SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

SreeSainath Nagar, Tirupati

Department of Computer Science and Engineering

Syllabus Revision carried out in 2016

Program: B.Tech.-Computer Science and Engineering

Regulations : SVEC-16

This document details the following:

1. Courses where syllabus has been changed 20% and more.
2. Course-wise revised syllabus with changes highlighted.

Note: *For SVEC-16 revised syllabus, SVEC-14 (previous syllabus) is the reference.*

List of Courses where syllabus content has been changed (20% and more)

S. No.	Course Code	Name of the course	Percentage of content changed	Page Number in which Details are Highlighted
1.	16BT30503	Python Programming	100	3
2.	16BT30532	Python Programming Lab	100	5
3.	16BT50502	Linux Programming	26.6	8
4.	16BT50503	Computer Vision	100	13
5.	16BT50504	Data Communications	100	15
6.	16BT50531	Computer Networks Lab	100	18
7.	16BT50533	Object Oriented Analysis and Design Lab	37.5	20
8.	16BT60501	Software Testing	73.3	28
9.	16BT60531	Software Testing Lab	56.25	33
10.	16BT60502	Soft Computing	100	37
11.	16BT60503	Wireless Networks	100	39
12.	16BT60504	Principles of Programming Languages	100	42
13.	16BT70502	Ethical Hacking	100	44
14.	16BT70503	Computer Forensics	100	46
15.	16BT70506	Multimedia Application Development	50	48
16.	16BT71210	High Performance Computing	100	52
17.	16BT50442	Micro Processors and Interfacing	35.5	54
18.	16BT50341	Optimization Techniques	100	58
19.	16BT1HS01	Technical English	20	60
20.	16BT1HS31	English Language Lab	20	64
21.	16BT1BS02	Engineering Physics	20	68
22.	16BT2BS01	Transformation Techniques and Partial Differential Equations	100	72
23.	16BT4HS31	Soft Skills Lab	100	74
24.	16BT6HS05	French Language	100	76
25.	16BT6HS06	German Language	100	78
26.	16BT6HS07	Indian Constitution	100	80
27.	16BT6HS08	Indian Economy	100	82

S. No.	Course Code	Name of the course	Percentage of content changed	Page Number in which Details are Highlighted
28.	16BT6HS09	Indian Heritage and Culture	100	84
29.	16BT6HS10	Indian History	100	86
30.	16BT6HS11	Personality Development	100	88
31.	16BT6HS13	Philosophy of Education	100	90
32.	16BT6HS13	Public Administration	100	92
33.	16BT60112	Building Maintenance and Repair	100	94
34.	16BT60115	Environmental Pollution and Control	40	96
35.	16BT21201	Object Oriented Programming through C++	100	100
36.	16BT21232	Object Oriented Programming Lab	100	102
37.	16BT41204	Theory of Computation	20	106
38.	16BT41203	Software Engineering	35	108
39.	16BT31231	Java Programming Lab	100	112
40.	16BT51233	Web Technologies Lab	20	118
41.	16BT61201	Cloud Computing	42	125
42.	16BT61231	Cloud Computing Lab	100	129
43.	16BT31531	Operating Systems Lab	45	131
44.	16BT61501	Data warehousing and Data mining	45	133
45.	16BT61531	Data warehousing and Data mining Lab	60	137
46.	16BT71508	Internet of Things	100	145
47.	16BT70402	Embedded Systems	80	147
48.	16BT70413	Introduction to Nanoscience and Nanotechnology	100	151
49.	16BT60310	Managing Innovation and Entrepreneurship	50	153
		Average %(A)	77.06	
		Total No. of Courses in the Program (T)	112	
		No. of Courses where syllabus (more than 20% content) has been changed (N)	49	–
		Percentage of syllabus content change in the courses (C)=(A x N)/100	37.76	
		Percentage of Syllabus Content changed in the Program (P)= C/T	**33.71**	

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Sree Sainath Nagar, A. RANGAMPET
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Sree Sainath Nagar, A. RANGAMPET
Chittoor (Dist.) - 517 102, A.P., INDIA,

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II B. Tech. – I Semester
(16BT30503) PYTHON PROGRAMMING

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES:
A Course on "Object Oriented Programming through C++"

COURSE DESCRIPTION:
Data types and Expressions; Control Statements; Strings; Text Files; Lists; Dictionaries; Functions; Objects and their use; Exception Handling; Design with Classes; Graphical User Interface;

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate knowledge in:
· Data Types, Variables, Expressions
· Control statements, Strings and Text files.
· Lists, Dictionaries and Functions.
· Objects and Design with classes
· Exception Handling and GUI
CO2. Analyze complex computational problems.
CO3. Design solutions for real life computational problems
CO4. Solve complex problems using python scripting constructs.
CO5. Implement python scripts using Integrated Development Environment.
CO6. Apply Python programming knowledge to solve problems related to societal applications like Medical and Weather Forecasting.

DETAILED SYLLABUS:
UNIT- I: INTRODUCTION, DATA TYPES AND EXPRESSIONS
(8 periods)
Introduction: Computer science, Computer algorithms, Computer software, The Python programming language, First program in Python.
Data Types and Expressions: Literals, Variables and Identifiers, Operators, Expressions and Data types.

UNIT- II: CONTROL STRUCTURES, LISTS, DICTIONARIES AND SETS **(8 periods)**
Control Structures: Control structures, Boolean expressions, Selection control and Iterative control.
Lists: List structures, Lists in Python, Iterations over lists, Assigning and copying lists, List comprehensions.

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Dictionaries, Tuples and Sets: Dictionary types in Python, Implementation of Dictionary, Tuples, Set data type - the Set data type in Python, Implementation of sets.

UNIT-III: DESIGN WITH FUNCTIONS, STRINGS AND TEXT FILES   **(9 periods)**
Program routines, Functions, Recursion-Recursive functions, Recursive problem solving, Iteration Vs Recursion, A case study of Towers of Hanoi using recursion; Using text files, String processing, Exception handling, A Case study on cigarette Use/ Lung cancer Correlation program.

UNIT-IV: OBJECTS AND THEIR USE, OBJECT ORIENTED PROGRAMMING   **(9 periods)**
Objects and Their Use: Software objects, Turtle graphics-Creating a turtle graphics window, The default turtle, Fundamental turtle attributes and behavior, Additional turtle attributes, Creating multiple turtles.
Object Oriented Programming: Encapsulation, Inheritance, and Polymorphism.

UNIT–V: GUI PROGRAMMING   **(11 periods)**
Tkinter Overview - tkinter pragmatics, Documentation, Extensions, structure; tkinter coding alternatives, adding buttons and callbacks-lambda, bound method, callable class object, Binding events; adding multiple widgets, Reusable GUI Components with classes, Dialogs, Entry, check buttons and Radio buttons, Scales, Menus.

                                Total Periods: 45

TEXT BOOKS:
1.   Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus*, Wiley India Edition, 2016.
2.   Mark Lutz, "Programming Python," O'Reilly Publications, Fourth Edition, 2011.

REFERENCE BOOK:
1.   Kenneth Lambert and B.L. Juneja, *Fundamentals of Python,* Cengage Learning, Third Edition, 2012.

II B. Tech. – I Semester
(16BT30532) PYTHON PROGRAMMING LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		--	--	3	2

PRE-REQUISITES:
A Course on "Python Programming"

COURSE DESCRIPTION:
Hands on practice – Scripting using Python Programming constructs; Conditional statements; Loops; Text Files; Lists; Dictionaries; Strings; Functions; GUI.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate practical knowledge of using python scripting constructs:
·   Selection and Repetition statements.
·   Lists, Dictionaries, Strings and Functions.
·   Text Files and GUI.
CO2.   Analyze the complexity of computer hardware.
CO3.   Design solutions for specified computational problems using Object Oriented Programming concepts
CO4.   Use appropriate python scripts and functions for solving complex problems.
CO5.   Create window based applications using tkinter package
CO6.   Apply contextual knowledge to computational problems related to societal applications like Medical and Weather Forecasting.
CO7.   Work effectively to contribute individually to solve real world problems.
CO8.   Communicate effectively in both oral and written to develop Python scripts.

LIST OF EXERCISES:
1.   a.   Write a python script to display a simple message
       b.   Write a python script to perform basic arithmetic operations on two values
              which are accepted from the user.
2.   a.   Write a python script to calculate the factorial of a given number.
       b.   Write a python script to calculate sum of individual digits of a given number.
       c.   Write a python script to display the prime number series up to the given N Value.

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3.   a.   Write a python script to find the largest number among three numbers and display them in ascending order using if-else construct.

      b.   Write a python script to create a simple text file, write the contents into the created file and display the same on to the console screen.

4.   Write a python script to remove all the occurrences of a given character from a text file, copy the resultant text into another text file. Find the total occurrences of the eliminated characters and display the count along with the contents of the text file on to the console.

5.   a.   Write a python script to display Fibonacci sequence of numbers using while loop, for loop and do-while loop constructs.

      b.   Write a python script to demonstrate string methods.

6.   a.   Write a python script to create a list and add n number of user-defined values to the list and display the same on to the console screen.

      b.   Write a python script to perform the following operations on Lists:
               (i) Matrix Addition.
               (ii) Matrix Multiplication.

7.   a.   Write a python script to search a key element in the given list of elements.

      b.   Write a python script to arrange the given list of elements in ascending or descending order.

8.   a.   Write a python script to find GCD of two numbers using recursive and non recursive functions.

      b.   Write a python script to convert the following using functions:
               (i) Fahrenheit to Celsius temperature.
               (ii) Celsius to Fahrenheit temperature.

9.   a.   Write a python script to draw a square using setposition method in absolute positioning.

      b.   Write a python script to draw a triangle using left, right and Forward methods in relative positioning.

      c.   Write a python script using penup and pendown methods to draw "W" character using turtle graphics.

      d.   Write a python script to create your own polygon shape and create an interesting design with it.

10.	a.	Write a GUI Script for creating text label in a window.
	b.	Write a Python Script to create a command button. When the button is clicked the event should be handled and the message on the window should change from "Hello" to "Good Bye".
11.	a.	Write a python script to demonstrate the Exception Handling.
	b.	Write a Python script to demonstrate the Mouse and Key Event handling.
	c.	Write a python script to demonstrate menu-driven applications
12.		By forming a group of 3 to 4 members develop a mini-project for Horse Race Simulation with the help of GUI programming and tkinter package.

REFERENCE BOOKS:

1 Charles Dierbach, *Introduction to Computer Science using Python: A Computational Problem-Solving Focus,* Wiley India Edition, 2016.
2. Mark Lutz, *Programming Python,* O'Reilly Publications, Fourth Edition, 2011.

(16BT50502) LINUX PROGRAMMING

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES:
A Course on "Operating Systems"

COURSE DESCRIPTION:
Concepts on Linux Programming; Shell Programming; Process, Signals and File System Structure; Inter process Communications and Socket Programming for Client-Server Interaction.

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

CO1. Demonstrate knowledge on
- Shell programming
- File Structure and System Calls
- Processes management and handling signals,
- IPC and Sockets

CO2. Analyze shell scripts and system calls related to Linux Environment.

CO3. Design shell scripts and system calls for specified computational problems

CO4. Use appropriate shell scripts and system calls for solving complex problems.

CO5. Provide appropriate Linux solutions for real time applications

CO6. Apply contextual knowledge to solve problems related to societal issues.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO LINUX AND LINUX ENVIRONMENT   (9 Periods)
The GNU project and the Free Software Foundation, Linux distributions, Programming Linux - Linux programs, Text editors, The C Compiler; Program arguments - getopt, getopt_long. Environment variables - Use of environment variables, The environ variable, Time and Date, User information, Host information.

UNIT-II: SHELL PROGRAMMING   (9 Periods)
Necessity of shell programming, Pipes and redirection - Redirecting output, Redirecting input, Pipes, The Shell as a programming language - Interactive programs, Creating a script, Making a script executable, Shell syntax – Variables, Conditions, Control structures, Functions, Commands, Command execution.

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UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS
(9 Periods)
Linux File Structure and Commands: File structure - Directories, Files and devices, System calls and Device drivers; Library functions - Low-level file access, write, read and open commands, Initial permissions, Other system calls for managing files; File and directory maintenance commands - chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd.
Input-Output Commands: The standard I/O library commands - fopen, fread, fwrite, fclose, fflush, fseek, fgetc, getc, and getchar, fputc, putc and putchar, fgets and gets; Formatted input and output commands - printf, fprintf, sprintf, scanf, fscanf, sscanf.

UNIT-IV: PROCESS AND SIGNALS   (8 Periods)
Process structure - Process table, Viewing processes, System processes, Process scheduling; Starting new processes - Waiting for a process, Zombie processes, Input and output redirection, Threads; Signals - Sending signals, Signal sets.

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS
(10 Periods)
Inter-Process Communication: Pipe definition, Process pipes, Sending output to popen - Passing more data, popen, implementation, The pipe call; Parent and child processes - Reading closed pipes, pipes used as standard input and output; Named pipes – FIFOs, Accessing a FIFO, Client/Server using FIFOs.
Socket Connections: Socket attributes, Creating a socket, Socket addresses, Naming a socket, Creating a socket queue, Accepting connections, Requesting connections, Closing a socket, Socket communications, Host and network byte Ordering.

Total Periods: 45

TEXT BOOK:
1.   Neil Matthew and Richard Stones, *Beginning Linux Programming,* Wiley Dreamtech, Fourth Edition, 2008.

REFERENCE BOOKS:
1.   Richard Petersen, *Linux: The Complete Reference,* Tata McGraw-Hill, Sixth edition, 2007.
2.   Sumitabha Das, *Your UNIX: The Ultimate Guide,* Tata McGraw-Hill, 2007.

III B. Tech (CSE) – I Semester
14BT50502: UNIX INTERNALS
(Common to CSE & IT)

Int. Marks: 30   Ext. Marks: 70   Total Marks: 100

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L  T  P  C
3  1  -  3
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PREREQUISITES : A Course on "Operating Systems".

COURSE DESCRIPTION:
Concepts on internal structure of Unix Operating Systems, Utilities, Shell Programming, Process, Signals, File Locking to provide Security, Inter process Communications and Socket Programming for client server Interaction.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to

CO1: Gain knowledge on
  • Internal Structure of UNIX Operating System,
  • Utilities and shell programming
  • Processes management and handling signals,
  • File Locking
  • Sockets and IPC.

CO2: Analyze and identify the system calls to interact with Unix Environment.

CO3: Implement UNIX applications using Shell Scripting for simple problems and C programming for IPC and Sockets.

DETAILED SYLLABUS

UNIT–I: INTRODUCTION TO UNIX AND UTILITIES
                                                    (9 periods)
General Review of the System: History of UNIX, Architecture of Unix, User Perspective.
The Buffer Cache: Headers, Buffer Pool, Scenarios for Retrieval of a Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages.
Utilities: General Purpose Utilities, File Handling Utilities, Security by File Permissions, Process Utilities, Disk Utilities, Networking Commands.

UNIT-II: SHELL PROGRAMMING

(8 periods)

Text Processing Utilities and Backup Utilities. Shell, Shell Responsibilities, Types of Shell, Pipes and I/O Redirection, Shell as a Programming Language, Shell Syntax: Variables, Conditions, Control Structures, Functions, Commands, Command Execution, Shell Scripts.

UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS

(10 periods)

Introduction to Unix File System, File Descriptors, Inode Representation, Super Block, System Calls and Library Functions. Low Level File Access: open, read, write, close, lseek, stat, fstat, lstat, ioctl, umask, dup and dup2. The Standard I/O Library: fopen, fread, fwrite, fclose, fflush, fseek, fgetc, fputc, fgets. Formatted Input and Output: printf, fprintf, sprint, scanf, fscanf, and sscanf. File and Directory Maintenance: chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir.

Scanning directories: opendir, readdir, telldir, seekdir, rewinddir, closedir.

UNIT-IV: PROCESS, SIGNALS AND FILE LOCKING

(9 periods)

Process, Process Identifiers, Process Structure, Zombie Processes, Orphan Process, fork, vfork, exit, wait, waitpid, exec, Signals functions, Unreliable Signals, Interrupted System Calls, kill, raise, alarm, pause, abort, system, sleep Functions, Job Control Signals.

Data Management: Managing Memory: malloc, free, realloc, calloc, File Locking: Creating Lock Files, Locking Regions, Use of Read and Write with Locking, Competing Locks, Other Lock Commands-Advisory Locking, Mandatory Locking; Deadlocks.

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS

(9 periods)

Pipe, Process Pipes, The Pipe Call, Parent and Child Processes, Named Pipes: FIFOs, Semaphores: semget, semop, semctl, Message Queues: msgget, msgsnd, msgrcv, msgctl, Shared Memory: shmget, shmat, shmdt, shmctl, IPC Status Commands. Socket, Socket Connections - Socket Attributes, Socket Addresses, socket, connect, bind, listen, accept, Socket Communications.

(Total periods: 45)

TEXT BOOKS:
1. Neil Matthew, Richard Stones, "Beginning Linux Programming," Wiley Dreamtech, 2004.
2. Maurice J. Bach, "The Design of the Unix Operating System," Pearson Education, 2002.

REFERENCE BOOKS:
1. Sumitabha Das, "Your Unix The Ultimate Guide," TMH, 2007.
3. W. Richard. Stevens, "Advanced Programming in the UNIX Environment," 2nd edition, Pearson Education, 2005.

(16BT50503) COMPUTER VISION
(Interdisciplinary Elective–1)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES:
A course on "Computer Graphics"

COURSE DESCRIPTION:
Introduction to Computer Vision; Geometric Camera Models, Light, Color, Texture; Stereopsis; Segmentation by Clustering, Classification; Detection of Objects; Object Recognition and Information Retrieval.

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

CO1. Demonstrate knowledge on geometric camera models, light, color, texture, stereopsis, segmentation, and classification, detection of objects, object recognition and information retrieval procedures.

CO2. Analyze the digital image by Texture and Stereopsis methods.

CO3. Design solutions for image analysis problems by segmentation and classification techniques.

CO4. Develop novel techniques and efficient algorithms for image synthesis.

CO5. Apply clustering, classification, object recognition and information retrieval techniques for image analysis.

CO6. Use Contextual knowledge to solve problems related to societal issues.

DETAILED SYLLABUS:

UNIT-I: GEOMETRIC CAMERA MODELS, LIGHT AND COLOR
(10 Periods)

Geometric Camera Models: Image formation – Pinhole perspective, Weak perspective, Cameras with lenses, The human eye.

Light: Modelling pixel brightness – Reflection at surfaces, Sources and their effects, the Lambertian with specular model, Area sources.

Color: Human color perception, The physics of color, Representing color, A model of image color, Inference from color – Finding specularities using color, Shadow removal using color.

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UNIT-II: TEXTURE AND STEREOPSIS   (9 Periods)
Texture: Local texture representations using filters, Pooled texture representations by discovering textons, Synthesizing textures and filling holes in images, Image denoising, Shape from texture.
Stereopsis: Binocular camera geometry and the epipolar constraint, Binocular reconstruction, Human stereopsis.

UNIT-III: SEGMENTATION BY CLUSTERING   (9 Periods)
Grouping and Gestalt, Important applications – Background subtraction, Shot boundary detection, Interactive segmentation, Forming imaging regions; Image segmentation by clustering pixels; Segmentation, clustering and graphs – Terminology and facts for graphs, Agglomerative clustering with a graph, Divisive clustering with a graph, Normalized cuts.

UNIT-IV: CLASSIFICATION AND DETECTION OF OBJECTS
**   (9 Periods)**
Learning To Classify: Classification, Error and Loss – Using loss to determine decisions, Training error-test error-and-overfitting, Regularization, Error rate and cross-validation, Receiver operating curves.
Classifying Images - Classifying images of single objects.
Detecting Objects in Images – The sliding window method.

UNIT-V: OBJECT RECOGNITION, INFORMATION RETRIEVAL AND APPLICATIONS   (8 Periods)
Object Recognition: Categorization, Selection, Feature questions, Geometric questions, Semantic questions.
Basic Technologies from Information Retrieval: Word counts, Smoothing word counts, Approximate nearest neighbors and hashing, Ranking documents.
Applications: Classifying materials and scenes.

Total Periods: 45

TEXT BOOK:
1. David A. Forsyth and Jean Ponce, *Computer Vision: A Modern Approach,* Pearson Education, Second Edition, 2015.

REFERENCE BOOK:
1. Rafael C. Gonzalez, Richard E. Woods and Steven L. Eddins, *Digital Image Processing using MATLAB,* Tata McGraw Hill Education, Second Edition, 2010.

(16BT50504) **DATA COMMUNICATIONS**
(Interdisciplinary Elective – 1)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES:
Courses on "Digital Logic Design" and "Basic Electronic Devices and Circuits"

COURSE DESCRIPTION:
Concepts of Data Communication; Transmission Media-metallic and optical fiber, Digitization techniques–PCM; Multiplexing, Wireless Communication Systems; Telephone and Cellular Concepts; Data Communication Equipment

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate knowledge on
  - Data communication and networking
  - Digital transmission and multiplexing
  - Telephone and cellular concepts
  - Data communication codes and equipment
CO2. Analyze various types of modulation and multiplexing techniques.
CO3. Design wireless communication equipment to fulfill networking requirements.
CO4. Solve problems pertaining to analog or digital communication system in terms of complexity of the transmitters and receivers.
CO5. Use Data communication hardware and equipment for data communication.
CO6. Contribute towards societal issues and responsibilities in designing and developing   sustainable networks.

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO DATA COMMUNICATIONS, NETWORKING, SIGNALS, NOISE, MODULATION AND DEMODULATION   (9 periods)
Introduction to Data Communications And Networking:
Data communication network architecture, Protocols and standards, Standards organizations for data communications, Layered network architecture, Data communications circuits, Serial and parallel data transmission, Data communications circuit arrangements, Data communication networks.

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Signals, Noise, Modulation and Demodulation: Signal analysis, Electrical noise and signal-to-noise ratio, Analog modulation systems, Information capacity, Bits, Bit rate, Baud and M-ary encoding, Digital modulation.

UNIT-II: DIGITAL TRANSMISSION, MULTIPLEXING AND T CARRIERS **(9 periods)**
Digital Transmission: Pulse modulation, Pulse Code Modulation (PCM), Linear versus nonlinear PCM codes, Companding, PCM line speed.
Multiplexing and T Carriers: Time-division multiplexing, T1 digital carrier system, Digital line encoding, T carrier systems, Frame synchronization, Frequency-division multiplexing, Wavelength-division multiplexing.

UNIT-III: WIRELESS COMMUNICATIONS SYSTEMS, TELEPHONE INSTRUMENTS AND SIGNALS **(9 periods)**
Wireless Communications Systems: Electromagnetic polarization, Rays and wave fronts, Electromagnetic radiation, Spherical wave front and the inverse square law, Wave attenuation and absorption, Optical properties of radio waves, Terrestrial propagation of electromagnetic waves, Basics of microwave communications systems and satellite communications systems.
Telephone Instruments and Signals: The subscriber loop, Standard telephone set, Basic telephone call procedures, Call progress tones and signals, Cordless telephones, Caller ID, Electronic telephones, Units of powers measurement, Crosstalk.

UNIT-IV: CELLULAR TELEPHONE CONCEPTS AND DATA COMMUNICATIONS CODES **(9 periods)**
Cellular Telephone Concepts: Mobile telephone service, Cellular telephone, Interference, Cell splitting, Sectoring, Segmentation, Dualization, Topology, Roaming and handoff, Network components, First-generation analog cellular telephone, Second-generation cellular telephone systems, Digital cellular telephone.
Data Communications Codes and Error Control: Data communications character codes, Bar codes.

UNIT-V: DATA COMMUNICATION HARDWARE AND EQUIPMENT **(9 periods)**
Data Communications Hardware: Data communication hardware, Data communication circuits, Line control unit, Serial interfaces.
Data Communications Equipment: Digital service unit and channel service unit, Voice-band data communication modems,

Bell systems-compatible voice-band modems, Voice-band modern block diagram, Voice- band modem classifications, Asynchronous voice-band modems, Synchronous voice-band modems, Modem synchronization, ITU-T voice-band modem specifications, 56K modems, Probability of error and bit error rate.

Total Periods: 45

TEXT BOOK:
1.   Wayne Tomasi, *Introduction to Data Communications and Networking,* Pearson Education, First Edition, 2005.

REFERENCE BOOKS:
1.   Behrouz A. Forouzan, *Data Communications and Networking,* Mc-Graw Hill, Fifth Edition, 2013.
2.   Fred Halsall, *Data Communications, Computer Networks and Open Systems*, Pearson Education, Fourth Edition, 1996.

(16BT50531) COMPUTER NETWORKS LAB
(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		--	--	3	2

PRE-REQUISITES:
A Course on "Computer Networks"

COURSE DESCRIPTION:
Hands on Practice on Data Link Layer Framing Methods; Routing Algorithms; Congestion Control Algorithms; Connection Management in Transport Layer;

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

CO1.   Demonstrate Knowledge on:
- Framing methods for data link layer,
- Shortest path using Dijkstra's routing algorithms

CO2.   Identify suitable algorithm to find shortest path in a given network

CO3.   Design and compute subnet masks and addresses for networking Requirements.

CO4.   Solve problems related to Flow control, Error control, congestion control and Network Routing.

CO5.   Apply Latest software tools and technologies for designing simple to complex applications in computer networks.

CO6.   Assess the impact of wired and wireless Networks in the context of societal applications like VoIP, Multi-user Network Games, Internet of Things.

CO7.   Work effectively as an individual to implement mini-project.

CO8.   Demonstrate communication skills both oral and written for preparing and generating reports.

LIST OF EXERCISES:
1.   Implement the following data link layer framing methods.
     i.   Character count.
     ii. Character stuffing.
     iii. Bit stuffing.
2.   Implement the frame sorting technique used in buffers.
3.   Design and develop a program to compute checksum for the given frame 1101011011 using CRC-12, CRC-16, and CRC-CCIP. Display the actual bit string transmitted. Suppose any bit is inverted during transmission. Show that this error is detected at the receivers end.

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4. Implement Dijkstra's algorithm to compute the Shortest path for the given graph.
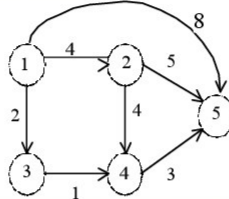
5. Develop a program to obtain routing table for each node using Distance Vector Routing Algorithm by considering the given subnet with weights indicating delay between Nodes.
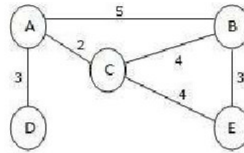
6. Write a program to simulate flow based routing.
7. Write a program to simulate random early detection congestion control algorithm.
8. Using TCP/IP sockets, write a client-server program to open a file available in the   server.
9. Write a program for congestion control using leaky bucket algorithm.
10. Write a program for the Mail Client
   i.   POP Client: Gives the server name, user name and password retrieve the mails and allow manipulation of mail box using POP commands.
   ii. SMTP Client: Gives the server name, send e-mail to the recipient using SMTP commands
11. Write a program for HTTP server to implement the commands - GET, POST, HEAD and DELETE. The server must handle multiple clients.

REFERENCE BOOK:

1. Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks,* Pearson Education, Fifth edition, 2015.

III B. Tech. – I Semester
(16BT50533) OBJECT ORIENTED ANALYSIS AND DESIGN LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		--	--	3	2

PRE-REQUISITES:
A Course on "Object Oriented Analysis and Design"

COURSE DESCRIPTION:
Hands on Practice to Design and Implement - Automated Teller Machine, Library Information System, Online Ticket Reservation System, Point of Sales, Airport Simulation, Course Registration System, Home Appliance Control System and Hospital Management System using Object-Oriented Language.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate practical knowledge on principles of object oriented analysis and design through UML diagrams.
CO2.   Analyze user requirements and identify suitable structural and behavioral modeling components.
CO3.   Design and develop UML models for real time applications.
CO4.   Solve real world problems by applying structural and behavioral modeling techniques.
CO5.   Use UML to design the software system.
CO6.   Apply contextual knowledge of UML models to assess societal issues.
CO7.   Involve as individual to solve case studies.
CO8.   Develop a model for complex computational activities by preparing and presenting reports through effective communication.

LIST OF EXERCISES:
Case studies given below should be Modeled using Visual Modeling tools in different views i.e. Use case view, logical view, component view, Deployment view.

CASE STUDY 1: AUTOMATED TELLER MACHINE (ATM)
Problem Statement:
Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a

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relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 2: LIBRARY INFORMATION SYSTEM
Problem Statement:
A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned back to the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 3: ONLINE TICKET RESERVATION FOR RAILWAYS
Problem Statement:
Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so that the ticket reservation can be done over the online ticket reservation system. During the booking of the ticket reservation, passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus, the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and AC compartment. Design the application for the above problem description.

CASE STUDY 4: A POINT OF SALE (POS) SYSTEM
Problem Statement:
A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer, bar code scanner and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily

unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client-side terminals and interfaces such as browser, PDA's and touch-screens.

CASE STUDY 5: A MULTI-THREADED AIRPORT SIMULATION
Problem Statement:
Simulate the operations in an airport. Your application should multiple aircrafts using several runways and gates avoiding collisions/conflicts. Loading: an aircraft uses the runway, lands and then taxis over to the terminal. Take-Off an aircraft taxies to the runway and then takes off.

CASE STUDY 6: ONLINE STUDENT COURSE REGISTRATION SYSTEM FOR UNIVERSITY
Problem Statement:
At the beginning of each semester students may request a course catalogue containing a list of course offerings for the semester. Information about each course, such as professor, department, and prerequisites will be included to help students make informed decisions. The new on-line registration system will allow students to select four course offerings for the coming semester. In addition, each student will indicate two alternative choices in case a course offering becomes filled or cancelled. No course offering will have more than ten students. No course offering will have fewer than three students. A course offering with fewer than three students will be cancelled. Once the registration process is completed for a student, the registration system sends information to the billing system, so the student can be billed for the semester. Professors must be able to access the on-line system to indicate which courses they will be teaching. They will also need to see which students signed up for their course offering. For each semester, there is a period of time that students can change their schedules. Students must be able to access the on-line system during this time to add or drop courses. The billing system will credit all students for courses dropped during this period of time.

CASE STUDY 7: HOME APPLIANCE CONTROL SYSTEM
Problem Statement:
A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top.A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller,

indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

CASE STUDY 8: HOSPITAL MANAGEMENT SYSTEM
Problem Statement:
Hospital Management System (HMS) is state-of-the-art software that offers comprehensive solutions to various segments of Healthcare Industry such as Super Specialty, Multi-specialty and General Hospitals of varied capacities, small Nursing Homes, HMOs, Polyclinics and General Practitioners. This HMS solution addresses the issues from multi-discipline angels namely patients, Doctors, Pharmacy, Hospital Management and Services. The software provides both clinical as well as patient care aspects to hospital management. The software is divided into different modules, each addressing a specific activity of the hospital and there by facilitating better patient care. Each module can be used as a standalone solution or can be integrated in a phased manner. Modules are designed so that they meet the present and future requirements of the hospital. HMS offers various sub-systems and a seamless integration. By being modular, each module can be used as a standalone solution or can be integrated in a phased manner. Modules are also so designed to meet the present as well as future requirements of the organization and process a unique ability with the business growth. HMS consists of the Base modules, Add-on modules and Specialty modules. Additional modules both add-on and specialty modules can be seamlessly integrated to the HMS at any time. The Integration Manager takes care of all the data consistency issues.

REFERENCE BOOKS:
1.   Grady Booch, James Rum Baugh and Ivar Jacobson, *The Unified Modeling Language User Guide*, Pearson Education, Second Edition, 2009.

2.   Hans-Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, *UML 2 Toolkit,* Wiley Dreamtech India Pvt. Ltd., 2004.

III B.Tech II-Semester
14BT60521: OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY
(Common to CSE,CSSE & IT)

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

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L  T  P  C
-  -  3  2
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PREREQUISITE: A Course on "Object Oriented Analysis & Design"

COURSE DESCRIPTION: Modeling case studies - Automated Teller Machine, Library Information System, Online Ticket Reservation system, Point of sales etc.,

COURSE OUTCOMES:
After successful completion of the course student will be able to

CO 1   Apply Unified Modeling Language to design software system.
CO 2   Analyze the static and dynamic aspects of software system.
CO 3   Model the design for given set of requirements.
CO 4   Develop UML models for real world applications.

Case studies given below should be Modeled using Visual Modeling tools in different views i.e Use case view, logical view, component view, Deployment view.

CASE STUDY 1:

AUTOMATED TELLER MACHINE (ATM)

Problem Statement:

Software is designed for supporting a computerized ATM banking network. All the process involved in the bank is computerized these days. All the accounts maintained in the bank and also the transactions effected, including ATM transactions are to be processed by the computers in the bank. An ATM accepts a relevant cash card, interacts with user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system to be designed and implemented must include appropriate record keeping and security provisions. The system must handle concurrent access to the same account.

CASE STUDY 2:

LIBRARY INFORMATION SYSTEM

Problem Statement:

A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. A member can reserve a book or magazine that is not currently available in the library, so that when it is returned back to the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the systems.

CASE STUDY 3: ONLINE TICKET RESERVATION FOR RAILWAYS

Problem Statement:

Computer play an integral part of the day in today's life. It makes the entire job easier and faster, every job is computerized so as the ticket reservation we can book over the online ticket reservation system. During the booking of the ticket reservation passenger has to select origin, date of journey, destination, class of train etc. The reservation counter keeps track of passenger's information. Thus the system will have all the details about the trains and facilities provided by them. There are various trains with the different level of convenience for the passengers. The whole database will be maintained by database administrator. There are varieties of trains where the passengers can select the train according to the convenience for their destination journey. The journey could be within the state or across the India. Each train has the three types of classes i.e. Sleeper class, First class and the AC compartment. Design the application for the above problem description.

CASE STUDY 4: A POINT OF SALE (POS) SYSTEM

Problem Statement:

A POS System is a computerized application used to record sales and handle payments; it is typically used in a retail store. It includes hardware components such as a computer and bar code scanner, and software to run the system. It interfaces to various service applications, such as a third-party tax calculator and inventory control. These systems must be relatively fault tolerant; that is, even if remote services and temporarily unavailable they must still be of capturing sales and handling at least cash payments. A POS system must support multiple and varied client - side terminals and interfaces such as browser, PDA's, touch - screens.

CASE STUDY 5: RECRUITMENT PROCEDURE FOR SOFTWARE INDUSTRY

Problem Statement:

In the software industry the recruitment procedure is the basic thing that goes in the hand with the requirement as specified by the technical management team. HR first gives an advertisement in leading Newspapers, Journals, Weeklies and Websites. The job seekers can apply for it through by Post or by e-mail to the company. The technical skill and the experience of the candidates are reviewed and the short listed candidates are called for the interview. There may be different rounds for interview like the written test, technical interview, and HR interview. After the successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: ONLINE AUCTION SALES

Problem Statement:

The online auction system is a design about a website where sellers collect and prepare a list of items they want to sell and place it on the website for visualizing. To accomplish this purpose the user has to access the site. Incase it's a new user he has to register. Purchaser's login and select items they want to buy and keep bidding for it. Interacting with the purchasers and sellers through messages does this. There is no need for customer to interact with the sellers because every time the purchasers bid, the details will be updated in the database. The purchaser making the highest bid for an item before the close of the auction is declared as the owner of the item. If the auctioneer or the purchaser doesn't want to bid for the product then there is fixed cutoff price mentioned for every product. He can pay that amount directly and own the product. The purchaser gets a confirmation of his purchase as an acknowledgement from the website. After the transition by going back to the main menu where he can view other items.

CASE STUDY 7: TWO FLOOR ELEVATOR SIMULATOR

The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going

up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed. In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

CASE STUDY 8: HOME APPLIANCE CONTROL SYSTEM

A home appliance control system (HACS) is a system which provides various services to remotely operate on home appliances, such as microwave oven, TV, and garage door etc through remote devices such as mobile phone, desktop and palm-top. A home appliance control system (HACS) is a system which is controlled by a remote system such as a mobile phone or a palm-top, and at the same time controls, monitors and coordinates home appliances such as air conditioner, microwave oven, garage doors, TV set, VCR, audio controller, indoor/outdoor lights, water sprinkler, home security system, bath tub controller, etc. In order to activate home appliances and to allow for different ways of cooking, the HACS needs mechanisms for communication between the different devices in the system, and for coordination among the various processes running on such devices. The system administrator of the HACS system has the ability to add a new appliance or delete an existing one. The system administrator has the ability to add a new remote device and configure it with HACS or delete an existing one when it is not used. Also the system administrator can create an account for a new user or delete existing account if it is no longer used.

REFERENCE BOOKS:
1. Grady Booch, James Rum Baugh, Ivar Jacobson, "The Unified Modeling Language User Guide," 2 ed, Pearson Education, 2009
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, "UML 2 Toolkit," WILEY-Dreamtech India Pvt. Ltd., 2003.
3. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML," Pearson Education, 2000.
4. Pascal Roques, "Modeling Software Systems Using UML2," WILEY-Dreamtech India Pvt. Ltd, 2004.
5. Craig Larman, "An introduction to Object - Oriented Analysis and Design and Unified Process Applying UML and Patterns," Pearson Education, 2002.

(16BT60501) **SOFTWARE TESTING**

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	--	3

PRE-REQUISITES:
A course on "Software Engineering"

COURSE DESCRIPTION:
Software Testing Basics: Goals, Defects, Terminology, Methodology, STLC in SDLC, Verification & Validation; Software Testing Techniques: White box testing, Black Box Testing, Regression testing; Test Management: Test Planning, Design & Specifications; Test Automation: Tool selection & Guidelines.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate knowledge on
 • Software Testing Life Cycle.
 • Testing Techniques.
 • Test Management & Metrics.
 • Regression Testing
 • Test Automation
CO2. Analyze testing circumstances and their resultants in software development.
CO3. Design and develop the appropriate test cases in accordance to the software development model.
CO4. Use problem solving skills to control and monitor the testing process
CO5. Apply testing tools for testing the software quality.
CO6. Apply contextual knowledge to perform testing on software related to societal applications

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO SOFTWARE TESTING
(9 periods)
Evolution of Software Testing, Software Testing—Myths and Facts, Goals of software testing, Psychology for software testing, Software testing definitions, Model for software testing, Effective software testing vs. exhaustive software testing. Effective testing is hard, Software testing as a process.
Terminology and Methodology: Software testing terminology, Software Testing Life Cycle (STLC), Software testing methodology.

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UNIT-II: WHITE BOX TESTING   **(9 periods)**
Need of white-box testing, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, Data flow testing, Mutation testing.

UNIT-III: BLACK BOX TESTING   **(8 periods)**
Boundary Value Analysis (BVA), Equivalence class testing, State table-based testing, Decision table-based testing, Cause-effect graphing based testing, Error guessing.

UNIT-IV: SOFTWARE TEST MANAGEMENT AND METRICS
                                        (10 periods)
Test Management: Test organization, Structure of testing group, Test planning, Detailed test design, Test specifications. **Software Metrics**: Definition of software metrics, Classification of software metrics, Size metrics.

UNIT-V: REGRESSION AND AUTOMATION   **(9 periods)**
Regression Testing: Progressive vs. regressive testing, Regression testing produces quality software, Regression testability, Objectives of regression testing, Regression testing types, Defining regression test problem, Regression testing techniques.
Automation and Testing Tools: Need for automation, Categorization of testing tools, Selection of testing tools, Costs incurred in testing tools, Guidelines for automated testing, Overview of some commercial testing tools.

                                        Total Periods: 45
TEXT BOOK:
1.   Naresh Chauhan, *Software Testing: Principles and Practices,* Oxford University Press, Second Edition, 2016.

REFERENCE BOOKS:
1.   Boris Beizer, *Software Testing Techniques,* Dream Tech Press, Second Edition, 2004.
2.   Dr. K. V. K. K. Prasad, *Software Testing Tools,* Dreamtech, First Edition, 2004.

IV B.Tech – I Semester
14BT71204: SOFTWARE TESTING TECHNIQUES
(Common to CSE,CSSE&IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

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L  T  P  C
3  1  -  3
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PREREQUISITES: A Course on "Software Engineering".

COURSE DESCRIPTION: Basic & Advance concepts of Software Testing and Techniques: STLC in SDLC, Coverage, Verification & Validation Models, Workbenches, Defects management, White box testing, Black box testing, Integration testing, System testing, Automation tools.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Demonstrate in-depth knowledge in software testing methodologies, test strategies.
CO2. Analyzing testing circumstances and their resultants in software development.
CO3. Design & develop the best tests strategies in accordance to the development model.
CO4. Acquire problem solving skills to ensure quality software development meeting the industry standards.
CO5. Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

DETAILED SYLLABUS:

UNIT-I: BASIC CONCEPTS OF SOFTWARE TESTING
(9 periods)
Software Testing Fundamentals: Definition, Approaches, Testing during SDLC, Traceability Matrix, Essentials of Software Testing, Workbench, Features of Test Process, Misconceptions about Testing, Principles of Software Testing, Salient features of Good Testing, Test Policy, Test Strategy, Test Planning, Challenges in Testing, Categories of Defect, Defect, Error/Mistake in Software, Test Process, Skills required by Tester

UNIT-II: ADVANCED CONCEPTS OF SOFTWARE TESTING
(9 periods)

Software Verification & Validation: Verification, Verification Workbench, Methods of Verification, Types of Reviews, Reviews in STLC, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Management of Verification & Validation.

V-Test Model: V-model for Software, Testing during - Proposal Stage, Requirement Stage, Test-Planning Stage, Design Phase, Coding. VV Model, Critical Roles and Responsibilities.

Defect Management: Defect Classification, Management Process, Lifecycle, Template, Fixing & Root Cause of Defect, Estimating impact of Defect, Defect Management needing the Risk, Techniques for finding Defects, Reporting a Defect.

UNIT-III: TESTING TECHNIQUES –I   **(9 periods)**
Flow Graphs and Path Testing: Path-Testing Basics, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Implement and Application of Path Testing.

Transaction-Flow Testing and Data-Flow Testing: Transaction Flows, Transaction-Flow Testing Techniques, Dataflow Testing Basics, Data-Flow Testing Strategies, Application, Tools, Effectiveness.

UNIT-IV: TESTING TECHNIQUES –II   **(10 periods)**
Logic Based Testing: Motivational Overview, Decision Tables, Path Expressions Again, KV Charts, Specifications.

State Graphs And Transition Testing: State Graphs, Good State Graphs and Bad, State Testing, Testability Tips.

UNIT-V: TESTING TOOLS AND TEST PLANNING
(8 periods)
Testing Tools: Features of Test Tool, Guidelines for selecting Test Tools, Tools and Skills of Tester, Static & Dynamic Testing Tools, Advantages & Disadvantages of using Test Tools, When to use Automated Test Tools, Testing using Automated Tools, Difficulties while introducing New Tools.

Test Planning: Test Policy & its contents, Strategy & its contents, Test Plan, Quality Plan & Test Plan, Quality Plan Template, System Test Plan Template, Guidelines for developing a Test Plan, Test Estimation, Test Standards, Test Scenarios & Test cases, Template for Test cases, Test Scripts, Building Test Data, Generation of Test Data, Roles & Responsibilities in STLC.

(Total periods: 45)

TEXT BOOKS:

1. M.G.Limaye, "Software Testing: Principles and Techniques and Tools," Tata Mc Graw - Hill Education, 1ST Edition, 2009.
2. Boris Beizer, "Software Testing Techniques," Dream Tech Press, 2nd Edition, 2004.

REFERENCE BOOKS:

1. Ilene Burnstein,"Practical Software Testing," Springers-Verilog International Edition, 2003.
2. Dr.K.V.K.K.Prasad, "Software Testing Tools," Dreamtech, 1st Edition, 2004.

III B. Tech. – II Semester
(16BT60531) SOFTWARE TESTING LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		--	--	3	2

PRE-REQUISITES:
A course on "Software Testing"

COURSE DESCRIPTION:
Hands on Practice to Develop Functional, System, Regression and Acceptance tests; White Box Testing & Black Box Testing; Test Automation.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate practical knowledge of
- White Box Testing
- Black Box Testing
- Regression Testing
- Test Automation

CO2.   Analyze the software requirements and report the bugs.
CO3.   Design test cases using relevant testing techniques for an application.
CO4.   Demonstrate decision making skills for testing desktop applications.
CO5.   Use software testing tools and technologies for testing desktop applications.
CO6.   Apply contextual knowledge to perform testing on software related to societal applications.
CO7.   Work effectively as an individual and member of a team for testing software applications.

LIST OF EXERCISES:
1. Generate Functional Test Scenarios & Test Cases for the Income Tax Calculator application. (Hint: Use the Application's SRS document supplied by the instructor).
2. Generate System Test Scenarios & Test Cases for the Income Tax Calculator application. (Hint: Use the Application's SRS document supplied by the instructor & Functional Test Scenarios).
3. Generate Regression & User Acceptance test cases for the Income Tax Calculator application. (Hint: Use the Application's SRS document supplied by the instructor & System Test Scenarios).

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4. Conduct Basis Path Testing & Data Flow Testing for below listed modules of Income Tax Calculator application:
   a. Salary Income Details
   b. Tax Deduction
   (Hint: Basis Path Testing: Compute dd path & Cyclomatic Complexity; Data Flow Testing: Arrive on du & dc Paths).
5. Conduct Basis Path Testing & Data Flow Testing for below listed modules of Income Tax Calculator application:
   a. Male Taxation
   b. Female Taxation
   (Hint: Basis Path Testing: Compute dd path & Cyclomatic Complexity; Data Flow Testing: Arrive on du & dc Paths).
6. Validate the inputs for the below listed modules of Income Tax Calculator application and arrive on a detailed report about valid inputs and invalid inputs:
   a. Accept Personal Details (APD)
   b. Accept Income Details (AID)
   (Hint: Use equivalence class partitioning methods & BVA techniques appropriately).
7. Validate the inputs for the below listed modules of Income Tax Calculator application and arrive on a detailed report about valid inputs and invalid inputs:
   a. Accept Savings & Donation Details (ASD)
   b. Accept Tax Deduction (ATD)
   (Hint: Use equivalence class partitioning methods & BVA techniques appropriately).
8. Conduct a System Test on the given Desktop application with any Functional Testing Tool.

TEXT BOOK:
1.   Naresh Chauhan, *Software Testing: Principles and Practices,* Oxford University Press, Second Edition, 2016.

REFERENCE BOOK:
1.   Dr. K. V. K. K. Prasad, *Software Testing Tools,* Dreamtech, First Edition, 2004

IV B.Tech I Sem
14BT70521: **Software Testing Techniques Lab**

Int. Marks: 25; Ext. Marks: 50; Total Marks: 75

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L  T  P  C
-  -  3  2
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Prerequisite: A course on "Software Testing Techniques"

Course Description: Test cases development for: Unit, Integration, System, and Acceptance test; Functional Tests, Performance Tests, Defect reporting.

COURSE OUTCOMES:

On successful completion of this course the students will be able to:
CO 1. Analyzing testing circumstances and their resultants in software development.
CO 2. Design & develop the best tests strategies in accordance to the development model.
CO 3. Conduct tests with latest testing tools to address critical and complex areas of the software testing and achieve quality with ease.

LIST OF PROGRAMMING EXCERSICES

1.   Generate Unit test cases for the Project module-wise and test them for defects, identify the defects from the code and correct them. Try Identify the various unit test metrics studied already to identify module stability. Fill the unit test report supplied by the instructor.
2.   Generate Integration test cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various Integration test metrics studied already to identify module stability. Fill the Integration test report supplied by the instructor.
3.   Generate System test cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.
4.   Generate User Acceptance cases for the Project and test them for defects, identify the defects and correct them. Try Identify the various System test metrics studied already to identify system stability. Fill the System test report supplied by the instructor.

5. Conduct a Functional Test on the given Web portal with any Functional Testing Tool.
6. Generate Performance Test Reports for the given Web portal and estimate its performance.
7. Conduct a Functional Test on the given Desktop application with any Functional Testing Tool.
8. Generate Performance Test Reports for the given Desktop application and estimate its performance.

REFERENCE BOOKS:

1. Dr.K.V.K.K.Prasad, "Software Testing Tools", Dreamtech, 1st Edition, 2004.
2. M.G.Limaye, "Software Testing: Principles and Techniques and Tools", Tata Mc Graw - Hill Education, 1st Edition, 2012.
3. Ilene Burnstein, "Practical Software Testing", Springers-Verilog Internation Edition, 2003.

(16BT60502) SOFT COMPUTING
(Common to CSE and IT)
(Interdisciplinary Elective–2)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: —

COURSE DESCRIPTION:
Concepts on Soft Computing Techniques; Artificial Neural Networks; Supervised Learning; Unsupervised Learning; Fuzzy logic; Genetic Algorithms.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate knowledge in
- Artificial Neural Networks
- Supervised Learning Networks
- Unsupervised Learning Networks
- Fuzzy sets, relations and measures
- Genetic Operators

CO2.   Analyze neural network architectures, Fuzzy systems and Genetic algorithms.

CO3.   Design soft computing solutions for real life computational problems.

CO4.   Use soft computing techniques to solve complex computational problems.

CO5.   Create algorithms using soft computing techniques.

CO6.   Apply contextual knowledge to solve problems related to societal issues like Business Intelligence, Forecasting.

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO SOFT COMPUTING AND ARTIFICIAL NEURAL NETWORKS   (8 Periods)
Soft Computing: Neural networks, Application scope of neural networks, Hybrid systems, Soft computing, Applications of soft computing.
Artificial Neural Networks: Fundamentals, Evolution, Basic Models, Terminologies, Hebb network.

UNIT-II: SUPERVISED LEARNING NETWORKS (10 Periods)
Perceptron Networks: Theory, Perceptron learning rule, Architecture, Flowchart for training process, Perceptron training algorithm for single and multiple output classes, Perceptron network testing algorithm.

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Back-Propagation Networks: Theory, Architecture, Flow chart for training process, Training algorithm, Learning factors of back-propagation networks, Testing algorithm for back-propagation networks.

UNIT–III: UNSUPERVISED LEARNING NETWORKS
(9 Periods)

Unsupervised Learning Networks: Fixed weight competitive nets, Kohonen self-organizing feature maps, Learning vector quantization, Counter-propagation networks, Adaptive response theory network.

UNIT–IV: FUZZY LOGIC   (10 Periods)
Classical Sets and Fuzzy Sets: Classical sets- Operations, Properties, Function mapping; Fuzzy sets- Operations, Properties.

Classical Relations and Fuzzy Relations: Cartesian product of relation, Classical relations, Fuzzy relations, Tolerance and equivalence relations, Non-interactive fuzzy sets.

UNIT–V: FUZZY SYSTEMS AND GENETIC ALGORITHMS
(8 Periods)

Fuzzy Arithmetic and Fuzzy Measures: Fuzzy arithmetic, Extension principle, Fuzzy measures, Measures of fuzziness.

Genetic Algorithms: Genetic operators, Working principle, Fitness function, reproduction.

Total Periods: 45

TEXT BOOK:
1.   S. N. Sivanandan and S. N. Deepa, *Principles of Soft Computing*, Wiley India, Second Edition, 2011.

REFERENCE BOOKS:
1.   Jyh-Shing Roger Jang, Chuen-Tsai Sun and Eiji Mizutani, Neuro-*Fuzzy and Soft Computing*, Prentice-Hall India, 2003.
2.   S. Rajasekaran and G. A. Vijayalakshmi Pai, *Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications*, PHI Learning Private Ltd, 2011.

(16BT60503) WIRELESS NETWORKS
(Interdisciplinary Elective–2)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	--	3

PRE-REQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION:
Generations of Wireless Networks; Voice and Data Processing; Wireless Network Topology; GSM; TDMA; CDMA; Wireless LANs; Wireless WANs; Wireless PAN;

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate knowledge on
   - Wireless Medium Access methods.
   - Network Topology
   - Wireless LAN, HIPERLAN
   - GSM, CDMA, GPRS
CO2.   Analyze the network topologies in Wireless Networks
CO3.   Design solutions for network communications at physical and transport layers
CO4.   Solve complex problems related to network communications and wireless networks
CO5.   Apply GSM, CDMA, GPRS and Bluetooth to create Home Access Networks and wireless Personal Area Network.
CO6.   Apply contextual knowledge to solve problems using societal applications like health care devices, Internet of Things.

DETAILED SYLLABUS:
UNIT-I: OVERVIEW OF WIRELESS NETWORKS AND WIRELESS MEDIUM ACCESS ALTERNATIVES   (9 periods)
Overview of Wireless Networks: Different generations of wireless networks.
Wireless Medium Access Alternatives: Fixed assignment access for voice-oriented networks – Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA); Random access for data-oriented networks – Access methods for wireless LANs; Integration of voice and data traffic.

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UNIT-II: NETWORK PLANNING AND WIRELESS NETWORK OPERATIONS (9 periods)

Network Planning: Wireless network topologies – Infrastructure of network topology, Ad hoc network topology; Cellular topology, Cellular concept, Cellular hierarchy; Cell fundamentals.

Wireless Network Operations: Mobility management – Location management, Handoff management, Mobile IP; Security in wireless networks – Security requirements for wireless networks, Overview of network security, Identification schemes.

UNIT-III: INTRODUCTION TO WIRELESS LANS AND IEEE 802.11 WIRELESS LANS (9 periods)

Introduction to Wireless LANs: Historical overview of the LAN industry, Wireless home networking-Home Access Networks (HAN), Needs of HAN, HAN technologies.

IEEE 802.11 WLANs: IEEE 802.11 – Overview of IEEE 802.11, Reference architecture, Layered protocol architecture; The PHY Layer – FHSS, DSSS, DFIR, IEEE 802.11a, IEEE 802.11b; MAC sublayer – General MAC frame format; MAC management sublayer – Registration, Handoff, Security.

UNIT-IV: GSM TECHNOLOGY, CDMA TECHNOLOGY AND MOBILE DATA NETWORKS (10 periods)

GSM Technology: GSM – Reference architecture; Mechanisms to support a mobile environment – Registration, Call establishment, Handoff, Security.

CDMA Technology: CDMA – IS-95 CDMA forward channel, IS-95 CDMA reverse channel, Packet and frame formats in IS-95.

Mobile Data Networks: GPRS – Reference architecture in GPRS, Mobility support in GPRS, Protocol layers in GPRS; SMS – Overview of SMS Operation; Mobile application protocols – Wireless application protocol, i-Mode.

UNIT-V: WIRELESS ATM, HIPERLAN AND WIRELESS PAN (8 periods)

Wireless ATM and HIPERLAN: Wireless ATM – Reference model, Protocol entities, PHY and MAC layer alternatives, Mobility support; HIPERLAN – HIPERLAN-1, Requirements and architecture, PHY and MAC layers; HIPERLAN-2 – Architecture and reference model, PHY layer, DLC layer, Convergence layer, Security, Overall comparison with 802.11.

Wireless PAN: IEEE 802-15 WPAN, Home RF – Architecture; Bluetooth – Overall architecture, Protocol stack, Physical connection, Security.

Total Periods: 45

TEXT BOOK:

1. Kaveh Pahlavan and Prashant Krishna Murthy, *Principles of Wireless Networks,* PHI Learning Pvt. Ltd., 2009.

REFERENCE BOOKS:

1. William Stallings, *Wireless Communications and Networks,* Pearson Education, Second Edition, 2012.
2. C. Sivaram Murthy and B.S. Manoj, *Ad-hoc Wireless Networks Architectures and Protocols,* Pearson Education, Second Edition, 2007.

III B. Tech. – II Semester
(16BT60504) PRINCIPLES OF PROGRAMMING LANGUAGES
(Program Elective–1)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: —

COURSE DESCRIPTION:
Concepts of Programming Languages, Paradigms; Different Data Types; Arithmetic and Boolean Expressions, Programming Statements; Fundamental of Subprograms; Data Abstraction; Exception Handlers; Logic and Functional Programming Languages;

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

CO1. Gain knowledge on
- Data types,
- Expressions, statements,
- Subprograms and abstract data types,
- Exceptional handling in object oriented programming languages

CO2. Analyze the constructs of procedural, object-oriented, functional and logic programming languages.

CO3. Design functional forms, structures, control flow, list and predicate functions for the development of interpreted functional languages.

CO4. Use appropriate programming language to develop software applications.

CO5. Select appropriate technique in logic and functional based programming languages to develop effective programs.

CO6. Apply Contextual knowledge in programming languages for societal issues.

DETAILED SYLLABUS:

UNIT-I: PRELIMINARIES AND DATA TYPES   (9 periods)

Preliminaries: Reasons for studying concepts of programming languages, Programming domains, Language evaluation criteria, Influences on language design, Language categories, Language design trade-offs, Implementation methods, Programming environments.

Data Types: Primitive, Character string, User-defined, Ordinal, Array, Associative arrays, Records, Tuple, List, Union, Pointer and reference types, Type checking, Strong typing, Type equivalence.

UNIT-II: EXPRESSIONS AND ASSIGNMENT STATEMENTS AND STATEMENT- LEVEL CONTROL STRUCUTERS (10 periods)

Expressions and Assignment Statements: Arithmetic expressions, Overloaded operators, Type conversions, Relational and boolean expressions, Short-Circuit evaluation, Assignment statements, Mixed-mode assignment.

Statement-Level Control Structures: Selection statements, Iterative statements, Unconditional branching, Guarded commands.

UNIT-III: SUBPROGRAMS AND ABSTRACT DATA TYPES (10 periods)

Subprograms and Blocks: Fundamentals of subprograms, Design issues for subprograms, Local referencing environments, Parameter-passing methods, Parameters that are subprograms, Calling subprograms indirectly, Overloaded subprograms, Co-routines.

Abstract Data Types: Concept of abstraction, Introductions to data abstraction, Design issues, Language examples, Parameterized abstract data types.

UNIT-IV: CONCURRENCY AND EXCEPTION HANDLING (8 periods)

Concurrency: Subprogram-level concurrency, Semaphores, Monitors, Message passing, Java threads, C# Threads.

Exception Handling: Exception handling, Exception handling in Ada, Exception handling in C++, Exception handling in Java.

UNIT-V: LOGIC PROGRAMMING LANGUAGES AND FUNCTIONAL PROGRAMMING LANGUAGES (8 periods)

Logic Programming Languages: Predicate calculus, Overview of logic programming, Origins of Prolog, Basic elements of Prolog.

Functional Programming Languages: Mathematical functions, Fundamentals of functional programming languages, LISP, An introduction to scheme, Common LISP, ML.

Total Periods: 45

TEXT BOOK:
1. Robert. W. Sebesta, *Concepts of Programming Languages*, Pearson Education, Tenth Edition, 2015.

REFERENCE BOOKS:
1. D. A. Watt, *Programming Language Design Concepts*, Wiley Dreamtech, 2007.
2. A. B. Tucker, R. E. Noonan, *Programming Languages*, Tata Mc-Graw Hill, Second Edition.

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(16BT70502) ETHICAL HACKING
(Program Elective-2)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: A Course on "Computer networks"

COURSE DESCRIPTION:
Network and Computer Attacks; Foot Printing and Social Engineering; Port Scanning; Enumeration; Desktop and Server Operating System vulnerabilities; Hacking Web Servers; Cryptography; Network Protection System; Hacking Wireless Network.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate Knowledge on
- Network and Computer attacks
- OS Vulnerabilities
- Hacking web servers, Hacking wireless network
CO2.   Analyze system and network vulnerabilities.
CO3.   Design security solutions for risks that arise from hacking.
CO4.   Use appropriate ethical hacking technique to solve security problems.
CO5.   Apply contextual knowledge to assess safety and legal issues in applications like cyber crime, social engineering.
CO6.   Inculcate use of ethical hacking practices while maintaining professional ethics.

DETAILED SYLLABUS:
UNIT-I: ETHICAL HACKING OVERVIEW, NETWORK AND COMPUTER ATTACKS   (9 periods)
Ethical Hacking Overview: Ethical hacking, Certification programs for network security personnel. **Network and Computer Attacks:** Malicious software, Protection against malware, Intruder attacks on networks and computers, Addressing physical security.

UNIT-II: FOOTPRINTING AND SOCIAL ENGINEERING, PORT SCANNING   (9 periods)
Footprinting and Social Engineering: Using web tools for foot printing, Conducting competitive intelligence, Using domain name system zone transfers, Introduction to social engineering. **Port Scanning:** Port scanning, Using port scanning tools, Conducting ping sweeps, Understanding scripting.

UNIT-III: ENUMERATION, OS VULNERABILITIES

(9 periods)

Enumeration: Enumeration, Enumerating windows operating systems, Netware operating system and Unix operating system. **Desktop and Server OS Vulnerabilities:** Windows OS vulnerabilities, Tools for identifying vulnerabilities in windows, Best practices for hardening windows systems, Linux OS vulnerabilities.

UNIT-IV: HACKING WEB SERVERS, HACKING WIRELESS NETWORK (9 periods)

Hacking Web Servers: Understanding web applications, Web application vulnerabilities, Tools for web attackers and Security testers. **Hacking Wireless Network:** Understanding wireless technology, Wireless network standards, Authentication, Wardriving, Wireless hacking.

UNIT-V: CRYPTOGRAPHY, NETWORK PROTECTION SYSTEM

(9 periods)

Cryptography: Understanding cryptography basics, Cryptography attacks.

Network Protection System: Understanding routers, Firewalls, Intrusion detection and prevention systems, Honeypots.

Total Periods: 45

TEXT BOOK:
1. Michael T. Simpson, Kent Backman and James E. Corley, *Hands-On Ethical Hacking and Network Defense,* Cengage Learning, First edition, 2013.

REFERENCE BOOKS:
1. Kimberly graves, *CEH Official Certified Ethical Hacker Review Guide,* Wiley Publications, 2007.
2. Michael Gregg, *Certified ethical hacker (CEH) Cert guide,* Pearson Education, 2014.

(16BT70503) COMPUTER FORENSICS
(Program Elective–3)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: A Course on "Computer Networks"

COURSE DESCRIPTION:
Computer Forensic Technologies; Evidence Collection and Data Seizure; Duplication and Preservation of Digital Evidence; E-mail Investigations; Data Analysis and Validation; Processing Crime and Incident Scenes; Mobile Device and Network Forensics; Computer Forensic Tools; Report Writing for Investigations

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate knowledge on
- Occurrence of Cyber Crime, Cyber Detectives.
- Evidence and Data Capture and Computer Forensic Analysis.
- Law Enforcement crime and incident scenes.

CO2.   Analyze and present computer forensic evidence.
CO3.   Design solutions for a wide range of computer forensic problems - attack on routers and e-mail crimes.
CO4.   Conduct investigations on forensic data.
CO5.   Utilize appropriate forensic tools to collect digital evidence.
CO6.   Apply contextual knowledge to assess the computer crimes relevant to cyber crime detection.

DETAILED SYLLABUS:
UNIT–I: OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY AND SERVICES   (9 Periods)
Computer Forensics Fundamentals: Computer forensics, Use of computer forensics in law enforcement, Benefits of professional forensics methodology, Steps taken by computer forensics specialists.
Types of Computer Forensics Technologies: Types of military computer forensic technology, Types of law enforcement, Computer forensic technology, Types of business computer forensic technology.
Computer Forensics Services: Occurrence of cyber crime, Cyber detectives, Computer forensics investigative services.

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UNIT–II: COMPUTER FORENSICS EVIDENCE CAPTURE AND INVESTIGATIONS   **(9 Periods)**

Evidence Collection and Data Seizure: Collect evidence, Collection options, Types of evidence, The rules of evidence, Volatile evidence, General procedure – Collection and archiving, Methods of collection, Collection steps; Controlling contamination- The chain of custody; Duplication and preservation of digital evidence- Preserving the digital crime scene; Computer evidence processing steps.

E–Mail Investigations: Exploring the role of e-mail in investigations, Investigating e-mail crimes and violations.

UNIT-III: COMPUTER FORENSIC ANALYSIS   **(10 Periods)**

Data Analysis and Validation: Determining data to collect and analyze, Validating forensic data, Addressing data, Hiding techniques, Performing remote acquisitions.

Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, Processing law enforcement crime, Preparing for a search, Seizing digital evidence at the scene, Storing digital evidence.

UNIT–IV: FORENSICS IN VARIOUS AREAS AND FORENSICS TOOLS   **(10 Periods)**

Mobile Device Forensics: Understanding mobile device forensics, Acquisition procedures for Mobile devices.

Network Forensics and Live Acquisitions: Network Forensic Overview, Performing live acquisitions, Developing standard procedure for network forensics.

Computer Forensic Tools: Types of computer forensic tools, Computer forensic hardware and software tools.

UNIT–V: REPORT WRITING FOR INVESTIGATIONS   **(7 Periods)**

Types of reports, Report structure, Writing reports clearly, Designing the layout and presentation of reports, Generating report findings with forensic software tools, Using access data FTK to generate reports.

Total Periods: 45

TEXT BOOKS:
1. John R. Vacca, *Computer Forensics, Computer Crime Scene Investigation,* Firewall Media, First Edition, 2009.
2. Bill Nelson, Amelia Phillips and Christopher Steuart, *Guide to Computer Forensics and Investigations,* Cengage Learning, Fourth Edition, 2010.

REFERENCE BOOKS:
1. Nina Godbole and Sunit Belapure, *Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,* Wiley India Pvt Ltd, First Edition, 2011.
2. Kevin Mandia, Chris Prosise and Matt Pepe, *Incident Response & Computer Forensics,* Tata McGraw-Hill, Second Edition, 2006.

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES:
Courses on "Object Oriented Programming through C++" and "Computer Graphics"

COURSE DESCRIPTION:
Multimedia; Fundamental Concepts in Audio and Video; Action Script 3.0; Multimedia Data Compression; Multimedia Network Communications and Applications.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1.   Demonstrate knowledge on
· Multimedia and Hypermedia
· Action Script 3.0
· Video representations and standards
· Multimedia Network Communications.
CO2.   Analyze Action Script 3.0 principles, functions and components for developing multimedia authoring applications.
CO3.   Design multimedia software for developing Internet applications and flash animations.
CO4.   Develop solutions for simple to complex real life multimedia applications.
CO5.   Use compression techniques and Action script 3.0 for development of multimedia applications.
CO6.   Apply contextual knowledge to address issues like data compression, network communications in societal applications.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO MULTIMEDIA   (8 periods)
Definition of Multimedia, Multimedia and Hypermedia, World Wide Web, Overview of multimedia software tools, Graphics and image data representations - Graphics/Image data types, popular file formats.

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UNIT-II: ACTION SCRIPT-I (10 Periods)
Action Script 3.0 core concepts - Tools for writing action script code, Flash client runtime environments, Compilation, Just In Time compilation, Classes and objects, Creating a program, Packages, Defining a class, Variable and values, Constructor parameters and arguments; Action Script 3.0 conditionals, Loops and functions - Conditionals, Loops; Functions - Package-level functions, Nested functions, Source-file-level functions.

UNIT-III: ACTION SCRIPT-II (10 Periods)
Action Script 3.0 data types and type checking - Data types and type annotations, Untyped variables, parameters, Return values, Strict modes three special cases, Warnings for missing type annotations, Detecting reference errors at compile time, Casting, Conversion to primitive types, Default variable values, Null and undefined; Action Script 3.0 events and event handling - Action script event basics, Accessing the target object, Accessing the object that registered the listener.

UNIT-IV: MULTIMEDIA DATA COMPRESSION (10 Periods)
Lossless compression algorithms - Basics of information theory, Run-length coding, Variable length coding, and Dictionary based coding; Lossy compression algorithms - Quantization, Transform coding; Image compression standards - JPEG standard, JPEG 2000.

UNIT-V: MULTIMEDIA NETWORKS COMMUNICATIONS (7 Periods)
Multimedia Networks - Basics of multimedia networks, Multiplexing technologies, LAN and WAN; Multimedia network communications and applications - Quality of multimedia data transmission, Multimedia over IP, Media-on-demand.

Total Periods: 45

TEXT BOOK:
1. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia,* Pearson Education, Second Edition, 2008.
2. Colin Moock, *Essential Action Script 3.0,* SPD O'Reilly, First Edition, 2007.

REFERENCE BOOKS:
1. Nigel Chapman and Jenny Chapman, *Digital Multimedia,* Wiley Dreamtech, Second Edition, 2004.
2. Fred Halsall, *Multimedia Communications,* Pearson, First Edition, 2004.

IV B.Tech – I Semester
14BT71202: MULTIMEDIA AND APPLICATION DEVELOPMENT
(Professional Elective -II)
(Common to CSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

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L  T  P  C
3  1  -  3
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PREREQUISITES: Courses on "Object Oriented Programming" and "Computer Graphics"

COURSE DESCRIPTION: Introduction to Multimedia; Fundamental Concepts in Audio and Video; Action Script 2.0; Multimedia Data Compression; Multimedia Network Communications and Applications.

COURSE OUTCOMES:
On successful completion of the course, student will be able to:
CO1. Demonstrate fundamental knowledge on image, audio, video representations & standards and multimedia network communications.
CO2. Analyze ActionScript principles, functions and components for developing multimedia authoring applications.
CO3. Apply various lossy/lossless coding techniques on text and images for compression and decompression

<u>**DETAILED SYLLABUS:**</u>
UNIT-I: INTRODUCTION TO MULTIMEDIA   (10 Periods)
Definition of Multimedia, Multimedia and Hypermedia, Multimedia Software Tools, Graphics and Image Data representations-Graphics and Image Data types, File Formats, Color models in Images, Color models in Video.
Definition of sound, Digitization, Nyquist theorem, Signal to Noise Ratio, Signal to Quantization-Noise Ratio, Types of Video Signals, Analog Video, Digital Video.

UNIT-II: ACTIONSCRIPT-I   (9 Periods)
ActionScript 2.0 Features, Data Types and Type Checking: Static Typing, Type Syntax, Compatible Types, Casting, ActionScript 2.0 Type checking, Classes-Defining classes, Constructor functions, Properties, Methods.
Inheritance: A Primer on inheritance, Subclasses as subtypes, Overriding Methods and Properties, Constructor functions in Subclasses, Polymorphism and Dynamic binding.

UNIT-III: ACTIONSCRIPT-II   **(9 Periods)**

Interfaces: Introduction, Syntax and Use.

Packages: Syntax, Defining Packages, Package Access and Classpath.

Exceptions: The Exception Handling Cycle, Exception bubbling, finally block, Nested Exceptions, Limitations.

Authoring an ActionScript 2.0 class, An OOP Application Development, Using Components with ActionScript 2.0, MovieClip Subclasses.

UNIT-IV: MULTIMEDIA DATA COMPRESSION

          (10 Periods)

Lossless compression algorithms- Introduction, Basics of Information Theory, Run Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding. Lossy Compression Algorithms-Quantization, Introduction to Transform Coding-DCT, DFT.

Image Compression Techniques: JPEG Standard, JPEG 2000. Audio Compression Techniques-ADPCM in Speech Coding Introduction to Video Compression, Video Compression Based on Motion Compensation, MPEG-1, MPEG-2.

UNIT-V: MULTIMEDIA NETWORK COMMUNICATIONS AND APPLICATIONS   **(7 Periods)**

Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MoD).

(Total Periods:45)

TEXT BOOKS:
1.   Ze-Nian Li and Mark S. Drew, "Fundamentals of Multimedia", Pearson Education, 2nd edition, 2008.
2.   Colin Moock, "Essentials ActionScript 2.0", SPD O'Reilly, 1st edition, 2005.

REFERENCE BOOKS:
1.   Nigel Chapman and Jenny Chapman, "Digital Multimedia", Wiley Dreamtech, 2nd edition, 2004.
2.   Brian Underdahl, "Macromedia Flash MX", TMH, 1st edition, 2002.
3.   Fred Halsall, "Multimedia Communications", Pearson, 1st edition, 2004
4.   K.R.Rao, Zoram S. Bojkovic, "Multimedia Communication Systems", Pearson Education, 1st edition, 2002.

(Program Elective-1)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	--	3

PRE-REQUISITES: A course on "Computer Organization"

COURSE DESCRIPTION: Cache-based Microprocessor Architecture; Memory Hierarchies; Multithreaded Processors; Common Sense Optimizations; The Role of Compilers; Data Access Optimization; Shared-memory Computers; Parallel Scalability; Introduction to OpenMP; Parallel Jacobi Algorithm; Introduction to MPI; MPI Performance Tools; MPI Parallelization of Jacobi Solver.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate knowledge on:
  - Modern Processors and code Optimization.
  - Parallel computing paradigms.
CO2. Analyze computation problems and identify the suitable parallel processing approaches to achieve optimum computation.
CO3. Design Parallel processing algorithms for achieving high performance computing.
CO4. Solve shared memory problems using Parallel Programming.
CO5. Use OpenMP and MPI tools in Parallel Programming.

DETAILED SYLLABUS:
UNIT-I: MODERN PROCESSORS   (08 Periods)
Stored-program computer architecture, General-purpose cache-based microprocessor architecture, Memory hierarchies, Multicore processors, Multi-threaded processors, Vector processors.

UNIT-II: BASIC OPTIMIZATION TECHNIQUES FOR SERIAL CODE   (10 Periods)
Scalar profiling, Common sense optimizations, Simple measures, Large impact, The role of compilers, C++ optimizations, Data access optimization-balance analysis and light speed estimates, Storage order.
Case study: The Jacobi algorithm and Dense matrix transpose.

UNIT-III: PARALLEL COMPUTERS   (09 Periods)
Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers, Hierarchical systems, Networks. Basics of parallelization, Data Parallelism, Function parallelism, Parallel scalability.

UNIT-IV: SHARED–MEMORY PARALLEL PROGRAMMING WITH OpenMP   (09 Periods)
Introduction to OpenMP – Parallel execution, Data scoping, OpenMP work sharing for loops, Synchronization, Reductions, Loop scheduling and tasking.
Case study: OpenMP-parallel Jacobi algorithm, Efficient OpenMP programming-profiling OpenMP programs, Performance pitfalls.
Case study: Parallel sparse matrix-vector multiply.

UNIT V: DISTRIBUTED–MEMORY PARALLEL PROGRAMMING WITH MPI   (09 Periods)
Message passing, Introduction to MPI, Examples - MPI parallelization of Jacobi solver; Efficient MPI Programming - MPI performance tools, communication parameters, Synchronization, Serialization, Contention, Reducing communication overheads, Understanding intranode point-to-point communication.

                                        Total Periods: 45

TEXT BOOK:
1. Georg Hager and Gerhard Wellein, *Introduction to High Performance Computing for Scientists and Engineers,* Chapman & Hall/CRC Computational Science Series, First Edition, 2012.

REFERNCE BOOKS:
1. Charles Severance and Kevin Dowd, *High Performance Computing,* O'Reilly Media, Second Edition , 1998.
2. Kai Hwang and Faye Alaye Briggs, *Computer Architecture and Parallel Processing,* McGraw Hill, 1984.

(16BT50442) **MICROPROCESSORS AND INTERFACING**

(Common to CSE, IT and CSSE)

(interdisciplinary Elective-1)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITES: Courses on 'Digital Logic Design' and 'Computer Organization'.

COURSE DESCRIPTION: INTEL 8086 & 8051- Architectures; Instruction set; Programmable Interfacing Concepts; ADC, DAC, 8255, 8257,8259 ,8279,8251, Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES:

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

CO1:   Demonstrate knowledge in:
- Internal Hardware details of Intel 8086, 8051 & programming devices like 8255, 8257, 8259, 8279 and 8251.
- Interfacing various peripherals to build standalone systems

CO2:   Analyze various peripherals and interfacing techniques.

CO3:   Design application based Microcomputer system using 8086 and 8051.

CO4:   Solve problems by providing microcomputer-based real time solutions.

CO5:   Apply programming tools, appropriate techniques and resources to complex engineering activities for microprocessor and microcontroller based systems with understanding of limitations.

C06:   Solving societal problems by applying concepts of microprocessors and microcontrollers.

DETAILED SYLLABUS:

UNIT I – INTEL 8086 ARCHITECTURE AND PROGRAMMING (09 periods)

Evolution of Microprocessors, Architecture of 8086 microprocessor, Register organization, Physical Memory Organization, Signal description of 8086, General Bus Operation Minimum and Maximum mode operation of 8086, Timing diagram, Addressing modes.

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UNIT II – ASSEMBLY LANGUAGE PROGRAMMING WITH 8086 AND INTERRUPTS   **(11 periods)**
Instruction set of 8086, Assembler directives and Operators; Interrupts and Interrupt service routines, Interrupt Cycle of 8086, Non Maskable interrupt, Maskable interrupt (INTR), Interrupt Programming, Passing Parameters to procedures, MACROS.

UNIT III–BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086   **(08 periods)**
Semiconductor memory Interfacing, Dynamic RAM interfacing, Interfacing I/O ports, Programmable Input-Output Port (PIO) 8255, Modes of operations of 8255, Interfacing analog to digital and digital to analog converters, stepper motor interfacing.

UNIT IV – SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES   **(09 periods)**
Programmable Interrupt Controller 8259A; The keyboard/Display Controller 8279-Architecture, Signal Description, Modes of operations; Programmable Communication Interface 8251 USART; DMA Controller 8257, DMA Transfers and Operations.

UNIT V – INTRODUCTION TO 8051 MICROCONTROLLER   **(09 periods)**
Microprocessors Vs Microcontrollers, The 8051 Architecture: Introduction, 8051 Microcontroller Hardware, input/output pins, Ports and circuits, External Memory, Counters and Timers, Serial Data Input / Output, Interrupts; Addressing Modes, Instruction set of 8051, simple programs on arithmetic operations using 8051.

                                      Total Periods: 46

TEXT BOOKS:
1. A.K. Ray & K.M.Bhurchandi, *Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing,* TMH, 2002 reprint.
2. Kenneth J. Ayala, *The 8051 Microcontroller-Architecture, Programming & Applications,* 3rd Edition, Cengage learning, June 2004.

REFERENCE BOOKS:
1. Douglas V.Hall, *Microprocessors and Interfacing: Programming and Hardware*, revised 2nd Edition, TMH.
2. Yu-cheng Liu, Glenn A. Gibson, *Microcomputer systems: The 8086/8088 Family architecture, Programming and Design*, PHI, 2006.
3. Mazidi and Mazidi, *The 8051 Microcontroller and Embedded Systems,* PHI, 2000.

III B. Tech. - I Semester
14BT50431: MICROPROCESSORS AND INTERFACING
(Common to CSE,CSSE & IT)

Int. Marks: 30; Ext. Marks: 70; Total Marks: 100

L	T	P	C
3	1	-	3

PRE-REQUISITES: Courses on "Digital Logic Design"and "Computer Organization".

COURSE DESCRIPTION:
INTEL 8086 & 8031/51- Architectures; Instruction set; Programmable Interfacing Concepts; Serial Communication; Advanced peripheral Interfacing; Applications.

COURSE OUTCOMES: After completion of the course, students should be able to
CO1. Gain potential knowledge in
   • Internal hardware details of Intel 8086,8051
   • Interfacing various peripherals to build stand alone systems
CO2. Critically analyze various peripherals and interfacing techniques
CO3. Design and develop Microcomputer based system to suit a particular application.
CO4. Choose suitable Hardware and software components of a system that work together to solve engineering problems.

DETAILED SYLLABUS

UNIT I - INTEL 8086 ARCHITECTURE AND PROGRAMMING
(11 periods)
Evolution of Microprocessors, Architecture of 8086 microprocessor, register organization - special functions of general purpose registers, Memory segmentation, Pin description, Minimum and Maximum mode operation of 8086, timing diagram, Addressing modes, Assembler directives, Instruction set of 8086, , Simple programs , Procedures and Macros.

UNIT II - MEMORY INTERFACING, PRIORITY INTERRUPT CONTROLLER AND DMA **(7 periods)**
Memory (static RAM and EPROM) and I/O interfacing, 8257 (DMA controller), Interrupt structure, Interrupt vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.

UNIT III - 8255A AND ITS APPLICATIONS
(7 periods)

Types of data communication - serial and parallel, Methods of parallel data transfer, 8255A (programmable peripheral interface) - Internal block diagram, Control words and initialization, interface of I/O devices: key board, stepper motor.

UNIT IV - SERIAL DATA COMMUNICATION AND STANDRADS
(8 periods)

Types of serial data transmission - synchronous and asynchronous, 8251 (USART) - architecture, Simple programs for sending and receiving characters with an 8251 (polling & interrupt basis), serial communication standards- RS232C. RS232C to TTL and TTL to RS232C conversion.

UNIT V - 8031/51 Microcontroller Architecture and Programming
(12 periods)

Microcontrollers Vs. general purpose processors, Criterion for choosing microcontroller, 8051 Architecture- Internal and external memories, Timers/Counters, Serial communication, Interrupts. Addressing modes, Instruction set of 8051, simple programs using 8051, Timer Programming, Serial port programming, Interrupts programming.

(Total Periods: 45)

TEXT BOOKS:
1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware," revised 2nd Edition, TMH, 2006.
2. Mazidi and Mazidi, "The 8051 Microcontroller and Embedded Systems," PHI, 2000.

REFERENCE BOOKS:
1. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and Peripherals- Architecture, Programming and Interfacing," TMH, 2002.
2. Yu-cheng Liu, Glenn A. Gibson, "Microcomputer systems: The 8086/8088 Family architecture, Programming and Design," PHI, 2006.
3. Kenneth J. Ayala, "The 8051 Microcontroller-Architecture, Programming & Applications," Cengage learning, 3rd Edition, 2004.

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(16BT50341) OPTIMIZATION TECHNIQUES

(Common to CE, CSE, and CSSE)

(Interdisciplinary Elective-2)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITES:
A course on "Multi variable calculus and differential equations"

COURSE DESCRIPTION:
Introduction to optimization; classical optimization techniques; classification of optimization problems; linear programming; transportation and assignment problem; non-linear programming; un-constrained non-linear programming; constrained non-linear programming; dynamic programming.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstrate the knowledge on Optimization techniques for Linear, Non linear and Dynamic programming problems.
CO2. Analyze and quantify a system architecture or product design problem for selecting appropriate objective function, design variables, parameters and constraints.
CO3. Develop mathematical models for real time optimization problems.
CO4. Conduct investigations on complex problems and make recommendations based on solutions, analysis and limitations of models.
CO5. Use optimization techniques for solving complex problems of real time applications.
CO6. Optimize the resources in organizations for sustainable development.

DETAILED SYLLABUS:
UNIT-I: CLASSICAL OPTIMIZATION TECHNIQUES
(09 periods)
Introduction, Engineering applications of optimization, Statement of an optimization problem, Design vector, Design constraints, Constraint surface, Objective function, Classification of optimization problems, Single variable optimization, Multi variable optimization without constraints, Multi variable optimization with equality constraints - Lagrange multipliers method; Multi variable optimization with inequality constraint - Kuhn Tucker conditions.

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UNIT–II: LINEAR PROGRAMMING   **(09 periods)**
Introduction, Formulation, Graphical solution, Simplex method, Big M-method, Two–phase method, Duality principle, Dual simplex method.

UNIT-III: TRANSPORTATION AND ASSIGNMENT PROBLEMS
                                     (09 periods)
Transportation problems: Formulation, Initial basic feasible solution - North–West corner rule, Least cost method, and Vogel's approximation method; Optimal solution using Modified distribution method - Unbalanced transportation problem, Degeneracy.
Assignment problems: Formulation, Solution of assignment problem and its variants, Traveling salesman problem.

UNIT–IV: NON-LINEAR PROGRAMMING   **(09 periods)**
One dimensional minimization methods, classification - Fibonacci method, quadratic interpolation method; classification of unconstrained minimization methods - Powell's method, steepest descent method (Cauchy's method); classification of constrained optimization techniques - interior and exterior penalty function methods.

UNIT–V: DYNAMIC PROGRAMMING   **(09 periods)**
Multistage decision processes, Concept of sub optimization and Principle of optimality, Computational procedure in dynamic programming - calculus method, Tabular method; Linear Programming problem by dynamic programming approach, Applications - reliability problem, shortest path problem, and capital budgeting problem.

                                    Total Periods:45

TEXT BOOKS:
1. Singiresu S Rao, *Engineering Optimization: Theory and Practice*, New Age International, 3rd Edition, 2010.
2. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis, *Engineering Optimization: Methods and applications*, Wiley India Pvt. Ltd., 2nd Edition2006.

REFERENCE BOOKS:
1. C Mohan and Kusum Deep, *Optimization Techniques*, New Age International Publishers, 1st Edition, 2010.
2. Hamdy A. Taha, *Introduction to Operations Research*, PHI, 9th edition, 2013.

I B. Tech. – II Semester   [ECE, EEE & EIE]

(16BT1HS01) TECHNICAL ENGLISH

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: *English at Intermediate level*

COURSE DESCRIPTION: Introduction to Communication; Active Listening; Effective Speaking; Reading; and Writing.

COURSE OBJECTIVES:

CEO1. To impart knowledge of the nuances of communication.
CEO2. To develop Listening, Speaking, Reading and Writing skills in order to use language effectively in distinct situations.
CEO3. To imbibe an attitude of assimilating language skills in the sequence of locating, retrieving, reporting, evaluating, integrating, and accurately citing in the required context.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

CO1: Demonstrate knowledge in

  ➢ Process of communication
  ➢ Modes of listening
  ➢ Paralinguistic features
  ➢ Skimming and Scanning
  ➢ Elements of style in writing

CO2: Analyze the possibilities and limitations of language, understanding
  ➢ Barriers to Communication
  ➢ Barriers to Effective Listening
  ➢ Barriers to Speaking
  ➢ Formal and metaphorical language

CO3: Design and develop functional skills for professional practice**.**

CO4: Apply writingskills in preparing and presenting documents

CO5: Function effectively as an individual and as a member in diverse teams.

CO6*:*Communicate effectively with the engineering community and society in formal and informal situations**.**

DETAILED SYLLABUS:

UNIT I - **INTRODUCTION TO COMMUNICATION:**   **(9 periods)**

Introduction –Language as a Tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Modes of Communication – Barriers to Communication (classification)

UNIT II - **ACTIVE LISTENING:**   **(9 periods)**

Introduction – Reasons for poor Listening – Traits of a Good Listener – Listening Modes – Types of Listening – Barriers to Effective Listening – Listening for General Content and Specific Information

UNIT III - **EFFECTIVE SPEAKING:** **(9 periods)**

Introduction – Achieving Confidence, Clarity and Fluency – Paralinguistic Features – Barriers to Speaking – Types of Speaking – Persuasive Speaking

UNIT IV - **READING**: **(9 periods)**

Introduction and Reading Rates – Reading and Interpretation – Intensive and Extensive Reading – Critical Reading – Reading for Different Purposes – SQ3R Reading Technique –Study Skills

UNIT V – **WRITING**: **(9 periods)**

Introduction – Language – Elements of Style – Techniques for Good Technical Writing – Referencing and Styling – Right Words and Phrases – Sentences

Total Periods: *45*

TEXT BOOKS:

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt.Ltd., New Delhi, 2015.

2. Sanjay Kumar &Pushp Lata, *Communication Skills*, Oxford University Press, New Delhi, 2013.

3. Teri Kwal Gamble and Michael Gamble, *Communication Works*, Tata Mc Graw-Hill, New Delhi, 2010.

4. Rajendra Pal and J.S. Korlahalli, *Essentials of Business Communication*, Sultan Chand and Son, New Delhi, 2010.

14BT1HS01: **TECHNICAL ENGLISH**

I -Year B.Tech.

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		2	-	-	4

COURSE OBJECTIVES:

1. To lay basic foundation and impart knowledge of English language, grammar and communication skills.
2. To develop listening, speaking, reading and writing skills among students needed in their personal, academic and professional pursuits.
3. To train students apply the nuances of English for various communication needs.
4. To build confidence in effective usage of English language.

COURSE OUTCOMES :   After completion of the course the students will be able to

1. Acquire fundamental and functional knowledge of English language, grammar and communication skills.
2. Identify and analyze productive skills (speaking and writing) and receptive skills (listening and reading) of English language proficiency for effective communication and practice.
3. Design and develop functional skills for professional practice through English.
4. Communicate effectively with the engineering community and society to comprehend and deliver effective solutions.
5. Inculcate an attitude to upgrade competence of English knowledge and communication to engage in independent and life-long learning.

DETAILED SYLLABUS:

UNIT – **I   :**   **(10 periods)**

My Early Days, **A. P. J. Abdul Kalam** from **TechnicalEnglish for Engineer**s by Cambridge University Press for India Pvt Ltd. (2014).

Communication: Importance of communication-- Language as a tool of Communication – Communicative Skills (Listening, Speaking, Reading and Writing) – Effective Communication – Verbal and Non-verbal Communication

UNIT – **II :**   **(10 periods)**

A Speech by N. R. Narayana Murthy from **TechnicalEnglish for Engineer**s by Cambridge University Press for India Pvt Ltd. (2014).

Listening: Meaning and Art of Listening – Importance of Listening– Traits of a Good Listener - Reasons for poor Listening –Types of Listening – Barriers to Effective Listening

UNIT – **III :**   **(10 periods)**
The Town by the Sea by Amitav Ghosh from **TechnicalEnglish for Engineer**s by Cambridge University Press for India Pvt Ltd. (2014).

Speaking: Achieving Confidence, Clarity, and Fluency – Paralinguistic Features – Types of Speaking – Barriers to Speaking.

UNIT – **IV :**   **(10 periods)**
Dr. C. V. Raman: The Celebrated Genius from **TechnicalEnglish for Engineer**s by Cambridge University Press for India Pvt. Ltd., (2014).

Reading: Reading and Interpretation—Intensive and Extensive Reading—Critical Reading--Reading Comprehension-– Techniques for Good Comprehension – SQ3R Reading Technique

UNIT – **V :**   **(10 periods)**
Lesson Entitled **The Model Millionaire** from **TechnicalEnglish for Engineer**s by Cambridge University Press for India Pvt. Ltd. (2014).

Writing: Characteristics –– Language –Elements of Style – Techniques for Good Technical Writing – Avoiding Plagiarism and Referencing and Styling.

                                                                 Total periods: 50

TEXT BOOKS:

1. **Technical English for Engineers**, Cambridge University Press for India Pvt. Ltd., First Edition, (2014),
2. Meenakshi Raman & Sangeetha Sharma, **Technical Communication**, Oxford University Press, New Delhi, 2012.

REFERENCE BOOKS:

1. M. Ashraf Rizvi,**Effective Technical Communication**, Tata McGraw–Hill, Publishing Company Limited, First Edition, 2005.

2. Martin Hewings, **Advanced English Grammar: A Self Study Reference and Practice Book for Advanced South Asian Students,**Cambridge University press, First South Asian Edition, 1999, New Delhi.

(16BT1HS31) ENGLISH LANGUAGE LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		0	0	3	2

PRE-REQUISITES: English at intermediate or equivalent level.

COURSE DESCRIPTION: Phonetics; Vocabulary Building; Functional Grammar; Just a Minute; Elocution/Impromptu; Giving Directions/Conversation Starters; Role Play; Public Speaking; Describing People, Places, Objects and Events; Reading Comprehension; Listening Comprehension; Information Transfer.

COURSE OBJECTIVES:

CEO1: To impart the knowledge of native pronunciation through Phonetics.

CEO2: To enhance Listening, Speaking, Reading and Writing skills for effective usage of language in formal and informal situations.

CEO3: To imbibe a positive attitude of learning the language through computer-aided multimedia instructions.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate knowledge in
- ➢ Phonetics
- ➢ Information Transfer

CO2: Analyze the situations in professional context by using
- ➢ Vocabulary
- ➢ Grammar

CO3: Design and develop functional skills for professional practice.

CO4: Apply the techniques of Listening and Reading skills to comprehend Listening and Reading comprehension.

CO5: Function effectively as an individual and as a member in diverse teams through
- ➢ Extempore talk and
- ➢ Role Play

CO6: Communicate effectively in public speaking in formal and informal situations.

CO7: Recognize the need to engage in lifelong learning to upgrade competence of knowledge and communication.

LIST OF EXERCISES:

1. Phonetics
2. Vocabulary Building
3. Functional Grammar
4. Just a Minute
5. Elocution/Impromptu
6. Giving Directions/Conversation Starters
7. Role Play
8. Public Speaking
9. Describing People, Places, Objects and Events.
10. Reading Comprehension
11. Listening Comprehension
12. Information Transfer

Total Lab Slots: 10

TEXT BOOK:

1. Department Lab Manual

REFERENCE BOOKS:

1. D. Sudha Rani, *A Manual for English Language Laboratories*, Pearson, Noida, 2010.
2. D. Sudha Rani, *Advanced Communication Skills Laboratory Manual*, Pearson, Noida, 2012.
3. R. Manivannan and G. Immanuel, *Communication Skills Laboratory*, VK Publications, Sivakasi, 2013
4. Nira Kumar*, English Language Laboratories*, PHI Learning Pvt. Ltd., New Delhi, 2011.

(14BT1HS02)ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY
B. Tech. – I year
(Common to All branches of Engineering)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
25	50	75		-	-	3	3

COURSE OBJECTIVES:

1. To impart practical knowledge in segmental features, supra-segmental features and Para-linguistic features.
2. To develop language skills for effective communication with clarity and precision in academic, professional and personal situations.
3. To apply the practical knowledge of functional grammar and vocabulary enrichment in effective writing.
4. To develop interest in English language so that the students use it effectively in various formal, informal and neutral situations.

COURSE OUTCOMES:

On the successful completion of the course, the students will / should be able to
1. Gain practical knowledge in
   ➢ English Speech Sounds
   ➢ Stress Patterns in word and sentence
   ➢ Intonation Patterns
   ➢ Paralinguistic Features
   ➢ Vocabulary Enrichment
2. Analyse the functional part of the grammatical elements for writing grammatically correct English in various academic and personal practices.
3. Develop various language functions to fulfil the purpose of speaking and writing in academic, professional and personal contexts
4. Apply the knowledge of the usage of various language software for enhancing the language skills more and more thereby acquiring unconsciously the language functions and elements that are commonly used in various contexts
5. Communicate effectively with engineering community and society in various formal, informal and neutral situations.
6. Demonstrate various language functions by participating in
   ➢ Just A Minute
   ➢ Impromptu Speech
   ➢ Elocution
   ➢ Role Plays
   ➢ Presentations
7. Engage in lifelong learning for the development of the communicative competence for meeting the global challenges.

DETAILED LIST OF EXPERIMENTS / LAB PRACTICE SESSIONS:

1. English Speech Sounds and Phonemic Transcription
2. Word Stress & Sentence Stress
3. Accent, Rhythm and Intonation
4. Paralinguistic Features.
5. Vocabulary Building
   a. Importance of Vocabulary Enrichment in Speaking: Spelling
   b. Synonyms – Antonyms – prefix – Suffixes – One Word Substitutes
   c. Idioms and Phrases – Homophones – Homonyms – Homographs.
6. Functional Grammar
   a. Parts of Speech
   b. Tenses
   c. Change of Speech
   d. Change of Voice
   e. Word Order& Error Correction
   f. Essay Writing
7. Just a Minute, Impromptu Speech & Elocution
8. Role Plays
9. Telephonic Etiquette
10. Listening Skills
11. Describing People, Places and Objects
12. Presentation Skills
13. Information Transfer

REFERENCES :
   1. Departmental Lab Manual

I B. Tech. – I/II Semester

(16BT1BS02) ENGINEERING PHYSICS

(Common to all branches)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES: Intermediate / senior secondary Physics

COURSE DESCRIPTION:

Lasers; optical fibers; principles of quantum mechanics; band theory of solids; semiconductors; dielectric properties of materials; acoustics of buildings; superconductors; crystallography and nano materials.

COURSE OBJECTIVES:

CEO1 : To provide the basic knowledge of architectural acoustics, quantum mechanics, lasers, superconductors, optical fibers, semiconductors and nanotechnology.

CEO2 : To develop skills in using semiconductor devices, lasers, and optical fibers.

COURSE OUTCOMES: After completion of the course, a successful student will be able to:

CO1: Acquire basic knowledge of lasers, optical fibers, quantum mechanics, dielectrics, semiconductors, and superconductors, acoustic of buildings, crystallography and nano materials.

CO2: Analyze the construction and working of various laser systems, semiconductor devices, various types of optical fibers and its communication system and nano materials properties.

CO3: Gain skills in designing of lasers, optical fiber cable, semiconductor devices, acoustically good halls and nanomaterials.

CO4: Develop problem solving skills in engineering context.

CO5: Use relevant techniques for assessing ball milling, pulsed laser deposition, pn-junction, Laser

DETAILED SYLLABUS:

UNIT I – LASERS AND FIBER OPTICS   (11 periods)

Lasers: Introduction, characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein's coefficients – condition for amplification, population inversion, Nd:YAG laser, Helium-Neon laser, semiconductor laser and applications of lasers.

Fiber optics: Introduction, principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, classification of optical fibers optical fiber communication system and applications of optical fibers.

UNIT II – PRINCIPLES OF QUANTUM MECHANICS AND BAND THEORY OF SOLIDS   (07 periods)

Principles of Quantum Mechanics: Introduction, de-Broglie's hypothesis, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment).

Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy bands formation in solids, distinction between conductors, semiconductors and insulators based on band theory.

UNIT III – SEMICONDUCTORS AND DIELECTRIC PROPERTIES OF MATERIALS
            (13 periods) Semiconductors: Introduction, types of semiconductors, intrinsic carrier concentration, electrical conductivity in semiconductors, drift and diffusion currents, Einstein's relation, Hall effect and its applications, direct and indirect band gap semiconductors, p-n junction, energy band diagram of p-n diode, LED, photo diode and Solar cell.

Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, frequency dependence of polarizability (qualitative treatment), ferroelectricity.

UNIT IV – ACOUSTICS OF BUILDINGS AND SUPERCONDUCTIVITY   (07 periods)
Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of sound and its measurement, factors affecting the architectural acoustics and their remedies.

Superconductivity: Introduction, General properties - Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory (qualitative treatment), applications of superconductors.

UNIT V – CRYSTALLOGRAPHY AND NANOMATERIALS   (07 periods)
Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law- powder method.

Nanomaterials: Introduction, principles of nanomaterials, properties of nanomaterials, synthesis of nanomaterials by ball milling and pulsed laser deposition and applications of nanomaterials.

Total Periods: 45

TEXT BOOKS:
1. P. K. Palaniswamy,***Engineering Physics***,   Scitech Publications India Private Limited, 2nd Edition, 2009

REFERENCE BOOKS:
1. Dr. S. Mani Naidu*, **Engineering Physics**, Pearson Education, 1st Edition, 2013.
2. M.N. Avadhanulu, P.G.Kshirsagar, ***A textbook of Engineering Physics***, S.Chand& Company Ltd. Revised edition 2014.
3. K. Thyagarajan***, Engineering Physics-I***, McGraw-Hill Education (India) Pvt.Ltd. 2015

(14BT1BS01) ENGINEERING PHYSICS

(Common to All Branches of Engineering)

I Year B. Tech.

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		2	1	--	4

Pre requisite: --
COURSE OBJECTIVES:
1. To provide the basic knowledge of space & time, acoustics principles, quantum mechanics, laser concepts, nanotechnology, superconductors, principles of optical fibers and its communication systems, p-n Junction based devices and zero resistance concepts.
2. To develop skills in using semiconductor devices, lasers, magnetic field intensity and fiber optics.
3. To apply laser techniques and optical fibers in communication technology.

COURSE OUTCOMES:
After completion of the course, a successful student will be able to:
1. Apply the knowledge of lasers and optical fiber technology in communication systems.
2. Analyze and provide basic information to design acoustically good halls, theatres, sound recording rooms, etc.
3. Gain knowledge of crystal directions and planes and for analyzing the complex crystal structure behavior for engineering and medical applications.
4. Use magnetic materials, lasers and superconductors for the benefit of society.
5. Recognize the importance of lasers, optical fibers and superconductors for effective use in engineering applications.

DETAILED SYLLABI:

UNIT-I: LASERS, FIBER OPTICS AND HOLOGRAPHY   (18 periods)

Lasers: Introduction, characteristics of laser, principles of lasing action, spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, ruby laser, Helium-Neon laser, semiconductor laser, applications of lasers.

Fiber optics: Introduction, construction and working principle of optical fiber, acceptance angle, acceptance cone and numerical aperture, types of optical fibers and refractive index profiles, Attenuation and losses in fibers, optical fiber communication system, applications of optical fibers in sensors and medicine.

Holography: Introduction, construction of a hologram, reconstruction of image from hologram, applications.

UNIT-II: SPECIAL THEORY OF RELATIVITY, ACOUSTICS OF BUILDINGS AND CRYSTALLOGRAPHY   (16 periods)

Special Theory of Relativity: Introduction, absolute frame of reference, time dilation, length contraction, addition of velocities, mass-energy equivalence, energy-momentum relation.
Acoustics of Buildings: Introduction, basic requirement of acoustically good hall, reverberation and time of reverberation, Sabine's formula for reverberation time (qualitative treatment), absorption coefficient of Sound and its measurement, factors affecting the architectural acoustics and their remedies.

Crystallography: Introduction, crystal planes, crystal directions and Miller indices, separation between successive (hkl) planes, X-ray diffraction by crystal planes, Bragg's law, Laue and powder methods.

UNIT-III :PRINCIPLES OF QUANTUM MECHANICAS AND BAND THEORY OF SOLIDS
(17 periods)

Principles of Quantum Mechanics: Black body radiation – Wien's law, Rayleigh-Jeans law and Planck's law (qualitative), waves and particles, matter waves, de-Broglie's hypothesis, G.P. Thomson experiment, Heisenberg's uncertainty principle, Schrödinger's one dimensional wave equation (time independent), significance of wave function, particle in a one dimensional potential box, Fermi-Dirac distribution and effect of temperature (qualitative treatment only), scattering-source of electrical resistance.
Band Theory of Solids: Electron in a periodic potential, Kronig-Penney model (qualitative treatment), origin of energy band formation in solids, effective mass of electron, distinction between metals, semiconductors and insulators based on band theory.

UNIT-IV: DIELECTRIC PROPERTIES OF MATERIALS AND SEMICONDUCTORS
(17 periods)
Dielectric Properties of Materials: Introduction, dielectric constant, electronic, ionic and orientation polarizations (qualitative treatment), local field, Clausius-Mossotti equation, frequency dependence of polarisability (qualitative treatment), ferro and piezo electricity.

Semiconductors: Introduction, intrinsic and extrinsic semiconductors, carrier concentration, electrical conductivity in semiconductors, drift and diffusion, Einstein's relation, Hall effect, direct and indirect band gap semiconductors, p-n junction, energy diagram of p-n diode, diode equation (qualitative), LED, photo diode and solar cell.

UNIT-V :MAGNETIC PROPERTIES OF MATERIALS, SUPERCONDUCTIVITY AND NANOMATERIALS
(17 periods)
Magnetic Properties of Materials: Introduction, origin of magnetic moment, classification of magnetic materials into dia, para, ferro, anti-ferro and ferri magnetism, hysteresis, soft and hard magnetic materials.

Superconductivity: General properties, Meissner effect, penetration depth, Type-I and Type-II superconductors, flux quantization, Josephson effects, BCS theory, applications of superconductors.

Nanomaterials: Introduction, surface area to volume ratio, quantum confinement, properties of nanomaterials, synthesis of nanomaterials by ball milling, plasma arcing, pulsed laser deposition and sol-gel methods, carbon nanotubes-properties and applications, applications of nanomaterials.

Total : 85 periods

TEXT BOOKS :
1. S. Mani Naidu,*Engineering Physics*, Pearson Education, 2013.
2. P. K. Palaniswamy, *Engineering Physics*, Scitech Publications India Private Limited, 2009

REFERENCE BOOKS:
1. R. K. Gaur and S. L. Gupta *, Engineering Physics*, , Dhanpat Rai Publications (P) Ltd., 8th Edition, 2001.
2. M. R. Srinivasan *,Engineering Physics* , New Age International (P) Limited,   Publishers, 1st Edition,2010.

(16BT2BS01) TRANSFORMATION TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to all Branches of Engineering)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE REQUISITE: Intermediate /Senior secondary mathematics

COURSE DESCRIPTION: Fourier series; Fourier integrals and transforms; Laplace transforms; z – transforms; partial differential equations.

COURSE OBJECTIVES:

CEO 1: To impart basic knowledge on Fourier series, Fourier transforms, Laplace transforms, z-transforms and partial differential equations.

CEO 2: To develop skills in analyzing the problems, designing mathematical models, Fourier series, Fourier transforms, Laplace transforms, z-transforms and partial differential equations for the problems in engineering.

COURSE OUTCOMES: After completion of the course a successful student is able to

CO 1 :Acquire basic knowledge in
   (a) Fourier series and Fourier transforms
   (b) Fourier integrals
   (c) Laplace transforms and their applications
   (d) z- transforms and their applications
   (e) solving partial differential equations
   (f) Heat transfer and wave motion

CO 2 : Develop skills in analyzing the
   (a) Properties of Fourier series for a given function
   (b) Partial differential equations through different evaluation methods
   (c) Difference equations through z – transforms
   (d) Engineering systems and processes involving wave forms and heat transfer

CO 3 :Develop skills in designing mathematical models for
   (a) Problems involving heat transfer and wave forms
   (b) Engineering concepts involving, Fourier transforms, Fourier integrals, Laplace transforms, z-transforms and difference equations
CO 4 :Develop analytical skills in solving the problems involving
   (a) Fourier series and Fourier transforms
   (b) Laplace transforms
   (c) Z-transforms and difference equations
   (d) Heat transfer and wave motion

CO 5 : Use relevant transformation techniques for
   (a) Obtaining Fourier transforms for different types of functions
   (b) Laplace transforms
   (c) Z- transforms
   (d) Partial differential equations

DETAILED SYLLABUS:

UNIT- I : FOURIER SERIES   (7 periods)

Fourier series:Determination of Fourier coefficients, convergence of Fourier series (Dirichlet's conditions),Fourier series of even and odd functions, Half-range Fourier sine and cosine expansions.

UNIT- II: FOURIER INTEGRALS AND FOURIER TRANSFORMS   (8 periods)

Fourier integral theorem (statement only), Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms –properties, Inverse transform and finite Fourier transforms.

UNIT-III:LAPLACE TRANSFORMS   (12 periods)

Laplace transforms of standard functions. Properties of Laplace transforms. First and second shifting Theorems. Laplace transforms of derivatives and integrals. Inverse transforms. Convolution theorem (without proof), inverse Laplace transforms by convolution theorem. Laplace transform of periodic functions, Applications of Laplace transforms to ordinary differential equations of first and second order with constant coefficients.

UNIT-IV :   Z- TRANSFORMS   (9 periods)

Z – transforms, inverse Z– transforms, damping rule, shifting rule, initial and final value theorems. Convolution theorem(without proof), solution of difference equations by Z– transforms.

UNIT – V : PARTIAL DIFFERENTIAL EQUATIONS   (9 periods)

Formation of Partial differential equations – Solutions of first order linear equations by method of grouping. First and second order equations by method of separation of variables – Solutions of one dimensional Wave equation, Heat equation.

Total no. of periods: 45

TEXT BOOK:

1. T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham and M.V.S.S.N. Prasad, *Engineering Mathematics, vol-1*, S. Chand & Company 13/e,2014.
2. T.K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, *Mathematical Methods*, S.Chand and Company, 8/e,2013

REFERENCE BOOKS:

1. Grewal, B.S., *Higher Engineering Mathematics*, Khanna publishers, Delhi, 42/e,2012
2. Kreyszig, E., *Advanced Engineering Mathematics*, John Wiley and Sons, Inc., 9/e,2013.

II B. Tech. – II Semester/ III B.Tech – I Semester

(Common to all Branches)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		0	0	3	2

PRE-REQUISITES:

English Language Laboratory in I B.Tech or English Laboratory at Diploma Level.

COURSE DESCRIPTION:

Body Language; Creative Thinking; Stress Management; Goal Setting; Interpersonal Skills; Leadership Skills; Team Work; Assertiveness; Etiquette; Conflict Management; Report Writing; Group Discussions.

COURSE OBJECTIVES:

CEO1: To impart knowledge of Body Language in order to appreciate non-verbal forms of understanding and expression.

CEO2: To develop the principles in understanding the elements of team, anticipating the problem situation and adopt appropriate steps to remedy.

CEO3: To imbibe an attitude of planning & organizing to set and meet goals.

COURSE OUTCOMES:
On successful completion of this course the students will be able to
CO1: Acquire knowledge in

> ➢ Goal Setting
> ➢ Creative Thinking
> ➢ Leadership Skills
> ➢ Team Work

CO2: Analyse the functional knowledge in
> ➢ Body Language
> ➢ Interpersonal Skills
> ➢ Stress Management

CO3: Apply the techniques of soft skills in a problem situation enhanced through multimedia software.
CO4: Function effectively as an individual and as a member in diverse teams.
CO5: Communicate effectively in public speaking in formal and informal situations.

LIST OF EXERCISES:

1. Body Language
2. Creative Thinking
3. Stress Management
4. Goal Setting
5. Interpersonal Skills
6. Leadership Skills

7. Team Work
8. Assertiveness
9. Etiquette
10. Conflict Management
11. Report Writing
12. Group Discussions

Total Lab Slots: 10

TEXT BOOKS:

1**.** Department Lab Manual.

REFERENCE BOOKS:

1. R. C. Sharma & Krishna Mohan, *Business Correspondence and Report Writing*, Tata McGraw-Hill Publishing Company Limited, Third Edition, New Delhi, 2012.
2. Gopalswamy Ramesh and Mahadevan Ramesh, *The Ace of Soft Skills*, Pearson, Noida, 2010.
3. Jeff Butterfeild, *Soft Skills for Everyone*, Cengage learning, Delhi, 2011.
4. Barun K. Mitra, *Personality Development and Soft Skills*, Oxford University Press, Noida, 2012.

SUGGESTED SOFTWARE:

1. English Language Communication Skills Laboratory Software – SOFTX Technologies Pvt. Ltd., Hyderabad.
2. GEMS – Globarena E- Mentoring System.
3. Speech Solutions.
4. English Pronunciation Dictionary by Daniel Jones.
5. Learning to Speak English 8.1, The Learning Company – 4 CDs.
6. Mastering English: Grammar, Punctuation and Composition.
7. English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
8. Dorling Kindersley Series of Grammar.
9. Language in Use 1, 2 & 3.
10. Cambridge Advanced Learner's Dictionary - 3rd Edition.
11. Centronix – Phonetics.
12. Let's Talk English, Regional Institute of English South India.
13. The Ultimate English Tutor.

(16BT6HS05) FRENCH LANGUAGE (La Langue Francais)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES

COURSE DESCRIPTION: Oral communications; Basic grmmar; ;advancedgrammar;basic writing; Business French (La Francais Commercial)

COURSE OBJECTIVES:

CEO1. To impart knowledge of the nuances of communication.
CEO2. To develop Speaking and Writing skills in order to use French language effectively in distinct situations.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

CO1: Demonstrate knowledge in

➢ Process of communication
➢ Modes of listening
➢ Paralinguistic features
➢ Skimming and Scanning
➢ Elements of style in writing

CO2: Analyze the possibilities and limitations of language, understanding
➢ Barriers to Communication
➢ Barriers to Effective Listening
➢ Barriers to Speaking
➢ Formal and metaphorical language

CO3: Design and develop language skills for professional practice**.**

CO4: Apply basic writing skills in writing Emails and understanding wide range of technical terminologies.

CO5: Understand French culture and civilization.

CO6*:* Communicate effectively with the native French in day to day situation**.**

DETAILED SYLLABUS

UNIT I –ORAL COMMUNICATION: **(9 periods)**

Introduction - Language as a Tool of Communication, French alphabets, Phonetics and pronunciation, making contacts, giving information, Arranging things, Expression of feelings.

UNIT II –BASIC GRAMMAR: **(9 periods)**
Introduction –Articles, -Er ending Verbs, Nouns, Numbers, Gender, Pronouns, Sentence structure – Case study.

UNIT III –ADVANCED GRAMMAR: **(9 periods)**

Introduction -Adjectives, Prepositions, Introduction to tenses – Present tense, past tense and future tense, Active and Passive voice.

UNIT IV –BASIC WRITING: **(9 periods)**

Introduction -Introduction to written communication, Pre-writing, Creating context for writing and Data collection, fill in forms, Write greeting cards, Invitations and Short personal announcements, Short text to describe photos and pictures.

UNIT V –BUSINESS FRENCH (La Francais Commercial) **(9 periods)**

Introduction - E-mail writing, Letter writing, Learning technical vocabulary and its application.

Case study of influential French companies, Learning computer/desktop/new age- media vocabulary, Introduction to how to present a topic, Fixing an Appointment

Total Periods: 45

TEXT BOOKS:

1. Annie Berther, ***Alter Ego*** , Hachette Publications, 2012

REFERENCE BOOKS:
1   Regine Merieux, Yves Loiseau,   ***Connexions*** , Goyall Publishers, 2011
2   Delphine Ripaud, ***Saison***, French and Euroean Inc., 2015

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	--	3

PRE-REQUISITES

COURSE DESCRIPTION: Oral communication; Basic grammar; Advanced grammar; Basic writing; Business German

COURSE OBJECTIVES:

CEO3. To impart knowledge of the nuances of communication.
CEO4. To develop Speaking and Writing skills in order to use German language effectively in distinct situations.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

CO1: Demonstrate knowledge in

  ➢ Process of communication
  ➢ Modes of listening
  ➢ Paralinguistic features
  ➢ Skimming and Scanning
  ➢ Elements of style in writing

CO2: Analyze the possibilities and limitations of language, understanding
  ➢ Barriers to Communication
  ➢ Barriers to Effective Listening
  ➢ Barriers to Speaking
  ➢ Formal and metaphorical language

CO3: Design and develop language skills for professional practice**.**

CO4: Apply basic writing skills in writing Emails and understanding wide range of technical terminologies.

CO5: Understand German culture and civilization.

CO6: Communicate effectively with the native German in day to day situation**.**

DETAILED SYLLABUS

UNIT I –ORAL COMMUNICATION: **(9 periods)**

Introduction - Language as a Tool of Communication, German alphabets, Phonetics and pronunciation, making contacts, giving information, Arranging things, Expression of feelings.

UNIT II –BASIC GRAMMAR: **(9 periods)**
Introduction –Articles, Verbs, Nouns, Numbers, Gender, Pronouns, Sentence structure – Case study.

UNIT III –ADVANCED GRAMMAR: **(9 periods)**

Introduction -Adjectives, Prepositions, Introduction to tenses – Present tense, past tense and future tense, Active and Passive voice, Introduction to Case- Akkusativ, Nominativ, Dativ&Genetiv Case.

UNIT IV –BASIC WRITING: **(9 periods)**

Introduction -Introduction to written communication, Pre-writing, Creating context for writing and Data collection, fill in forms, Write greeting cards, Invitations and Short personal announcements, Short text to describe photos and pictures.

UNIT V –BERUFSDEUTCSCH (BUSINESS GERMAN): **(9 periods)**

Introduction - E-mail writing, Letter writing, Learning technical vocabulary and its application.

Case studies of influential German companies, Learning computer/desktop/new age- media vocabulary, Introduction to how to present a topic, Fixing an Appointment.

Total Periods: 45

TEXT BOOKS:

1. Heuber, *Tangram Aktuelleins*, Heuber Verlag Publications , 2011.

REFERENCE BOOKS:

1. Anta Kursisa, Gerhard Newner, Sara vicenta, *Fir fuer Deutsch 1 und Deutsch 2,* Heuber Verlag Publications, 2005
2. Herman Funk, *Studio D A1*, Cornelsen GOYAL SAAB Publication, 2011.

III B. Tech. – II Semester / IV B. Tech. – I Semester

<mark>(16BT6HS07) INDIAN CONSTITUTION</mark>
<mark>(Open Elective)</mark>

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: ---

COURSE DESCRIPTION: Elements, functions and functionaries according to Indian Constitution, understanding for better professional practice and good citizenry

COURSE OBJECTIVES:

CEO1: To familiarize the students with parliamentary proceedings, legislature, and administration federal system and judiciary of India, civil services, Indian and international politics

CEO 2: To imbibe attitude for ethical behavior and attitude within provision of Constitution

COURSE OUTCOMES: After successful completion of the course the students will be able to

CO1: Gain knowledge in

- parliamentary proceedings, laws, legislature, administration and its philosophy
- federal system and judiciary of India
- socials problems and public services like central civil services and state civil services
- Indian and international political aspects and dynamics

CO2 : Develop etiquette and professional behavior in line with the constitution of India for becoming a responsible citizen

DETAILED SYLLABUS :

<mark>**UNIT- I : PREAMBLE AND ITS PHILOSOPHY**   **(8 periods)**</mark>

<mark>Introduction and Evolution of Indian Constitution, preamble and its Philosophy.</mark>

<mark>**UNIT- II :UNION GOVERNMENT**   **(8 periods)**</mark>

<mark>Powers, Functions and Position of President, Vice-President and Council of Ministers, Composition of parliament, Constitution Amendment Procedure, Financial Legislation in Parliament.</mark>

<mark>**UNIT-III :FEDERAL SYSTEM**   **(14 periods)**</mark>

<mark>Centre-State relations, Directive Principles of State Policy, Fundamental Rights and Duties, Centre-State Relations, Features of Federal System, Administrative Relationship between Union and States, Powers, Functions and Position of Governors, Function of Chief Ministers, Council of Ministers, Composition and powers of the State Legislature.</mark>

<mark>**UNIT-IV :JUDICIARY AND PUBLIC SERVICES**   **(10 periods)**</mark>

The Union Judiciary - Supreme Court and High Court, All India Services, Central Civil Services, State Services, Local Services and Training of Civil Services.

UNIT-V : INTERNATIONAL POLITICS **(5 periods)**

Foreign Policy of India, International Institutions like UNO, WTO, SAARC and Environmentalism.

Total periods : 45

TEXT BOOK:

1. Briji Kishore Sharma, *Introduction to the Constitution of India*, Prentice Hall of India, 2005.

REFERENCE BOOKS:

1. Mahendra Pal Singh,V. N. Shukla's *Constitution of India*, Eastern Book Company, 2011.
2. Pandey J. N., *Constitutional Law of India* - Central Law Agency, 1998

(16BT6HS08) INDIAN ECONOMY
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: --

COURSE DESCRIPTION:
Introduction; Time Value of Money; Elementary Economic Analysis; Value Analysis/Value Engineering; Economic Planning.

COURSE OBJECTIVES:

CEO1: To familiarize the students with the concept of elementary principles of Indian economy and their operational significance from engineering perspective.
CEO2: To develop skills for effective use of principles of economy in firm/industry/corporation in public or private sector.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Acquire the knowledge in
> ➢ Micro and Macro Economics.
> ➢ Traditional and Modern methods of Capital Budgeting.
> ➢ Five year plans and NITI Aayog.

CO2: Analyze
> ➢ Capital Budgeting.
> ➢ Value Analysis and Value Engineering.
> ➢ Economic analysis
> ➢ Law of supply and demand

CO3 : Ability to understand the nuances of project management and finance

DETAILED SYLLABUS:

UNIT – I: INTRODUCTION   **(9 Periods)**
Economics- Flow in an Economy, Law of Supply and Demand; Micro and Macro Economics; Relationship between Science, Engineering, Technology, and Economic Development; Concept of Engineering Economics-Types of Efficiency, Definition and Scope of Engineering Economics.

UNIT – II: TIME VALUE OF MONEY   **(12 Periods)**
Concepts and Application; Capital Budgeting-Traditional and Modern Methods; Simple and Compound Interest, Cash Flow Diagram, Principle of Economic Equivalence; Evaluation of Engineering Projects – Present Worth Method, Future Worth Method, Annual Worth Method, Internal Rate of Return Method, Cost-benefit Analysis in Public Projects; Depreciation Policy-Depreciation of Capital Assets, Causes of Depreciation, Straight Line Method and Declining Balance Method.

UNIT – III: ELEMENTARY ECONOMIC ANALYSIS   **(9 Periods)**
Economic Analysis – Meaning, Significance, Simple Economic Analysis; Material Selection for a Product, Substitution of Raw Material; Design Selection for a Product; Material Selection-Process Planning, Process Modification.

UNIT - IV: VALUE ANALYSIS/VALUE ENGINEERING   **(6 Periods)**
Introduction- Value Analysis, Value Engineering, Functions, Aims; Value Analysis vs. Value Engineering; Value Engineering Procedure- Advantages, Application Areas.

UNIT- V: ECONOMIC PLANNING   (9 Periods)
Introduction- Need For Planning in India, Five year plans(1951-2012), NITI Aayog (from 2014 onwards); Inclusive Growth-Meaning, Significance, Need for inclusive growth in India, Strategy for more inclusive growth, Challenges and Prospects; Employment and Inclusive Growth in India, Role of engineers in sustaining inclusive growth.

Total Periods: 45

TEXT BOOKS

1. Panneerselvam R. ,*Engineering Economics* , PHI Learning Private Limited, Delhi , 2/e,2013.
2. Jain T.R., V. K.Ohri, O. P. Khanna. *Economics for Engineers*. VK Publication, 1/e, 2015.

REFERENCE BOOKS
1. DuttRudar&Sundhram K. P. M.*IndianEconomy*.S. Chand, New Delhi, 62 revised edition 2010.
2. Misra, S.K. & V. K. Puri. *Indian Economy***: Its Development Experience.** Himalaya Publishing House, Mumbai   32/e ,2010.

(16BT6HS09)INDIAN HERITAGE AND CULTURE
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: ---

COURSE DESCRIPTION: Basic traits of Indian Culture; Humanistic Reforms under Jainism and Buddhism; Culture in the medieval period; Socio Religious reforms in Indian Culture; Reform movements for harmonious relations.

COURSE OBJECTIVES:

CEO5. To impart the knowledge on history of India and process of evaluation of Indian Culture and its importance.

CEO6. To develop analytical mind on the administrative hierarchies through the study of ancestral administration and study its relevance to the existing administrative set up

CEO7. To imbibe an attitude of having harmonious relations within society.

COURSE OUTCOMES: On successful completion of this course, the students will be able to

CO1: Acquaint knowledge in

    (a) human aspirations and values in Vedic culture.
    (b) cultural aspects of Buddhism and Jainism
    (c) unification of our country under Mourya's and Gupta's administrations
    (d) socio Religious aspects of Indian culture
    (e) reform movements and harmonious relations.

CO2 : Apply ethical principles and reforms as models for the upliftment of the societal \ status in the present cultural contexts

DETAILED SYLLABUS:

UNIT I - **: BASIC TRAITS OF INDIAN CULTURE**   **(9 periods)**

Meaning and definition and various interpretations of culture. Culture and its features. The Vedic and Upanishadic culture and society. Human aspirations and values in these societies. Chaturvidhapurushardhas, Chaturashrma and Chaturvarna theory.

UNIT II - **: HUMANISTIC REFORMS UNDER JAINISM AND BUDDHISM   (9 periods)**

Salient features of Jainism - contributions of Jainism to Indian culture. Contributions of Aachaarya and Mahaapragya. Buddhism as a humanistic culture. The four noble truths of Buddhism. Contributions of Buddhism to Indian culture.

Unit- III : CULTURE IN THE MEDIEVAL PERIOD   **(9 periods)**

Unifications of India under Mouryas and Guptas and their cultural achievements. Cultural conditions under satavahanas. Contributions to pallavas and cholas to art and cultural achievements of vijayanagara rulers.

Unit- IV : SOCIO RELIGIOUS REFORMS IN INDIAN CULTURE   (9 periods)

Western impact on India, Introductin of western education, social and cultural awakening and social reform movements of Rajaramohan Roy - Dayanandha Saraswathi- Anne Besant. (theosophical society)

Unit- V : REFORM MOVEMENTS FOR HARMONIOUS RELATIONS   (9 periods)

Vivekananda, Eswarchandravidyasagar and Veeresalingam- emancipation of women and struggle against caste. Rise of Indian nationalism. Mahatma Gandhi- Non violence and satyagraha and eradication of untouchability .

Total Periods: *45*

TEXT BOOKS:

1. ValluruPrabhakaraiah, ***Indian Heritage and Culture***, Neelkamal Publications Pvt. Ltd. Delhi, 1/e , reprint 2015.

REFERENCE BOOKS:

1. L. P. Sharma, ***History of Ancient India***, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
2. L. P. Sharma, ***History of Medieval India***, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
3. L. P. Sharma, ***History of Modern India***, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
4. The Cultural Heritage of India Vol-I, II, III, IV, V, The Ramakrishna Mission Institute of Culture, Calcutta.

III B. Tech. – II Semester / IV B. Tech. – I Semester

(16BT6HS10)INDIAN HISTORY

(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: ----

COURSE DESCRIPTION: Introduction; Ancient India; Classical and Medieval era; Modern India; India after independence.

COURSE OBJECTIVES:

CEO1: To familiarize the students with elements of Indian history by which they could correlate contemporary issues and problems in Indian society.

CEO 2: To develop analytical skills on social processes of civilizations, modernization and social change

CEO 3: To imbibe culture that will enhance them to be better citizens of the nation

COURSE OUTCOMES: After successful completion of the course the students will be able to

CO 1: Gain knowledge on evolution and history of India as a nation

CO2: Analyze social and political situations of past and current periods

CO3: Practice in career or at other social institutions morally and ethically

DETAILED SYLLABUS:

UNIT-I : INTRODUCTION   (8 periods)
Elements of Indian History; History Sources: Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography; sociological concepts-structure, system, organization, social institutions, Culture and social stratification (caste, class, gender, power), State& Civil Society.

UNIT-II : ANCIENT INDIA   (9 periods)
Mohenjo-Daro civilization; Harappa civilization; Mauryan Empire.

UNIT -III: CLASSICAL & MEDIEVAL ERA   (12 periods)
Classic Era (200 BC - 1200 AD); Hindu - Islamic Era (1200 - 1800 AD).

UNIT-IV: MODERN INDIA   (6 periods)
Age of Colonialism (17th - 19th centuries); First war of Indian Independence; Freedom Struggle (1857-1947).

UNIT-V :INDIA AFTER INDEPENDENCE (1947 -)   (10 periods)

Total periods : 45

TEXT BOOK:

1. K. Krishna Reddy, ***Indian History***, Tata McGraw-Hill, 21st reprint,2017

REFERENCE BOOKS:

1. Guha, Ramachandra, ***India after Gandhi***, Pan Macmillan,2007 Thapar, Romila, ***Early India***, Penguin, 2002

(16BT6HS11) PERSONALITY DEVELOPMENT
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: Soft Skills Lab

COURSE DESCRIPTION:

Self-esteem & Self-Management; Developing Positive Attitudes; Self-Motivation & Self-Management; Getting Along with the Supervisor; Workplace Success.

COURSE OBJECTIVES:

CEO1: To make students understand the concept and components of personality and thereby to apply the acquired knowledge to themselves and mould their personality.

CEO2: To impart training for positive thinking, that enables the students to be in a good stead to face the challenges,

CEO3: To imbibe an attitude of planning & organizing to set and meet goals.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Demonstrate knowledge in

  ➢ Self-Management
  ➢ Planning Career

CO2: Analyze the situations based on
  ➢ Attitudes
  ➢ Thinking strategies

CO3: Design and develop the functional skills for professional practice in

CO4: Function effectively as an individual and as a member in diverse teams.

CO5: Communicate effectively in public speaking in formal and informal situations.

DETAILED SYLLABUS:

UNIT – I: SELF-ESTEEM & SELF-IMPROVEMENT   (9 Periods)

Know Yourself – Accept Yourself; Self-Improvement: Plan to Improve - Actively Working to Improve Yourself.

Case study: 1

UNIT – II: DEVELOPING POSITIVE ATTITUDES   (9 Periods)

How Attitudes Develop – Attitudes are Catching – Improve Your Attitudes.

Case study: 2

UNIT – III: SELF-MOTIVATION & SELF-MANAGEMENT   **(9 Periods)**

Show Initiative – Be Responsible Self-Management; Efficient Work Habits – Stress Management – Employers Want People Who can Think – Thinking Strategies.

Case study: 3

UNIT – IV: GETTING ALONG WITH THE SUPERVISOR   **(9 Periods)**

Know your Supervisor – Communicating with Your Supervisor – Special Communications   With Your Supervisor – What Should You Expect of Your Supervisor? – What Your Supervisor   Expects of You - Moving Ahead Getting Along with Your Supervisor.

Case study: 4

UNIT - V: WORKPLACE SUCCESS   **(9 Periods)**

First Day on the Job – Keeping Your Job – Planning Your Career – Moving ahead.

Case study: 5

Total Periods: 45

TEXT BOOK:

1. Harold R. Wallace and L. Ann Masters, *Personality Development*, Cengage Learning, Delhi, Sixth Indian Reprint 2011.

REFERENCE BOOKS:

1. Barun K. Mitra, *Personality Development and Soft Skills,* Oxford University Press, New Delhi, 2011.
2. Stephen R. Covey, *The 7 Habits of Highly Effective People*, Free Press, New York, 1989
3. K. Alex, *Soft Skills*, S. Chand & Company Ltd, New Delhi, Second Revised Edition 2011.
4. Stephen P. Robbins and Timothy A. Judge*, Organizational Behaviour*, Prentice Hall, Delhi, 16th Edition 2014.

(16BT6HS12) PHILOSOPHY OF EDUCATION
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: ---

COURSE DESCRIPTION: Introduction to Philosophy and Engineering Education; Philosophical methods and their implications in engineering; Philosophical education in India; Values and Engineering education; Outcome based education.

COURSE OBJECTIVES:

CEO1: To familiarize the students with the fundamentals of educational philosophical methods.

CEO2: To impart skills in applying the contextual knowledge of Engineering education and responsibilities.

CEO3: To imbibe an attitude to inculcate and implement values of engineering education.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Acquire knowledge in
  - Philosophy of Engineering education.
  - Philosophical Methods.
  - Knowledge acquiring methods.
  - Engineering education and responsibilities.

CO2: Understand the impact of Outcome Based Education for effective educational outcomes

CO3: Apply reasoning to assess societal issues with the contextual knowledge of engineering education and responsibilities.

DETAILED SYLLABUS :

Unit- I:INTRODUCTION TO PHILOSOPHY ANDENGINNERING EDUCATION
(9 periods)

Concept , Significance, and Scope of Philosophy in Engineering – Aims of Engineering Education – relationship between philosophy and engineering education – speculative, normative and critical approaches of philosophy in engineering.

Unit- II :PHILOSOPHICAL METHODS AND THEIR IMPLICATIONS IN ENGINEE RING (9 periods)

Introduction to Philosophical approaches: Idealism, Naturalism, Pragmatism, Realism and Existentialism; Significance and Scope in Engineering Education.

Unit: III :PHILOSOPHICAL EDUCATION IN INDIA   (9 periods)

Different branches of philosophy- meaning, Epistemology: nature and scope; Knowledge acquiring methods; Kinds and instruments of knowledge; Re-shaping of educational thoughts by Indian

thinkers: Rabindranath Tagore, Sri Aurobindo Gosh, Mahatma Gandhi, Jiddu Krishnamurthy and Swamy Vivekananda.

Unit- IV:VALUES AND ENGINEERING EDUCATION   **(9 periods)**

Introduction; Engineering education and responsibilities: health, social, moral, ethics aesthetic; Value: crisis and strategies for inculcation;
Case study: Engineering Solutions given by Mokshagundam Visvesvaraya

Unit-V :OUTCOME- BASED EDUCATION   **(9 periods)**

Institutional visioning ;educational objectives ; programme outcomes , curriculum, stakeholders, infrastructure and learning resources ; governance and management, quality in education.

Total periods: 45

TEXT BOOKS :

1. Ganta Ramesh, *Philosophical Foundations of Education*, Neelkamal Publications, 1/e,2013
2. Carl Micham, *Thinking through technology(The Paths between Engineering and Philosophy)*.University of Chicago Press, 1/e,1994.
3. Louis L Bucciarelli, *Engineering Philosophy,* Delft University Press,1/e, 2003.
4. NBA/ABET Manuals.

REFERENCE BOOKS :

1. Louis L Bucciarelli, *Philosophy of Technology and Engineering Sciences*, North Holland, 1/e, 2009 (e-book).
2. Samuel Florman,   *Existential pleasures of education*. Martins's Griffin S.T. publication, 1/e, 1992.

(16BT6HS13)PUBLIC ADMINISTRATION
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	0	3

PRE-REQUISITES: Nil

COURSE DESCRIPTION:
Introduction; Public Policy; Good Governance; E-Governance; Development Administration.
COURSE OBJECTIVES:

CEO1: To familiarize the students with the theories, concepts and practices of public administration from engineering perspective.

CEO2: To develop critical thinking and problem solving skills for effective practice of Good Governance and Administrative Development that are applied in the chosen domain.

CEO3: To imbibe an attitude of understanding and implementing administration policies for sustainable development in distinguished sectors.

COURSE OUTCOMES: On successful completion of this course the students will be able to

CO1: Acquireknowledge in
  ➢ Public Policy.
  ➢ Good Governance.
  ➢ E-governance.
  ➢ Development Administration.
  ➢

CO2: Analyze the possibilities and limitations of existing policies through Good Governance perspective.

CO3: Design and develop solutions in e-governance models to find and provide opportunities in e-governance.

CO4: Adopt principles of e-governance in addressing the existing issues and challenges in e-governance sector.

CO5: Understand the significance of Administrative Development in finding professional engineering solutions by probing
  ➢ Bureaucracy.
  ➢ Role of civil society.

DETAILED SYLLABUS :

UNIT – I: INTRODUCTION   (9 Periods)
Public and Private Administration- Differences and Similarities, Meaning, Scope; Importance of Public Administration in Modern Era; Public Administration and its implications in the field of Engineering.

Case Study: Unique Identification Authority of India (UIDAI):Aadhaar Project: Challenges Ahead

UNIT – II: PUBLIC POLICY   (9 Periods)

Meaning and Scope; Policy Formulation in India; Policy making process; Policy Implementation Engineering and Public Policy**,**Social, ethical, Monetary and fiscal policies; policy implications of engineering; The engineer's role in Public Policy.

Case Study: NITI Aayog: Demonetization and Aftermath of Demonetization – Cashless transactions.

UNIT – III: GOOD GOVERNANCE   (9 Periods)
Significance; Objectives; Concepts; Reforms; Organization and its basic problems Administrative and Governance reforms in India; Sustainable and Inclusive growth in India; Engineering and Sustainable Environment-Role of Engineers; Right to information Act

Case Study: Strategies in Good Governance: A Case Study of Karnataka, Kerala and Orissa.

UNIT – IV: E-GOVERNANCE   (9 Periods)
Meaning, Significance, Issues in E-governance; E-governance Models, Problems and Opportunities; Application of Data Warehousing and Data Mining in Governance; Engineers role in re-engineering E-governance.

Case Study: e-Housing System for Bhavana NirmanDhanasahayam Online disbursement of housing assistance in Kerala.

UNIT - V: DEVELOPMENT ADMINISTRATION   (9 Periods)
Introduction; Development Administration-Administrative Development- Sustainable Development - Significance- Objectives; Bureaucracy - Personnel administration and human resources development; Role of civil society-Citizens and administration; Development and Engineering: Issues Challenges and Opportunities.
Case Study: Neeru-Chettu (Water-Tree) of Andhra Pradesh.
Case Study: TPDDL of Delhi and Odisha.

Total Periods: 45

TEXT BOOKS

1. M.P. Sharma, B.L. Sadana, HarpreetKaur. ***Public Administration in Theory and Practice****.* KitabMahal, Mumbai, 1/e,2014.
2. CSR Prabhu, ***E. Governance – concepts and case studies***.PHI, New Delhi, 2/e 2012.

REFERENCE BOOKS

1. Surendra Munshi, Bijupaul Abraham ***Good Governance, Democratic societies and Globalization***, Sage publications, New Delhi,1/e ,2004.

2. R.K.Sapru, ***Public Policy****,* Sterling Publishers Pvt Ltd., New Delhi, 1/e, 2001.

(Open Elective)
(Common to EEE, ECE & EIE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION:
Durability of buildings, Failure and repair of buildings, Material Techniques for repair, Maintenance of buildings, Conservation and recycling.

COURSE OUTCOMES: On successful completion of the course, students will be able to
CO1. Acquire basic knowledge on durability and serviceability, failures, repair and rehabilitation of buildings.
CO2. Analyze failures, repair and rehabilitation techniques.
CO3. Solve complex building maintenance problems through proper investigations and interpretation.
CO4. Use modern tools and techniques for various repairs and rehabilitation of structures.
CO5. Provide solutions for building maintenance and repair problems considering health and safety.
CO6. Consider environmental sustainability in building maintenance and repair.
CO7. Maintain ethical standards for quality in repairs and rehabilitation of structures.
CO8. Evaluate specifications and perform cost analysis of building components while repair and rehabilitation.

DETAILED SYLLABUS:

UNIT-I: DURABILITY AND SERVICEABILITY OF BUILDINGS   (10 Periods)
Life expectancy of different types of buildings; Effect of environmental elements such as heat, dampness, frost and precipitation on buildings; Effect of chemical agents on building materials, Effect of pollution on buildings, Effect of fire on building; Damage by biological agents like plants, trees, algae, fungus, moss, insects, etc.; Preventive measures on various aspects, Inspection, Assessment procedure for evaluating for damaged structures, Causes of deterioration, Testing techniques.

UNIT-II:FAILURE AND REPAIR OF BUILDINGS   (10 Periods)
Building failure – Types, Methodology for investigation; Diagnostic testing methods and equipment, Repair of cracks in concrete and masonry, Materials for Repair, Methods of repair, Repair and strengthening of concrete buildings, Foundation repair and strengthening, Underpinning, Leakage of roofs and repair methods.

UNIT-III: TECHNIQUES FOR REPAIR   (08 Periods)
Rust eliminators and polymers coating for rebars during repair, Foamed concrete, Mortar and dry pack, Vacuum concrete, Gunite and shotcrete, Epoxy injection, Mortar repairs for cracks, Shoring and underpinning.

UNIT-IV: MAINTENANCE OF BUILDINGS   (09 Periods)
Reliability principles and its applications in selection of systems for building, Routine maintenance of building, Maintenance cost, Specifications for maintenance works, Dampness-Damp proof courses, Construction details for prevention of dampness; Termite proofing, Fire protection, Corrosion protection.

UNIT-V: CONSERVATION AND RECYCLING   (08 Periods)

Performance of construction materials and components in service, Rehabilitation of constructed facilities, Conservation movement, Materials and methods for conservation work, Recycling of old buildings and its advantages, Examples.

Total Periods: 45

TEXT BOOKS:

1. Dennison Campbell, Allen and Harold Roper, *Concrete Structures – Materials, Maintenance and Repair*, Longman Scientific and Technical, UK, 1991.
2. Allen, R.T. L., Edwards, S.C. and J. D. N. Shaw, *The Repair of Concrete Structures*, Blackie Academic & Professional, UK, 1993.

REFERENCE BOOKS:

1. Peter H. Emmons, *Concrete Repair and Maintenance*, John Wiley and Sons Publications, 2002.
2. Building Construction under Seismic Conditions in the Balkan Region, UNDP/UNIDO Project Rer/79/015,Volume 5, *Repair and Strengthening of Reinforced Concrete, Stone and Brick Masonry Buildings*, United Nations Industrial Development Organisation, Vienna.
3. Shetty, M. S., *Concrete Technology*, S. Chand and Company.
4. Smith, P. and Julian, W., *Building Services*, Applied Science Publications, London, 1976.
5. SP: 25, BIS; *Causes and Prevention of Cracks in Buildings*.
6. Champion, S., *Failure and Repair of Concrete Structures*, John Wiley and Sons Publications, 1961.
7. Perkins, P. H., Repair, Protection and Water Proofing of Concrete Structures, E& FN Spon, UK, 3rdEdition, 1997.

(16BT60115)ENVIRONMENTAL POLLUTION AND CONTROL
(Open Elective)
(Common to EEE, ECE & EIE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PREREQUISITES: --

COURSE DESCRIPTION:
Fundamentals ofairpollution;Dispersion of pollutants; Effects and control of air pollution; Water pollution;Soil pollution and control; Municipal solid waste management.

COURSE OUTCOMES: On successful completion of the course, students will be able to
CO1. Demonstrateknowledge on air, water, soil pollution and their control and solid waste management.
CO2. Analyze causes and effects of air, water and soilpollution and their remedial measures.
CO3. Recommend suitable solutionsto complex environmental pollution problems.
CO4. Use appropriate remedial technique to solve environmental pollution problems.
CO5. Understand the effects of environmental pollutionon human health and vegetation.
CO6. Encourage sustainable development through implementation of pollution control measures.
CO7. Maintain IS Codes for environmental quality control.

DETAILED SYLLABUS:

UNIT-I: AIR AND NOISE POLLUTION (08 Periods)
Air Pollution: Scope, Significance, Classification, Sources – Line, Area, Stationary, Mobile; Effects of air pollutants on man, material and vegetation; Global effects of air pollution; Air pollution meteorology - Lapse rate, Inversion, Plume pattern; Dispersion of air pollutants - Dispersion models and applications; Ambient air quality standards.
Noise Pollution: Sound pressure, Power and intensity, Impacts of noise, permissible limits of noise pollution, measurement of noise.

UNIT-II: AIR AND NOISE POLLUTIONCONTROL (10 Periods)
Self-cleansing properties of the environment, Dilution method, Control at source, Process changes and equipment modifications, Control of particulates–Types of equipment, Design and operation – Settling chambers, Centrifugal separators, Bag house filters, Wet scrubbers, Electrostatic precipitators; Control of gaseous pollutants – Adsorption, Absorption, Condensation, Combustion; Control of air pollution from automobiles, Control of noise pollution.

UNIT-III: WATER POLLUTIONAND CONTROL (10 Periods)
Water pollution – Sources, Causes, Effects; Surface and groundwater quality – Physical, Chemical, Biological; Drinking water quality standards, Water purification – Processes, Engineered systems – Aeration, Solids separation, Settling operations, Coagulation, Softening, Filtration, Disinfection; Wastewater – Sources, Causes, Effects, Treatment and disposal – Primary, Secondary, Tertiary; Case studies.

UNIT-IV: SOIL POLLUTION AND CONTROL (08 Periods)
Soil pollutants, Sources of soil pollution, Causes, Effects and control of soil pollution, Diseases caused by soil pollution, Methods to minimize soil pollution, Effective measures to control soil pollution, Case studies.

UNIT-V: MUNICIPAL SOLID WASTE MANAGEMENT (09 Periods)

Types of solid waste, ==Composition of solid waste==, Collection and transportation of solid waste, Methods of disposal – ==Open dumping==, Sanitary landfill, Composting, Incineration, ==Utilization - Recovery and recycling, Energy Recovery==.

Total Periods: 45

TEXT BOOKS:

1. Peavy, H. S, Rowe, D. R., and Tchobanoglous, G., *Environmental Engineering*, McGraw Hill Inc., 1985.
2. C.S.Rao, *Environmental Pollution Control Engineering*, New Age International Pvt. Ltd., 2nd Edition, 2007.
3. Ibrahim A. Mirsa, *Soil Pollution: Origin, Monitoring & Remediation*, Springer, UK, 2nd Edition, 2008.

REFERENCE BOOKS:

1. M.N. Rao and H.V.N. Rao, *Air Pollution,* Tata McGraw–Hill Education Pvt. Ltd., 19th Edition, 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* Academic Press (Elsevier)*,* 5th Edition, 2014.
3. S.M.Khopkar,*Environmental Pollution Monitoring and Control,* New Age International Pvt. Ltd., 2nd Edition, 2007.
4. V. M. Domkundwar, Environmental Engineering, DhanpatRai& Co. Pvt. Ltd., New Delhi, 2014.

14BT70106: ENVIRONMENTAL POLLUTION AND CONTROL
(Open Elective)
(Common to ECE, EEE, EIE & CE)

Internal Marks	External Marks	Total	L	T	P	C
30	70	100	3	1	–	3

PREREQUISITES: Environmental Sciences

COURSE DESCRIPTION: Introduction, Sources and Effects of Air Pollution – Dispersion of Pollutants and their control – Surface and Ground Water Pollution and control–Soil Pollution and remediation–Management of Municipal Solid Wastes.

COURSE OUTCOMES:
On successful completion of the courses, the students will be able to:
CO1. Explain various pollutants, characteristics and their dispersion
CO2. Analyze the major pollutants that causes environmental pollution.
CO3. Conduct research and select suitable techniques to control pollution.
CO4. Understand the effects of environmental pollutions on human beings and vegetation.
CO5. Communicate the methods of management and control of environmental pollution.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO AIR POLLUTION AND DISPERSION OF POLLUTANTS
(08 Periods)
Scope – Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, Point and Non– Point, Line and Area Sources of Air Pollution – Stationary and Mobile Sources – Dispersion of Pollutants – Dispersion Models – Applications.

UNIT-II: EFFECTS AND CONTROL OF PARTICULATES **(09 Periods)**
Effects of Air Pollutants on Man, Material and Vegetation – Global Effects of Air Pollution – Green House Effect, Heat Island, Acid Rains, Ozone Holes – Control of Particulates – Control at Sources – Process Changes – Equipment Modifications – Design and Operation of Control Equipment – Settling Chambers – Centrifugal Separators – Bag Filters, Dry and Wet Scrubbers – Electrostatic Precipitators.

UNIT-III: WATER POLLUTION **(10 Periods)**
Introduction–Water Quality in Surface Waters – Nutrients – Controlling Factors in Eutrophication–Effects of Eutrophication – Ground Water Pollution – Thermal Pollution – Marine Pollution – Sewage Disposal in Ocean – Types of Marine Oil Pollution – Cleanup of Marine Oil Pollution – Control of Water Pollution – Case Study on Tanneries – Drinking Water Quality Standards.

UNIT-IV: SOIL POLLUTION **(09 Periods)**
Soil Pollutants – Sources of Soil Pollution – Causes of Soil Pollution and their Control – Effects of Soil Pollution– Diseases Caused by Soil Pollution – Methods to Minimize Soil Pollution – Effective Measures to Control Soil Pollution – Case Study on Fertilizer.

UNIT-V: MUNICIPAL SOLID WASTE MANAGEMENT **(09 Periods)**
Introduction – Types of Solid Wastes – Principles of Excreta Disposal – Domestic Solid Waste Production – Collection of Solid Wastes – Transport of Solid Wastes – Management of Solid Wastes – Methods of Land Disposal – Sanitary Landfill – Composting – Incineration.

Total Periods: 45

TEXT BOOKS:
1. C.S.Rao, *Environmental Pollution Control Engineering*, 2nd Edition, New Age International Pvt Ltd., 2007.
2. Y.Anjaneyulu, *Introduction to Environmental Science,* 1st Edition, BS Publications*.,* 2009.

REFERENCE BOOKS:
1. M.N. Rao and H.V.N. Rao, *Air Pollution,* 19th Edition, Tata McGraw–Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* 5th Edition, Academic Press (Elsevier)*,* 2014.
3. S.M.Khopkar , *Environmental Pollution Monitoring and Control,* 2nd Edition, New Age International Pvt Ltd., 2007.

4. S.Deswal and K.Deswal, *Environmental Science,* 2nd Edition, Dhanpat Rai & Co, 2011.

I B.Tech. - II Semester
(16BT21201) OBJECT ORIENTED PROGRAMMING THROUGH C++
(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	1	-	4

PREREQUISITES: A Course on "Programming in C".

COURSE DESCRIPTION:

Introduction to Object Oriented concepts and Fundamental Concepts of C++; Decision Making Statements, Looping Statements and Functions; Arrays, Pointers & References and Strings; Classes & Objects and Overloading Operators; Composition & Inheritance, Templates, Iterators & Generics and File Handling;

COURSE OUTCOMES:

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

CO1: Demonstrate knowledge on object oriented programming concepts - Object, Class, Inheritance, Polymorphism, Encapsulation, Abstraction and Message passing.

CO2: Identify object oriented concepts for code reusability and optimization.

CO3: Design and develop solutions for given specifications.

CO4: Demonstrate problem solving skills to provide software solutions to real world problems.

CO5: Develop C++ programming to provide solutions to complex engineering problems using object oriented concepts.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND FUNDAMENTAL CONCEPTS
(Periods: 10)

An introduction to object technology: Objects and methods, Object: A practical example, Classes, Declaring classes and objects.

Key Object Orientation concepts and Elementary C++ programming: Abstraction, Encapsulation, Aggregation/ composition, Inheritance, Some simple programs, The output operator, Characters and literals, Variables and their declarations, Program tokens, Initializing variables, Objects, variables and constants, The input operator.

point values, Scope.

UNIT-II: DECISION MAKING STATEMENTS, LOOPING STATEMENTS AND FUNCTIONS (Periods:10)

Decision making statements: The if statement, The if-else statement, Keywords, Comparison operators, Statement blocks, Compound Conditions, Short- circuiting, Boolean expressions, Nested selection statements, The else-if statement, The switch statement, The conditional expression operator.

Looping Statements: The while statements, Terminating a loop, the do-while statement, the for statement, the break statement, the continue statement, the goto statement, Generating pseudo-random numbers

Functions: Introduction, Standard c++ library functions, User-defined functions, Test drivers, function declarations and definitions, Local variables and functions, void functions, Boolean functions, I/O functions, passing by reference, passing by constant reference, Inline functions, Scope, Overloading, The main () function, Default arguments

UNIT-III: ARRAYS, POINTERS & REFERENCES AND STRINGS (Periods: 12)

Arrays: Introduction, processing arrays, initializing an array, Array index out of bounds, passing an array to a function, the linear search algorithm, the bubble sort algorithm, the binary search algorithm, Using arrays with enumeration types, Type definitions, Multidimensional arrays.

Pointers and References: The reference operator, References, Pointers, the dereference operator, Derived types, Objects and lvalues, Returning a reference.

C++ Strings: Introduction, working with strings in C++, String manipulation, Strings and arrays, miscellaneous string functions, String streams

UNIT-IV: CLASSES & OBJECTS AND OVERLOADING OPERATORS (Periods: 12)

Classes and objects: Introduction, Class declarations, Constructors, Constructor initialization lists, Access functions, Private member functions, The copy constructor, The class destructor, Constant Objects, Structures, Pointers to object, Static data members, static function members, predefined classes, Data hiding and encapsulation, Exception handling

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SVEC16 - B.TECH - INFORMATION TECHNOLOGY

Overloading Operators: Introduction, Overloading the assignment operator, The this operator, Overloading Arithmetic operator, Overloading the arithmetic assignment operator, Overloading the relational patterns, Overloading the stream operators, Conversion operators, Overloading the increment and decrement operators, Overloading the subscript operator

UNIT-V: COMPOSITION & INHERITANCE, TEMPLATES, ITERATORS & GENERICS AND FILE HANDLING (Periods: 11)

Composition and inheritance: Introduction, Composition, Inheritance, protected class members, Overriding and dominating inherited members, private access versus protected access, virtual functions and polymorphism, virtual destructors, Virtual functions, pure virtual functions, Abstract classes, object-oriented programming.

Templates, iterators and Generics: Introduction, Function templates, Class templates, Container classes, Subclass templates, passing template classes to template parameters, Iterator classes, Generic programming

C++ File Handling: File I/O

(Total Periods: 55)

TEXT BOOKS:

1. John R Hubbard, *Programming with C++*, 3rd Edition, Tata McGraw-Hill, 2010.
2. P. B. Mahapatra, "Thinking in C++", 1st Edition, Galgotia Publications Pvt. Ltd, 2005.

REFERENCE BOOKS:

1. Sourav Sahay, Object Oriented Programming with C++, 2nd

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I B.Tech. - II Semester
(16BT21232) OBJECT ORIENTED PROGRAMMING LAB
(Common to CSE, CSSE & IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
50	50	100	-	-	3	2

PREREQUISITES: A Course on "OOPS through C++".

COURSE DESCRIPTION:

Hands-on experience on creating Virtual machines on Windows and Linux platforms, Development of Service based web applications & their deployment and Mobile app development.

COURSE OUTCOMES:

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

1. Demonstrate practical knowledge on Object oriented programming concepts - Object, Class, Inheritance, Polymorphism, encapsulation, Abstraction, message passing.
2. Apply object oriented programming concepts to develop real world applications.
3. Demonstrate Problem solving skills using basic and advanced concepts of C++.
4. Work individually and in teams collaboratively in implementing the applications.
5. Demonstrate communication skills both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. a. Write a C++ program that takes length as input in feet and inches. The program should then convert the lengths in centimeters and display it on screen. Assume that the given lengths in feet and inches are integers.
   b. Write a C++ program to find the sum for the given variables using function with default arguments.
2. Implement the Number Guessing Game in C++ with the given instructions. In this game the computer chooses a random number between 1 and 100, and the player tries to guess the number in as few attempts as possible. Each time the player enters a guess, the computer tells him whether the guess is too high, too low, or right. Once the player guesses the number, the game is over.

3. Write a program to perform arithmetic operations on two numbers. The program must be menu driven, allowing to select the operation (+, -, *, or /) and input the numbers. Furthermore, the program must consist of following functions:
    i) Function showChoice: This function shows the options and must explain how to enter data.
    ii) Function add: This function accepts two number as arguments and returns sum.
    iii) Function subtract: This function accepts two number as arguments and returns their difference.
    iv) Function multiply: This function accepts two number as arguments and returns product.
    v) Function divide: This function accepts two number as arguments and returns quotient.
4. Write a menu driven C++ program with following option
    a. Accept elements of an array
    b. Display elements of an array
    c. Sort the array using bubble sort method
    Write C++ functions for all options. The functions should have two parameters name of the array and number of elements in the array.
5. X. Y, Z are arrays of integers of size M, N, and M + N respectively. The numbers in array X and Y appear in descending order. Write a user-defined function in C++ to produce third array Z by merging arrays X and Y in descending order.
6. a. Write a program to enter any number and find its factorial using constructor.
    b. Write a program to generate a Fibonacci series using copy constructor.
7. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imaginary parts to equal values and third which takes two argument is used to initialized real and imaginary to two different values.
8. a. Write a program to overload unary increment (++) operator.
    b. Write a program to overload binary + operator.

9. a. Define a class TEST in C++ with following description:

Private Members

TestCode of type integer
Description of type string
NoCandidate of type integer
CenterReqd (number of centers required) of type integer
A member function CALCNTR() to calculate and return the number of centers as (NoCandidates/100+1)

Public Members

- A function SCHEDULE() to allow user to enter values for TestCode, Description, NoCandidate & call function CALCNTR() to calculate the number of Centres
- A function DISPTEST() to allow user to view the content of all the data members

b. Define a class REPORT with the following specification:

Private members :

adno	4 digit admission number
name	20 characters
marks	an array of 5 floating point values
average	average marks obtained
GETAVG()	a function to compute the average obtained in five subject

Public members:

READINFO()	function to accept values for adno, name, marks. Invoke the function GETAVG()
DISPLAYINFO()	function to display all data members of report on the screen.

You should give function definitions.

10. a. Create a base class basic_info with data members name ,rollno, gender and two member functions getdata and display. Derive a class physical fit from basic_info which has data members height and weight and member functions getdata and display. Display all the information using object of derived class.

b. Create a class called LIST with two pure virtual function store() and   retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.

11. a. Write a program to define the function template for swapping two items of the various data types such as integer, float, and characters.
b. Write a program to define the class template for calculating the square of given numbers with different data types.
12. a. Write a C++ program to write number 1 to 100 in a data file NOTES.TXT.
b. Write a program to read a set of lines from the keyboard and to store it on a specified file.

Any one of the following mini projects are to be implemented by a group of 4-5 students.

1. Mini Project : Banking System
   Develop an application on BANKING SYSTEM which has account class with data members like account number, name, deposit, withdraw amount and type of account. Customer data is stored in a binary file. A customer can deposit and withdraw amount in his account. Must support the features of creation, modifying and deletion account any time.

2. Mini Project : Library Management System
   Develop an application on LIBRARY MANAGEMENT SYSTEM which has book and student class with data members like book no, bookname, authorname. Books records is stored in a binary file. A student can issue book and deposit it within 15 days. Student is allowed to issue only one book. Student Records are stored in binary file. Administrator can add, modify or delete record.

3. Mini Project : Supermarket Billing System
   Develop a simple console application for SUPERMARKET BILLING SYSTEM which has product class with data members like product no, product name, price, quantity, tax, discount. Product details is stored in a binary file. A customer can purchase product and his invoice generated. Administrator can create, modify, view and delete product record.

REFERENCE BOOKS:

1. John R Hubbard, *Programming with C++*, 3rd Edition, Tata McGraw-Hill, 2010.
2. Sourav Sahay, *Object Oriented Programming with C++*, 2nd Edition, Oxford University Press, 2012.

(16BT41204) THEORY OF COMPUTATION
(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITES: A course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of Computation; Finite State Automaton; Regular Expressions; Grammars; Push Down Automaton; Turing Machine.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on Formal languages and automata.

CO2. Analyze the classification of languages, automata's and their computing power.

CO3. Design grammars and automata (recognizers) for regular expressions and formal languages.

CO4. Solve computational problems using automata.

CO5. Apply theorems to translate automata's and identify the class of languages.

DETAILED SYLLABUS:

UNIT-I: FINITE AUTOMATA   (10 Periods)

Introduction to Finite automata, The central concepts of automata theory, Deterministic finite automata, Nondeterministic Finite automata, The equivalence of DFA and NDFA, Finite automata with epsilon-transitions, Conversion of epsilon-NFA to NFA and DFA, Mealy and Moore models.

UNIT-II: REGULAR EXPRESSIONS AND LANGUAGE (9 Periods)

Regular expressions, Identity rules, Finite automata and Regular expressions, Applications of regular expressions, Pumping lemma for regular languages, Applications of the pumping lemma, Closure properties of regular languages, Equivalence of two regular expressions, Equivalence of two finite automata and minimization of automata.

UNIT-III: CONTEXT-FREE GRAMMARS   (9 Periods)

Context-free grammars, Parse trees, Applications of context-free grammars, Ambiguity in grammars and languages, Normal forms for context-free grammars, The pumping lemma for context-free languages.

UNIT-IV: PUSH DOWN AUTOMATA   (7 Periods)

Definition of the pushdown automaton, The languages of a PDA, Equivalence of PDA's and CFG's, Deterministic pushdown automata, Chomsky hierarchy of languages, The model of linear bounded automaton.

UNIT-V: TURING MACHINES   (10 Periods)

Turing machine model, Representation of turing machines, Language acceptability by turing machine, Design of turing machines, Programming techniques for turing machines, Turing machines with semi-infinite tapes, Multi stack machines and counter machines, Universal turing machines.

Total Periods: 45

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D Ullman, *Introduction to Automata Theory, Languages and Computation,* Pearson Education, Third Edition, 2011.

2. K.L.P. Mishra and N.Chandrasekaran, *Theory of Computer Science: Automata Languages and Computation,* PHI Learning, Third Edition, 2009.

REFERENCE BOOK:

1. John C Martin, *Introduction to Languages and the Theory of Computation,* TMH, Third Edition, 2009.

III B.Tech – I Semester
14BT50501: THEORY OF COMPUTATION
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PREREQUISITES: A course on "Discrete Mathematical Structures".

COURSE DESCRIPTION: Fundamentals of computation – Finite State Automaton, Push Down automaton, Turing Machine, and decidability of problems.

COURSE OBJECTIVES:

CEO1. To impart knowledge on mathematical proofs of automata theory and computational complexity.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to:

1. Demonstrate Knowledge on (PO1)
   - Finite State Automaton
   - Regular Expression
   - Push Down Automaton and Turing Machine.
2. Develop formal proofs for models of Computation. (PO3)
3. Apply the concepts of automata in modeling abstract devices. (PO4)

DETAILED SYLLABUS

UNIT-I: FINITE AUTOMATA   **(Periods: 09)**

Finite Automata: Introduction to Finite Automata, Structural Representations, Automata and Complexity, The Central Concepts of Automata Theory, An Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata with epsilon-Transitions.

UNIT-II: REGULAR EXPRESSIONS   **(Periods: 09)**

Regular Expressions: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expression, Proving Languages not to be Regular, Closure Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III: CONTEXT-FREE GRAMMARS AND PUSH DOWN AUTOMATA

(Periods: 10)

Context-Free Grammars: Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages.

Push Down Automata: Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

UNIT-IV: TURING MACHINES AND LINEAR BOUNDED AUTOMATA

(Periods: 08)

Turing Machines: Types of Computational Problems, The Turing Machine, Programming Techniques for Turing Machine, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers, The Model of Linear Bounded Automaton.

UNIT-V: UNDECIDABILITY   **(Periods: 09)**

Undecidability: Language that is not Recursively Enumerable, An Undecidable Problem, Undecidable Problems About Turing Machines, Post's Correspondence Problem.

(Total Periods: 45)

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D Ullman, **"Introduction to Automata Theory, Languages and Computation"**, 3rd edition, Pearson, 2011.

REFERENCE BOOKS:

1. K.L.P. Mishra and N.Chandrasekaran, **"Theory of Computer Science: Automata Languages and Computation"**, 3rd edition, Phi Learning, 2009.
2. John C Martin, **"Introduction to Languages and the Theory of Computation"**, 3rd edition, TMH, 2009.

II B.Tech. - II Semester
(16BT41203) SOFTWARE ENGINEERING
(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITES: --

COURSE DESCRIPTION: Concepts of Software Engineering; Software Process Models; Conventional and Agile Process Models; Software Requirements Engineering Process; System Analysis; Architectural Design; User Interface Design and Re-engineering; Software Testing; Risk and Quality Management.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:

CO1.   Demonstrate knowledge on:
- Fundamental concepts of software engineering.
- Process models.
- Software development life cycle.

CO2.   Analyze software requirements and process models required to develop a software system.

CO3.   Design and develop a quality software product using design engineering   principles.

CO4.   Develop software product as per user and societal requirements.

CO5.   Follow standards for software development and quality management.

CO6.   Demonstrate skills in applying risk and quality management principles for   effective management of software projects.

DETAILED SYLLABUS:

UNIT I: SOFTWARE ENGINEERING AND SOFTWARE PROCESS
(11 Periods)

A Generic View of Process: The nature of software, Software engineering- Software engineering layers; The software process, Software engineering practice, Software myths.

Process Models: A Generic process model, Incremental process models, Evolutionary Process models; The unified process, Agile

Development-Agility, Agile process, Scrum, Agile modeling (AM), Agile Unified Process (AUP), The Cleanroom strategy.

UNIT II: REQUIREMENTS ENGINEERING AND MODELING
(7 Periods)

Requirements Engineering: Functional and non-functional requirements, The software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

Requirements Modeling: Data modeling concepts, Flow-oriented modeling, Case study on requirements modeling for WebApps.

UNIT III: DESIGN ENGINEERING AND METRICS (8 Periods)

Design Engineering: Design within the context of software engineering, The Design process, Design concepts, Software architecture, Architectural styles, Architectural design.

Process and Project Metrics: Metrics in the process and project domains, Software measurement, Metrics for software quality.

UNIT IV: SOFTWARE TESTING STRATEGIES AND APPLICATIONS   (9 Periods)

Testing Strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software, Validation testing, System testing, The art of debugging.

Testing Conventional Applications: Software testing fundamentals, Basis path testing, White box and Black box testing, Object oriented testing methods.

UNIT V: RISK, QUALITY MANAGEMENT AND REENGINEERING

(10 Periods)

Risk and Quality Management: Reactive and proactive risk strategies, Software risks, Risk Mitigation Monitoring and Management (RMMM), RMMM plan, Software quality factors, Defect amplification Model, Formal Technical Reviews (FTR), Software Quality Assurance (SQA)-Tasks, Goals and metrics;

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Software reliability.

Reengineering: Introduction, Business Process Reengineering (BPR), Software reengineering, Restructuring, Reverse engineering, Forward engineering.

Total Periods: 45

TEXT BOOKS:

1. Roger S. Pressman, *Software Engineering-A Practitioner's Approach,* McGraw-Hill International Edition, Seventh Edition, 2010.

2. Ian Sommerville, *Software Engineering,* Pearson Education, Ninth Edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal and Yogesh Singh, *Software Engineering, New Age International Publishers,* Third Edition, 2007.

2. Shely Cashman Rosenblatt, *Systems Analysis and Design, Thomson Publications,* Sixth Edition, 2006.

14BT51202: SOFTWARE ENGINEERING
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PREREQUISITES: Nil.

COURSE DESCRIPTION: Concepts of Software Engineering, software process models: Conventional and agile process models, software requirements engineering process, system analysis, architectural design, User interface design and re-engineering, software testing, risk and quality management.

COURSE OBJECTIVES:

CEO1. To impart knowledge on software engineering methods, practices and their appropriate applications.

CEO2. To apply software engineering principles to develop a software project.

COURSE OUTCOMES:
On successful completion of this course, the students will be able to:

1. Demonstrate knowledge in (PO1)

   - Fundamental concepts of software engineering.
   - Process models.
   - Software development life cycle.

2. Analyze software requirements and process models required to develop a software system.(PO2)
3. Design and develop a quality software product using design engineering principles.(PO3)
4. Demonstrate skills in applying risk and quality management principles for effective management of software projects.(PO11)

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING   (Periods: 09)

A Generic view of process: Evolving role of software, Software myths, Software engineering- A layered technology, A process framework, CMMI, Process patterns, Process assessment, Personal and team process models.

Process models: Waterfall model, Incremental process models, Evolutionary process models, the unified process, agile process models-Scrum, agile modeling.

UNIT II: REQUIREMENTS ENGINEERING   (Periods: 09)

Functional and non-functional requirements, the software requirements document, Requirements specifications, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management.

System modeling: Context models, Interaction models, Structural models, Behavioral models, Model driven engineering

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UNIT III: DESIGN ENGINEERING   (Periods: 09)

Creating an architectural design: Design process and design quality, Design concepts, Software architecture, Data design, Architectural styles and patterns, Architectural design

Performing user interface design: The golden rules, User interface analysis and design, Interface analysis, Interface design steps, Re-engineering.

UNIT IV: SOFTWARE TESTING   (Periods: 10)

Testing strategies: A strategic approach to software testing, Strategic issues, Test strategies for conventional software, Test strategies for object oriented software , Validation testing, System testing, The art of debugging.

Testing tactics: Software testing fundamentals, white box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing methods.

UNIT V: RISK AND QUALITY MANAGEMENT   (Periods: 08)

Risk management: Reactive and proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM plan.

Quality management: Quality concepts, Software quality assurance, Software reviews, Formal technical reviews, Formal approaches to SQA, Statistical software quality assurance, Software reliability.

[Total Periods: 45]

TEXT BOOKS:

1. Roger S. Pressman, **"Software Engineering, A practitioner's Approach"**, McGraw-Hill International Edition, 6th edition, 2010.

2. Ian Sommerville, **"Software Engineering"**, Pearson Education, 9th edition, 2011.

REFERENCE BOOKS:

1. K. K. Aggarwal & Yogesh Singh, **"Software Engineering"**, New Age International Publishers, 3rd edition, 2007.

2. Shely Cashman Rosenblatt, **"Systems Analysis and Design"**, Thomson Publications, 6th edition, 2006.

II B.Tech. - II Semester
(16BT31231) JAVA PROGRAMMING LAB
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		-	-	3	2

PRE-REQUISITES: A course on "Java Programming".

COURSE DESCRIPTION: Hands-on experience on Polymorphism; Inheritance and Interfaces; Exception Handling; Multithreading; Event Handling; AWT; Applets; Servlets.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on basic concepts of Java programming.

CO2. Design and develop efficient programs with multitasking ability and handle exceptions.

CO3. Demonstrate independent problem solving skills in developing interactive applications.

CO4. Apply object oriented approach to develop user friendly interface and learn how to communicate with systems over the network.

CO5. Build Java applications suitable for societal requirements.

CO6. Work effectively as an individual and as a member in team for case studies implementation.

CO7. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. a. Write a Program to accept two integers through the command line arguments and print the sum of the two numbers.

   b. Write a Program to accept a String as a Command line argument and the program should print a Welcome message.

2. Write a program that displays a menu with options (i) Add (ii) Sub. Based on the options chosen, read 2 numbers and perform the relevant operation. After performing the

operation, the program should ask the user if he wants to continue. If the user presses y or Y, then the program should continue displaying the menu else the program should terminate.[Use Scanner class]

3. a. Write a program to print the element of an array that has occurred highest number of time.

   b. Write a program to find greatest number in a 3*3 array. The program is supposed to receive 9 integer numbers as command line arguments.

4. a. Create a class "AmountInWords" to convert the amount into words. (Consider the amount to be not more than 100000.)

   b. Write a Program to count tokens- number of words and characters in a string.

5. Implement any one of the case study with the specifications given below:

   a) Create classes, objects and their properties.

   b) Add methods to classes and implement them.

   c) Refine the objects by adding constructors and local variables.

   d) Show communication between the objects by calling instance of one object from another class.

   e) Handle Exceptions and Implement relationships like inheritance.

Case study 1: Banking Application:

The banking application consists of five divisions. They are customer details, creating a new account, withdrawing money, loan details and depositing money. The customer details consist of customer name, address, phone number, account number. To withdraw money checks the balance in the account and then get the money. The loan details consist of loan types like home loans, car loans, education loans etc. To deposit money enter the account number and give the account to be deposited.

Case study 2: Library Application:

The Library Application consists of Student, faculty and book

details, Issue book, and return book. The student and faculty details consist of name, ID, Branch and maximum number of books can be issued to them. The book details consist of ID, Book name and Author name. To Issue a book to members, the librarian checks the availability of book and if the book is not available, then an error message will be displayed. To return the book, the librarian verifies the validity and if the validity is expired then the fine amount message will be displayed. The student and faculty can view the book details issued to them and also can check the count of remaining books that can be taken for issue.

6. a. Write a program that correctly implements producer consumer problem using the concept of inter-thread communication.

   b. Write a program that demonstrates time slicing among equal priority threads, show that a lower priority thread's execution is deferred by the time slicing of higher-priority threads.

7. Develop an Applet that receives an integer in one text field, and computes its factorial value and returns it in another text field, when the button named "Compute" is clicked.

8. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result.

9. Create a Servlet that recognizes first time visitor to web application and responds by saying "Welcome to new user" otherwise "welcome back".

REFERENCE BOOKS:

1. Herbert Schildt, *Java the Complete Reference,* Oracle Press, Ninth Edition, 2014.

2. Sachin Malhotra and Saurab Choudhary, *Programming in Java,* Oxford University Press, Second Edition, 2014.

14BT41221: OBJECT ORIENTED PROGRAMMING LAB
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
25	50	75		-	-	3	2

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Hands-on Programming using concepts of classes, objects, inheritance, Polymorphism, String API, Exception Handling mechanisms, Threads, Applets, AWT, Swings and Database Connectivity using JDBC and Servlets.

COURSE OBJECTIVES:

CEO1. To develop problem solving skills through Object Oriented concepts.

CEO2. To develop design and implementation skills for Graphical User Interface based Systems.

CEO3. To apply advanced java programming for development of interactive applications.

COURSE OUTCOMES:

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

1. Design and develop real time applications using applets. (PO3)
2. Demonstrate problem solving skills using classes, objects, inheritance, runtime polymorphism, AWT and Servlets to develop web/interactive applications. (PO4)

List of Programming Exercises

1:

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2:

a) Write a Java program to find the average and sum of 1st N numbers using command line arguments

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3:

a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes containsonly the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Write a java program to design a class using the inheritance and static that show all function of bank (withdrawl, deposit) and generate account number dynamically.

c) Write a java program to design(Implement runtime polymorphism) using abstract methods and classes

4:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

5:

a) Write a java program that import the Userdefine package and access the member variable of classes that contained by the package

b) Write a java program to handle ArithmeticException, ArrayIndexOutOfBoundsException using try and multiple catch statements

c) Write a java program to throw a user defined exception called Negative, if the entered input is a negative number and to handle the exception.

6:

a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named - Compute is clicked.

7:

a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digts and for the +, -,*, % operations. Add a text field to display the result.

b) Write a Java program for handling mouse events.

8:

a) Write a Java program that creates three threads. First thread displays - Good Morning for every one second, the second thread displays - Hello for every two seconds and the third thread displays - Welcome for every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

9:

a) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box.

b) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.

c) Write a Java program that allows the user to draw lines, rectangles and ovals.

10:

a) Write an applet that computes the payment of a loan, by taking the amount of the loan, the interest rate and the number of month's values in the text fields. it takes one parameter from the browser: monthly rate as a checkbox ,if it is true, the interest is calculated per month otherwise the interest is calculated per annual.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

11: Create a table which should contain at least the following fields: name, password, email-id, phone number. Write a java program to connect to the database (Ex: MS-Access) and extract data from the tables and display them

12: Assume four users user1, user2, user3 and user4 having passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1) Create a Cookie and add these four user ids and passwords to this Cookie, read user id and password entered in the login form.

2) If he is valid user (i.e., user-name and password match) welcome him with his name, else display "You are not an authorized user".

TEXT BOOKS:

1. Herbert Schildt, "The complete reference Java," TMH, 7th edition, 2007.

2. Timothy Budd, Understanding Object-oriented Programming wth Java, Addison-Wesley, updated edition, 2002.

REFERENCE BOOK:

1. Sachin Malhotra, Saurab Choudhary, "Programming in java," Oxford university press, 2nd edition, 2013.

III B.Tech. - I Semester
(16BT51233) WEB TECHNOLOGIES LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		-	-	3	2

PRE-REQUISITES: A course on "Web Technologies".

COURSE DESCRIPTION: Hands-on experience on HTML, HTML5, CSS, JavaScript, JQuery, Bootstrap, PHP and MySQL.

COURSE OUTCOMES:
On Successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on web page design elements, dynamic content and database Interaction.

CO2. Analyze user requirements to develop web applications.

CO3. Design client-server applications using web technologies.

CO4. Demonstrate problem solving skills to develop enterprise web applications.

CO5. Use HTML, CSS, JavaScript, JQuery, Bootstrap and PHP technologies for device independent web application development.

CO6. Apply web technologies to develop interactive, dynamic and scalable web applications for societal needs.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXERCISES:

1. Design the following static web pages of an online book store web application.

a. Home Page:

b. Catalogue Page:

The catalogue page should display the following details of available books.

      i. Snap shot of cover page   ii. Title of the text book
      iii. Author name   iv. Publisher
      v. Price   vi. More details link.

Logo		Name of the Book Store		
Home	Latest Arrivals	Best Sellers	Contact Us	Search
Computers Electronics Electrical Bio-Tech	HTML5 Black Book	**HTML5 Black Book** Kogent Learning Solutions Dreamtech Press Rs. 570/-	More Details	
	PHP and MySQL	**Beginning PHP and MySQL** 4th Edition W Jason Gilmore Apress Rs. 520/-	More Details	

c. Registration Page:

Design the Registration page with the following fields and navigate it with create an account link.

      i. First Name   ii. Last Name

      iii. Gender   iv. Date of Birth

      v. Username   vi. Password

      vii. Confirm Password   viii. Address

      ix. Postal Code   x. Mobile No.

      xi. Email-Id

2. a. Design a web page to store username and password information using the local storage concept.

    b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.

3. Apply the following styles to all web pages of online book store web application.

    a. Fonts and Styles: font-family, font-style, font-weight and font-size.

    b. Backgrounds and colors: color, background-color, background-image and background-repeat.

c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align

d. Borders: border, border-width, border-color and border-style

e. Styles for links: A: link, A: visited, A:active, A:hover

f. Selectors, Classes, Layers and Positioning elements.

4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.

b. Username - It should contain combination of alphabets, numbers and underscore. It should not allow spaces and special symbols.

c. Password - It should not less than 8 characters in length and it contains one uppercase letter and one special symbol.

d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.

e. Postal Code: It must allow only 6 digit valid number.

f. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

g. e-mail id - It should allow the mail id with the following format: Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery

a. Displaying of images with Custom animated effects

b. Playing of selected video from the list of videos

c. Showing the animated text in increasing and decreasing font size

d. Changing the size of the area in a web page using DIV tag

e. Hiding and Showing elements in a web page.

6. Design a web page with the following features using Bootstrap and Media Query.

a. Components

b. Responsive tables

c. Responsive images and videos

7. a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

b. Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.

8. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

9. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.

10. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.

11. a. Mini Project - 1: Design a web application for selling products online with the following features.

Mobile website option - The online store should be built on a responsive design template and its features need to be available to all users, at any time, from anywhere and in any device.

Image options - The photos should also be taken from different points of view to give you a clearer idea of the product. Image options should include viewing angles, zoom, multiple images, and more.

Detailed product description - The description should often include the important details, such as the expiration date, size dimensions, weight, manufacturers date, and practical uses must be included in a good product description.

Order Tracking - The customers should be able to track their ordered products by logging into an account created upon registration.

Payment Options - An online website should allow credit card/debit card/net banking for payment.

b. Mini Project - 2: Design a social website with the following features

Build Profile - Members allow to build their profiles.

Upload content - The Social Networking Sites allow members to upload text messages, photographs, audio and video files. All posts are arranged in descending order with the last post coming first.

Build conversations - Content posted by members can be browsed and commented upon by all members who form part of the community. Content can also be tagged from third party sites on subjects that interest the group.

REFERENCE BOOKS:

1. Kogent Learning Solutions Inc, *HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,* Dreamtech Press, Second Edition, 2016.

2. W. Jason Gilmore, *Beginning PHP and MySQL,* APress, Fourth Edition, 2011.

3. Snig Bahumik, *Bootstrap Essentials,* PACKT Publishing, 2015. (e-book).

III B.Tech. II Semester
14BT61222: WEB PROGRAMMING LAB
(Common to CSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on experience on HTML; HTML5; CSS; JavaScript; JQuery; PHP; MySQL; XML and AJAX.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL.
2. Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:

1. Design the following static web pages required for an online book store web site.

A. Home Page:

Logo	Name of the Book Store			
Home	Latest Arrivals	Best Sellers	Contact Us	Search
Computers Electronics Electrical Bio-Tech	Description of the Book Store (Images, Scroll Text, etc)		Username Password Sign-in New User Create an Account	

The Home page must have the following three frames:

Top frame: Logo and the book store name and links to Home page, Latest arrivals, Best sellers, Contact us and Search.

Left frame: At least four links for navigation, which will display the books catalogue relevant to engineering disciplines. For e.g. when the link "Computers" is dicked, the catalogue relevant to computer science books will be displayed in the right frame.

Right frame: The pages of navigated links in the left and top frame must be loaded in the right frame. Initially it will load the Home page that can include the description of the book store, sign-in and create account information.

B. Catalogue Page:

The catalogue page should display the following details of books available in the web site. The details are as follows:

a. Snap shot of cover page   b. Title of the text book

c. Author name   d. Publisher

e. Price   f. More details link.

Logo		Name of the Book Store		
Home	Latest Arrivals	Best Sellers	Contact Us	Search
Computers Electronics Electrical Bio-Tech		**HTML5 Black Book** Kogent Learning Solutions Dreamtech Press Rs. 570/-		More Details
		Beginning PHP and MySQL 4th Edition W Jason Gilmore Apress Rs. 520/-		More Details

C. Registration Page:

Design the Registration page with the following fields and link it to create an account link.

a. First Name   b. Last Name   c. Gender

d. Date of Birth   e. Username   f. Password

g. Confirm Password   h. Address   i. Postal Code

j. Mobile No.   k. Email-Id

2.

a. Design a web page to store username and password information using the local storage concept.

b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.

3. Apply the following styles to all web pages of online book store web site.

a. Fonts and Styles: font-family, font-style, font-weight and font-size

b. Backgrounds and colors: color, background-color, background-image and background-repeat

c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align

d. Borders: border, border-width, border-color and border-style

e. Styles for links: A: link, A: visited, A:active, A:hover

f. Selectors, Classes, Layers and Positioning elements.

4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.

b. Username - It should contain combination of alphabets, numbers and _. It will not allow spaces and special symbols.

c. Password - It should not less than 8 characters in length.

d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.

e. Postal Code: It must allow only 6 digit valid number.

e. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

f. E-mail id - It should allow the mail id with the following format:

Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery

a. Displaying of images with Custom animated effects

b. Playing of selected video from the list of loaded videos

c. Showing the animated text in increasing and decreasing font size

d. Changing the size of the area in a web page using DIV tag

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d. Hides and Shows elements on web page.

6.

a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

b. Write a PHP program to red user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.

7. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

8. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.

9. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.

10. Write an XML file to store book details including:

a. Title of the book b. Author of the book   c. ISBN number

d. Publisher Name   e. Edition   f. Price

i. Write a Document Type Definition (DTD) or XML Schema to validate the above XML file.

ii. Display the contents of the XML file with the following format using XSLT.

The contents should be displayed in a table format. The header of the table should be in color grey and the author names should be displayed in red color, bold and capitalized. Use appropriate colors for remaining fields.

11. Design a web page to reload some portion of the web page content using XMLHttpRequest object.

III B.Tech. - II Semester
(16BT61201) CLOUD COMPUTING
(Common to IT and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITES: Courses on "Computer Networks" and "Operating Systems".

COURSE DESCRIPTION: Virtualization, Virtualization Technologies; Cloud Computing Fundamentals, Deployment Models; Cloud Computing Architecture; Cloud Computing Mechanisms; Cloud Security, Cloud Disaster Recovery; Working with Clouds; and Case Studies.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on services, architecture, types of infrastructural models, disaster recovery and virtualization.

CO2. Analyze the issues in cloud computing Data, Network and Host security.

CO3. Apply API development skills in web applications for Cloud deployment.

CO4. Use research based knowledge to build cloud applications.

CO5. Use advanced programming languages to access cloud services.

CO6. Build cloud environment suitable for societal requirements.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO VIRTUALIZATION AND TECHNOLOGIES (9 periods)

Introduction to Virtualization: Definition, Objectives, Characteristics, Benefits of virtualization, Taxonomy of virtualization technologies, Pros and cons of virtualization.

Virtualization Technologies: VMware, Hyper-V, Zen and virtual iron.

UNIT II: FUNDAMENTAL CLOUD COMPUTING AND MODELS
(9 Periods)

Cloud Computing: Origin and influences, Basic concepts and terminology, Goals and benefits, Risks and challenges.

Cloud Models: Roles and boundaries, Cloud characteristics, Cloud delivery models, Cloud deployment models.

UNIT III: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE (9 Periods)

Cloud-Enabling Technology: Broadband networks and internet architecture, Data center technology, Virtualization technology, Web technology, Multitenant technology, Service technology.

Cloud Architectures: Architecture - Workload distribution, Resource pooling, Dynamic scalability, Elastic resource capacity, Service load balancing, Cloud bursting, Elastic disk provisioning, Redundant storage.

UNIT IV: CLOUD SECURITY AND DISASTER RECOVERY

(9 Periods)

Cloud Security: Data, Network and host security, Cloud security services and cloud security possible solutions.

Cloud Disaster Recovery: Disaster recovery planning, Disasters in the cloud, Disaster management, Capacity planning and cloud scale.

UNIT V: CLOUD CASE STUDIES (9 Periods)

Case Studies: Software-as-a-Service (SaaS) - Salesforce.com, Facebook; Platform-as-a-Service (PaaS) - Google App Engine, MS-Azure and IBM Bluemix; Infrastructure-as-a- Service (IaaS) - Amazon EC2, Amazon S3 and Netflix.

Total Periods: 45

TEXT BOOKS:

1. Thomas Erl and RicardoPuttini, *Cloud Computing- Concepts, Technology and Architecture,* Pearson, 2013.

2. Ivanka Menken and Gerard Blokdijk, *Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,* Lightning Source, 2009.

IV B.Tech. II Semester
14BT81201: **CLOUD COMPUTING**
(Common to CSE, CSSE and IT)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: Courses on "Computer Networks" and "Operating Systems"

COURSE DESCRIPTION: Cloud computing fundamentals; cloud computing architecture; cloud computing mechanisms; cloud security; working with clouds, virtualization and case studies.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:

1. Demonstrate knowledge on services, architecture, types of infrastructural models, Disaster Recovery and Virtualization.
2. Analyze the issues in cloud computing.

Detailed Syllabus:

UNIT - I: FUNDAMENTAL CLOUD COMPUTING   **(09 periods)**

Understanding Cloud Computing: Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models.

UNIT - II: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE
(09 periods)

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.

Fundamental Cloud Architectures: Architecture - Workload Distribution, Resource Pooling, Dynamic Scalability, Elastic Resource Capacity, Service Load Balancing, Cloud Bursting, Elastic Disk Provisioning, Redundant Storage.

UNIT - III: CLOUD COMPUTING ADVANCED ARCHITECTURES
(10 periods)

Advanced Cloud Architectures: Architecture-Hypervisor Clustering, Load Balanced Virtual Server Instances, Non-Disruptive Service Relocation, Zero Downtime, Cloud Balancing, Resource Reservation, Dynamic Failure Detection and Recovery, Bare-Metal Provisioning, Rapid rovisioning,

storage Workload Management.

Specialized Cloud Architectures: Architecture - Direct I/O Access,Direct LUN Access,Dynamic Data Normalization,Elastic Network Capacity,Cross-Storage Device Vertical Tiering,Intra-Storage Device Vertical Data Tiering,Load Balanced Virtual Switches,Multipath Resource Access,Persistent Virtual Network Configuration,Redundant Physical Connection for Virtual Servers,Storage Maintenance Window.

UNIT - IV: WORKING WITH CLOUDS   (09 periods)

Cloud Delivery Model Considerations: Cloud Delivery Models - The Cloud Provider, Cloud Delivery Models - The Cloud Consumer, Case Study Example.

Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.

UNIT - V: INTRODUCTION TO VIRTUALIZATION   (08 periods)

History of Virtualization, Objectives of virtualization, Benefits of Virtualized Technology, VMware, Microsoft Hyper-V and Ubuntu.

Total Periods: 45

TEXT BOOKS:

1. Thomas Erl and RicardoPuttini **"Cloud Computing- Concepts, Technology and Architecture,"** Pearson, First Edition 2013.

2. Ivanka Menken, **"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,"** First Edition, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, **"Cloud Computing Bible,"** Wiley India Pvt Ltd, First Edition, 2011.

2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, **"Cloud computing principles and paradigms,"** John Wiley and Sons, 2011.

3. John W. Rittinghouse, James F. Ransome, **"Cloud Computing implementation, Management and Security,"** CRC Press, Taylor & Francis group, First Edition 2010.

III B.Tech. - II semester
(16BT61231) CLOUD COMPUTING LAB

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		-	-	3	2

PRE-REQUISITES: A course on "Cloud Computing".

COURSE DESCRIPTION: Hands-on experience on creating virtual machines on Windows and Linux platforms; Development of service based web applications and their deployment.

COURSE OUTCOMES: On successful completion of this course, students will be able to:

CO1. Demonstrate hands-on experience on Virtualization models and Cloud Environment.

CO2. Analyze the given experiment and relate to existing cloud architectures.

CO3. Apply API development skills in web applications for cloud deployment.

CO4. Demonstrate independent problem solving skills in developing dynamic web applications.

CO5. Use advanced programming languages to access cloud services.

CO6. Build suitable cloud environment for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

CO8. Demonstrate communication skills, both oral and written for preparing and presenting reports.

LIST OF EXPERIMENTS:

1. Create VM's with given set of configuration on Hyper-V Ubuntu 14LTs files with 2GB RAM and 200GB Hard Disk through Infrastructure Services (IaaS).

2. Create Virtualization on VMware Windows 7 OS with 4GB RAM and 500GB Hard Disk" through Infrastructure as a Service (IaaS).

3. Develop a simple web application for student details and operative using Salesforce.com in Cloud Platform under Software as Service (SaaS).

4. Develop a simple web application for personal Homepage, Attributes, Controllers, GUI, Visual Page, Forms, and Templates under Software as Service (SaaS).

5. Develop a web application for performing calculator operations. Deploy this application on Salesforce.com Cloud Platform under Software as Service (SaaS).

6. Develop a web application on IBM Bluemix Cloud Platform for executing application using Eclipse under Platform as a Service.

7. Create virtual machine instance with given set of configuration on Amazon web Services (AWS) under Infrastructure as a Service (IaaS).

8. Create virtual machine instance with set of configuration on Amazon S3 (Simple Storage Service) in Amazon Web Service (AWS) under Infrastructure as a Service (IaaS).

9. Develop a web application on IBM Bluemix Cloud Platform for implementing IoT application.

10. Develop a calculator web based application on MS-Azure Platform i.e. Platform as a Service (PaaS).

11. Develop a student home page web based application on MS-Azure Platform i.e. Platform as a Service (PaaS) Cloud.

12. Develop a mobile app on Google App Engine for uploading a resume into a website, collaborated with Drop box. The resume should be encrypted. (PaaS)

13. Develop a service call to run on Drop box resumes for picking the resumes of given skill set. (PaaS)

i. 6+ years of Exp in Java Development.

ii. 10 years of experience in Automation Testing.

130

(Common to CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		-	-	3	2

PRE-REQUISITE: A course on Operating Systems.

COURSE DESCRIPTION: Hands on practice in simulating algorithms for CPU Scheduling, Memory Management, I/O Management, Deadlock Handling mechanisms; Implementing Synchronization problems; practice on UNIX commands.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:
CO1. Demonstrate knowledge of the following algorithms to solve problems:
    i.   CPU Scheduling
    ii.   Memory Management
    iii.   I/O Management
CO2. Formulate and analyze solutions to problems pertaining to Memory and I/O.
CO3. Designing models for deadlock handling mechanisms.
CO4. Develop skills in basic UNIX commands.
CO5. Use appropriate APIs' available in modern operating systems (such as threads, system calls, semaphores, etc...) for software development.
CO6. Communicate effectively on complex operating system problems with implication to User-friendliness.
CO7. Develop and demonstrate user defined libraries to communicate with the kernel or effective implementation of projects across multidisciplinary environments

LIST OF EXPERIMENTS:
1. Write a program to implement the following system calls:
    a) fork b) exec c) getpid d) wait
2.   a. Write a program to demonstrate File Permissions.
    b. Write a program to implement named and unnamed pipes.
3.   Implement the following CPU Scheduling Algorithms:
    a) FCFS b) SJF (Preemptive) c) Round Robin d) Priority. Use the following set of processes, compare the performance of above scheduling policies

Process Name	Arrival Time	Processing Time	Priorities
A	0	3	2
B	1	5	4
C	3	2	1
D	9	5	5
E	12	5	3

4. Implement the following synchronization problems:
   a) Producer Consumer Problem
   b) Dining Philosopher's Problem.

Implement Banker's Algorithm for Deadlock Avoidance and Detection. Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not. Consider number of resources are three and Jobs are five as shown in the figure:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3			
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2	3	3	2
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

6. Implement the following Algorithms:
   a) First Fit b) Best Fit c) Worst Fit

7. Implement multiprogramming with fixed number of tasks and variable number of tasks. The size of the memory is 1000K. Operating system size is 200K. Number of processes are P1, P2, P3 with sizes 150K, 100K and 70K.

8. Implement the following Page Replacement Algorithms:
   a) FIFO   b) LFU   c) LRU   d) Optimal
   Consider number of frames are three and Reference string is
   2 3 2 1 5 2 4 5 3 2 4 2 4 5

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Seventh Edition, Willy India Edition, 2006.

III B. Tech. – II Semester

(16BT61501) DATA WAREHOUSING AND DATA MINING

(Common CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITE: A course on Database Management Systems.

COURSE DESCRIPTION: Data Mining Fundamentals; Data Preprocessing; Operational Database Systems and Data Warehouses; Mining Frequent Patterns; Classification and Prediction; Clustering; New Trends and Research Frontiers.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:
- CO1. Demonstrate knowledge on Concepts of data warehousing and data mining.
- CO2. Analyze using data mining techniques to find useful and potential Knowledge.
- CO3. Design of Data Warehouse for OLAP applications and deployment.
- CO4. Evaluate the usage of association mining techniques on complex data objects.
- CO5. Select appropriate techniques to measure the interesting patterns from heterogeneous databases.
- CO6. Apply appropriate evolutionary data mining algorithms to find solutions of Real time Applications.

DETAILED SYLLABUS:

UNIT I: DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING   (09 Periods)
Data Warehouse, Operational Database Systems versus Data Warehouses, A Multi tired Architecture, A Multidimensional Data Model, Stars, Snowflakes and Fact Constellations: Schemas, Role of Concept hierarchies, Measures, OLAP Operations, From online Analytical processing to Multidimensional Data Mining, Indexing OLAP Data.

UNIT II: DATA MINING AND DATA PREPROCESSING   (08 Periods)
Introduction to Data Mining, kinds of data, kinds of patterns, major issues in Data Mining, Data Pre-processing, Data Cleaning, Data Integration , Data Reduction, Data Transformation and Discretization.

UNIT III: ASSOCIATIONS AND CLASSIFICATION
(10 Periods)

Basic Concepts , Frequent itemset Mining Methods, pattern evaluation methods- From Association Mining to Correlation Analysis ,Classification, Decision Tree Introduction, Bayesian Classification Methods, Rule Based Classification, Prediction: Linear Regression.

UNIT IV: CLUSTER ANALYSIS
(09 Periods)

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods -k-Means and K-Medoids , Hierarchical methods-Agglomerative and divisive method, Density-Based Method-DBSCAN, Grid-Based Method-STING, Outlier Analysis.

UNIT V: DATA MINING TRENDS
(09 Periods)

Mining Complex Data Types: Mining sequence data, Mining other kinds of data: Spatial, Text, Multimedia and Web data, Data Mining Trends.

Total Periods: 45

TEXT BOOK:
1. Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining: Concepts and Techniques,* Elsevier, 3rd Edition, 2013.

REFERENCE BOOKS:
1. K.P. Soman, Shyam Diwakar and V. Ajay, *Insight into Data mining Theory and Practice,* Easter Economy Edition, Prentice Hall of India, 2006.
2. G. K. Gupta, *Introduction to Data Mining with Case Studies,* Easter Economy Edition, Prentice Hall of India, 2006.
3. Tan P.N, Steinbach M.and Kumar V., *Introduction to Data mining*, Addison-Wesley, 2006.

IV B.Tech. I Semester
14BT61201: DATAWAREHOUSING AND DATA MINING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES: A course on "Database Management Systems"

COURSE DESCRIPTION: Data Warehouse Design, Data Mining Fundamentals, Data Preprocessing, Mining Frequent Patterns, Classification and Prediction, Clustering Techniques.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Demonstrate knowledge on
- Concepts of data mining and data warehousing
- Data preprocessing and association rule mining
- Classification and Prediction techniques
- Clustering techniques

CO1. Analyze data mining techniques for finding necessary useful and potential knowledge

CO3. Apply machine learning techniques to discover and measure interesting patterns from large databases.

DETAILED SYLLABUS:

UNIT-I: DATA WAREHOUSING AND DATA MINING   (12 Periods)
Data Warehouse: Basic Concepts, Modeling, Design and Usage, Data Generalization by Attribute-oriented Induction **Data Mining:** Why Data Mining, What is Data Mining, Kinds of data can be mined, Kinds of patterns can be mined, Kinds of applications targeted, Major Issues in Data Mining.

UNIT-II: DATA PREPROCESSING   (10 Periods)
Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT-III: MINING FREQUENT PATTERNS, ASSOCIATIONS AND CORRELATIONS   (7 Periods)
Basic Concepts, Frequent Itemset Mining Methods, pattern mining in Multilevel and Multidimensional Space

UNIT-IV: CLASSIFICATION AND PREDICTION TECHNIQUES
(9 Periods)
Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule Based Classification, Techniques to improve classification accuracy: Bagging and Boosting, Bayesian Belief Networks, Classification using frequent patterns.

UNIT-V: CLUSTER ANALYSIS (7 Periods)

Cluster Analysis, Partitioning Methods: K-Means; Hierarchical Methods: AGNES Vs DIANA; Density based Methods: DBSCAN, Outlier Analysis and Detection Methods.

Total No. of Periods: 45

TEXT BOOK:
1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining: Concepts and Techniques" 3rd edition, Elsevier, 2013.

REFERENCE BOOKS:
1. Margaret H Dunham, "Data Mining Introductory and Advanced Topics", 2nd edition, Pearson Education, 2006.
2. Tan P.N, Steinbach M. and Kumar V.: "Introduction to Data Mining", Addison-Wesley, 2006.

III B. Tech. - II Semester

(16BT61531) DATA WAREHOUSING AND DATA MINING LAB

(Common CSE, IT and CSSE)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
50	50	100		-	-	3	2

PRE-REQUISITE: A course on Data warehousing and Data Mining

COURSE DESCRIPTION: Hands on practical experience on Warehouse design; OLAP operation; Data pre-processing techniques; Association rule mining; classification of data; Naïve Bayes classifier; Decision tree; Clustering technique using WEKA-Open source machine learning tool.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:

CO1. Demonstrate knowledge on the creation and usage of data warehouses.

CO2. Analyze and interpret the results using data mining techniques.

CO3. Design and develop transformations such as filter, join and rank on data warehouses.

CO4. Use classification and clustering techniques to find interesting patterns in large databases.

CO5. Choose and deploy modern tools to handle large, missing and noisy data in datasets.

CO6. Use appropriate data mining algorithms to find solutions for real time societal applications.

CO7. Function effectively as an individual to perform operations on different databases using Informatica.

CO8. Communicate effectively using report generation tools on business data.

LIST OF PROGRAMMING EXCERSICES:
Experiments on Informatica
To create Employee datawarehouse using Employee database system using following tables.

For the given data tables,

Employee table			Dept table		
Name	**Data type**	**Size**	**Name**	**Data type**	**Size**
Eno	Number	20	Eno	Number	20
Ename	Varchar2	25	Ename	Varchar2	25
Deptno	Number	10	Deptno	Number	10
DepName	Varchar2	12	DepName	Varchar2	12
Salary	Number	20	Salary	Number	20
Job	Varchar2	20	Job	Varchar2	20

List of Experiments

A. Implement mapping of warehouse server on Employee table.
B. Display the list of employees whose salary is greater than 5000 by designing filter transformation.
C. Find the maximum and minimum salaried employee using aggregate transformation.
D. Join Employee and Dept table using joiner transformation.
E. Rank transformation on employee table.
F. Router transformation on employee and department table.

II. Experiments on Weka:
Credit Risk Assessment:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering**. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.

2. **Books**. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.

3. **Common Sense.** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.

4. **Case Histories.** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset:
" **DM** stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
Owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
" **Foreign_worker**. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
There are **20 attributes** used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

List of Experiments:

1. Preprocess the data in weka with a simple experiments
     a) Handling missing data(both nomial and numerical)
     b) All types normalization(min-max,z-score,decimal scaling)
     c) sampling
2. Implement Decision tree classification of German data set.
3. Implement Naïve Bayes classifier on German data set.
4. Implement K-means clustering technique for German data.

5. <mark>Implement Apriori algorithm, calculate all frequent itemsets(L's) for the following transactional data and display the 10 most significant rules you get using the default values of support and confidence.</mark>

Transactional Data:

TID	List of item_ids
T100	I1,I2,I5
T200	I2,I4
T300	I2,I3
T400	I1,I2,I4
T500	I1,I3
T600	I2,I3
T700	I1,I3
T800	I1,I2,I3,I5
T900	I1,I2,I3

REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining: Concepts and Techniques"* Elsevier, 3rd Edition, 2013.
2. K.P. Soman, Shyam Diwakar and V. Ajay, *Insight into Data mining Theory and Practice*, Easter Economy Edition, Prentice Hall of India, 2006.
3. I.H Witten, E.Frank, *Data mining: Practical Machine learning Tools and Techniques with java Implemenatation,* Morgan Kaufmann Publishers,1999.

IV B.Tech. I Semester
14BT71521: DATA WAREHOUSING AND DATA MINING LAB
(Common to CSE and CSSE)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	-	-	3	2

PREREQUISITE: A Course on "Data warehousing and data mining"

COURSE DESCRIPTION: Hands on practical experience on Data transformations like aggregation, filter, joiner transformations using INFORMATICA; Data preprocessing techniques; Mining frequent patterns, classification and clustering techniques using WEKA open source machine learning tool.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Design warehouse and develop mining algorithms to solve real-time problems.
CO2. Apply warehouse and mining tools to store and extract data from large databases.

LIST OF EXPERIMENTS:

I.   Experiments on Informatica
For the given data tables
Employee table

Name	datatype	Size
eno	number	10
ename	varchar	7
sal	number	7
job	varchar	10
deptno	number	4

Dept table

name	datatype	size
eno	number	10
ename	varchar	7
deptno	number	5
deptname	varchar	7
sal	number	7
job	varchar	10

1. Implement mapping of warehouse server on Employee table.
2. Display the list of employees whose salary is greater than 5000 by designing filter transformation.
3. Find the maximum and minimum salaried employee using aggregate transformation.
4. Join Employee and Dept table using joiner transformation.

II. Experiments on Weka 3.7.5:

Credit Risk Assessment: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. **Knowledge Engineering.** Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. **Books.** Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. **Common Sense.** Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. **Case Histories.** Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset:
- **DM** stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- **Owns_telephone.** German phone rates are much higher than in Canada so fewer people own telephones.
- **Foreign_worker.** There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are **20 attributes** used in judging a loan applicant. The goal is the classify the applicant into one of two categories, good or bad.

Subtasks:

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why or Why not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12. (Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

REFERENCE BOOK:

1. Ian. H. Witton and Eibe Frank "Data Mining: Practical Machine Learning Tools and techniques", Second Edition, Elsevier Publication, 2005.

IV B. Tech. - I Semester
(16BT71508) INTERNET OF THINGS
(Common to CSE, IT and CSSE)
(Program Elective – 4)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PRE-REQUISITE: A course on Computer Networks

COURSE DESCRIPTION:
Internet of Things Components; Communication models; Prototyping; Hardware; Design models; Analytics for IoT.

COURSE OUTCOMES:
On successful completion of this course, students will be able to:
CO1. Demonstrate knowledge on Protocols, functional blocks and communication models of Internet of things.
CO2. Identify appropriate sensors and communication modes used in IoT based systems.
CO3. Design appropriate solutions for IoT applications using Raspberry Pi and Arduino kits.
CO4. Appropriately synthesize the models and applications for usage in Home automation and cities.
CO5. Apply evolutionary techniques to perform analytics on the data integrated from IoT based systems.
CO6. Use advances in IoT technology to design and develop applications.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO INTERNET OF THINGS   (08 Periods)
Definition, Characteristics, Things, Protocols, Logical Design, Functional Blocks, Communication models, APIs, Enabling Technologies, Levels & Deployment templates.

UNIT II: DEVICES AND END POINTS   (10 Periods)
IoT Devices-Examples-Raspberry PI interfaces, Arduino interfaces, Programming Raspberry PI with Python, Other IOT devices, Domain Specific IoTs.

UNIT III: SENSORS AND CONNECTIVITY   (08 Periods)
Sensors-Types of Sensor Nodes; Internet Communications, IP Addresses, MAC Address, TCP & UDP ports, Application Layer Protocols.

UNIT IV: DESIGN METHODOLOGY AND CASE STUDIES
(10 Periods)

Design Methodology:
Purpose and Requirements specifications, Process Specifications, Domain Model specifications, Information Model specifications, Service specification, Level Specifications, Functional View specifications, Operational View specifications, Device and Component integration, Application development.
Case Studies: Home Automation, Cities.

UNIT V: DATA ANALYTICS FOR IoT   (09 Periods)
Analytics, Apache Hadoop, Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Chef & Case studies.

Total Periods: 45

TEXT BOOK:
1.   Arshdeep Bahga, Vijay Madisetti, *Internet of Things – A hands-on approach*, University Press, 2015.

REFERENCE BOOKS:
1.   Adrian McEwen and Hakim Cassimally, *Designing the Internet of Things*, Wiley Publishing, 2013.
2.   CharlesBell, *Beginning Sensor Networks with Arduino and Raspberry Pi*, Apress, 2013.
3.   Marco Schwartz, *Internet of Things with the Arduino Yun,* Packt Publishing, 2014.
4.   Matt Richardson, Shawn Wallace, *Getting Started with Raspberry Pi*, Maker Media, Inc, 2012.

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IV B.Tech. - I semester
(16BT70402) EMBEDDED SYSTEMS
(Common to EEE, ECE & CSSE)

</div>

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PREREQUISITES:
Courses on Switching Theory and Logic Design, Microprocessors and Microcontrollers.

COURSE DESCRIPTION:
Embedded system design approaches; MSP430 Architecture; Instruction Set; On-Chip Resources; Programming; Communication with peripherals; Internet of Things related Issues.

COURSE OUTCOMES: On successful completion of the course, students will be able to:
CO1. Apply knowledge in
- MSP430 Architecture, Pin out, Instruction set
- High level programming
- Usage of On-chip resources like ADC, DAC, Timers
- Internet of Things related issues

CO2. Analyze various design issues regarding
- Usage of on chip resources
- Low power modes
- Communication support

CO3. Design embedded systems using MSP430 series microcontrollers to suit market requirements.
CO4. Solve engineering problems and arrive at solutions in designing embedded systems to support interconnectivity.
CO5. Apply techniques, program skills, On-Chip resources to design networked embedded systems with an understanding of limitations.
CO6. Reason out and practice professional engineering to deliver efficient and costeffective embedded based products to society.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO EMBEDDED SYSTEMS   (09 Periods)
Embedded Systems - Definition, Approaches, Applications, Anatomy of microcontroller, Memory, Software; MSP430 Introduction- Pin out, Functional Block diagram, Memory, CPU, Memory mapped input and output, Clock generator; Exceptions- Interrupts and Resets.

UNIT - II: ARCHITECTURE OF MSP430   (09 Periods)
CPU, Addressing Modes, Constant Generator and Emulated Instructions, Instruction Set, Example programs, Reflections on CPU and Instruction set, Resets, Clock System.

UNIT - III: FUNDAMENTALS FOR PROGRAMMING   (09 Periods)
Development Environment, C Programming Language, Assembly Language, Programming and Debugging, Sample programs- Light LEDs in C, Read input from a switch; Automatic Control- Flashing light by delay, use of subroutines, using Timer_A; Header files and issues, Functions, Interrupts and Low power modes.

UNIT - IV: TIMERS, MIXED SIGNAL SYSTEMS AND COMMUNICATION
(09 Periods)
Timers - Watchdog Timer, RTC, Measurement in capture mode; Mixed-Signal Systems- Comparator_A, ADC10 Architecture & operation, ADC12, Sigma-Delta ADC Architecture & operation, DAC; Communication- Communication Peripherals in MSP430, SPI, Inter-integrated Circuit Bus, Asynchronous communication with the USCI_A.

CO- Design Issues: Co-design Models, Architectures, Languages, a Generic Co-design Methodology

IOT: Introduction, Origins, Drivers and Applications, IOT Communication Models - Device to Device, Device to Cloud, Device to Gateway, Back end Data Sharing Model; IPV6 and IOTs', IOT Issues, Security Issues-challenges; Privacy Considerations, Interoperability/Standards.

Total Periods: 45

TEXT BOOKS:

1. John H. Davies, *MSP430 Microcontroller Basics*, Newnes Publications, 2008.
2. Karen Rose, Scott Eldridge, Lyman Chapin, *The Internet of Things: An Overview: Understanding the Issues and Challenges of a More Connected World, Internet Society*, Oct. 2015.
3. Jorgen Staunstrup, Wayne Wolf, *Hardware/software co-design Principles and Practice*, Springer, 2009.

REFERENCE BOOK:

1. Chris Nagy, *Embedded Systems Design using the TI MSP30 Series*, Newnes Publications, 2003.

IV B.Tech - I Semester
14BT70402: EMBEDDED SYSTEMS

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	--	3

PREREQUISITES: A course onMicroprocessors and Microcontrollers.

COURSE DESCRIPTION:
Introduction to Embedded System; State Machines and Concurrent Process Models; Various Communication interfacing Models; RTOS Concepts; Target Architectures.

COURSE OUTCOMES:
On successful completion of the course, the students will be able to:
CO1. Demonstrate knowledge on Communication Interfacing Models, Processor Technology, State Machines, Kernel Objects, ARM and SHARC Controllers.
CO2. Analyze Various problems in Optimization of Single Purpose Processor, Synchronization among the Processes, Clock Driven and Event Driven Scheduling and Debugging Techniques
CO3. Design and develop embedded system to suit a particular Application.
CO4. Choose suitable Hardware and software components of a system that Work together to solve engineering problems to exhibit a specific behavior.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION **(12 Periods)**
Embedded systems overview, classification, applications, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors, Basic architecture, operation, Pipelining, Programmer's view, development environment.

UNIT-II: STATE MACHINE AND CONCURRENT PROCESS MODELS (08 Periods)
Introduction, models versus languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model.

UNIT-III: COMMUNICATION INTERFACE **(07 Periods)**
Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Fire wire, Ethernet, I^2C bus and CAN.

UNIT-IV: RTOS CONCEPTS **(10 Periods)**
CONCEPTS 1: Architecture of the Kernel, Tasks and Task scheduler, Types of real-time tasks, Task periodicity, Task scheduling, Classification of scheduling algorithms, Clock driven Scheduling, Event driven Scheduling, resource sharing, Commercial RTos.
CONCEPTS 2: Interrupt service routines, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem.

UNIT-V: TARGET ARCHITECUTERS **(08 Periods)**
Host and target machines, linkers, loading software into target machine, debugging techniques,ARM microcontroller, ARM pipeline, Instruction set architecture, THUMB instructions, Exceptions in ARM, salient features of SHARC microcontroller and comparison with ARM microcontroller.

Total Periods: 45

TEXT BOOKS:
1. Frank Vahid, Tony D. Givargis, *Embedded System Design – A Unified Hardware/Software Introduction,* John Wiley, 2002.
2. KVKK Prasad, *Embedded/Real Time Systems,* Dramatic Press, 2005.

REFERENCE BOOKS:
1. Raj Kamal, *Embedded System Architectures Programming & Design*, Tata MC Graw-Hill Publising, 2003.

2. David E.Simons, *An Embedded Software Premier*, Pearson Educational, 2004.

(16BT70413)INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY
(Open Elective)

Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	1	-	3

PREREQUISITES:--

COURSE DESCRIPTION:
Introduction to the concept ofnano;Description of nanomaterial;Nanostructure characterization tools;Classification of nanomaterials;Fabrication of nanomaterial;Different applications of nanostructures and nanomaterials.

COURSE OUTCOMES: On successful completion of the course, students will be able to
CO1. Demonstrate knowledge in
  • Nanoscale technology.
  • Difference between micro and nanotechnology
  • Classification of Nanostructure and Nanomaterial
  • Fabrication of various nanomaterials and nanostructures.
CO2. Analyze numerical and analytical problems in
  • Nanomaterial size by using Scanning Electron Microscope and X-Ray diffraction
CO3. Design and fabricate devices based on nanostructures like
  • Nano solar cell
  • Nano cantilever
  • Nano bio-sensor
CO4. Synthesize nano particle of different materials to solve the problems related to fabrication of nanostructures.
CO5. Select appropriate technique for fabrication ofnanostructures and Nano composites.
CO6. Apply ethical standards and legal issues while using chemical substances infabrication of new nanostructures.

DETAILED SYLLABUS:

UNIT-I: FUNDAMENTALS OF NANOTECHNOLOGY(08 Periods)
Introduction – Scientific revolutions, Time and length scale in structures, Definition of a nanosystem; Dimensionality and size dependent phenomena - Surface to volume ratio Fraction of surface atoms, Surface energy and surface stress, surface defects, Properties at nanoscale (optical, mechanical, electronic, and magnetic).

UNIT-II:IDENTIFICATION AND CHARACTERIZATION TOOLS FOR NANOMATERIALS AND NANOSTRUCTURE(10 Periods)
Field Emission Scanning Electron Microscopy (FESEM), Environmental Scanning ElectronMicroscopy (ESEM) High Resolution, Transmission Electron Microscope (HRTEM), Scanning Tunneling Microscope(STM), Surface enhanced Raman spectroscopy (SERS), Secondary Ion Mass Spectroscopy, Focused Ion Beam Photoelectron Spectroscopy, X-ray Photoelectron Spectroscopy (XPS), Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), X-Ray Diffraction, Intensities in X-Ray Scattering Particle Size Effect.

UNIT-III:CLASSIFICATION OF NANOMATERIALS(10 Periods)
Classification based on dimensionality, Quantum Dots,Wells and Wires-III-V Nanoparticles, Electronic Structure of Nanosemiconductor, Carbon based nanomaterials (buckyballs, nanotubes, graphene), Metal based nano materials (nanogold, nanosilver and metal oxides), Nanocomposites,Nanopolymers,Nanoglasses, Nano ceramics, Biological nanomaterials, Fulrene-discovery and early years,.

UNIT-IV: SOME FABRICATION TECHNIQUES OF NANOMATERIALS AND NANOSTRUCTURES (09 Periods)

Chemical Methods: Metal Nanocrystals by Reduction, Solvothermal Synthesis, Photochemical Synthesis, Sonochemical Routes, Chemical Vapor Deposition (CVD), Metal Oxide Chemical Vapor Deposition (MOCVD), Plasma Enhanced Chemical Vapour Deposition Technique(PECVD), Hydrothermal Method, Sol-Gel.

PhysicalMethods: Ball Milling, Electrodeposition, Spray Pyrolysis, Flame Pyrolysis, DC/RF Magnetron Sputtering, Molecular Beam Epitaxy (MBE) Thermal Evaporation Method.

UNIT-V: APPLICATIONS   (08 Periods)

Solar energy harvesting, Catalysis, Molecular electronics and printed electronics Nanoelectronics, Polymers with aspecial architecture, Liquid crystalline systems, Linear and nonlinear optical and electro-optical properties, Applications in displays and other devices, Nanomaterials for data storage, Photonics, Plasmonics, Chemical and biosensors, Nanomedicine and Nanobiotechnology, MESFET.

Total Periods: 45

TEXT BOOKS:

1. Pradeep T., *A Textbook of Nanoscience and Nanotechnology*, Tata McGraw Hill Education Pvt. Ltd., 2012.
2. Hari Singh Nalwa, *Nanostructured Materials and Nanotechnology*, Academic Press,   2002.

REFERENCE BOOKS:

1. Nabok A., *Organic and Inorganic Nanostructures*, Artech House, 2005.
2. Dupas C., Houdy P., Lahmani M*, Nanoscience: Nanotechnologies and Nanophysics*, Springer - Verlag Berlin Heidelberg, 2007.
3. S.M. Sze, Physics of Semiconductor Devices, 2ndEdition, 2001.

III B. Tech. – II Semester

(16BT60310) MANAGING INNOVATION AND ENTREPRENEURSHIP

(Common to CE, ME, CSE, IT & CSSE)
(Open Elective)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: —

COURSE DESCRIPTION: Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts of Shifting Composition of the Economy Purposeful Innovation & Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

COURSE OUTCOMES: On successful completion of this course, the student will be able to:

CO1. Demonstrate the principles of business innovation and entrepreneurship for establishing industrial ventures.

CO2. Analyze business plans for potential investors and stakeholders and effectively answer probabilistic questions on the substance of plan.

CO3. Develop a comprehensive and well planned business structure for a new venture.

CO4. Conduct investigation on complex problems, towards the development of Project.

CO5. Apply modern statistical and mathematical tools to design projects and subsequent work procedures.

CO6. Apply ethics in constructive innovation framework.

CO7. Exhibit professionalism by employing modern project management and financial tools.

DETAILED SYLLABUS:

UNIT - I: Creativity and Innovation (07 Periods)

Introduction, Levels of innovation, Purposeful innovation and the sources of innovative opportunity, The innovation process, Innovative strategies, Strategies that aim at introducing and innovation, Dynamics of ideation and creativity – Inbound, Outbound; Context and process of new product development, Theories of outsourcing.

UNIT - II: Paradigms of Innovation (11 Periods)

Systems approach to innovation, Innovation in the context of developed economies and Emerging economies, Examining reverse innovation and its application, Performance gap, Infrastructure gap, Sustainability gap, Regulatory gap, Preference gap, organizational factors effecting innovation at firm level.

UNIT - III: Sources of finance and venture capital (07 Periods)

Importance of finance, Comparison of venture capital with conventional development capital, Strategies of venture funding, Investment phases, Investment process, Advantages and disadvantages of venture capital, Venture capital developments in India.

UNIT - IV: Intellectual property innovation and Entrepreneurship (11 Periods)

Introduction to Entrepreneurship, Evolution of entrepreneurship from economic theory, Managerial and entrepreneurial competencies, Entrepreneurial growth and development, Concepts, Ethics and Nature of International Entrepreneurship, Intellectual property – forms of IP, Patents, Trademarks, Design registration, Copy rights, Geographical indications, Patent process in India.

UNIT - V: Open Innovation framework & Problem solving (09 Periods)

Concept of open innovation approach, Difference between open innovations and Cloud innovation approaches, Limitations and

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Opportunities of open innovation framework, Global context of strategic alliance, Role of strategic alliance, Problem Identification and Problem Solving, Innovation and Diversification.

Total Periods: 45

TEXT BOOKS:

1. Vinnie Jauhari, Sudhanshu Bhushan, *Innovation Management*, Oxford University Press, 1st Edition, 2014.

2. Drucker, P. F., *Innovation and Entrepreneurship*, Taylor & Francis, 2nd Edition, 2007.

REFERENCE BOOKS:

1. Robert D Hisrich, Claudine Kearney, *Managing Innovation and Entrepreneurship*, Sage Publications, 1st Edition, 2014.

2. V.K.Narayanan, *Managing Technology and Innovation for Competitive Advantage*, Pearson India, 1st Edition, 2002.

III B.Tech – II Semester
14BT60308: MANAGING INNOVATION AND ENTREPRENEURSHIP
(OPEN ELECTIVE)
(Common to CSE, IT, CSSE, CE & ME)

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	3

PRE-REQUISITES: Nil

Course Description:
Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts Shifting Composition of the Economy Purposeful Innovation & 7 Sources of Innovative Opportunity The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification.

Course Outcomes:
After completion of this course, a suessful student will be able to:

CO1: Define, explain and illustrate theories of business innovation and entrepreneurship, the evolution of industries and economies, and the roles of Entrepreneurs.

CO2: Develop a comprehensive and well structured business plan for a new venture.

CO3: Present a persuasive business plan to potential investors or to internal stakeholders and effectively answer probing questions on the substance of the plan; and,

CO4: Work effectively in multidisciplinary, cross-cultural teams, towards the development of a Team Project.

Unit-I: ENTREPRENEURSHIP   **(7 Periods)**
Introduction to Entrepreneurship: Evolution of entrepreneurship from economic theory; Managerial and entrepreneurial competencies, entrepreneurial growth and development.

UNIT II: CREATIVITY AND INNOVATION   **(11Periods)**
Creativity and Innovation: Concepts Shifting Composition of the Economy; Purposeful Innovation & the 7 Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies: Strategies that aim at introducing an innovation, innovation & entrepreneurship, planning -incompatible with Innovation & entrepreneurship.

Unit-III: THE INDIVIDUAL ENTREPRENEUR   **(7 Periods)**
Entrepreneurial Motivation: Need for continuous learning & relearning; Acquiring Technological Innovation Entrepreneurial motivation (nach story); Achievement Motivation in Real life- Case Study. Entrepreneurs versus inventors

Unit-IV: INTERNATIONAL ENTREPRENEURSHIP OPPORTUNITIES
                                                    (11 Periods)
International Entrepreneurship: Concepts and Nature of International Entrepreneurship. The changing International environment. Ethics and International Entrepreneurship. Entrepreneurial entry in to international business, strategic Issues in International Entrepreneurship.

Unit-V: Creative Problem Solving   (9 Periods)
Problem Identification and Problem Solving: Problem Identification. Problem solving Innovation and Diversification.

                                                    Total Periods: 45

TEXT BOOKS:
1:        Martin, M.J. "Managing Innovation and Entrepreneurship in Technology based Firm", John Wiley Interscience, 1994.
2:        Ettlie, J.E. "Managing Technology Innovation", John Wiley & Sons, 2000.
3:        Robert D Hisrich., Michael P Peters., Dean A Shepherd,"Entrepreneurship"The McGraw-Hill Companies, 6th Edition, 2011

REFERENCE BOOKS:
1:        Christensen, C. M. and Raynor, M. E. The Innovators Solution: Creating and Sustaining Successful Growth, Boston, MA: Harvard Business School Press, (2003).
2:        Drucker, P. F., Innovation and Entrepreneurship, New York: Harper, 1985.
3:        Harvard Business Review on Innovation (Collection of articles), Harvard Business School Press (2001).
4:        Harvard Business Review on Entrepreneurship (Collection of articles), Harvard Business School Press (1999)
5:        Rogers, E.M., "Diffusion of Innovations", New York: Simon and Schuster, 5th Edition, 2003.
6:        Drucker, P. F. "The Discipline of Innovation," Harvard Business Review, May2000. (Originally published 1985, May-June)