SREE VIDYANIKETHAN ENGINEERING COLLEGE
(AUTONOMOUS)
Sree Sainath Nagar, Tirupati

Department of Computer Science and Systems Engineering

Supporting Document for 1.1.2

Syllabus Revision carried out in 2016

Program: B.Tech.- Computer Science and Systems 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 has been changed (20% and more)

Course Code	Name of the course	Percentage of Syllabus changed	Page Number in which Details are Highlighted
16BT31531	Operating Systems Lab	45	4
16BT51502	Systems Software	100	8
16BT51503	Intelligent Computing Systems	100	12
16BT51531	Systems Software Lab	100	15
16BT61501	Data warehousing and Data mining	45	18
16BT61502	Network Security	60	22
16BT61504	Windows Programming	100	26
16BT61531	Data warehousing and Data mining Lab	60	28
16BT61505	Bio-Informatics	100	36
16BT71501	System Modeling and Simulation	40	40
16BT71502	Systems Engineering	100	44
16BT71503	Data Analytics	100	47
16BT71506	Software Architecture and Design Patterns	45	49
16BT71504	Performance Evaluation of Computer Systems	60	53
16BT71507	Business Analytics	100	57
16BT71508	Internet of Things	100	59
16BT71509	Secure Software Engineering	100	61
16BT71531	System Modeling and Simulation Lab	100	63
16BT1HS01	Technical English	20	66
16BT1HS31	English Language Lab	20	70
16BT1BS02	Engineering Physics	20	74
16BT2BS01	Transformation Techniques and Partial Differential Equations	100	80
16BT4HS31	Soft Skills Lab	100	83
16BT6HS05	French Language	100	85
16BT6HS06	German Language	100	87
16BT6HS07	Indian Constitution	100	89
16BT6HS08	Indian Economy	100	91
16BT6HS09	Indian Heritage and Culture	100	93
16BT6HS10	Indian History	100	95

16BT6HS11	Personality Development	100	97
16BT6HS13	Philosophy of Education	100	99
16BT6HS13	Public Administration	100	101
16BT60112	Building Maintenance and Repair	100	104
16BT60115	Environmental Pollution and Control	40	106
16BT50533	Object Oriented Analysis and Design Lab	37.5	110
16BT30503	Python Programming	100	117
16BT60502	Soft Computing	100	119
16BT60503	Wireless Networks	100	121
16BT21201	Object Oriented Programming through C++	100	124
16BT21231	IT Workshop	50	126
16BT21232	Object Oriented Programming Lab	100	131
16BT41204	Theory of Computation	20	135
16BT41203	Software Engineering	35	137
16BT31231	Java Programming Lab	100	141
16BT51233	Web Technologies Lab	20	147
16BT61201	Cloud Computing	42	154
16BT70402	Embedded Systems	80	156
16BT70413	Introduction to Nanoscience and Nanotechnology	100	160
16BT60310	Managing Innovation and Entrepreneurship	50	162
	Average	**77.34**	
	Total No. of Courses in the Program	112	
	No. of Courses where syllabus (more than 20%) has been changed	49	
	Percentage of Syllabus changed in the Program	**33.83**	

DEAN (Academics)

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II B. Tech. – I Semester

(16BT31531) OPERATING SYSTEMS LAB

(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. I Semester
14BT51521: OPERATING SYSTEMS AND SYSTEMS SOFTWARE LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	—	—	3	2

PREREQUISITES: Courses on "Operating Systems and Systems Software"

COURSE DESCRIPTION:

Hands on practical experience on implementation of CPU scheduling algorithms, Bankers algorithm for Deadlock avoidance and detection, multi programming, page replacement algorithms and file allocation strategies; Creation of symbol tables, implementation of pass one, pass two of two pass assemblers and Loaders.

COURSE OUTCOMES:

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

CO1. Implement algorithms for

a. CPU Scheduling
b. Deadlock handling Mechanisms
c. Memory Management
d. File allocation
e. Text Processing
f. Symbol table creation
g. Assemblers and loaders

LIST OF EXPERIMENTS:

1. Implement the following CPU scheduling algorithms:
   a) FCFS b) Round Robin (Time Quantum=3) c) SJF d) Priority
   Use the following set of processes, compare the performance of above scheduling policies.

Process Name	Arrival Time	Processing Time	Priority (lower number has highest priority)
A	0	3	2
B	1	5	1
C	3	2	3
D	9	5	4
E	12	5	5

2. Implement Bankers algorithm for Deadlock avoidance and detection.
   Consider number of resources are 03 and Jobs are 05.
   The resource types A, B and C are 10, 5 and 7 instances are available respectively.

Process	Allocation			Max		
	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
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not.

3. Implement multi programming with fixed number of tasks and multi programming with variable number of tasks.
   Processes are P1, P2, P3 with sizes 150K, 100K and 70K respectively.
4. Write a Program to simulate the following page replacement algorithms
   a) FIFO b) LRU
   Consider no. of Frames are three.
   Reference string is 2 3 2 1 5 2 4 5 3 2 4 2 4 5 3
5. Implement the following file allocation strategies
   a) Sequential b) Indexed c) Linked
   Consider the disk consists 20 blocks and file consists 5 records
6. Creation of a Symbol Table
7. Implementation of Pass One of Two Pass Assembler
8. Implementation of Pass Two of Two Pass Assembler
9. Implementation of an Absolute loader
10. Implementation of Relocating loader

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Seventh Edition, Willy India Edition, 2006.
2. Leland L. Beck, "System Software – An Introduction to Systems Programming," Third Edition, Addison-Wesley, 1999.
3. John J. Donovan, "Systems Programming", Tata McGraw-Hill Edition, Thirty Ninth reprint, 2006.

III B. Tech. - I Semester

(16BT51502) SYSTEMS SOFTWARE

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

PRE-REQUISITE: A course on Operating Systems.

COURSE DESCRIPTION:
Kernel and Shell; The shell interpretive cycle ; Shell scripts; System calls for the File System - Open, Read, Write, File and record locking ; Process states and transitions;Process Creation; TCP/IP Basics; Resolving IP Addresses, Maintaining Security.

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

CO1. Demonstrate knowledge on commands for text processing and Files.
CO2. Analyze and Interpret process and System management techniques used in System Software
CO3. Use inbuilt UNIX system APIs to control system and its process.
CO4. Apply algorithms to manipulate the process context in system Software.
CO5. Perform effective troubleshooting using system error defines available with the operating system.

DETAILED SYLLABUS:

UNIT I: UNIX ARCHITECTURE AND COMMAND USAGE (09 Periods)

Division of Labor : Kernel and Shell, The file and process, The System calls, Features of UNIX, Internal And External Commands, Command Structure, General-Purpose Utilities: cal, date, echo, printf, bc, script, Email Basics, mailx, passwd, who, uname, tty, sty.

Handling Files: The file, File Name, The parent-child relationship, The home variable, pwd, cd, mkdir, rmdir, ls, cat, cp, rm, mv, more, file, wc, od, cmp, comm, diff, gzip, gunzip, tar, zip and unzip.

UNIT II: UNIX KERNEL AND SYSTEM CALLS (09 Periods)

Introduction to system concepts, Kernel Data Structures, System Administration

System calls for the File System: Open, Read, Write, File and record locking, Adjusting the position of file I/O, Close, File

creation, Creation of special files, Change directory and change root, Change owner and change mode, Stat and fstat , Pipes, Dup, Mounting and unmounting file systems, Link, Unlink, File system abstractions, File system maintenance

UNIT III: PROCESS DESCRIPTION **(09 Periods)**

Process states and transitions, Layout of system memory, The context of a process, Saving the context of process, Manipulation of the process address, Sleep

UNIT IV: PROCESS CONTROL **(08 Periods)**

Process creation, Signals, Process termination, Awaiting process termination, Invoking other programs, The user id of a process, Changing the size of a process, The shell, System boot and init process.

UNIT V: ADVANCED SYSTEM MANAGEMENT **(10 Periods)**

Networking Tools: TCP/IP Basics, Resolving IP Addresses, The Applications, Ping: Checking the Network, telnet :Remote Login, ftp: File Transfer Protocol, SSH: The Secure Shell, The SSH Tools, The Domain Name System(DNS).

Maintaining Security, Partitions and File Systems, The Standard File Systems and Their Types, fdisk: Creating Partitions, mkfs: Creating a File System, Mounting and Unmounting File Systems, fsck: File System Checking.

Total Periods: 45

TEXT BOOKS:

1. Sumitabha Das, *Unix Concepts and Applications*, TMH, 4th Edition, 2006.
2. Maurice J. Bach, *The Design Of The Unix Operating System*, PHI, 2008.

REFERENCE BOOKS:

1. Graham Glass, King Ables, *Unix for programmers and users*, Pearson, 3rd Edition, 2009.
2. N.B Venkateswarlu, *Advanced Unix programming*, BS Publications, 2nd Edition, 2010.
3. Yashwanth Kanitkar, *Unix Shell programming*, BPB Publications, 2010.

III B.Tech - I Semester
14BT51502: SYSTEMS SOFTWARE

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

PREREQUISITES: A Course on "Microprocessors and Interfacing"

COURSE DESCRIPTION: System Software and Machine Architecture, Simplified Instructional Computer; Instruction Formats and Addressing Modes, One Pass Assemblers and Multi Pass Assemblers; Design of an Absolute Loader, MS-DOS Linker; Macro Instruction Arguments; Text Editors, User Interface;

COURSE OUTCOMES:

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

CO1. Gain knowledge on instruction formats, addressing modes, instruction sets, I/O and programming.

CO2. Analyze one pass assemblers and multi pass assemblers through basic assembler functions

CO3. Design and develop bootstrap loaders, linkage editors and absolute loader using assembly language.

CO4. Acquire skills for programming macros, two-pass algorithm and a single-pass algorithm.

CO5. Use text editing tools for debugging and processing capabilities.

CO6. Learn and upgrade professionally in day-to-day practice while working with systems software.

DETAILED SYLLABUS:

UNIT - I: MACHINE ARCHITECTURE (9 Periods)

System Software and Machine Architecture, The Simplified Instructional Computer(SIC)- SIC Machine architecture, Data and Instruction Formats, Addressing Modes Instruction Sets, I/O and Programming.

UNIT II: ASSEMBLERS (9 Periods)

Basic Assembler Functions- A Simple SIC Assembler, Assembler Algorithm and Data Structures,Machine-Dependent Assembler Features-Instruction Formats and Addressing Modes, Program Relocation, Machine-Independent Assembler Features - Literals, Symbol – Defining Statements, Expressions, One-PassAssemblers, Multi-PassAssemblers, Implementation Example - MASM Assembler.

UNIT III LOADERS AND LINKERS (10 Periods)

Basic Loader Functions – Design of an Absolute Loader, ASimple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for Linking Loader, Machine-Independent Loader Features – Automatic Library Search, Loader Options, Loader Design Options –Linkage Editors, Dynamic Linking, Bootstrap Loaders, Implementation Example – MS-DOS Linker.

UNIT IV MACRO PROCESSORS **(9 Periods)**

Macro Instructions, Features of a Macro Facility- Macro Instruction Arguments, Conditional Macro Expansion, Macro Calls within Macros, Macro Instructions Defining Macros, Implementation-Implementation of a Restricted Facility: A Two-Pass Algorithm, A Single-Pass Algorithm.

UNIT V SYSTEM SOFTWARE TOOLS **(8 Periods)**

Text Editors - Overview of the Editing Process , User Interface, Editor Structure, Interactive Debugging Systems - Debugging Functions and Capabilities, Relationship with Other Parts of the System.

Total No. of Periods: 45

TEXT BOOKS:

1. Leland L. Beck, "System Software – An Introduction to Systems Programming," Third Edition, Addison-Wesley, 1999.
2. John J. Donovan, "Systems Programming," Tata McGraw-Hill Edition, 2006

REFERENCE BOOKS:

1. D. M. Dhamdhere, "Systems Programming and Operating Systems," Second Revised Edition, Tata McGraw-Hill, 2010

III B. Tech. - I Semester

(16BT51503) INTELLIGENT COMPUTING SYSTEMS

(Interdisciplinary Elective-1)

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

PRE-REQUISITES: Courses on Discrete Mathematical Structures and Design and Analysis of Algorithms

COURSE DESCRIPTION: AI Problems; Problem Characteristics Search Algorithms; Inference in Propositional Logic; Forward and Backward Chaining Algorithms; Truth Maintenance Systems; Basic Probability Notations; Forms of Learning; Evolutionary Computing.

COURSE OUTCOMES:

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

CO1. Demonstrate Knowledge on
- Artificial Intelligent Techniques
- Searching algorithms
- Inference in Propositional and First Order Logic
- Evolutionary Computing

CO2. Analyze and solve problems involving search algorithms.

CO3. Design and develop knowledge based solutions for AI based systems.

CO4. Apply knowledge representation, reasoning, and machine learning techniques to solve real world problems.

CO5. Use appropriate evolutionary algorithms in intelligent computing systems.

CO6. Demonstrate the use of intelligent systems' principles in societal context to solve diverse problems.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION (09 Periods)

The AI Problems, The Underlying Assumption, The Levels of the Model, Criteria of Success, Some General References, One Final Word and Beyond. Problems, Problem Spaces, and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics.

UNIT II: SEARCHING AND PROBLEM SOLVING (09 Periods)

Issues in the Design of Search Programs. Uninformed Search Strategies, Avoiding Repeated States. Informed Search and Exploration: Informed (Heuristic) Search Strategies, Heuristic Functions, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces.

UNIT III: KNOWLEDGE AND REASONING (09 Periods)

Logical Agents, Knowledge–Based Agents, The Wumpus World, Logic, Propositional Logic a Very Simple Logic, Reasoning Patterns in Propositional Logic, Effective Propositional Inference, Agents Based on Propositional Logic.

First-Order Logic:

Representation Revisited, Syntax and Semantic of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT IV: KNOWLEDGE REPRESENTATION AND REASONING (09 Periods)

Ontological Engineering, Categories and Objects, Actions, Situations, and Events, Mental Events and Mental Objects, The Internet Shopping World, Reasoning Systems for Categories, Reasoning with Default Information, Truth Maintenance Systems. Uncertainty, Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distributions, Independence, Bayes' Rule and its use.

UNIT V: LEARNING AND EVOLUTIONARY COMPUTATION CONCEPTS (09 Periods)

Learning from Observations, Forms of Learning, Inductive Learning, Learning Decision Trees, Ensemble Learning, Computational Learning Theory. History of Evolutionary Computation, Evolutionary Computation Overview, Genetic algorithms, Evolutionary Programming and strategies, Implementation issues, Genetic algorithm implementation, Particle Swarm Optimization Implementation.

Total Periods: 45

TEXT BOOKS:

1. Elaine Rich, Kevin Knight and Shivashankar B Nair, *Artificial Intelligence,* Tata McGraw Hill, 3rd Edition, 2007.
2. Stuart Russell and Peter Norvig, *Artificial Intelligence A Modern Approach*, Pearson Education, 2nd Edition, 2011.

REFERENCE BOOKS:

1. Russell C.Eberhart and Yuhui Shi, *Computational Intelligence: Concepts to Implementations,* Elsevier, 2007.
2. George F. Luther, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving,* Pearson Education, 5th Edition, 2001.

III B. Tech. - I Semester

(16BT51531) SYSTEMS SOFTWARE LAB

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

PRE-REQUISITES: Courses on Programming in C and Operating Systems

COURSE DESCRIPTION: Hands on Implementation of copy of a file using standard I/O and system calls; emulate the UNIX commands; Access Permissions; Loops in Directory hierarchy; Displaying time of day for every 60 seconds; Print all error messages; Running two programs in pipeline.

COURSE OUTCOMES:

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

CO1. Demonstrate and interpret the working of commands available in UNIX.
CO2. Recognize different types of file supported by UNIX operating system.
CO3. Design and implement system-level applications for open-source operating systems.
CO4. Select and make use of the OS kernel functions and their APIs, standard programming Languages and utility tools.
CO5. Use different APIs for System Software design.

LIST OF EXPERIMENTS:

1. Write a C program that makes a copy of a file using standard I/O and system calls
2. Write a C program to emulate the UNIX ls –l command.
3. Write a program that prints the owner, file type, access permissions, and access times of files supplied as parameters. If a file (parameter) is a directory, the program should read the directory and print the above information for all files in the directory.
4. Write a program that visits every directory, starting with the current directory. How should it handle loops in the directory hierarchy?
5. Write a program that changes its root to a particular directory, and investigate the directory tree accessible to that program.
6. Write a C program that displays the real time of a day every 60 seconds.
7. Write a C program to print all error messages.
8. Write a C program to check all 12 permission bits of a file.
9. Write a C program to run two programs in a pipeline.

III B.Tech. I Semester

14BT51521: OPERATING SYSTEMS AND SYSTEMS SOFTWARE LAB

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
25	50	75	–	–	3	2

PREREQUISITES: Courses on "Operating Systems and Systems Software"

COURSE DESCRIPTION:
Hands on practical experience on implementation of CPU scheduling algorithms, Bankers algorithm for Deadlock avoidance and detection, multi programming, page replacement algorithms and file allocation strategies; Creation of symbol tables, implementation of pass one, pass two of two pass assemblers and Loaders.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Implement algorithms for

a. CPU Scheduling
b. Deadlock handling Mechanisms
c. Memory Management
d. File allocation
e. Text Processing
f. Symbol table creation
g. Assemblers and loaders

LIST OF EXPERIMENTS:

1. Implement the following CPU scheduling algorithms:
   a) FCFS b) Round Robin (Time Quantum=3) c) SJF d) Priority
   Use the following set of processes, compare the performance of above scheduling policies.

Process Name	Arrival Time	Processing Time	Priority (lower number has highest priority)
A	0	3	2
B	1	5	1
C	3	2	3
D	9	5	4
E	12	5	5

2. Implement Bankers algorithm for Deadlock avoidance and detection.
   Consider number of resources are 03 and Jobs are 05.
   The resource types A, B and C are 10, 5 and 7 instances are available respectively.

Process	Allocation			Max		
	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
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

Find the safe sequence. If Max. request of any one process is changed, detect whether deadlock is occurred or not.

3. Implement multi programming with fixed number of tasks and multi programming with variable number of tasks.
   Processes are P1, P2, P3 with sizes 150K, 100K and 70K respectively.
4. Write a Program to simulate the following page replacement algorithms
   a) FIFO b) LRU
   Consider no. of Frames are three.
   Reference string is 2 3 2 1 5 2 4 5 3 2 4 2 4 5 3
5. Implement the following file allocation strategies
   a) Sequential b) Indexed c) Linked
   Consider the disk consists 20 blocks and file consists 5 records
6. Creation of a Symbol Table
7. Implementation of Pass One of Two Pass Assembler
8. Implementation of Pass Two of Two Pass Assembler
9. Implementation of an Absolute loader
10. Implementation of Relocating loader

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Principles", Seventh Edition, Willy India Edition, 2006.
2. Leland L. Beck, "System Software – An Introduction to Systems Programming," Third Edition, Addison-Wesley, 1999.
3. John J. Donovan, "Systems Programming", Tata McGraw-Hill Edition, Thirty Ninth reprint, 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

(16BT61502) NETWORK SECURITY

(Program Elective-1)

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:
Foundations of Network Security; Security Technologies; Symmetric and Asymmetric key encryption algorithms; System Security with Firewalls; Intrusion Detection.

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

CO1. Demonstrate knowledge on types of attacks, firewalls, Symmetric encryption, Cryptography, message authentication and confidentiality
CO2. Analyze the principles of symmetric and public key cryptographic algorithms
CO3. Design appropriate algorithms suiting the security needs of the network.
CO4. Apply security schemes in firewall design to protect the organization's internet/network systems.
CO5. Use modern engineering techniques to identify Intrusion Detection, types of malicious software and apply suitable counter measures.
CO6. Apply ethical means to integrate network operations, administration and information assurance in a network.

DETAILED SYLLABUS:

UNIT I: NETWORK SECURITY FOUNDATIONS (10 Periods)
Network Security Overview: Benefits of good Security Practices, Security Methodology
Attacks: Define Access Attacks, Modification attacks, DoS attacks, Repudiation attacks, Hacking Techniques, Sniffing Switch Networks, IP spoofing

UNIT II: SECURITY TECHNOLOGIES (08 Periods)
Firewalls: Types of firewalls, Develop firewall configuration, design firewall rule set
Virtual Private Network: Define VPN, Deploy User, site VPNs, Standard VPN techniques, types of VPN systems

UNIT III: SYMMETRIC KEY ENCRYPTION AND MESSAGE CONFIDENTIALITY (09 Periods)

Symmetric key Encryption Principles, Symmetric Block Encryption Algorithms, Random and Pseudorandom numbers, Stream Ciphers and RC4, Cipher block mode of operations

UNIT IV: PUBLIC KEY CRYPTOGRAPHY AND MESSAGE AUTHENTICATION (09 Periods)

Secure Hash functions, Message Authentication codes, public key cryptography principles and algorithms, Digital Signatures

UNIT V: SYSTEM SECURITY (09 Periods)

Intruders: Intrusion Detection, Password Management, Types of IDS, Setup IDS, manage IDS, Intrusion prevention

Malicious Software: Types of malicious software, viruses, Virus Counter measures, Worms

TEXT BOOKS:

1. William Stallings, *Network Security Essentials: Applications and Standards*, Pearson, 4th Edition, 2011.
2. Eric Maiwald, *Fundamentals of Network Security*, McGraw Hill Education, 2010.

REFERENCE BOOK:

1. Roberta Bragg, Mark Rhodes-Ousley, *Network Security: The Complete Reference*, McGraw Hill Education, 2004.

IV B.Tech. I Semester
14BT81202: CRYPTOGRAPHY AND NETWORK SECURITY

(PROFESSIONAL ELECTIVE – I)

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

PREREQUISITES: A Course on "Computer Networks".

COURSE DESCRIPTION: Principles and practice of cryptography and network security: classical systems, symmetric block ciphers-DES; public-key cryptography-RSA, Diffie-Hellman; hash functions, authentication, key management, key exchange, signature schemes, E-mail, web security, and firewalls.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on Cryptographic algorithms, their mathematical models, Message Authentication, Digital Signatures and firewall.

CO2. Analyze vulnerabilities and threats on information systems based on various security parameters.

DETAILED SYLLABUS:

UNIT-I: CLASSICAL ENCRYPTION TECHNIQUES (8 Periods)

Introduction: Services, Mechanisms, and Attacks Concepts, The OSI Security Architecture, Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques.

UNIT-II: BLOCK CIPHERS AND PUBLIC-KEY CRYPTOGRAPHY (9 Periods)

Block Ciphers and the Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard (DES), The Strength of DES, Block Cipher Design Principles, Block Cipher Modes of Operation.

Public-Key Cryptography: Principles of Public-Key Cryptosystems, the RSA Algorithm, Diffie-Hellman Key Exchange.

UNIT-III: MESSAGE AUTHENTICATION CODES, HASH FUNCTIONS, AND DIGITAL SIGNATURES (9 Periods)

Message authentication codes: Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and MACs, Hash algorithms-SHA, HMAC.

Digital Signatures: Digital Signatures, Digital Signature Standard (DSS), Authentication applications- Kerberos, X.509 Authentication Service.

UNIT-IV: ELECTRONIC MAIL SECURITY, IP SECURITY AND WEB SECURITY (10 Periods)

Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME- Multipurpose Internet Mail Extensions (MIME), S/MIME Functionality, Messages, Certificate Processing.

IP Security: IP Security Overview, Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

Web Security: Web security Considerations, Secure Sockets Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction.

Unit-V: INTRUDERS, MALICIOUS SOFTWARE, AND FIREWALLS (9 Periods)

Intruders: Intrusion Detection, Password Management-Password Protection, Password selection.

Malicious Software: Viruses and Related Threats, Virus Countermeasures.

Firewalls: Firewall Design Principles, Trusted Systems.

Total No. of Periods: 45

TEXT BOOK:

1. William Stallings, "Cryptography and network Security principles and Practice", Pearson Education, 3rd edition, 2003.

REFERENCE BOOKS:

1. William Stallings, "Network Security Essentials Applications and Standards", , Pearson Education, 3rd edition.
2. Behrouz A Forouzan and Debdeed Mukhopadhyay, "Cryptography and Network Security", McGraw Hill Education, 2nd edition, 2010.

III B. Tech. - II Semester

(16BT61504) WINDOWS PROGRAMMING

(Program Elective-1)

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

PRE-REQUISITE: A course on Operating Systems.

COURSE DESCRIPTION:
Windows File Processing; Advanced File and Exception Handling; Memory Management; Process Management; Inter-process Communication; Network programming with Windows Sockets.

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

CO1. Acquire knowledge on Windows File processing and Exception Handling.
CO2. Analyze and Interpret process management techniques used in System Software.
CO3. Design and Develop memory mapping techniques for sequential files and Dynamic Link Libraries
CO4. Use contextual knowledge for implementing Inter-Process Communication and Network Programming With Sockets.
CO5. Apply Win32 programming techniques for Heap memory management and Parallel pattern searching.
CO6. Exhibit professional ethics and responsibilities by understanding Windows Programming standards compared to open standards.

DETAILED SYLLABUS:

UNIT I: WINDOWS PROGRAMMING (08 Periods)
Windows Standards and Open Systems, Principles,32-bit and 64-bit Source Code Portability, The Windows File Systems, File Naming, Opening, Reading, Writing, and Closing File, Unicode and Generic Characters, Unicode Strategies, Error Processing.

UNIT II: ADVANCED FILE AND EXCEPION HANDLING (10 Periods)
The 64-Bit File System, File Pointers, Getting the File Size, Random Record Updates, File Attributes and Directory Processing, Listing File Attributes, Setting File Times, File Processing Strategies, File Locking, Exceptions and their Handlers, Floating-Point Exceptions, Errors and Exceptions, Termination Handlers, Console control Handlers, Vectored Exception Handling.

UNIT III: MEMORY MANAGEMENT **(08 Periods)**

Windows Memory Management Architecture, Heaps, Managing Heap Memory, Sorting Files with a Binary Search Tree, Memory-Mapped Files, Sequential File Processing with Mapped Files, Sorting a Memory-Mapped File, Dynamic Link Libraries, Explicitly Linking a File Conversion Function.

UNIT IV: PROCESS MANAGEMENT **(09 Periods)**

Windows Processes and Threads, Process Creation, Process Identities, Duplicating Handles,Exiting and Terminating a Process, Waiting for a Process to Terminate, Environment Blocks and Strings, Parallel Pattern Searching, Processes in a Multiprocessor Environment, Process Execution Times, Generating Console Control Events.

UNIT V: INTERPROCESS COMMUNICATION & NETWORK PROGRAMMING **(10 Periods)**

Anonymous Pipes, Named Pipes, Named Pipe Transaction Functions, Comments on the Client/Server Command Line Processor, Mailslots, Pipe and Mailslot Creation, Connection and Naming, Windows Sockets, Socket Server & Client Functions, Comparing Named Pipes and Sockets, In-Process Servers, Line-Oriented Messages, DLL Entry Points an TLS, Datagrams, Berkeley Sockets versus Windows Sockets.

Total Periods: 45

TEXT BOOK:

1. Johnson M. Hart, *Windows System Programming*, Pearson Education, 4th Edition, 2010.

REFERENCE BOOK:

1. Leland L.Beck, *System Software,* Pearson Education, 3rd Edition, 2001.

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. 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.

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. Witten and Eibe Frank "Data Mining: Practical Machine Learning Tools and techniques", Second Edition, Elsevier Publication, 2005.

III B. Tech. – II Semester

(16BT61505) BIOINFORMATICS

(Open Elective)

(Common to CE, ME, CSE, IT and CSSE)

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

PRE-REQUISITE: —

COURSE DESCRIPTION:

Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Biological Database; Homology Modeling; Structure Prediction; Molecular Dynamics

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
CO2. Analyze biological sequences for Homology Modeling.
CO3. Apply clustering methods for Phylogenetic trees.
CO4. Solve bio sequencing problems using dynamic programming.
CO5. Select and apply appropriate techniques and tools to structure Prediction

DETAILED SYLLABUS:

UNIT I: NUCLEIC ACIDS, PROTEINS AND AMINO ACIDS (08 Periods)

Bioinformatics-Definition, Nucleic acid structure, Protein structure, the central dogma, Physico-chemical properties of the amino acids and their importance in protein folding, Polymerase chain reaction (PCR)

UNIT II: INFORMATION RESOURCES FOR GENES AND PROTEIN (10 Periods)

Database file formats, Nucleic acid sequence databases, Protein sequence databases

Sequence Alignment Algorithm

Pair wise sequence alignment – The problem, Pair wise sequence alignment – Dynamic programming methods, The effect of scoring parameters on the alignment, Multiple sequence alignment

UNIT III: PREDICTION OF THE THREE-DIMENSIONAL STRUCTURE OF A PROTEIN AND HOMOLOGY MODELING **(09 Periods)**

Secondary Structure Prediction, Basic Principles, The Steps of Comparative Modeling, Accuracy of Homology Models, Manual versus Automatic Models, SNPs, Motifs.

UNIT IV: PHYLOGENETIC METHODS **(10 Periods)**

Phylogenetic trees, choosing sequences, Distance matrices and clustering methods, Calculation of distances in the neighbor-joining method, Bootstrapping, Tree optimization criteria and tree search methods, The maximum-likelihood criterion, Calculating the likelihood of the data on a given tree, The parsimony criterion.

UNIT V: NEW FOLD MODELING **(08 Periods)**

Estimating the Energy of a Protein Conformation, Energy Minimization, Molecular Dynamics,
The "Omics" Universe-Transcriptomics, Proteomics, Interactomics, Structural Genomics, Pharmacogenomics.

Total Periods: 45

TEXT BOOKS:

1. Paul G. Higgs and Teresa K. Attwood, *Bioinformatics and Molecular Evolution"* Blackwell Publishing 2005.
2. Anna Tramontano, *Introduction to Bioinformatics*, Chapman and Hall/CRC, 2006.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, *Bioinformatics Basics, Applications in Biological Science and Medicine*, CRC Press, Taylor & Francis Group, 2nd Edition, 2005.
2. Rastogi S. C., NamitaMendiratta and Parag Rastogi, *Bioinformatics: Methods and Applications: Genomics, Proteomics and Drug Discovery*, PHI Learning Pvt. Ltd., 3rd Edition, 2011.

III B.Tech. II Semester
14BT61205: BIO INFORMATICS

(OPEN ELECTIVE)
(Common to CSE, CSSE, IT and ME)

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

PREREQUISITES: Nil

COURSE DESCRIPTION: Introduction to Bioinformatics; Biology and Information; Sequence alignment and dynamic programming; Primary databases, Secondary databases and their use in Bioinformatics.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on concepts of biological databases, Genome and proteome.
CO2. Analyze biological database management system.
CO3. Create, select and apply appropriate techniques and tools to manage the biological data.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIOINFORMATICS (8 Periods)

Internet basics, Scope of bioinformatics, elementary commands and protocols, ftp, telnet, http, primer on information theory, introduction to perl and bioperl.

UNIT-II: BIOLOGY AND INFORMATION (7 Periods)

Bioinformatics, Computers in Biology and Medicine, The Virtual Doctor, Biological Macromolecules as Information Carriers.

UNIT-III: SEQUENCE ALIGNMENT AND DYNAMIC PROGRAMMING (10 Periods)

Heuristic alignment algorithms, global sequence alignments- Needleman-Wunsch algorithm, local sequence alignments- smith-waterman algorithm, amino acid substitution matrices- PAM and BLOSUM, Multiple sequence alignment and phylogenetic analysis.

UNIT-IV: PRIMARY DATABASES AND THEIR USE (11 Periods)

Introduction to biological databases- organization and management, searching and retrieval of information from the World Wide Web, Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB), primary databases NCBI, EMBL, DDBJ.

UNIT-V: SECONDARY DATABASES **(9 Periods)**

Introduction to secondary databases- organization and management of databases Swiss-Prot, Uniprot and PIR, Introduction to biochemical databases-organization and Management of databases, KEGG, ExPASy, BRENDA.

Total No. of Periods: 45

TEXT BOOKS:

1. David W. Mount **"Bioinformatics: Sequence and Genome Analysis"**, CSHL Press, 2nd edition, 2005.

REFERENCE BOOKS:

1. Hooman H. Rashidi and Lukas K. Buehler, **"Bioinformatics Basics, Applications in Biological Science and Medicine"**, CRC Press, Taylor & Francis Group, 2nd edition,2005.
2. Rastogi S. C., NamitaMendiratta, Parag Rastogi, **"Bioinformatics: Methodsand Applications: Genomics, Proteomics and Drug Discovery"**, PHI Learning Pvt. Ltd., 3rd edition, 2011.

IV B. Tech. - I Semester

(16BT71501) SYSTEM MODELING AND SIMULATION

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

PRE-REQUISITES: Courses on Programming in C and Probability Distributions and Statistical Methods.

COURSE DESCRIPTION:
Discrete event simulation; R Studio Operations; Useful statistical models; Queueing systems; Properties of random numbers, Test for random numbers; Data collection, Types of simulations with respect to output analysis.

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

CO1. Demonstrate knowledge on functional modeling of system design.
CO2. Analyze the performance of Queueing systems in real world applications.
CO3. Design dynamic system operations using simulation results using R.
CO4. Apply mathematical foundations and computer science theory in the modeling and design of experiments for real time systems.
CO5. Select suitable tools and simulation software for simulating computer based systems.
CO6. Relate appropriate professional principles of engineering practice for designing simulation models.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO DISCRETE EVENT SIMULATION (08 Periods)

Simulation-Advantages and Disadvantages, Areas of application, Steps in a simulation study, Basics of spreadsheet simulation, Queueing simulation in a spread sheet, Concepts in discrete-event simulation, List processing, Selection of simulation software, Simulation environments.

UNIT II: THE R ENVIRONMENT (10 Periods)

Command line interface, R Studio, Basic Math, Variables, Data Types, Vectors, Calling Functions, Missing Data, Reading data into R, ggplot2, Function arguments, Return values, Control

statements, Loops, Correlation and covariance, T-Tests, ANOVA, Autoregressive moving average, VAR.

UNIT III: STATISTICAL MODELS (07 Periods)

Terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions.

UNIT IV: QUEUEING MODELS AND RANDOM NUMBERS (09 Periods)

Characteristics of queuing systems, Queueing notation, Long-run measures of performance of queueing systems. Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for random numbers, Inverse-transform technique, Acceptance-rejection technique.

UNIT V: ANALYSIS OF SIMULATION DATA (11 Periods)

Input Modeling-Data Collection, Identifying the distribution with data, Parameter estimation, Multivariate and time series input models. Validation of Simulation Models -Model building verification and validation, Verification of simulation models. Estimation of absolute performance - Types of simulations with respect to output analysis, stochastic nature of output data, Absolute measures of performance and their estimation, Output analysis of terminating Simulations.

Total Periods: 45

TEXT BOOKS:

1. Jerry Banks, John S. Carson II, Barry L.Nelson and David M.Nicol, *Discrete-Event System Simulation,* Pearson India,5th Edition, 2013.
2. Jared P. Lander, *R for Everyone*, Pearson India, 2014.

REFERENCE BOOKS:

1. Narsingh Deo, System *Simulation with Digital Computer*, Prentice Hall India 2009.
2. Averill M. Law, *Simulation Modeling and Analysis*, McGraw Hill Education (India) Private Limited, 4th Edition, 2007.

IV B.Tech. I Semester

14BT71504: SIMULATION AND MODELING

(PROFESSIONAL ELECTIVE – I)
(Common to CSE and CSSE)

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

PREREQUISITES: A course on "Probability and Statistics"

COURSE DESCRIPTION:
Discrete event simulation; useful statistical models; queueing systems; properties of random numbers, test for random numbers; data collection, types of simulations with respect to output analysis.

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

- **CO1.** Gain knowledge on functional modeling of system design.
- **CO2.** Analyze the performance of queueing systems in real world applications.
- **CO3.** Design dynamic system operations using simulation results.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO DISCRETE EVENT SIMULATION **(9 Periods)**
Simulation of queueing systems, Simulation of inventory systems, Concepts in discrete-event simulation, List processing, Selection of simulation software.

UNIT II: STATISTICAL MODELS **(9 Periods)**
Review of terminology and concepts, Useful statistical models, Discrete distributions, Continuous distributions, Poisson process, Empirical distributions.

UNIT III: QUEUEING MODELS **(9 Periods)**
Characteristics of queueing systems, Queueing notation, Long-run measures of performance of queueing systems, Steady-state behavior of infinite-population Markovian models, Steady-state behavior of finite-population models, Networks of queues.

UNIT IV: RANDOM NUMBERS **(9 Periods)**
Properties of random numbers, Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for random numbers, Inverse-transform technique, Acceptance-rejection technique, Special properties.

UNIT V: ANALYSIS OF SIMULATION DATA (9 Periods)

Data collection, Identifying the distribution with data, Parameter estimation, Goodness-of-fit tests, Fitting a nonstationary Poisson process, Selecting input models without data, Multivariate and time series input models.

Types of simulations with respect to output analysis, Stochastic nature of output data, Measures of performance and their estimation, Output analysis of terminating Simulations and steady state simulations.

Total No. of Periods: 45

TEXT BOOK:

1. Jerry Banks, John S. Carson II, Barry L.Nelson and David M.Nicol, "*Discrete-Event System Simulation,*" Fourth Edition PHI Learning Private Ltd., New Delhi, 2009.

REFERENCE BOOKS:

1. Geoffrey Gordon, "*System Simulation,*" Second Edition, PHI, 2006.
2. Averill M. Law, "Simulation *Modeling and Analysis*," Fourth Edition, McGraw Hill Education (India) Private Limited, 2007.

IV B. Tech. - I Semester

(16BT71502) SYSTEMS ENGINEERING

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

PRE-REQUISITE: A course on Software Engineering.

COURSE DESCRIPTION: Foundations of System Engineering; Complex Systems structure; System Engineering Management and Development.

COURSE OUTCOMES:

On the Successful Completion of this Course, students will be able to:

CO1. Demonstrate Knowledge on:
- System Engineering foundation
- Structure of Complex Systems
- System Engineering management and Development

CO2. Analyze the requirements for the development of structures of a system.

CO3. Design system engineering management plan for complex integrated systems and evaluate them in operational environment.

CO4. Use appropriate system engineering methods in iterative system development process

CO5. Use appropriate methods to support the phases of Production, operation and maintenance in system development.

CO6. Apply ethical principles of System engineering for addressing the issues in modeling, simulation and trade-off analysis for complex systems development.

DETAILED SYLLABUS:

UNIT I: FOUNDATIONS OF SYSTEMS ENGINEERING **(09 Periods)**

Systems Engineering and the World of Modern Systems - Origins of Systems Engineering - Examples of Systems Requiring Systems Engineering - Systems Engineering Viewpoint - Systems Engineering as a Profession - The Power of Systems Engineering

System Engineering Landscape-System Engineering Viewpoint–Perspective of System Engineering– Systems Domain-System Engineering Field–System Engineering Approaches – System Engineering Activities and Products

UNIT II: STRUCTURE OF COMPLEX SYSTEMS (09 Periods)

System Building Blocks and Interfaces - Hierarchy of Complex Systems - System Building Blocks - The System Environment - Interfaces and Interactions

The System Development Process-Systems Engineering Through the System Life Cycle - Evolutionary Characteristics of the Development Process - The Systems Engineering Method - Testing Throughout System Development

UNIT III: CONCEPT DEVELOPMENT STAGE (10 Periods)

Needs Analysis- Originating a New System -Operations Analysis - Functional Analysis - Feasibility Definition - Needs Validation - System Operational Requirements

Concept Exploration- Developing the System Requirements - Operational Requirements Analysis - Performance Requirements Formulation

Concept Definition- Selecting the System Concept - Performance Requirements Analysis - Functional Analysis and Formulation - Concept Selection - Concept Validation - System Development Planning - System Functional Specifications

UNIT IV: ENGINEERING DEVELOPMENT STAGE (09 Periods)

Advanced Development -Reducing Program Risks - Requirements Analysis - Functional Analysis and Design - Prototype Development - Development Testing - Risk Reduction -**Engineering Design**- Implementing the System Building Blocks - Requirements Analysis - Functional Analysis and Design - Component Design - Design Validation - Configuration Management

UNIT V: POST DEVELOPMENT STAGE AND MANAGEMENT (08 Periods)

Production-Systems Engineering in the factory-Engineering for production-Transition from development to production-Production Operations

Operations and Support-Installing, Maintaining, and upgrading the system-Installation and test- In-Service support, Major System Upgrades: Modernization

Managing System Development and Risks - Work Breakdown Structure (WBS) - Systems Engineering Management Plan (SEMP) - Risk Management - Organization of Systems Engineering

Total Periods: 45

TEXT BOOK:

1. Alexander Kossiakoff , William N. Sweet, *Systems Engineering: Principles and Practice,* John Wiley & Sons, Inc., Hoboken, New Jersey, 2nd Edition, 2016.

REFERENCE BOOK:

1. B. Blanchard and W. Fabrycky, *Systems Engineering and Analysis,* Prentice Hall, 4th Edition, 2006.

IV B. Tech. - I Semester

(16BT71503) DATA ANALYTICS

(Program Elective – 2)

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

PRE-REQUISITE: A course on Data Warehousing and Data Mining

COURSE DESCRIPTION: Introduction to Data Analytics; Analytic Processes and Tools; Cluster Analysis; Big Data; Hadoop;

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on concepts of Data Analytics Characteristics, Hadoop Framework ecosystem components and Cluster Analysis.
CO2. Identify appropriate solutions through analysis for problems of Big data and Hadoop.
CO3. Design and model an effective sustainable Database system for better performance using Data Analytic techniques.
CO4. Appropriately use database models for storing, accessing and analyzing large data sets.
CO5. Apply Hadoop Framework for data processing.
CO6. Recognize the need for using Hadoop environment for solving complex engineering problems.

DETAILED SYLLABUS:

UNIT- I: WHOLENESS OF DATA ANALYTICS (09 Periods)

Data Analytics, Business Intelligence, Pattern Recognition, Data Processing chain, Terminology and careers.

Data Mining: Data Mining, Gathering and selecting Data, Data cleansing and preparation, outputs of Data mining, Evaluating Data Mining results, Data Mining Techniques.

Data Visualization: Data Visualization, Excellence in visualization, Types of charts, Visualization example, Tips for Data Visualization.

UNIT II: DATA ANALYSIS (08 Periods)

Decision Trees: Decision Tree problem, Decision Tree construction, Lessons from constructing trees, Decision tree algorithms.

Regression: Regression, correlations and relationships, visual look at relationships, Non linear regression, logistic regression, Advantages and Disadvantages of regression models.

Artificial Neural Networks: ANN, Business applications of ANN, Design principles of ANN, Representation of a Neural Network, Developing an ANN, Advantages and Disadvantages of using ANN's.

UNIT III: CLUSTER ANALYSIS **(11 Periods)**

Applications of Cluster Analysis, Representing Clusters, Clustering Techniques, K-means algorithm for clustering, selecting the number of clusters, Advantages and Disadvantages of K-means algorithm.

Association Rule Mining: Association Rule Mining, Business applications of Association Rules, Representing Association Rules, Algorithm for Association Rule, Apriori Algorithm, Association Rules, Creating Association Rules.

Naïve-Bayes Analysis: Naïve-Bayes Model, Simple classification Example, Text Classification Example, Advantages and Disadvantages of Naïve-Bayes.

Social Network Analysis: Social Network Analysis, Techniques and Algorithms, Page Rank, Practical considerations.

UNIT IV: BIG DATA **(09 Periods)**

Big Data, Defining Big Data, Big Data Landscape, Business implications of Big Data, Technology implications of Big Data, Big Data technologies, Management of Big Data.

Data Modeling Primer: Evolution of Data Management Systems

Statistics Primer: Statistics Primer, Descriptive Statistics, Normal Distribution and Bell Curve, Inferential Statistics, Predictive Statistics.

UNIT V: HADOOP **(08 Periods)**

Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS, Processing Data with Hadoop, Hadoop YARN, Hadoop Ecosystem.

MongoDB: Introduction to MongoDB, Terms used in RDBMS and MongoDB, Datatypes in MongoDB, MongoDB query Language.

Total Periods: 45

TEXT BOOKS:

1. Anil Maheswari, *Data Analytics*, McGraw Hill Education, 2017.
2. Seema Acharya and Subhashini C, *Big Data and Analytics*, Wiley India, 2015

REFERENCE BOOKS:

1. Bart Baesens, *Analytics in a Big Data World: The Essential Guide to Data Science and Its Applications*, Wiley Publications, 2014.
2. Michael Berthold, David J. Hand, *Intelligent Data Analysis*, Springer, 2014.

IV B. Tech. - I Semester

(16BT71506) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

(Program Elective – 2)

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

PRE-REQUISITE: A course on Software Engineering.

COURSE DESCRIPTION: Architecture Business Cycle; Documenting Architecture; Layered Systems; Heterogeneous Architectures; Architectural Structures For Shared Information Systems; Formalizing Architectural Design Space; Selection and Usage Patterns;

COURSE OUTCOMES

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

CO1. Demonstrate knowledge in software architecture, styles, patterns and frameworks.
CO2. Analyze and select appropriate architectural patterns for software design
CO3. Design appropriate software architectures for software Project implementation.
CO4. Apply Skills for designing Architectural solutions using Formal Models and Specification.
CO5. Select appropriate techniques for designing and evaluating a system's architecture.

DETAILED SYLLABUS

UNIT I: INTRODUCTION TO SOFTWARE ARCHITECTURE (09 Periods)

Software Architecture, Software as Engineering Discipline, the Status of Software Architecture, Designing the Architecture, Documenting Architecture, Reconstructing Software Architecture. Software Architecture Guidelines, Baseline architecture, Good software architecture.

UNIT II: ARCHITECTURAL STYLES (09 Periods)

Pipes And Filters, Data Abstraction And Object Oriented Organization, Event-Based Implicit Invocation, Layered Systems, Repositories, Interpreters, Process Control, Familiar Architectures, Heterogeneous Architectures.

UNIT III: ARCHITECTURE DESIGN GUIDANCE AND FORMAL MODELS SPECIFICATION (08 Periods)

Database Integration, Batch Sequential, Simple Repository, Virtual Repository, Hierarchical Repository, Integration in Software Development Environments, Guidance for User Interfacing Architecture, Formalizing the Architecture of a Specific System, Formalizing an Architectural Style, Formalizing Architectural Design Space.

UNIT IV: DESIGN PATTERNS AND CREATIONAL PATTERNS (09 Periods)

Design Pattern, Smalltalk MVC, Catalogs, Role in Solving Design Problems, Selecting Design Pattern, Using Design Pattern. Creational Patterns: Abstract Factory, Prototype.

UNIT V: STRUCTURAL PATTERNS AND BEHAVIORAL PATTERNS (10 Periods)

Structural Patterns: Adapter, Bridge, Composite. Behavioral Patterns: Proxy, Interpreter, Iterator.

Total Periods: 45

TEXT BOOKS:

1. Mary Shaw, David Garlan, *Software Architecture Perspective: on an Emerging Discipline,* PHI, 2014.
2. Erich Gamma, *Design Patterns,* Pearson Education, 2006.

REFERENCE BOOKS:

1. Len Bass, Paul Clements, Rick Kazman, *Software Architecture in Practice*, SEI Series, 2012
2. Buschmann, *Pattern Oriented Software Architecture*, Wiley, 1996.
3. Gamma, Shaw, *An Introduction to Software Architecture*, World Scientific, 1995.

IV B.Tech. II Semester
14BT81505: SOFTWARE ARCHITECTURE
(PROFESSIONAL ELECTIVE – IV)

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: Architecture Business Cycle; Layered Systems; Heterogeneous architectures; Architectural structures for shared information systems; Inter-operability; Patterns for distribution; Architectural design space; Applications of ADL; Tools for Architectural Design;

COURSE OUTCOMES

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

CO1: Acquire knowledge in software architecture, styles, patterns and frameworks

CO2: Design software architectures.

CO3: Gain Skills to describe software architecture using Architectural Description Languages.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION TO SOFTWARE ARCHITECTURE AND ARCHITECTURAL STYLES (9 periods)

Introduction to software architecture: An Engineering Discipline for software, status of software architecture. Architecture Business Cycle: Where does Architecture comes from,Software process and Architecture Business cycle, what makes a good Architecture

Architecture styles:

Pipes and filters ,data abstraction and object oriented organization , Event-based Implicit Invocation, Layered Systems, Repositories , Interpreters ,process control, Other Familiar Architectures, Heterogeneous Architectures.

UNIT – II: SHARED INFORMATION SYSTEMS AND ARCHITECTURE DESIGN GUIDANCE (9 periods)

Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems. Guidance for User Interface Architectures, Case Study in Inter-operability: World Wide Web

UNIT-III : ARCHITECTURAL PATTERNS (8 periods)

Introduction

From Mud to Structure: Layers, pipes and Filters, Blackboard

Distributed Systems: Broker

UNIT – IV: FORMAL MODELS AND SPECIFICATION (10 periods)

Formalizing the Architecture of a Specific System, Formalizing an Architectural Styles, Formalizing Architectural Design Space, Case Study of an Industry Standard Computing Infrastructure: J2EE\EJB

UNIT – V: ARCHITECTURE DESCRIPTION LANGUAGES AND TOOLS FOR ARCHITECTURE DESIGN (9 periods)

Architectural Description Languages: Requirements for Architecture Description Languages, First class Connectors, Adding Implicit Invocation to Traditional programming Languages.

Tools for Architectural Design:

UniCon- A universal Connector Language, Exploiting Style in Architecture Design Environments, Beyond Definition/Use: Architectural Interconnection

Total No. of Periods: 45

TEXT BOOK:

1. Mary Shaw, David Garlan, " Software Architecture Perspective: on an Emerging Discipline", PHI,1996 .
2. Len Bass, Paul Elements, Rick Kazman, "Software Architecture in Practice", SEI Series, 2012.

REFERENCE BOOKS:

1. Buschmann," Pattern Oriented Software Architecture", Wiley, 1996.
2. Gamma, Shaw, "An Introduction to Software Architecture", World Scientific, 1995

IV B. Tech. - I Semester

(16BT71504) PERFORMANCE EVALUATION OF COMPUTER SYSTEMS

(Program Elective-2)

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

PRE-REQUISITE: A course on Probability Distributions and Statistical Methods.

COURSE DESCRIPTION: Performance Evaluation Systems; Workload characterization; Hardware and software monitors; Summarization of data, Linear regression models; Experimental Design.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on Performance Metrics, workload selection and Monitors.
CO2. Analyze and interpret the data using summarization techniques.
CO3. Design and develop Factorial Experimental models for evaluating the performance of a computer based systems.
CO4. Use statistical methods for interpretation of data in simulation based systems.
CO5. Select appropriate techniques for prediction of variability and index of dispersion.
CO6. Apply contextual knowledge to asses experimental errors in Factorial designs.

DETAILED SYLLABUS:

UNIT I: INTRODUCTION TO PERFORMANCE EVALUATION **(09 Periods)**

The art of performance evaluation, Performance projects, Common mistakes, Systematic approach, Selecting an evaluation technique, Performance metrics- selection, Usage, Classification, Setting performance requirements.

UNIT II: WORKLOADS **(09 Periods)**

Types of workloads: Addition Instruction, Instruction Mixes, Kernels, Synthetic Programs, Application Benchmarks, Popular Benchmarks.

Workload selection and Characterization Techniques: Services Exercised, Level Of Detail, Representativeness, Timeliness, Terminology, Averaging, Specifying Dispersion, Single-Parameter Histograms, Multi parameter Histograms, Principal-Component Analysis, Markov Models, Clustering.

UNIT III: MONITORS **(08 Periods)**

Monitor terminology, classification, Software, Hardware monitors, Software versus Hardware monitors, Firmware and Hybrid monitors, Distributed system monitors, Program execution monitors, Techniques for improving program performance, Accounting logs, Analysis and inter presentation of accounting log data.

UNIT IV: SUMMARIZING DATA AND LINEAR REGRESSION MODELS **(09 Periods)**

Summarizing Data: Probability and statistics concepts, Summarizing data by a single number, Selecting among the mean, Median, and Mode, Common misuses of means, Geometric, mean, Harmonic mean, Mean of a ratio, Summarizing variability, Selecting the index of dispersion, Determining distribution of data.

Linear Regression Models: Definition of a good model, Estimation of model parameters, Confidence intervals for regression parameters, Confidence intervals for predictions.

UNIT V: EXPERIMENTAL DESIGN AND ANALYSIS **(10 Periods)**

Experimental design: Terminology, Common mistakes in Experimentation, Types of Experimental Designs, 2^2 Factorial Designs, Computation of effects, Sign table method for calculating effects, Allocation of variation.

General 2^k Factorial Designs: 2^2r Factorial Designs, Computation of effects, Estimation of Experimental errors, Allocation of variation, Confidence intervals for effects, Confidence intervals for predicted responses, General 2^kr Factorial design

Total Periods: 45

TEXT BOOK:

1. Raj Jain, *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling*, Wiley-India, Reprint Edition 2014.

REFERENCE BOOKS:

1. Kishore S.Trivedi, *Probability & Statistics with reliability, queuing, and computer science applications*, PHI, 8th Edition, 2011.
2. Paul J. Fortier and Howard E. Michel, *Computer Systems Performance Evaluation and Prediction*, Elsevier, 2003.

IV B.Tech. II semester
14BT81504: PERFORMANCE EVALUATION OF COMPUTER SYSTEMS
(PROFESSIONAL ELECTIVE – III)

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

PRE-REQUISITES: A Course on "Simulation and Modeling"

COURSE DESCRIPTION: Performance Evaluation System; Queuing theory; Workloads; Monitors; Experimental Design; Summarization of data; linear regression models.

COURSE OUTCOMES:
On successful completion of this course the students will be able to:
CO1. Gain knowledge in:
- i) Queueing model, workload selection and techniques.
- ii) Design of Hardware, Software and Firmware monitors.

CO2. Analyze and interpret the data using summarization.
CO3. Design and develop 2^k Experimental models for evaluating the performance of a computer system.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO PERFORMANCE EVALUATION **(9 periods)**
The art of performance evaluation, Performance projects, Common mistakes, Systematic approach, Selecting an evaluation technique, Performance metrics: selection, Usage, Classification, Setting performance requirements.

UNIT II: QUEUING MODELS **(10 Periods)**
Introduction to queueing theory; Analysis of single queue; Queuing networks; Operational laws.

UNIT-III: WORKLOADS **(9 Periods)**
Types of work load; The art of workload selection; Work load characterization techniques.

UNIT-IV: MONITORS **(8 Periods)**
Monitor terminology, classification, software, hardware monitors, Software versus Hardware monitors, Firmware and hybrid monitors, distributed system monitors, program execution monitors, techniques for improving program performance, accounting logs, analysis and inter presentation of accounting log data.

UNIT V: EXPERIMENTAL DESIGN AND SUMMARIZING DATA

(9 Periods)

Introduction to Experimental Design, 2^K Factorial Designs; Summarizing measured data; simple Linear Regression Models;

Total No. of Periods: 45

TEXT BOOK:

1. Raj Jain, "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling," Wiley-India, 2008

REFERENCE BOOK:

1. Kishore S.Trivedi, "Probability & Statistics with reliability, queuing, and computer science applications," PHI, 2006.

IV B. Tech. - I Semester

(16BT71507) BUSINESS ANALYTICS

(Program Elective – 3)

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:

Analytics on Spreadsheets; Visualizing and Exploring Data; Descriptive Statistical Measures; Predictive Modeling and Analysis; Regression Analysis; Linear Optimization; Applications of Linear Optimization; Decision Analysis.

COURSE OUTCOMES:

On Successful Completion of this course, students will be able to:

CO1. Demonstrate knowledge on techniques involved in business analytics.
CO2. Analyze the techniques involved in classifying massive and opportunistic data.
CO3. Design solutions by evaluating business problems and determine suitable analytical methods.
CO4. Plan, organize and evaluate methods to prepare raw data for different analytical techniques.
CO5. Collect, manage, and interpret data to identify issues in the workplace and develop measures for solving them.
CO6. Apply ethical principles and commit to business decisions by using data analytic techniques.

DETAILED SYLLABUS:

UNIT I: FUNDAMENTALS OF BUSINESS ANALYTICS (11 Periods)

Introduction to Business Analytics: Evolution of Business Analytics, Scope of Business Analytics, Data for Business Analytics, Decision Models, Problem Solving and Decision Making. **Analytics on Spreadsheets:** Basic Excel Skills, Excel Functions, Spreadsheet Modeling and Spreadsheet Engineering.

UNIT II: DESCRIPTIVE ANALYTICS (09 Periods)

Visualizing and Exploring Data: Data Visualization, Data Queries Using Sorting and Filtering, Statistical Methods for Summarizing Data.

Descriptive Statistical Measures: Populations and Samples, Measures of Location, Measures of Dispersion, Measures of Shape, Measures of Association, Statistical Thinking in Business Decisions, Details of Data Modeling.

UNIT III: PREDICTIVE ANALYTICS (09 Periods)

Predictive Modeling and Analysis: Logic-Driven Modeling, Data-Driven Modeling, Analyzing Uncertainty and Model Assumptions, Model Analysis Using Risk Solver Platform

Regression Analysis: Simple Linear Regression, Residual analysis and regression assumptions, multiple linear regression, Building good regression models, Regression with categorical independent variables, Regression model with nonlinear Terms

UNIT IV: PRESCRIPTIVE ANALYTICS (08 Periods)

Linear Optimization: Building Linear Optimization Models, Implementing Linear Optimization Models on Spreadsheets, Solving Linear Optimization Models, Graphical Interpretation of Linear Optimization, Using Optimization Models for Prediction and Insight.

Applications of Linear Optimization: Types of Constraints in Optimization Models, Process Selection Models, Blending Models, Portfolio Investment Models, Transportation Models, Multiperiod Production Planning Models, Models with Bounded Variables, A Production / Marketing Allocation Model.

UNIT V: NONLINEAR, NON-SMOOTH OPTIMIZATION AND MAKING DECISIONS (08 Periods)

Nonlinear And Non-Smooth Optimization: Modeling and Solving Nonlinear Optimization Problems, Quadratic Optimization, Evolutionary Solver for Non-Smooth Optimization

Decision Analysis: Making Decisions with Uncertain Information, Decision Trees, The Value of Information, Utility and Decision Making, Case Study

Total Periods: 45

TEXT BOOK:

1. James R. Evans, *Business Analytics*, Pearson, 2016.

REFERENCE BOOKS:

1. R. N. Prasad, Seema Acharya, *Fundamentals of Business Analytics*, Wiley, 2014.
2. Evan Stubbs, *Delivering Business Analytics: Practical Guidelines for Best Practice*, Wiley, 2013.

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.

IV B. Tech. -I Semester

(16BT71509) SECURE SOFTWARE ENGINEERING

(Program Elective – 4)

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

PRE-REQUISITE: A course on Software Engineering

COURSE DESCRIPTION:

Security in software; Requirements engineering for secure software; Secure software architecture & design, secure coding & testing; and Governance & managing.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on security issues in:
- Requirements Engineering
- Architecture and Design
- Coding and Testing
- System Assembling

CO2. Analyze complex software projects to describe security risks and its mitigation techniques.

CO3. Design secure software system with minimal risks and attacks.

CO4. Use statistical methods to collect metrics for assessing and improving the security of a product, process, and project objectives.

CO5. Create software solutions for secure access and protection of data.

CO6. Apply ethical principles and methods for secure software system design.

DETAILED SYLLABUS:

UNIT I: SECURITY IN SOFTWARE (10 Periods)

The problem, Software assurance and software security, Threats to software security, Sources of software insecurity, the benefits of detecting software security defects early, managing secure software development, Defining properties of secure software.

Secure Software: Defining Properties of Secure Software, Core Properties of Secure Software, Influential Properties of Secure Software, Influencing the Security Properties of Software, The Defensive Perspective, The Attacker's Perspective.

UNIT II: REQUIREMENTS ENGINEERING (09 Periods)

Requirements Engineering For Secure Software: Misuse and abuse cases, the SQUARE process Model, SQUARE sample outputs, Requirements elicitation, Requirements prioritization.

UNIT III: SECURITY PRINCIPLES (09 Periods)

Secure Software Architecture and Design: Software security practices for architecture and design: Architectural risk analysis. Software security knowledge for architecture and design: Security principles, Security guidelines, and Attack patterns.

UNIT IV: SECURE CODING AND TESTING (08 Periods)

Considerations for Secure Coding and Testing: Code analysis, Coding practices, Software security testing, Security testing considerations throughout the SDLC.

UNIT V: GOVERNANCE AND MANAGEMENT (09 Periods)

Governance and Managing for More Secure Software: Governance and security, Adopting an enterprise software security framework, security extent, Security and project management, Maturity of Practice.

Total Periods: 45

TEXT BOOK:

1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, and Nancy R. Mead, *Software Security Engineering: A Guide for Project Managers,* Pearson Education (India), 2009.

REFERENCE BOOKS:

1. Gary McGraw, *Software Security: Building Security In*, Addison-Wesley, 2006.
2. Mark Dowd, John McDonald and Justin Schuh, *The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities,* Addison-Wesley, 2006.

IV B. Tech. - I Semester

(16BT71531) SYSTEM MODELING AND SIMULATION LAB

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

PRE-REQUISITES: A course on Programming in C Lab and System Modeling and Simulation

COURSE DESCRIPTION:
Hands on Experience on Generation of random numbers; Input Modeling; Queuing System; Simulation models.

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

CO1. Demonstrate Knowledge to solve complex engineering problems using Modeling and simulation.
CO2. Analyze the problems to develop models for applications to meet requirements of the system.
CO3. Design and develop solutions through modeling for computer based systems.
CO4. Apply simulation methods to interpret data and provide valid conclusions for problems in systems engineering
CO5. Use modern engineering techniques in modeling systems to provide effective solutions for real world problems.
CO6. Apply appropriate ethics and follow principles to model systems incrementally.

List of Experiments:

1. A baker is trying to figure out how many dozens of bagels to bake each day. The probability distribution of the number of bagel customers is as follows:

Number of Customers/Day	8	10	12	14
Probability	0.35	0.30	0.25	0.10

Customers order 1,2,3 or 4 dozen bagels according to the following probability distribution.

Number of Dozen Ordered /Customer	1	2	3	4
Probability	0.4	0.3	0.2	0.1

Bagels sell for $8.40 per dozen. They cost $5.80 per dozen to make. All Bagels not sold at the end of the day are sold at half price to a local grocery store. Based on 5 days of simulation, how many dozen bagels should be baked each day?

2. Develop a function for generation of pseudo-random numbers between 0 and 1.

3. Develop functions for generating random variates for continuous and discrete probability distributions using inverse transform technique and acceptance-rejection technique.

4. A self service car wash has 4 washing stalls. When in a stall, a customer may choose from among three options: 1. Rinse only 2. Wash and Rinse 3. Wash, Rinse and Wax. Each option has a fixed time to complete: Rinse only 3 minutes; wash and rinse 7 minutes; wash, rinse and wax 12 minutes. The owners have observed that 20% of customers choose rinse only; 70% wash and rinse; and 10% wash, rinse and wax. There are no scheduled appointments; the customers arrive at a rate of about 34 cars per hour. There is room for only 3 cars to wait in the parking lot, so, currently many customers are lost. The owners want to know how much more business they will do if they add another stall. Adding a stall will take away one space in the parking lot.

   Develop a queuing model of the system. Estimate the rate at which customers will be lost in the current and proposed system. Carefully state any assumptions or approximations you make.

5. Records pertaining to the monthly number of job-related injuries at an underground coal mine were being studied by a federal agency. The values for the past 100 months were as follows:

Injuries per month	Frequency of occurrence
0	35
1	40
2	13
3	6
4	4
5	1
6	1

a. Apply chi-square test to these data to test the hypothesis that the underlying distribution is poisson. Use the level of significance á = 0.05.
b. Apply chi-square test to these data to test the hypothesis that the distribution is poisson with mean 1.0. Again let á = 0.05.
c. What are the differences between parts (a) and (b), and when might each case arise.

6. Simulate a Single Server Queuing System.

7. Simulate Two-Server Queuing System.

8. Simulate and control a conveyor belt system

9. Perform Two-sample Kolmogorov-Smirnov test on sample data with atleast hundred entries.

10. Design and development of a simulation model for determining the parameters of periodic Review System.

REFERENCE BOOKS:

1. Jerry Banks, John S. Carson II, Barry L.Nelson and David M.Nicol, *Discrete-Event System Simulation*, Pearson India, 5th Edition, 2013.
2. Jared P. Lander, *R for Everyone,* Pearson India, 2014.
3. Narsingh Deo, *System Simulation with Digital Computer,* Prentice Hall India, 2009.
4. Averill M. Law, *Simulation Modeling and Analysis,* McGraw Hill Education (India) Private ltd, 4th Edition, 2007.

I B. Tech. – I Semester [CSE, CSSE, IT, CE & ME]

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 writing skills 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 **Technical English 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 **Technical English 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 **Technical English 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 **Technical English 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 **Technical English 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.

I B. Tech. – I Semester (CSE, CSSE, IT, CE & ME)

I B. Tech. – II Semester (ECE, EEE & EIE)

(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.

I B. Tech. – II Semester

(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

(16BT4HS31) SOFT SKILLS LABORATORY

(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.

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

(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

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

(16BT6HS06) GERMAN LANGUAGE

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

(16BT6HS07) INDIAN CONSTITUTION

(Open Elective)

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 :

UNIT- I : PREAMBLE AND ITS PHILOSOPHY (8 periods)

Introduction and Evolution of Indian Constitution, preamble and its Philosophy.

UNIT- II :UNION GOVERNMENT (8 periods)

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

UNIT-III :FEDERAL SYSTEM (14 periods)

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.

UNIT-IV :JUDICIARY AND PUBLIC SERVICES (10 periods)

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

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

(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. Dutt Rudar & Sundhram K. P. M.***Indian Economy***.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.

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

(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. Chaturvidha purushardhas, 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, Eswarchandra vidyasagar 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. Valluru Prabhakaraiah, ***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)

The Evolution of the Constitution and Main Provisions; Consolidation of India as a Nation; Politics in the States; Indian economy; Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing
Nature of work and organization.

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

III B. Tech. – II Semester (CSE, CSSE, IT, CE & ME)

IV B. Tech. – I Semester (ECE, EEE & EIE)

(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.

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

(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.

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

(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 Nirman Dhanasahayam 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.

(16BT60112) BUILDING MAINTENANCE AND REPAIR

(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, 3rd Edition, 1997.

IV B.Tech - I Semester

(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 ofair pollution;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.

IV B.Tech - I Semester
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.

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

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

L	T	P	C
-	-	3	2

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

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.

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.

III B. Tech. II Semester

(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.

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.

III B. Tech. – II Semester

(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.

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.

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.

Numeric overflow, Round off error, The format for floating 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

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

I B.Tech. - II Semester

(16BT21231) IT Workshop

(Common to IT & CSSE)

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

PREREQUISITES: —Nil—

COURSE DESCRIPTION:

Practice sessions on PC hardware, Internet, World Wide Web, LibreOffice Suite. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are include.

COURSE OUTCOMES:

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

1. Demonstrate analytical skills in:
   - Identification of functional parts of PC
   - Internet and World Wide Web.
   - Computer security issues and preventive measures.
   - Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Demonstrate effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

LIST OF EXERCISES:

1. PC Hardware

a. Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

b. Demonstrating assembling and disassembling of the Personal Computer.

c. Introduction to Operating Systems, components of OS, installation of Microsoft Windows-XP Operating System.

2. Operating System

a. Introduction to LINUX OS, installation of LINUX OS, Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc

b. Introduction to DOS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit.

3. Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software troubleshooting steps, PC diagnostic tools.

4. Libre Office:

a. Libre Writer

Introduction to Writer, importance of Writer as Word Processor, overview of toolbars , saving, accessing files, using help and resources.

i). Create a document using the features: Formatting fonts, drop cap, bullets and numbering, text effects, character spacing, borders and shading, tables, text direction, hyperlink, headers and footers, date and time.

ii). Create a document in using the features: picture effects, clipart, auto shapes & grouping, page setup, paragraph indentation, wrap text, footnote and equations.

5. Libre Calc

a. Introduction to Calc as a spreadsheet tool, overview of toolbars, accessing, saving Calc files, using help and resources.

i). Create a spreadsheet using the features: gridlines, format cells, auto fill, formatting text, formulae, table and charts.

ii). Create a spreadsheet using the features: split cells, text to columns, sorting,filter, conditional formatting, freeze panes, pivot tables, data validation.

6. Libre Impress:

a. Demonstration on Impress, utilities, overview of toolbars, PPT orientation, slide layouts, types of views.

i). Create a Presentation using the features: slide layouts, inserting text, formatting text, bullets and numbering, auto shapes, hyperlinks, pictures, clip art, audio, video, tables and charts.

ii). Create a Presentation using the features: slide design, slide hiding, slide transition, animation, rehearse timings and custom slideshow.

7. Libre Draw: Draw vector graphics and flowcharts using Libre draw tools.

8. LibreBase: Create a sample database using Libre Base(Ex: Student database).

9. Introduction LaTeX Tool. Create a document using the features: formatting fonts, applying text effects, insert pictures and images, using date and time option.

10. Internet & Computer Security

Introduction to computer networking, demonstration on network components, drivers loading and configuration settings, mapping of IP addresses, configuration of Internet and Wi-Fi.

11. Search Engines and Cyber Hygiene:

Working of search engine, Awareness of various threats on Internet, types of attacks and how to overcome. Installation of antivirus software, configuration of personal firewall and Windows update on computers.

12. Students should implement exercises 6 to 9 using MS- Office tool.

REFERENCES:

1. Vikas Gupta, *Comdex Information Technology Course Tool Kit,* 2nd Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, *Introduction to Information Technology,* 2nd Edition, Pearson Education, New Delhi, 2005.
3. Leslie Lamport, *A Document preparation system LATEX users guide and reference manual,* 2rd Edition.
4. IT Workshop Laboratory Manual, 2014.
5. www.libreoffice.org.

B.Tech I Year

14BT1ES06: ENGINEERING & IT WORKSHOP

(Common to All Branches of Engineering)

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

PREREQUISITES: - - -

COURSE DESCRIPTION:

Engineering Workshop: The course provides hands-on training in the trades Carpentry, Fitting, House-wiring, Tin Smithy, Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

IT Workshop: This course deals with practice sessions on PC hardware, Internet, World Wide Web, MS-Word, Excel, Power Point and Publisher. Demonstrations on installations of system software such as MS-Windows, Linux and device drivers, hardware and software troubleshooting, and protecting the personal computer from viruses and other cyber attacks are included.

COURSE OUTCOMES:

ENGINEERING WORKSHOP:

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

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production of component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

IT WORKSHOP:

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

1. Acquire analytical skills in:
   (a) Identification of functional parts of PC
   (b) Internet and World Wide Web.
   (c) Computer security issues and preventive measures.
   (d) Operating Systems.
2. Design document and presentations effectively.
3. Apply modern tools to develop IT based applications.
4. Gain effective communication skills through IT tools.
5. Update knowledge and skills in PC maintenance and usage of latest Operating Systems and Office automation tools.

List of Experiments:

ENGINEERING WORKSHOP:

1. Trades for Exercise:

Any TWO jobs from each trade should be performed.

a)	**Carpentry Shop**	:	Cross lap joint, mortise and tenon, T-joint, dove tail joint.
b)	**Fitting Shop**	:	Square fit and V-fit, semi circular fit, dove tail fit.
c)	**Sheet Metal Shop**	:	Trapezoidal tray, square tin, funnel, cylinder.
d)	**House wiring**	:	Wiring for two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, tube light connection, godown wiring.
(e)	**Foundry**	:	Preparation of casting using single piece pattern, Preparation of casting using split piece pattern

2. Trades for Demonstration:

a) **Welding**
b) **Metal Cutting**
c) **Plumbing**

In addition to the above, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, plastics, steels, meters, gauges, equipment, first-aid and shop safety shall be demonstrated through charts, layouts, figures, circuits, CDs/DVDs.

IT WORKSHOP:

a) PC Hardware

Week 1: Identify the peripherals of a personal computer, components in a Central Processing Unit (CPU) and its functions, block diagram of CPU along with the configuration of each peripheral.

Week 2: Demonstrating assembling and disassembling of the Personal Computer.

Week 3: Introduction to Operating Systems, Components of OS, Installation of Microsoft Windows-XP Operating System.

Week 4: Introduction to LINUX OS, Installation of LINUX OS, Basic DOS commands – mkdir, cd, cls, del, copy, attrib, date, path, type, format, exit. Basic commands in LINUX - cat, ls, pwd, rm, rmdir, cd, cp, mv, who, date, cal, clear, man, wc.

Week 5: Hardware & Software Troubleshooting: Diagnosis of PC malfunction, types of faults, common issues and how to fix them. Basic Hardware & Software Troubleshooting steps, PC diagnostic tools.

b) MS-Office:

MS Word

Week 6: Introduction to MS-Word, Importance of Word as Word Processor, Overview of toolbars, Saving, Accessing files, Using help and resources. Create a word document using the features: Formatting fonts, Drop cap, Applying text effects, Using character spacing, Borders and shading, Inserting headers and footers, Using date and time option.

Week 7: Create a word document in MS-Word using the features: Inserting tables, Bullets and numbering, Changing text direction, Hyperlink, Images from files and Clipart, Drawing toolbar and Word art.

Week 8: Create an invitation using Mail Merge in MS-Word

MS Power Point:

Week 9: Introduction to MS-Power Point, Utilities, Overview of toolbars, PPT orientation, slide layouts, Types of views.

Create a Power Point Presentation using the features: Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows.

Week 10: Create a Power Point Presentation using the features: Auto content wizard, Hyperlinks, Inserting images, Clip art, Audio, Video, Custom animation, Slide hiding, Tables and Charts.

MS Excel:

Week 11: Introduction to MS-Excel as a Spreadsheet tool, Overview of toolbars, accessing, Saving excel files, Using help and resources.

Create a spreadsheet using the features: Gridlines, Format cells, Summation, Auto fill, Formatting text, Formulae in Excel Charts.

Week 12: Create a spreadsheet using the features: Split cells, Sorting, Conditional formatting, Freeze panes, Pivot tables, Data validation.

MS Publisher & World Wide Web

Week 13: Introduction to MS-Publisher, Overview of toolbars, Saving files, Templates, Layouts.

Create a website using the features: Home page, About us, Department, Contact page.

Internet & Computer Security

Week 14: Search Engines and Cyber Hygiene: Introduction to computer networking, Demonstration on network components, Drivers loading and Configuration settings, Mapping of IP addresses, Configuration of Internet and Wi-Fi. Bookmarks, Search toolbars and pop up blockers. Types of search engines and how to use search engines, Awareness of various threats on Internet, Types of attacks and how to overcome. Installation of antivirus software, Configuration of personal firewall and Windows update on Computers.

Total Periods: *48*

REFERENCE BOOKS:

ENGINEERING WORKSHOP:

1. V. Ramesh Babu, **"Engineering Workshop practice,"** VRB Publishers Private Limited, 2009.
2. P.Kannaiah and K.L.Narayana, **"Workshop Manual,"** SciTech Publishers, 2009.
3. K. Venkata Reddy, **"Workshop Practice Manual,"** BS Publications, 2008.

IT WORKSHOP:

1. Vikas Gupta, **"Comdex Information Technology Course Tool Kit,"** Second Edition, WILEY Dreamtech, New Delhi, 2006.
2. ITL Education, **"Introduction to Information Technology,"** Second Edition, Pearson Education, New Delhi, 2005.
3. **"IT Workshop Laboratory Manual,"** Department of IT, SVEC, 2014.

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.

II B.Tech. - II Semester
(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;

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.

III B.Tech – I Semester
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

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.

II B.Tech – II Semester

14DT41221: 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 $ax^2 + bx + c = 0$. Reac 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 nor 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 methoc 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 digits 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 irterest 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 with 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:

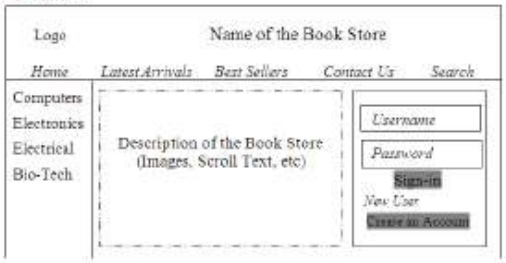
On Successful completion of this course, students will be able to:

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.

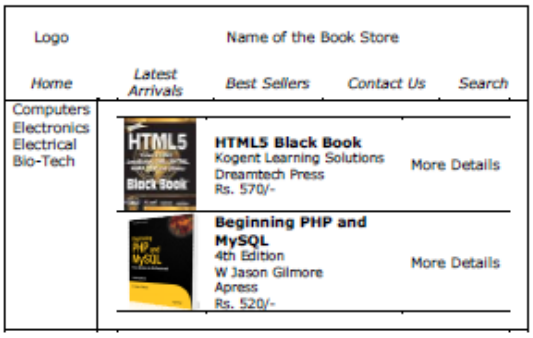
a. Home Page:



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.



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:

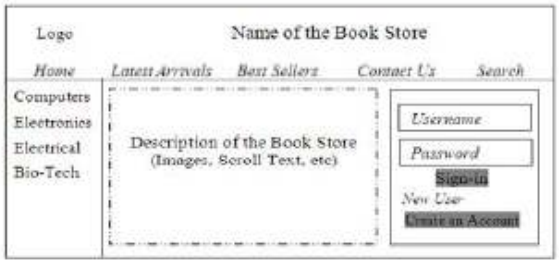
After the successful completion of the course, the student will be able to:

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:



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.

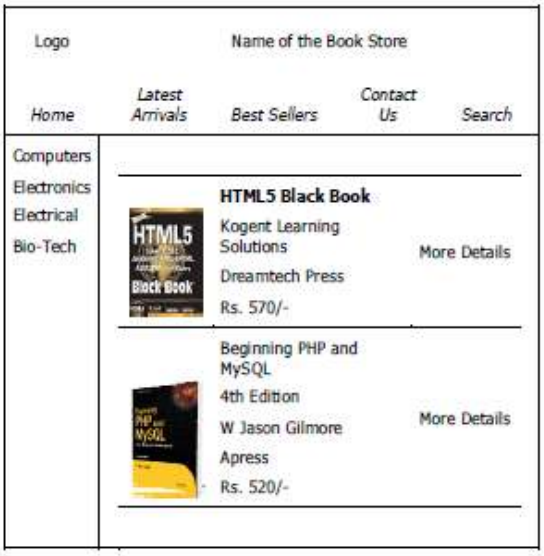
Left frame: At least four links for navigation, which will display the books catalogue relevant to engineering disciplines. For e.g. when the link "Computers" is clicked, the catalogue relevant to computer science books will be displayed in the right frame.

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.



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

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. - I semester

(16BT70402) EMBEDDED SYSTEMS

(Common to EEE, ECE & CSSE)

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.

UNIT - V: HARDWARE SOFTWARE CO-DESIGN AND INTERNET OF THINGS (09 Periods)

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 on Microprocessors 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.

IV B.Tech. - I Semester

(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

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; AcquiringTechnological 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)