Implement inheritance and polymorphism.
3. Develop packages and implement exception handling features.
4. Identify usage of collection framework and build multi-threaded applications.
5. Design Applets by using Event Handling features.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54240	PC Lab	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

List of Experiments (12 Experiments to be done)

Course Objectives:

1. To understand basic concepts of Java that is classes, objects, constructors and parameter passing.
2. To understand the concepts of inheritance and polymorphism.
3. To elaborate the use of Packages, Files Interfaces and Exception Handling.
4. To emphasize on collection frameworks and multithreading concepts.
5. To develop Applets for Web applications and GUI based applications

List of Experiments

1. a) Write a java program that prompts the user for input and find the largest of three numbers.
   b) Write a java program to add and multiply two matrices.

2. a) Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables and instantiate its object.

   b) Write a program to demonstrate method overloading and constructor overloading.

   c) Write a program to illustrate parameter passing techniques.

3. a) Write a program in java to demonstrate various types of inheritances.

   b) Write a program to illustrate method overriding.

4. a) Write a program to illustrate the use of abstract classes.

   b) Write a program to illustrate the use of object class and math class.

5. a) Write a program to illustrate the use of creation of packages.

   b) Write a program to illustrate interfaces and implement multiple inheritances.

6. a) Write a program to illustrate files.

b) Write a program to copy the data from one file to another.

7. a) Write a program to illustrate try, catch, throw, throws and finally keywords.

   b) Write a program to implement the concept of User defined Exceptions.

8. a) Write a program to illustrate StringTokenizer and Date classes.

   b) Write a program to illustrate Random and Scanner classes.

9. a) Write a program to illustrate collection classes and interfaces.

   i. LinkedList ii. TreeSet iii. HashSet

10. b) Write a program to illustrate Multithreading.

    c) Write a program to illustrate thread priorities.

11. a) Write a program to illustrate Thread Synchronization.

    b) Write a program to illustrate Inter Thread Communication..

. 12. a) Write a program to illustrate applet concept.

    b) Write a program to illustrate passing parameters to applet.

. 13. a) Write a program to illustrate Event Handling (keyboard events) .

    b) Write a program to illustrate Event Handling (Mouse events)

14. Write a program to develop a calculator application using AWT.

Course Outcomes:

At the end of this Lab, students will be able to:

1. Appraise the basic concepts of java.
2. Implement inheritance and polymorphism.
3. Develop packages and implement exception handling features.
4. Identify usage of collection framework and build multi-threaded applications.
5. Design Applets by using Event Handling features.

ELECTRONIC CIRCUIT ANALYSIS LAB

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54211	PC	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

List of Experiments (12 Experiments to be done)

Course Objectives

1. To design and test the various amplifier circuits.
2. To understand the operation of the amplifier circuits by plotting the frequency response curve.
3. To operate and test the feedback amplifier circuits and interpret the results.
4. To generate the signals for the desired frequency using oscillator circuits.
5. To operate the large signal amplifiers and find the efficiency.

I. Design verification using Simulation tools (Any 6 Experiments)

1. Common Emitter Amplifier.
2. Common Base Amplifier.
3. Two Stage RC Coupled Amplifier.
4. Colpitts Oscillator.
5. Cascode Amplifier.
6. Wien Bridge Oscillator using Transistors.
7. RC Phase Shift Oscillator using Transistors.
8. Class A Power Amplifier (transformer less).
9. Class B Complementary Symmetry Amplifier.
10. Common Gate (JFET) Amplifier.

II. Testing in the Hardware Laboratory (6 Experiments)

A) Any Three circuits simulated in simulation laboratory

B) Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier.
3. Single Tuned Voltage Amplifier.
4. Hartley Oscillators.
5. Darlington Pair.
6. Common Collector Amplifier.

Requirements

1. For software simulation of Electronic circuits.
   (i) Computer System with latest specifications.

(ii) Connected in LAN (Optional)
(iii) Operating system (Windows XP)
(iv) Suitable Simulations Software.

2. For Hardware simulations of Electronic Circuits
   (i) Regulated Power Supply (0-30V)
   (ii) CRO's
   (iii) Function Generators
   (iv) Millimeters
   (v) Components.

Course outcomes

After completing the course, students should be able to

1. Design and test various amplifier circuits and to find the gain.
2. Calculate the lower and upper 3 dB frequencies and Bandwidth of the amplifier circuits.
3. Design and test the feedback amplifier circuits and interpret the results.
4. Design and test the oscillator circuits and interpret the results.
5. Design and test the large signal amplifier circuits and interpret the results.

DATABASE MANAGEMENT SYSTEMS LAB

B. Tech II Year II Semester					Dept. of Electronics & Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54216	PC	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. Familiarize the SQL Commands and Integrity Constraints
2. Write PL/SQL procedures, triggers, functions and cursors

WEEK 1

Data Base user creation, Data definition Language commands, Data Manipulation commands, Data Control Language Commands, Transaction Control Language commands.

WEEK 2

1. Database Schema for a customer-sale scenario

Customer (Cust id: integer, cust_name: string)
Item (item_id: integer,item_name: string, price: integer)
Sale (bill_no: integer, bill_data: date, cust_id: integer, item_id: integer, qty_sold: integer)

For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b)Insert around 10 records in each of the tables
c)List all the bills for the current date with the customer names and item numbers
d)List the total Bill details with the quantity sold, price of the item and the final amount
e)List the details of the customer who have bought a product which has a price>200
f)Give a count of how many products have been bought by each customer
g)Give a list of products bought by a customer having cust_id as 5
h)List the item details which are sold as of today
i)Create a view which lists out the bill_no, bill_date, cust_id, item_id, price, qty_sold, amount

Create a view which lists the daily sales date wise for the last one week

WEEK 3

2. Database Schema for a Student Library scenario

Student (Stud_no : integer,Stud_name: string)
Membership (Mem_no: integer,Stud_no: integer)

Book (book_no: integer, book_name:string, author: string)
Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)

For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b)Insert around 10 records in each of the tables
c)List all the student names with their membership numbers
d)List all the issues for the current date with student and Book names
e)List the details of students who borrowed book whose author is CJDATE
f)Give a count of how many books have been bought by each student
g)Give a list of books taken by student with stud_no as 5
h)List the book details which are issued as of today
i)Create a view which lists out the iss_no, iss _date, stud_name, book name
j)Create a view which lists the daily issues-date wise for the last one week

WEEK 4

3 Database Schema for a Employee-pay scenario

employee (emp_id : integer,emp_name: string)
Department (dept_id: integer,dept_name:string)
Paydetails (emp_id : integer,dept_id: integer, basic: integer, deductions: integer, additions: integer, DOJ: date)
Payroll (emp_id : integer, pay_date: date)

For the above schema, perform the following—

a)Create the tables with the appropriate integrity constraints
b)Insert around 10 records in each of the tables
c)List the employee details department wise
d)List all the employee names who joined after particular date
e)List the details of employees whose basic salary is between 10,000 and 20,000
f)Give a count of how many employees are working in each department
g)Give a names of the employees whose netsalary>10,000
h)List the details for an employee_id=5
i)Create a view which lists out the emp_name, department, basic, deductions, netsalary
j)Create a view which lists the emp_name and his netsalary

WEEK 5

4. Database Schema for a Video Library scenario

Customer (cust_no: integer,cust_name: string)
Membership (Mem_no: integer, cust_no: integer)
Cassette (cass_no:integer, cass_name:string, Language: String)
Iss_rec(iss_no: integer, iss_date: date, mem_no: integer, cass_no: integer)

For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints

b)Insert around 10 records in each of the tables
c)List all the customer names with their membership numbers
d)List all the issues for the current date with the customer names and cassette names
e)List the details of the customer who has borrowed the cassette whose title is " The Legend"
f)Give a count of how many cassettes have been borrowed by each customer
g)Give a list of books which has been taken by the student with mem_no as 5
h)List the cassettes issues for today
i)Create a view which lists outs the iss_no, iss_date, cust_name, cass_name
j)Create a view which lists issues-date wise for the last one week

WEEK 6

5. Database Schema for a student-Lab scenario

Class (class_no: string,descrip: string)
Student (stud_no: integer, stud_name: string, class_no: string)
Lab (mach_no: integer, Lab_no: integer, description: String)
Allotment (Stud_no: Integer, mach_no: integer, dayof week: string)

For the above schema, perform the following—

a) Create the tables with the appropriate integrity constraints
b)Insert around 10 records in each of the tables
c)List all the machine allotments with the student names, lab and machine numbers
d)List the total number of lab allotments day wise
e)Give a count of how many machines have been allocated to the 'CSIT' class
f)Give a machine allotment etails of the stud_no 5 with his personal and class details
g)Count for how many machines have been allocatedinLab_no1 for the day of the week as "Monday"
h)How many students class wise have allocated machines in the labs
i)Create a view which lists out the stud_no, stud_name, mach_no, lab_no, dayofweek
j)Create a view which lists the machine allotment details for "Thursday".

WEEK 7

6. Write a program to find largest number from the given three numbers.
7. Simple programs using loop, while and for iterative control statement.
8. Write a program to check whether the given number is Armstrong or not
9. Write a program to generate all prime numbers below 100.

WEEK 8

10. Write a program to demonstrate the GOTO statement.
11. Write a program to demonstrate %type and %row type attributes

WEEK 9

12. Write a program to demonstrate predefined exceptions
13. Write a program to demonstrate user defined exceptions
14. Create a cursor, which displays all employee numbers and names from the EMP table.

WEEK 10

15. Create a cursor, which update the salaries of all employees who works in dept no 10.
16. Create a cursor, which displays names of employees having salary > 50000.

WEEK 11

17. Create a procedure to find reverse of a given number
18. Create a procedure to update the salaries of all employees whose salary is between 25000 to 50000

WEEK 12

19. Create a procedure to demonstrate IN, OUT and INOUT parameters
20. Create a function to check whether given string is palindrome or not.

WEEK 13

21. Create a function to find sum of salaries of all employees working in depart number 10.
22. Create a trigger before/after update on employee table for each row/statement.

WEEK 14

23. Create a trigger before/after delete on employee table for each row/statement.
24. Create a trigger before/after insert on employee table for each row/statement.

WEEK 15

Review

TEXT BOOKS:

1. Ivan Bayross, SQL, PL/SQLThe programming Language of Oracle, 3rd Revised Edition, BPBPublications, 2008.

Course outcomes

After completing the course, students should be able to

1. Apply different types of SQL commands to create, manipulate and access data from database
2. Construct database by using various integrity constraints
3. Develop basic PL/SQL programs
4. Implement PL/SQL Programs using procedures, functions and cursors
5. Create trigger for given problem

GENDER SENSITIZATION

B. Tech II Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54022	MC	L	T	P	C	CIE	SEE	Total
		2	0	0	0	--	--	--

PREREQUISITES: NONE

Course Objectives

1. Develop student's sensibility with regard to issues of gender in contemporary India
2. Provide a critical perspective on the socialization of men and women.
3. Introduce students to information about some key biological aspects of genders
4. Expose the students to debates on the politics and economics of work.
5. Help students reflect critically on gender violence.

UNIT I

Understanding Gender: Gender: Why should we study it? (Towards a world of equals: Unit-1)
Socialization: Making Women, Making Men (Towards a world of equals: Unit-2)
Introduction, Preparing for womanhood. Growing up male. First lesson in caste. Different Masculinities. Just Relationships: Being Together as Equals (Towards a world of equals: Unit-12)
Mary Kom and Onler. Love and acid just do not mix. Love Letters. Mothers and Fathers. Further reading: Rosa Parks-The Brae Heart.

UNIT II

Gender And Biology: Missing Women: Sex Selection and its Consequences (Towards a world of equals: Unit-4)
Declining Sex Ration. Demographic Consequences.
Gender Spectrum: Beyond The Binary (Towards a world of equals: Unit-10)
Two or many? Struggles with Discrimination.
Additional Reading: Our Bodies, Our Health (Towards a world of equals: Unit-13)

UNIT III

Gender And Labour: Housework: The invisible Labour (Towards a world of equals: Unit-3)
"May Mother doesn't work". "Share the Load". Women's work: its politics and economics (Towards a world of equals: Unit-7)
Fact and Fiction. Unrecognized and unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT IV

Issues Of Violence: Sexual Harassment: Say No! (Towards a world of equals: Unit-6)
Sexual Harassment, not Eve-teasing-coping with everyday Harassment-Further Reading: "Chupulu". Domestic Violence: Speaking out (Towards a world of equals: Unit-8)
Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about sexual Violence (Towards a world of equals: Unit-11)
Blaming the Victim- "I Fought for my life….." – Further reading: The Caste Face of Violence.

UNIT V

Gender Studies: Knowledge: Through the lens of gender (Towards a world of equals: Unit-5)
Point of View. Gender and the Structure of Knowledge. Further Reading: unacknowledged Women artists of Telangana.
Whose History? Questions for Historians and others (Towards a world of equals: Unit-9)
Reclaiming a past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

TEXT BOOKS

1. A. Suneetha, Uma Bhrugubanda, Duggirala Vasantha, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deep Sreenivas and Susie Tharu, " Towards a world of Equals; A Bilingual Textbook on Gender"

2. Sen, Amartya. "More than one million Women are Missing". New York review of books 37.20 (20 December 1990). Print. 'We Were Making History….' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women 1989.

REFERENCES

1. Tripti Lahari. "By the numbers: Where Indian Women Work. "Women's studies journal (14 November 2012) Available online at: http://blogs.wsj.com/indiarealtime/2012/11/14/by the numbers where Indian women work.

2. K. Satyanarayana & Susie Tharu (ed.) Steel are sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada
http://herpercollins.co.in/Bookdetail.asp? Book _code = 3732.

3. Monon, Nivedita, Seeing like a Feminist, New Delhi: Zubaan-Penguin Bokks, 2012.

4. Virginia Woolf: A Room of One's Own. Oxford: Black swan. 1992.

Course Outcomes

After completing the course, students should be able to

1. Develop a better understanding of important issues related to gender in contemporary India.
2. Identify the basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Analyze a finer grasp of how gender discrimination works in our society and how to counter it.
4. Acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.

Program Structure and Syllabus of

B. Tech III Year (I & II Semesters)

Electronics and Computer Engineering

(R22 REGULATIONS)

Venkatapur (V), Ghatkesar (M),

Medchal-Malkajgiri (Dt.), Hyderabad, Telangana, INDIA

info@anurag.edu.in; http://anurag.edu.in

III YEAR I SEMESTER

S.No	Course Code	Category	Course Title	L	T	P	Credits
1	A55025	PC	Operating Systems	3	0	0	3
2	A56035	PC	Software Engineering	3	0	0	3
3	A55092	PC	Data Communications and Computer Networks	4	0	0	4
4	A55093	PC	Integrated circuits and Applications	3	0	0	3
5	A55094	PE-I	1. Introduction to Cyber Security	3	0	0	3
	A57067		2. Data Science and Analytics				
	A55096		3.Fundamentals of Cloud Computing				
6	A55090	PC	Experiential Learning (MOOCs)	1	0	0	1
7	A55291	PC	Data Communications and Computer Networks Lab	0	0	2	1
8	A55292	PC	Integrated circuits and Applications Lab	0	0	2	1
9	A55293	HS	Quantitative Aptitude and Reasoning	0	0	2	1
			Total	**17**	**0**	**6**	**20**

III YEAR II SEMESTER

S.No	Course Code	Category	Course Title	L	T	P	Credits
1	A55023	PC	VLSI Design	3	0	0	3
2	A54027	PC	Design Analysis and Algorithms	3	1	0	4
3	A55027	PC	Web Technologies	3	0	0	3
4	A56090	PC	Embedded Systems	3	0	0	3
5	A56091	OE-I	1.Project Management	3	0	0	3
	A56092		2.Introduction to Electric and Hybrid Vehicles				
	A56093		3.Introduction to Communication Systems				
6	A56291	PC	VLSI Design Lab	0	0	2	1
7	A56292	PC	Web Technologies Lab	0	0	2	1
8	A56293	PC	Mini Project	0	0	4	2
			Total	**15**	**1**	**8**	**20**

Operating Systems

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55025	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

Course Objectives of Operating System are to:

1. Introduce basic concepts of operating system and process management
2. Discuss various CPU scheduling algorithms and problems of process synchronization
3. Demonstrate different methods for handling deadlock
4. Describe about memory management Techniques
5. Explore the File system, system security and protection mechanisms

Course Outcomes

At the end of the Operating System course, students will be able to:

1. Summarize operating system and process management concepts
2. Apply process scheduling and synchronization related issues
3. Outline Deadlock Prevention, Avoidance, Detection and recovery mechanisms
4. Analyze effectively memory management concepts
5. Illustrate various protection and security measures

UNIT I

Operating Systems Overview and Process Management: Introduction-What operating systems do, uni-programmed and multi-programmed, Operating System operations, Operating system services, System calls, Types of System calls, Operating System structure.

Process Management: Process concepts, Operations on processes, Inter process communication. Threads: overview, Multithreading models

UNIT-II

Process Scheduling and Synchronization: Process Scheduling – Basic concepts, Scheduling criteria, Scheduling algorithms, Thread scheduling.

Process Synchronization: Background, The critical section problem, Peterson's solution, Synchronization hardware, Semaphore, Classical problems of synchronization, Monitors.

UNIT-III

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Detection and avoidance, Recovery from deadlock.

UNIT-IV

Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation.

Virtual memory management - Demand paging, copy-on-write, page-replacement, Thrashing.

UNIT-V

File System, System Protection and Security: Storage management – File concept, Access methods, Directory and disk structure, File-system mounting. System protection- Goals of protection, principles of protection, Domain of protection, Access matrix.

System Security – Security problem, Program threats, System and Network threats.

Textbooks

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 9th Edition, John Wiley, 2016.

References

1. D. M. Dharmdhere, Operating Systems – A Concept based Approach, 2nd Edition, TMH, 2007.
2. Andrew S Tanenbaum, Modern Operating Systems, Third Edition, PHI, 2008.
3. Behrouz A. Forouzan, Richard F. Gilberg, Unix and Shell programming, Cengage Learning, 2009.

Software Engineering

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	Category	Hours / Week			Credits	Marks		
A56035	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

Course Objectives of Software Engineering course are to:

1. Understand the framework activities for a given project.
2. Choose a process model for given project requirements.
3. Design various system models for a given scenario.
4. Design various testing techniques.
5. Understand metrics for Products.

Course Outcomes

At the end of this Software Engineering course, students will be able to:

1. Outline the framework activities for a given project.
2. Apply Right process model for a given project.
3. Design various system models for a given Context.
4. Apply various testing techniques for a given project.
5. Identify various risks in project development.

UNIT I

INTRODUCTION TO SOFTWARE ENGINEERING: The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI),

Process models: The waterfall model, Incremental process models, Evolutionary process model. [TB-1,Ch-1,2,3]

UNIT II

AGILE PROCESS MODEL: Agile principles, Extreme programming, Dynamic System Development Methods, Feature Driven Development, Scrum framework, Sprint, Scrum master, Roles of Scrum Master, Implementing Scrum - A case study. [TB-1,Ch-4]

Software Requirements: Functional and non-functional requirements, the software requirements document. Requirements engineering process: Feasibility studies, Requirement's elicitation and analysis, Requirements validation, Requirements management. [TB-2, Ch-6,7]

UNIT-III

SYSTEM MODELS: Context Models, Behavioral models, Data models, Object models, structured methods. [TB-2,Ch-8]

Design Engineering: Design process and Design quality, Design concepts, the design metamodeling component level design: design class based components, conducting component level design. Performing User interface design: Golden rules. [TB-1,Ch-9,11]

UNIT IV

TESTING STRATEGIES: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing.

Product metrics: Software Quality, Metrics for Analysis Model- function based metrics, Metrics for Design Model-object oriented metrics, class-oriented metrics, component design metrics, Metrics for source code,

Metrics for maintenance. [TB-1,Ch-13,14,15]

UNIT V

RISK MANAGEMENT: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.
Quality Management: Quality concepts, Metrics for Software Quality, Software Reviews, Formal Technical Reviews, Software Reliability, The ISO 9000 quality standards. [TB-1,Ch-25,26]

Text books

1. Roger S. Pressman, Software Engineering - A practitioner's Approach, 6th edition. McGraw Hill International Edition, 2005.
2. Somerville, Software Engineering, 7th edition, Pearson education, 2009.

Reference Books:

1. K.K. Agarwal & Yogesh Singh, Software Engineering, New Age International Publishers,3rd edition, 2008
2. James F. Peters, Witold Pedrycz, Software Engineering - an Engineering approach, JohnWiely, 2007.
3. Waman S Jawadekar, Software Engineering Principles and Practice, The McGraw-Hill Companies, 2013.
4. https://nptel.ac.in/courses/106/105/106105182/
5. Gene Kim, Jez Humble, Patrics Debois, and Jon Wills, The DevOps Handbook – How to create world-class agility, reliability & Security in technology organizations,2nd Edition

Data Communications and Computer Networks

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
		L	T	P	C	CIE	SEE	Total
A55092	PC	4	0	0	4	50	50	100

Prerequisites

Digital Circuits.

Course Objectives:

1. To get familiarized with a general overview of the concepts, fundamentals of Data Communication and error-free transmission.
2. To become aware of protocols related to data link layer, Wireless authentication methods.
3. To get familiarized themselves with the process of routing protocols and strategies.
4. To learn to know different techniques for reliable transmission and quality services in computer networks.
5. To get familiarize to use different protocols for the exchange of data from the server.

UNIT-I

FOUNDATIONS OF DATA COMMUNICATION

Network Models: OSI model, Layers in the OSI model, TCP/IP protocol Suite. **Transmission Modes:** Simplex, Half-Duplex, Full-Duplex, **Network Types:** LAN, WAN, MAN**. Error detection**: Check Sum, Cyclic Redundancy Check (CRC).

UNIT-II

PROTOCOLS

Ethernet Standards (IEEE 802.3): Media Access Control Address, Address Resolution Protocol, Virtual LANs, VLAN Trunking, Spanning Tree Protocol, STP Port Roles.

Wireless LANs (IEEE 802.11): IEEE 802.11 Standards Evolution, 802.11 Frame Structure, CSMA/CA Protocol, Wireless Authentication Methods-Open System Authentication & Shared Key Authentication.

UNIT-III

NETWORK LAYER

IP Addressing: IPv4 Classful Addressing, IPv4 Header Format, Subnetting Techniques- FLSM & VLSM for Class C Network, IPv6 Address Types.

Routing Protocols: Static Routing- Standard Static Routes, Floating Static Routes, Default Static Routes. Dynamic Routing- Distance Vector Routing- RIP protocol, Link-State Routing-OSPF Single Area.

UNIT-IV

TRANSPORT LAYER

Transport Layer Protocols: TCP, TCP Header Format, 3-Way Handshake in TCP, UDP, UDP Header Format, Connection-oriented vs. connectionless services.

Congestion and QoS: Congestion Control and Quality of Service - Data Traffic, Congestion Control. Quality of Service, Techniques to improve QoS.

UNIT-V

APPLICATION LAYER:

DHCP, DORA Process**,** Domain Name System: Recursive Query, iterative Query, DNS Lookup Zones, DNS in the Internet, Electronic Mail, FTP, HTTP.

Text Books

1. Behrouz A Forouzan, "Data Communications and Networking", 4th Edition, McGraw-Hill Special Indian Edition 2006.
2. Andrew S Tanenbaum, David. J. Wetherall, "Computer Networks", 5th Edition. Pearson Education/PHI 2011.

Reference Books

1. S. Keshav, “An Engineering Approach to Computer Networks”, 2nd Edition, Pearson Education, 1997
2. William Stallings, “Data Communications”, 8th Edition, Pearson Publishers.

Course Outcomes:

After completing this course, the student will be able to

1. Gain the knowledge of the basic computer network technology, functions of each layer in the OSI, TCP/IP reference model and error detection codes.
2. Gain the knowledge of Data Link Layer protocols
3. Obtain the skills of subnetting and routing mechanisms.
4. Obtain the skills to improve quality data transmissions.
5. Familiarity with the essential protocols which function as an interface between the user and communicating devices.

Integrated Circuits and Applications

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55093	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

EDC AND ACA

Course Objectives:

1. Understand the basics and applications of operational amplifiers.
2. Design and analyze analog circuits like filters, oscillators, and waveform generators.
3. Study the working and uses of 555 timers and applications.
4. Learn about digital ICs, logic families, and their practical implementations.
5. Explore DAC and ADC types and their role in analog-digital interfacing.

UNIT-I

Integrated circuits basics, Operational Amplifiers: Introduction to ideal and practical Op. amps, Characteristics, 741 Opamp and features, Modes of operation: Inverting mode and Non-Inverting mode amplifiers and analysis. Applications of Op. amp: Adder, Subtractor, Integrator, Differentiator, Comparator.

UNIT-II

Active filters: Lowpass, Highpass, Bandpass and Band reject filters, first and second-order filter Topologies, all pass filters,
Sinewave Oscillators: RC phase shift, Wien bridge Oscillators.

UNIT-III

555 Timer: Operation, Monostable mode, missing pulse detector and pulse width modulator, Astable mode, FSK generator and pulse position modulator.
Schmitt Trigger and Waveform generators: Triangular, Saw tooth (using 555 Timer).

UNIT-IV

Types of Digital ICs, Standard TTL NAND gate analysis and characteristics, MOS & CMOS, comparison of various logic families. Combinational circuit ICs: Use of TTL-74XX series and CMOS 40XX series ICs, Applications: Multiplexer, deocoder and 4 bit-comparator. Sequential circuit ICs: Commonly available 74XX CMOS 40XX series ICs. Applications: Flipflops and counter.

UNIT-V

Digital to Analog Converters: Weighted resistor DAC and R-2R ladder DAC, Analog to Digital Converters: Flash type, counter type, successive approximation type and dual slope integrating type.

Text Books

1. D.Roy Choudhry, Shail Jain, -Linear Integrated Circuits, New Age International Pvt. Ltd., 2018, Fifth Edition.
2. Sergio Franco, -Design with Operational Amplifiers and Analog Integrated Circuits, 4th Edition, Tata Mc Graw-Hill, 2016.

References

1. Ramakant A. Gayakwad, -Operational Amplifiers and Linear IC, 4th Edition, Prentice Hall / Pearson Education,2015.
2. Robert F.Coughlin, Frederick F.Driscoll, -Operational Amplifiers and Linear Integrated Circuits, Sixth Edition,2001.
3. William D.Stanley, -Operational Amplifiers with Linear Integrated Circuits, Pearson Education,4th Edition,2001.
4. S.Salivahanan & V.S. Kanchana Bhaskaran, -Linear Integrated Circuits, TMH,2nd Edition, 4 th Reprint, 2016

Course Outcomes:

After end of the course, the student should be able to

1. Design op-amp based applications
2. Analyze and design linear and non-linear applications using op-amps.
3. Design IC-555 timer based applications.
4. Apply Combinational and Sequential ICs appropriate applications.
5. Choose appropriate A/D and D/A converters for signal processing applications.

Introduction to Cyber Security

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55094	PE-I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Digital Circuits, Networking

Course Objectives:

1. To Know what is cyberspace, cybersecurity
2. To understand with different attacking techniques of intruder.
3. To apply different exploitation techniques to gain access.
4. Interpret web exploitation tools
5. Analyze different types of and smart Phones security and Cyber Crimes

UNIT-I

DEFINING CYBERSPACE AND OVERVIEW OF COMPUTER AND WEB-TECHNOLOGY: Architecture of cyberspace, Communication and web technology, Internet, Internet infrastructure for data transfer and governance, Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security

UNIT-II

ATTACKER TECHNIQUES AND MOTIVATIONS: Phishing, Smishing, Vishing.
Threat Infrastructure: Botnets, Fast-Flux
SQL Injection: what is SQL Injection, Protecting against SQL Injection

UNIT-III

WEB EXPLOIT TOOLS: Features for Hiding, Proliferation of Web Exploit Tools Despite Protections, DoS Conditions, Brute Force and Dictionary Attacks, Cross-Site Scripting (XSS), Social Engineering. DNS Amplification attacks

UNIT-IV

DEFENSE AND ANALYSIS TECHNIQUES: Memory Forensics, Honeypots, Malicious Code Naming, Automated Malicious Code Analysis Systems: Passive Analysis, Active Analysis

UNIT-V

Smartphone security guidelines: Introduction to mobile phones, Smartphone Security. Android Security. IOS Security
Cybercrimes: Classification of cybercrimes, Common cybercrimes, Case studies.

Textbooks

1. James Graham, Richard Howard, Ryan Olson “Cyber Security Essentials” Taylor and Francis Group, LLC,2011.
2. Cyber Crime Impact in the New Millennium, by R. C Mishra, Auther Press. Edition 2010.
3. Joshua J. Drake, Zach Lanier, Collin Mulliner, Pau Oliva Fora, Stephen A. Ridley, Georg Wicherski “Android Hacker's Handbook” Willy, 2013
4. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.

References

1. Thomas A. Johnson,”Cyber Security”,Taylor & Francis Group, LLC,2015
2. Marjie T. Britz, “Computer Forensics and Cyber Crime An Introduction”, third edition , Pearson Education,2013
3. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)

Course Outcomes

After completing this course, the student will be able to:

1. Understand the fundamentals of cybersecurity.
2. Identify different types of cyberattacks and their motives.
3. Learn various exploitation methods used to gain unauthorized access.
4. Analyse web exploitation tools, attack statistics, and social engineering techniques.
5. Examine different types of Smartphone security & cybercrimes

Data Science and Analytics

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A57067	PE	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Basic Mathematics, Machine Learning and Data Visualization

Course Objectives

1. To gain a foundational understanding of data science.
2. To understand the data science process and significance of exploratory data analysis (EDA).
3. To develop scoring and ranking Systems.
4. To understand the Handling Large Data on a single computer.
5. To understand the Text mining and text analytics.

UNIT I

INTRODUCTION

Computer Science, Data Science, and Real Science, **Asking Interesting Questions from Data**:The Baseball Encyclopedia the Internet Movie Database (IMDb) Google Ngrams, New York Taxi Records **Properties of Data**: Structured vs. Unstructured Data, Quantitative vs. Categorical Data, Big Data vs. Little Data **Classification and Regression**, **Data Science Television**: The Quant Shop, Kaggle Challenges About the War Stories, **War Story**: Answering the Right Question.

UNIT-II

DATA MUNGING

Languages for Data Science: The Importance of Notebook Environments, Standard Data Formats **Collecting Data**: Hunting, Scraping, Logging

Cleaning Data: Errors vs. Artifacts. Data Compatibility, Dealing with Missing Values, Outlier

War Story: Beating the Market Crowd sourcing: The Penny Demo, when is the Crowd Wise, Mechanisms for Aggregation, Crowd sourcing Services, Gamification

Exploratory data analysis: Build the models.

UNIT-III

SCORES AND RANKINGS

The Body Mass Index (BMI), **Developing Scoring Systems**: Gold Standards and Proxies, Scores vs. Rankings, Recognizing Good Scoring Functions, Z-scores and Normalization

Advanced Ranking Techniques: Elo Rankings, Merging Rankings, Digraph-based Rankings, PageRank **War Story**: Clyde's Revenge, Arrow's Impossibility Theorem, War Story: Who's Bigger.

UNIT-IV

HANDLING LARGE DATA ON A SINGLE COMPUTER

Problems when handling large data, **General techniques for handling large data:** Choosing the right algorithm, Choosing the right data structure, Selecting the right tools

General programming tips for dealing with large data sets: Don't reinvent the wheel, Get the most of your hardware, reduce your computing needs, **Case study:** Predicting Malicious Urls, Building a recommender system inside a database.

UNIT-V

TEXT MINING AND ANALYTICS

Text mining in the real world, Text mining techniques: Bag of words, Stemming and Lemmatization, Decision tree Classifier.

Case Study- Classifying Reddit Posts: Research Goal, data retrieval, data preparation, data exploration, data analysis, presentation and automation.

Text books

1. Skiena, Steven S, The Data Science Design Manual, CRC press
2. Introducing Data Science, Davy Cielen, Arno D. B. Meysman, Mohamed Ali, Manning Publications Co., 1st edition, 2016.

Reference books

1. Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar, Introduction to Data Mining (Second Edition)
2. V.K. Jain, Data Science and Analytics (with Python, R and SPSS Programming), Khanna Book Publishing Company.
3. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning,Second Edition. ISBN 0387952845. 2009.
4. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011.
5. Data Science from Scratch: First Principles with Python, Joel Grus, O'Reilly, 1st edition, 2015.

Course Outcomes

At the end of the course, students should be able to:

1. Describe what Data Science is and the skill sets needed to be a data scientist.
2. Analyze the data science process and significance of exploratory data analysis (EDA)
3. Apply the scoring and ranking systems for datasets.
4. Apply basic algorithms for Handling Large Data.
5. Interprets Text mining and text analytics.

Fundamentals of Cloud Computing

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55096	PE	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Computer Organization and Computer Networks.

Course Objectives

This course provides an insight into cloud computing

UNIT I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing

Virtualization: Introduction to Virtualization, Approaches in Virtualization, Hypervisor and Its Role, Types of Virtualization

UNIT-II

Cloud Computing Fundamentals: Motivation for Cloud Computing, Defining Cloud Computing, 5-4-3 Principles of Cloud computing, Cloud Ecosystem, Requirements for Cloud Services.

UNIT-III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications on the Cloud, Managing the Cloud, Migrating Application to Cloud.

UNIT-IV

Cloud Deployment Models: Private cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Cloud Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service.

UNIT-V

Cloud Service Providers: EMC, Google, Amazon Web Services, Microsoft, Windows Azure, IBM, Cloud Models, IBM, Sales force.

Open-Source Support for Cloud: Open-Source Tools for IaaS, Open-Source Tools for PaaS, Open-Source Tools for SaaS.

Text books

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

References

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

Course Outcomes

After the end of the course, the students will be able to:

1. Understand different Computing Paradigms and Virtualization
2. Learn the fundamentals of Cloud Computing.
3. Understand various service delivery models of a cloud computing architecture.
4. Demonstrate the ways in which the cloud can be programmed and deployed
5. Identify applications that can deploy on a Cloud environment.

Experiential Learning (Moocs) – Satellite tracking LEO

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	Category	Hours / Week			Credits	Marks		
A55090	PC	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Prerequisites

- Basic Physics & Electronics knowledge (covered in 1st year)
- No prior experience with antennas, tracking, or MATLAB required

Course Objectives

- To introduce the fundamentals of LEO satellites and their communication systems
- To provide hands-on understanding of tracking tools and antenna design
- To foster curiosity in satellite communication and HAM radio technology.

UNIT I

Introduction to Satellites & Orbits

- Basics of artificial satellites
- Types of satellite orbits: LEO, MEO, GEO
- Characteristics and advantages of LEO satellites
- Real-world examples: NOAA, STARLINK, ISS
- Difference between LEO and other orbits.

UNIT-II

Fundamentals of Satellite Communication

- Line-of-sight communication & Doppler shift
- Uplink and downlink frequency concepts
- Analog, digital, and RF signal basics
- Azimuth, elevation, and footprint of satellites
- Introduction to TLEs and NORAD IDs.

UNIT-III

Antenna Systems for Tracking

- Overview of antennas: Yagi-Uda, Dipole, Helical, Patch
- Parameters: Gain, Beamwidth, Polarization
- Simple DIY antenna concepts
- Safe handling of antennas
- Concept of a basic ground station

UNIT-IV

Satellite Tracking Tools & HAM Radio Basics

- Orbitron Software:
- - Installation, configuration
- - Satellite pass prediction
- - Real-time tracking and logging
- -HAM Radio Introduction:
- - What is HAM?
- - Call signs, bands, and licensing basics

- - HAM’s role in satellite communication
- - Using HAM techniques in satellite tracking

UNIT-V

Antenna Design for NOAA Tracking & MATLAB Simulations

- Designing a handheld Yagi-Uda antenna
- Parameters for design: Boom length, element spacing, material selection
- Factors affecting performance: Orientation, weather, environment
- Tracking NOAA satellites: Frequencies and signal reception
- MATLAB Simulations:
- - Simulating radiation patterns
- - Gain vs angle plots for Yagi and Dipole
- - Beamwidth and directivity analysis

Assessment Criteria

- Class participation and interaction – 20%
- Orbitron tracking activity – 20%
- Antenna design + MATLAB simulation report – 40%
- Viva or short quiz – 20%

Course Outcomes

After the end of the course, the students will be able to:

- Understand LEO satellite systems and orbits
- Use Orbitron to predict and track real-time satellites
- Get exposure to HAM radio principles
- Design and simulate antennas using MATLAB for NOAA tracking

Data Communications and Computer Networks Lab

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55291	PC	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

List of Experiments

1. Design and Simulate a Basic LAN Network using Hubs, Switches and PC Connectivity in Packet Tracer.
2. Basic Switch Configuration & Security in Packet Tracer
3. Verify MAC Tables, ARP Cache, and ICMP Packets for a LAN Network in Packet Tracer
4. Implement a VLAN & Trunking for Different Departments and Simulate in Packet Tracer
5. Design and Configure a Spanning Tree Protocol for Loop Prevention in Layer 2 Switches.
6. Configure a Wireless network such as WIFI Router, AP with Wireless Authentication Methods in Packet Tracer.
7. Designing FLSM for a Class C Network and Test the Connectivity Using a Router in Packet Tracer.
8. Design and simulate Static Routing in a Multi-Network Topology in Packet Tracer.
9. Design and simulate Routing Information Protocol in a Multi-Network Topology to enable Dynamic Routing in Packet Tracer.
10. Design and simulate OSPF Single Area in a Multi-Network Topology to enable Dynamic Routing in Packet Tracer.
11. Simulation of DHCP for IP Assignment and DNS for Hostname Resolution in a Packet Tracer Network
12. Designing a Network with FTP for File Exchange and HTTP for Web Browsing in Packet Tracer

Course Outcomes

After completing this course, the student will be able to

1. Design and Configure Network Topologies.
2. Analyse and Troubleshoot Network Communication.
3. Deploy Wireless and Security Configurations.
4. Implement Dynamic and Static Routing Protocols.
5. Simulate Application Layer Services.

Integrated Circuits and Applications Lab

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55292	PC	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

List of Experiments

1. Frequency response of inverting and non inverting amplifiers
2. Adder, Subtractor, andd comparator using IC741
3. Verify the operation of Integrator and diffrentiator using IC741
4. Design of active low pass and highpass filters
5. Waveform generators using IC741
6. 555 timer in monostable operation
7. 555 timer in astable operation
8. Schimitt trigger circuit using IC741 and IC 555.
9. Verify the functionality of Multiplexer and Decoder
10. Verify the functionality of flipflops ICs
11. Verify the functionality of Counter(Decade/Updown)
12. Verify the functionality of CMOS based logic gates and their applications
13. Verify the functionality of 8 bit Analog to digital converter.

Course Outcomes

CO1 - Analyze the frequency response of op-amp circuits.
CO2 - Design analog circuits using IC 741.
CO3 - Implement timing applications using 555 timer.
CO4 - Verify combinational and sequential digital ICs.
CO5 - Demonstrate CMOS gates and ADC operation

Quantitative Aptitude and Reasoning

B. Tech III Year I Semester					Dept. of Electronics and Computer Engineering			
Code	Category	Hours / Week			Credits	Marks		
A55293	HS	L	T	P	C	CIE	SEE	Total
		0	0	0	2	50	50	100

Course Objective

1. Enhance the problem-solving ability of the students with focusing on basic concepts of speed math's, percentage and some fundamental rules.
2. Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
3. Calculate speed, distance and time using the speed equation. Examine and interpret speed time and distance.
4. Quick decision making and exploring possibilities.
5. Enhance the adequate problem solving and analytical skills.

UNIT-I

NUMBER SYSTEM: Speed Math's, Numbers, Factors, Prime and co primes, LCM & HCF, Divisibility rules, Finding the unit digit and applications, remainder theory.
Ratio and Proportion with Ages: Definition of ratio and Proportion, Finding the resultant ratio. Problems based on Ratios and ages.
Percentages: Introduction to percentages, Percentage Increase /Decrease, Results on Population, Results on Depreciation, Variations, Applications of Percentage
Profit and Loss: Classification of Profit and Loss, Profit/ Loss Percentages, Successive Discount.

UNIT-II

TIME AND DISTANCE: Difference between the average, Relative and Effective speed, reaching the destination late and early, stoppage time per hour, problems based on Trains and problems based on Boats.
Time and Work: Calculating Efficiency, alternate days concept, work and wages, Chain rule, problems based on Pipes and cisterns.
Simple and Compound Interest : Simple interest ,Principle , Rate, Amount , Applications of Simple interest, Compound interest , Compounded annually , Compounded Half yearly , Compounded Quarterly , Difference between simple and compound interest .

UNIT-III

PERMUTATIONS AND COMBINATIONS: Fundamental rules, Problems on Permutations and Combinations
Probability: Definition, Notations and Problems based on Probability.
Mean, Median and Mode: Introduction and problems on mean, median and mode
Partnership: Relation between Partners, Period of Investments and Shares
Averages: Average of different groups, change in average by adding, deleting and replacement of objects
Flow Chart: Introduction of symbols and problems on flow charts.

UNIT-IV

SEATING ARRANGEMENT: Circular, Row, Column, Square and Double row arrangement
Puzzles : Paragraph, incomplete puzzles and problems on them.
Number Series: Number, Alphabet and Letter Series.
Analogy: Simple, Double, Word and Number Analogy
Coding and Decoding: Classifications and Problems on Coding and Decoding.

UNIT-V

CLOCKS: Relation between minute and hour hand, angle between hands of a clock,exceptional cases in clocks. Gaining and loosing of time.

Calendars: Classification of years,finding the day of any random calendar date, repetition of calendar years.
Direction Sense Test: Sort of directions in puzzle, distance between two points, Problems on shadows.
Blood Relations: Defining the various relations among the members of a family, Solving blood relation puzzles by using symbols and notations. Problems on coded relations.

Text books

1. Verbal and Non Verbal Reasoning – R.S Agarwal, New Edition -2020, S. Chand.
2. Quantitative Aptitude – R.S Agarwal, New Edition- 2020, S. Chand.

Reference books

Quantitative Aptitude: Abhijeet Guha, New Edition-2020, Mc Graw Hill.

Course Outcomes:

After completing the course, students should be able to

1. Formulate the problem quantitatively and use appropriate arithmetical and statistical methods to solve the problem.
2. Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
3. By the end of this lesson, students will be able to: identify the work rate formula. apply the work rate formula to solve real-life ...
4. Critically evaluate various real life situations by resorting to analysis of key issues and factors.
5. Enable students to critically analyze material (information) to order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions.

VLSI Design

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55023	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Electronic Devices & Circuits, Digital Circuits

Course Objectives

1. To give exposure to different steps involved in the fabrication of ICs using, transistors and passive components
2. To explain electrical properties of transistors to analyse the behaviour of inverters designed with various loads.
3. To give exposure to the design rules to be followed to draw the layout of any logic circuit.
4. To provide concept to design different types of logic gates and analyse their transfer characteristics.
5. To provide design concepts to design building blocks of data path of any system using gates.
6. To understand basic programmable logic devices and testing of the circuits.

UNIT I

INTRODUCTION TO IC TECHNOLOGY AND ELECTRICAL PROPERTIES:

Metal-oxide-semiconductor (MOS), P-channel MOS, N-channel MOS, complementary MOS(CMOS) and Bi-CMOS, pass transistor, NMOS inverter, various pull ups, CMOS inverter analysis and design, Bi-CMOS inverters.

IC process technologies- oxidation, lithography, diffusion, ion implantation, metallization, encapsulation, probe testing, integrated resistors and capacitors.

Basic electrical properties: Basic electrical properties of MOS and Bi-CMOS circuits- Ids-Vds relationships, MOS transistor threshold voltage, gm, gds, figure of merit ωo.

UNIT II

VLSI CIRCUIT DESIGN PROCESSES:

VLSI design flow, MOS layers, stick diagrams, design rules and layout, 2μm CMOS design rules for wires, contacts and transistors layout diagrams for NMOS and CMOS inverters and logic gates, scaling of MOS circuits.

UNIT III

GATE LEVEL DESIGN DATA PATH SUBSYSTEMS:

Complex gates, switch logic, alternate gate circuits, time delays, driving large capacitive loads, wiring capacitances, fan-in and fan-out, choice of layers. Data path subsystems: Subsystem design, shifters, adders, ALUs, multipliers, parity generators, comparators, zero/one detectors, counters.

UNIT IV

ARRAY SUBSYSTEMS AND SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN:

SRAM, DRAM, ROM, serial access memory, content addressable memory Semiconductor integrated circuit design: PLAs, FPGAs, CPLDs, standard cells, programmable array logic, design approach, parameters influencing low power design.

UNIT V

CMOS TESTING:

CMOS testing, need for testing, test principles, design strategies for test, chip level test techniques, system-level test techniques, and layout design for improved testability.

Text Books

1. Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, “Essentials of VLSI circuits and systems”, PHI, 2005 Edition.
2. Wayne Wolf, “Modern VLSI Design” Pearson Education, 3rd Edition, 2002.

Reference Books

1. John P. Uyemura “CMOS logic circuit Design”, Springer, 2007.
2. Neil H.E Weste, David Harris, Ayan Banerjee. “CMOS VLSI Design – A circuits and systems perspective”, Pearson, 2009.
3. A. Albert Raj, Latha, “VLSI Design”, PHI, 2008.
4. Mead & Convey, “Introduction to VLSI”, BS Publications, 2010.
5. M. Micheal Vai, “VLSI Design”, CRC Press, 2009.

Course Outcomes

After completing this course, the student will be able to

1. Utilize knowledge about the fabrication process of integrated circuit using MOS transistors.
2. Draw the layout of any logic circuit which helps to understand and estimate parasitic of any logic circuit.
3. Design building blocks of data path using different types of logic gates.
4. Design array of memory using standard cells.
5. Utilize the different types of testing approaches to detect faults that can occur in a system and improve testability of system.

Design Analysis and Algorithms

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A54027	PC	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	50	100

Prerequisites

Data Structures

Course Objectives

1. Analyze the asymptotic performance of algorithms.
2. Apply the Paradigms and approaches to appreciate the impact of algorithm design in practice.
3. Synthesize efficient algorithms in common engineering design situations.
4. Analyze complex engineering problems using backtracking.
5. Utilize data structures and algorithmic design techniques in solving new problems.

Course Outcomes

1. Formulate the knowledge of algorithm analysis and its notations that are applied on the problems solved by divide and conquer paradigm. (L6)
2. Design the major graph algorithms for model engineering problems and knowledge of the greedy paradigm(L6)
3. Apply the dynamic-programming paradigm and recite algorithms that employ this paradigm. (L3)
4. Illustrate the concept of backtracking, branch and bound paradigm for real time problems. (L4)
5. Analyze the complexity of problems and differentiate that in terms of P and NP problems with examples. (L4)

UNIT I

INTRODUCTION: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Disjoint Sets- disjoint set operations, union and find operations

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort.

UNIT II

GRAPHS: breadth first search, depth first search, spanning trees, connected and bi connected components.

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III

DYNAMIC PROGRAMMING: General method, Multi stage graph,applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling salesperson problem.

UNIT IV

BACKTRACKING: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT V

LOWER BOUND THEORY: Comparison trees, NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Clique Decision Problem (CDP), Node cover decision problem

Text Books:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, Fundamentals of Computer Algorithms,Galgotia publications pvt. Ltd, Second Edition, 2007.
2. Thomas H. Cormen,Charles E. Leiserson,Ronald L. Rivert and Clifford Stein, Introdution to Algorithms, Third Edition ,PHI Learning Private Limited , Eastern Economy Edition, 2008.

Reference Books:

1. Aho, Ullman and Hopcroft,Design and Analysis of algorithms, Pearson education, Reprint 2002
2. R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai,Introduction to Design and Analysis of Algorithms A strategic approach, Mc Graw Hill,2005.
3. Allen Weiss,Data structures and Algorithm Analysis in C++,Third edition, Pearson education.

Web Technologies

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A55027	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Basics of Object Oriented programming, Java

Course Objectives

1. To provide knowledge on web architecture, web services.
2. Client side scripting technologies to focus on the development of web-based information systems and web services.
3. To provide skills to design interactive and dynamic web sites.
4. To provide knowledge for implementing web applications with database connection

Course Outcomes

Student will be able to:

1. Design static web pages and provide client side authentication.(L6)
2. Prepare Static Web pages With Validations.(L6)
3. Develop new tag sets using XML mechanism.(L5)
4. Design and develop web applications using JSP and MVC architecture.(L6)
5. Understand database connectivity and retrieving data using client/server database.(L2)

UNIT I

INTRODUCTION TO WEB:

Understanding Internet and Web, Web Architecture, Web servers, protocols: HTTP, Introduction HTML: History of HTML, WWW, HTML Basics: Elements, Attributes, Tags, Tables, Forms, Frames.div and span tags.HTML5

UNIT II

CSS:

Introduction to cascading style sheet, Types of style sheets, page layout, selectors, pseudo classes and elements.CSS3

JAVA SCRIPT: Introduction to scripting, control structures, conditional statements, Arrays functions, objects. JS framework (ReactJS)

HTML DOM:

Predefined object (Window, Location, History, Navigator). Events, DOM Node methods, Navigation, creating nodes, adding nodes, inserting nodes, removing & Replaces Nodes, Form object and Elements, DHTML with Java Script.front end frameworks(bootstrap),

UNIT III

XML: Basics of XML, Elements, Attributes, validation, Name space.

XML Scheme Languages: Introduction to DTD, internal and external DTD, Elements of DTD, DTD Limitations, XML Schema, Schema structure, Elements, parsing XML: XML DOM, Document node, element node, Text node, Java and DOM, Navigating DOM Tree.

UNIT IV

AJAX: Introduction, Environment, Asynchronous communication, process steps, sending and Retrieving Information, Ajax with XML.

Servlets : Introduction, Lifecycle, Generic and HTTP servlet, passing parameters to servlet, HTTP servlet Request & Response interfaces, Deploying web Applications, Session Tracking: Hidden form fields, cookies, URL- Rewriting, session.

UNIT V

JSP: Introduction, Difference Between servlets & JSP, Anatomy of JSP page, JSP elements: Directives, comments, Expressions, scriptlets, Declaration, Implicit JSP objects, using Action elements.
JDBC: Introduction, JDBC Drivers, Loading Driver, establishing connection, Executing SQL statement in JSP pages, MVC architecture.

Text Books:

Uttam K. Roy, Web Technologies, 8th Impression, Oxford Publication, 2014.

Reference Books:

1. Thomas Powell, “The Complete Reference HTML and CSS”, 5th Edition, Tata McGraw Hill, 2010.
2. Thomas Powell, Fritz Schneider, “The Complete Reference JavaScript 2.0”, 3rd Edition, Tata McGraw Hill, 2012.

Embedded Systems

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	Category	Hours / Week			Credits	Marks		
A56090	PC	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

For embedded systems, the course will enable the students to:

1. To identify various application areas and categories of embedded systems.
2. To explore the hardware and software architecture of embedded systems.
3. To provide an overview of ANSI C and its application in embedded programming.
4. To analyze the characteristics and applications of different communication interfaces.
5. To understand the architecture of real-time operating systems (RTOS).

UNIT I

INTRODUCTION TO EMBEDDED SYSTEMS:

What are Embedded systems, Application Areas, categories of Embedded systems, Overview of Embedded system Architecture, Recent Trends in Embedded Systems

UNIT II

ARCHITECTURE OF EMBEDDED SYSTEM:

Hardware Architecture, Software Architecture, Application software, Communication Software, Process of Generating Executable Image, Development/Testing Tools.

UNIT III

PROGRAMMING FOR EMBEDDED SYSTEMS:

Overview of ANSI C, GNU Development Tools, Bit Manipulation, Memory Management, Timing of Programs, Device Drivers, Productivity tools.

PROCESS OF EMBEDD SYTEM DEVELOPMENT:

Development Process, Requirements Engineering, Design, Implementation, Integration and Testing, Packaging.

UNIT IV

COMMUNICATION INTERFACE:

Need for communication, RS232/RS485, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Bluetooth,Wifi.

UNIT V

EMBEDDED/RTOS SYSTEM CONCEPTS:

Architecture of the kernel, Tasks and Task Scheduler, Interrupt Service Routines , Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory management, priority Inversion Problem.

Text Books:

1. Embedded / Real-Time Systems: Concepts, Design and Programming Black Book, New edition Dr. K.V.K Prasad ISBN: 9788177224610
2. Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

Reference Books:

1. Embedded System Design -frank vahid, tony grivargis, john Wiley.
2. Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.
3. Embedded Systems – Raj Kamal, TMH

Course Outcomes

Upon completion of this course, the students will be able to:

1. Able to articulate the concept and importance of embedded systems.
2. Understand the role of application and communication software in embedded systems.
3. Able to write and debug programs in ANSI C for embedded systems
4. Articulate the importance of communication interfaces in embedded systems.
5. Understand task management, scheduling, and interrupt handling in embedded systems.

Project Management

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A56091	OE	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

1. To understand the concept of Project Management.
2. To know about the different approaches to project screening and planning.
3. To explain about the factors of risk involved in project execution.
4. To understand about team leading and functional cooperation.
5. To know about the project performance and future trends in the project management.

Course Outcomes

At the end of this PM course, students will be able to:

1. Explain about the life cycle and other concepts of Project Management.
2. Apply different approaches to project screening and planning
3. Analyze different risk factors in project execution
4. Estimate how to lead a team, to get functional cooperation
5. Build performance evaluation reports and future trends in project management.

UNIT I

INTRODUCTION

Meaning, Need, Principles Project Lifecycle and its Phases, Project Management Research in brief, Project Management today, Organization strategy and structure and culture, Format of organization structure, Stake holder Management, Organization Culture, creating a culture for Project Management.

UNIT II

PROJECT IDENTIFICATION AND PLANNING

Defining the project, Project Identification Process, Approaches to Project Screening and Selection, Project Planning, Work Breakdown Structure, Financial Module, Getting Approval and Compiling a Project Charter, setting up a Monitoring and Controlling Process.

UNIT III

PROJECT EXECUTION

Initiating the Project, Controlling and Reporting Project Objectives, Conducting project evaluation, Risk, Risk Management Factors, Project Management, Four Stage Process, Risk Management an Integrated Approach, Cost Management, Creating a Project Budget.

UNIT IV

LEADING PROJECT TEAMS

Building a Project Team, Characteristics of an effective Project Team, achieving Cross- Functional Co-operation, Virtual Project Teams, Conflicts Management, Negotiations.

UNIT V

PERFORMANCE MEASUREMENT AND EVALUATION

Monitoring Project Performances, Project Control Cycles, and Earned Value Management, Human factors in Project Evaluation and Control, Project Termination, Types of Project Terminations, Project Follow-up. Current and Future Trends in Project Management.

Text Books:

1. Gray, Larson, Project Management, Tata McGraw Hill, 2015
2. Jeffery K. Pinto, Project Management, Pearson Education,2015

Reference Books:

1. Enzo Frigenti, Project Management, Kogan, 2015
2. R. Panneerselvam & P. Senthil Kumar, Project Management, PHI, 2015
3. Thomas M. Cappels, Financially Focused Project Management, SPD, 2008.

Introduction to Electric and Hybrid Vehicles

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A56092	OE	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Course Objectives

Course Objectives of EHV are:

1. To learn about the comprehensive overview of hybrid Electrical Vehicles.
2. To present about the Hybrid Electrical Drive Trains.
3. To understand about the configuration and control of Trains.
4. To know about Energy Storage requirements in Hybrid & Electric Vehicles.
5. To illustrate about Energy Management Strategies.

Course Outcomes

At the end of this EHV course, students will be able to:

1. Explain the importance of hybrid and electric vehicles.
2. Illustrate the drive-train topologies of electric vehicles & hybrid vehicles.
3. Demonstrate the configuration and control of various electrical machines used in electric drive-trains.
4. Choose proper Energy Storage systems for vehicles applications.
5. Identify various energy management strategies.

UNIT I

INTRODUCTION:

CONVENTIONAL VEHICLES: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, and mathematical model to describe vehicle performance.

Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles

UNIT II

HYBRID ELECTRIC DRIVE-TRAINS Basic concept of hybrid traction- Various hybrid Electric Drive-train topologies: Operating modes-Advantages and disadvantage-Front wheel and rear wheel drives-Differential-Electric vehicle drive train-EV architecture-EV drive train configurations

UNIT III

ELECTRIC TRAINS Requirement of EV motor-EV drive using DC motor-Control of DC motor using two quadrant dc-dc converter-EV drive fed induction motor-v/f control of induction motor- Elementary treatment of vector control of induction motor-EV drive fed by PMSM- Elementary treatment of vector control of PMSM

UNIT IV

ENERGY STORAGE Energy Storage Requirements-Battery cell component-Battery performance parameters- Basics of lead acid, lithium ion and nickel metal hydride batteries-Fuel cell principles-Fuel cell based electric vehicle-Ultra capacitor-Fly wheel-Fly wheel with gear mechanism

UNIT V

EV Charging Methods and Infrastructure

Types of Charging methods: Level 1, Level-2 and Level -3, basic block diagrams-Wireless charging-EV charging infrastructure in India.

Text Books:

1. Iqbal Hussein, Electric and Hybrid Vehicles, Design Fundamentals, CRC Press 2003.
2. M. A. Masrur and D. W. Gao, “Hybrid Electric Vehicles: Principles and Applications Practical Perspectives”, John Wiley & Sons, 2011.

Introduction to Communication Systems

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	Category	Hours / Week			Credits	Marks		
A56093	OE	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Prerequisites

Signal and Systems, Linear Algebra.

Course Objectives

The student will be able to

1. Understand the basic principle of a communication system.
2. Perform mathematical analysis of analog communication systems.
3. Outline the process of analog to digital conversion for digital communication systems.
4. Acquire knowledge of digital modulation techniques.
5. Understand the operation of communication networks.

UNIT I

FUNDAMENTALS OF COMMUNICATION SYSTEMS: Elements of Communication System, Source of Information, Electromagnetic Spectrum, Need of Modulation, Communication Channel and its classifications, Shannon's Information Capacity Theorem, Noise analysis- Uncorrelated and Correlated Noise; Signal to Noise Ratio (SNR), Noise Figure,

UNIT II

ANALOG COMMUNICATION: Amplitude Modulation (AM), Double Sideband Suppressed Carrier (DSB-SC) and Single Sideband Suppressed Carrier (SSB-SC)- Definition, Time domain and Frequency domain representation, Waveform representation, Coefficient of Modulation, Voltage, Current and Power Distributions, Frequency Modulation (FM) and Phase Modulation (PM)- Definition, Waveform representations.

UNIT III

Digital Communication- Baseband Transmission: Block Diagram of Digital Communication System, Its Advantages and Disadvantages, Pulse Code Modulation (PCM)- Block Diagram, Sampling Theorem, Quantization, Companding, Disadvantages of PCM, of Differential PCM (DPCM) and Delta Modulation (DM)- Concepts, Block Diagram, Advantages and Disadvantages

UNIT IV

Digital Communication- Passband Transmission: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK) and Phase Shift Keying (PSK)- Definitions, Mathematical Analysis, Waveform Representations, Constellation Diagram, Euclidean Distance, Generation and Detection (Coherent)

UNIT V

Communication Networks: Cellular Networks, Fiber Optics Networks, Satellite Networks- Architectures, Operational Principles, Advantages, Disadvantages, and Applications

Text Books:

1. Electronic Communications System: Fundamentals Through Advanced, Wayne Tomasi, 5th Edition. Pearson Education India, 2009.
2. Communication Systems, Simon Haykin, John Wiley & Sons, 2008.

Reference Books:

1. Kennedy, George, Brendan Davis, and S. R. M. Prasanna. Electronic communication systems.
2. Taub, Herbert, and Donald L. Schilling. "Principles of communication systems." TMH (1991).

3. Lathi, B. P., and Zhi Ding. "Modern analog and digital communication systems." Third generation Oxford University Press, New York (1998)

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Course Outcomes

At the end of this course students will be able to

1. Analyze a communication system with different performance parameters.
2. Examine the operation of an Analog Communication System.
3. Design an analog to digital (A/D) converter for Digital Communication System.
4. Analyze the performance of a Digital Communication System.
5. Evaluate the efficacy of different communication networks.

VLSI Design Lab

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A56291	PC	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Course Objectives

1. To design combinational circuits using HDL
2. To design sequential circuits using HDL
3. To design and analyse combinational circuits using Cadence/mentor graphics
4. To design and analyse sequential circuits using Cadence/mentor graphics

List of Experiments

Note: All experiments from each cycle are to be conducted.

E-CAD PROGRAMS: Programming can be done using any complier. Down load the programs on FPGA/CPLD boards and performance testing may be done by simulation using XILINX or equivalent front-end tools.

CYCLE - 1

1. HDL code to realize all the logic gates
2. Design of full adder using 3 modelling styles
3. Design of flip flops: SR, D.
4. Design of 4 bit binary counter

CYCLE - 2

VLSI EXPERIMENTS:

Experiments can be done using CADENCE or Equivalent CAD tools

Draw the schematic, Layout and perform physical verification, of the following.

1. CMOS inverter
2. CMOS NAND NOR, gates
3. CMOS AND, OR, gates
4. CMOS XOR and MUX gates
5. CMOS 1-bit Full Adder
6. CMOS SR and D Flip Flops
7. Pass Transistor
8. Design of 4 bit binary counter

Requirements

1. PC: P-IV
2. Operating system: Windows XP or Higher version
3. Software: XILINX, Cadence/Mentor Graphics
4. Kits: FPGA Spartan 3 & ZED Boards.

Course Outcomes

After completing the course, students should be able to

1. Realize all logic gates
2. Design combinational circuits
3. Design sequential circuits
4. Understand combinational circuits design using cadence tool
5. Analyse combinational, sequential circuits using CAD Tool.

Web Technologies Lab

B. Tech III Year II Semester					Dept. of Electronics and Computer Engineering			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A56292	PC	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Prerequisites

Client server architecture and able to develop static web application

Course Objectives

Client-side data validation using java script

1. To create dynamic web application using server side technologies
2. To create fully functional web application with MVC architecture.

Course Outcomes

Student will be able to:

1. Design static web pages and provide client side authentication.
2. Develop new tag sets using XML mechanism.
3. Understand database connectivity and retrieving data using client/server database.
4. Design dynamic web pages and develop web applications using MVC architecture.

Week – 1:

Design the following static web pages for College Information System.
web page that includes:

- A header with the College name and a navigation menu.
- A table display the program details menu.

Week – 2:

Design Student Inquiries Form using form tag

Week – 3:

Apply the CSS properties to College Information System web site

Week – 4:

Implement JavaScript Validation for a Student Inquiries Form
Write a JavaScript program to validate the input fields of a student inquiries form. The form should include fields like Name, Email, and Message, and enforce the following validation rules:

- Name: Must not be empty and should only contain alphabets.
- Email: Must follow a valid email format.
- Message: Must not be empty and should have a minimum length of 10 characters.

Week – 5:

Develop a Student Registration Portal using Bootstrap to create a responsive and mobile-friendly user interface.

- The portal will allow students to register by filling out a form
- The registration details will be displayed in a table format.

Week – 6:

Explore the basics of XML to represent a catalog of books or a student database by creating an XML document.
The program should demonstrate:

- Defining well-formed XML structure with elements and nested elements.
- Implementing namespaces to avoid naming conflicts in XML documents.

The program should include a practical example, such as creating an XML file to represent a catalog of books or a student database

Week – 7:

Build a web application to demonstrate parameter passing in Servlets by creating a simple student registration system. The application should:

- Collect student details (e.g., Name, Email, Course) through an HTML form.
- Pass these details as parameters to a Servlet.
- Process and display the details dynamically using the Servlet.