Supporting Document for 1.1.2

Syllabus Revision carried out in 2016

Program: B.Tech.- Information Technology

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
16BT21201	Object Oriented Programming through C++	100	4
16BT21231	IT Workshop	50	6
16BT21232	Object Oriented Programming Lab	100	11
16BT41204	Theory of Computation	20	15
16BT41203	Software Engineering	35	17
16BT31231	Java Programming Lab	100	21
16BT51201	Computer Graphics and Multimedia	40	27
16BT51231	CASE Tools and Computer Networks Lab	29	30
16BT51232	Computer Graphics and Multimedia Lab	100	44
16BT51233	Web Technologies Lab	20	45
16BT61201	Cloud Computing	42	52
16BT61203	Advanced Databases	100	56
16BT61231	Cloud Computing Lab	100	58
16BT61232	Knowledge Engineering Lab	100	60
16BT71201	Big Data Technologies	50	62
16BT71207	E-commerce	100	65
16BT71209	Machine Learning	100	67
16BT71508	Internet of Things	100	69
16BT71231	Big Data Technologies Lab	100	71
16BT1HS01	Technical English	20	73
16BT1HS31	English Language Lab	20	77
16BT1BS02	Engineering Physics	20	81
16BT2BS01	Transformation Techniques and Partial Differential Equations	100	87
16BT4HS31	Soft Skills Lab	100	89
16BT6HS05	French Language	100	91
16BT6HS06	German Language	100	93
16BT6HS07	Indian Constitution	100	95
16BT6HS08	Indian Economy	100	97
16BT6HS09	Indian Heritage and Culture	100	99
16BT6HS10	Indian History	100	101
16BT6HS11	Personality Development	100	103

16BT6HS13	Philosophy of Education	100	105
16BT6HS13	Public Administration	100	107
16BT60112	Building Maintenance and Repair	100	109
16BT60115	Environmental Pollution and Control	40	111
16BT50442	Micro Processors and Interfacing	35.5	115
16BT60441	Pattern Recognition	100	119
16BT70402	Embedded Systems	80	121
16BT50502	Linux Programming	26.6	125
16BT60503	Wireless Networks	100	130
16BT60502	Soft Computing	100	133
16BT30503	Python Programming	100	135
16BT60501	Software Testing	73.3	137
16BT31531	Operating Systems Lab	45	142
16BT61501	Data warehousing and Data mining	45	146
16BT60404	Image Processing	30	150
16BT70413	Introduction to Nanoscience and Nanotechnology	100	152
16BT60310	Managing Innovation and Entrepreneurship	50	154
Average		**74.40**	
	Total No. of Courses in the Program	112	
No. of Courses where syllabus (more than 20%) has been changed		48	
Percentage of Syllabus changed in the Program		**31.89**	

DEAN (Academics)

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PRINCIPAL

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

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

PREREQUISITES: A Course on "Programming in C".

COURSE DESCRIPTION:

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

COURSE OUTCOMES:

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

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

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

CO3: Design and develop solutions for given specifications.

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

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

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND FUNDAMENTAL CONCEPTS

(Periods: 10)

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

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

point values, Scope.

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

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

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

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

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

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

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

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

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

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

60

SVEC16 - B.TECH - INFORMATION TECHNOLOGY

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

UNIT-V: COMPOSITION & INHERITANCE, TEMPLATES, ITERATORS & GENERICS AND FILE HANDLING

(Periods: 11)

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

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

C++ File Handling: File I/O

(Total Periods: 55)

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Sourav Sahay, Object Oriented Programming with C++, 2nd
   Edition, Oxford University Press, 2012

5

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.

SVEC16 - B.TECH - INFORMATION TECHNOLOGY

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

9

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.

14

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.

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
14BT41221: OBJECT ORIENTED PROGRAMMING LAB
(Common to CSE, CSSE and IT)

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

PREREQUISITES: A course on "Object Oriented Programming".

COURSE DESCRIPTION: Hands-on Programming using concepts of classes, objects, inheritance, Polymorphism, String API, Exception Handling mechanisms, Threads, Applets, AWT, Swings and Database Connectivity using JDBC and Servlets.

COURSE OBJECTIVES:

CEO1. To develop problem solving skills through Object Oriented concepts.

CEO2. To develop design and implementation skills for Graphical User Interface based Systems.

CEO3. To apply advanced java programming for development of interactive applications.

COURSE OUTCOMES:

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

1. Design and develop real time applications using applets. (PO3)
2. Demonstrate problem solving skills using classes, objects, inheritance, runtime polymorphism, AWT and Servlets to develop web/interactive applications. (PO4)

List of Programming Exercises

1:

a) Write a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

b) The Fibonacci sequence is defined by the following rule: The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.

2:

a) Write a Java program to find the average and sum of 1st N numbers using command line arguments

b) Write a Java program to multiply two given matrices.

c) Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers (Use StringTokenizer class of java.util)

3:

a) Write a java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes containsonly the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

b) Write a java program to design a class using the inheritance and static that show all function of bank (withdrawl, deposit) and generate account number dynamically.

c) Write a java program to design(Implement runtime polymorphism) using abstract methods and classes

4:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java program to make frequency count of words in a given text.

5:

a) Write a java program that import the Userdefine package and access the member variable of classes that contained by the package

b) Write a java program to handle ArithmeticException, ArrayIndexOutOfBoundsException using try and multiple catch statements

c) Write a java program to throw a user defined exception called Negative, if the entered input is a negative number and to handle the exception.

6:

a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named - Compute is clicked.

7:

a) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the 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 ata time No light is on when the program starts.

c) Write a Java program that allows the user to draw lines, rectangles and ovals.

10:

a) Write an applet that computes the payment of a loan, by taking the amount of the loan, the interest rate and the number of month's values in the text fields. it takes one parameter from the browser: monthly rate as a checkbox ,if it is true, the interest is calculated per month otherwise the interest is calculated per annual.

b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

11: Create a table which should contain at least the following fields: name, password, email-id, phone number. Write a java program to connect to the database (Ex: MS-Access) and extract data from the tables and display them

12:Assume four users user1, user2, user3 and user4 having passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following.

1) Create a Cookie and add these four user ids and passwords to this Cookie, read user id and password entered in the login form.

2) If he is valid user (i.e., user-name and password match) welcome him with his name, else display "You are not an authorized user".

TEXT BOOKS:

1. Herbert Schildt, "The complete reference Java," TMH, 7th edition, 2007.

2. Timothy Budd, Understanding Object-oriented Programming 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
(16BT51201) COMPUTER GRAPHICS AND MULTIMEDIA

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

PRE-REQUISITES: A course on "Matrices and Numerical Methods".

COURSE DESCRIPTION: Introduction to Computer Graphics, Output Primitives; 2D Geometric Transformations and Viewing; 3D object representation and Visible Surface Detection Methods; Introduction to Multimedia, Audio and Video; Multimedia Data Compression.

COURSE OUTCOMES:

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

CO1.   Demonstrate knowledge on:
- Graphical interactive devices
- Viewing transformations
- 3-D object representations
- Surface detection methods
- Image, audio, video representations and standards.

CO2.   Analyze multimedia compression issues using image, audio and video compression techniques.

CO3.   Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

CO4.   Apply Transformations and Clipping algorithms for 2-D and 3-D objects, various lossy / lossless coding techniques on text and images for compression and decompression.

CO5.   Build multimedia applications for societal requirements.

UNIT -I: INTRODUCTION TO GRAPHICS AND OUTPUT PRIMITIVES   (9 Periods)

Introduction: Raster-Scan systems, Random Scan systems, Graphics monitors, Work stations and Input devices.

Output Primitives: Points and Lines, Line Drawing algorithms, Mid-point Circle and Ellipse algorithms.

Filled area primitives: Scan Line Polygon Fill algorithm, Boundary-fill algorithms and Flood-Fill algorithms.

UNIT -II: 2-D GEOMETRICAL TRANSFORMS AND 2-D VIEWING
(9 Periods)

2-D Transforms: Translation, Scaling, Rotation, Reflection and Shear transformations, Homogeneous coordinates, Composite Transforms, Transformations between coordinate systems.

2-D Viewing: The Viewing Pipeline, Viewing coordinate reference frame, Window to View-Port coordinate Transformation, Cohen-Sutherland line clipping algorithms.

UNIT -III: 3-D OBJECT REPRESENTATION AND VISIBLE SURFACE DETECTION METHODS   (9 Periods)

3-D Object representation: Polygon Surfaces, Quadric surfaces, Spline Representation, Hermite Curve, Bezier Curve and B-Spline Curves, Bezier and B-Spline Surfaces.

Visible Surface Detection Methods: Classification, Back-Face detection, Depth-Buffer, Scan-Line, Depth Sorting, BSP-Tree methods, Area Sub-Division and Octree methods.

UNIT-IV: INTRODUCTION TO MULTIMEDIA, AUDIO AND VIDEO   (9 Periods)

Introduction: Definition of Multimedia, Multimedia and Hypermedia, Multimedia Software tools, Graphics and Image Data representations-Graphics and Image Data types, File Formats, Color models in images, Color models in video.

Audio and Video: Definition of sound, Digitization, Nyquist Theorem, Signal to Noise ratio, Signal to Quantization-Noise ratio; Types of video signals, Analog video, Digital video.

UNIT-V: MULTIMEDIA DATA COMPRESSION   (9 Periods)

Lossless compression algorithms- Introduction, Basics of Information Theory, Run Length Coding, Variable Length coding, Dictionary Based coding, Arithmetic coding; Lossy Compression algorithms- Quantization; Introduction to Transform Coding-DCT, DFT; Image compression techniques-JPEG standard, JPEG 2000; Introduction to video compression- Video compression based on Motion Compensation, MPEG-1, MPEG-2.

Total Periods: 45

TEXT BOOKS:

1. Donald Hearn and M. Pauline Baker, Computer *Graphics C version,* Pearson Education, Second Edition, 2006.

2. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia,* Pearson Education, Second Edition, 2008.

REFERENCE BOOKS:

1. James D. Foley, Andries van Dam, Steven K. Feiner and John F. Hughes, *Computer Graphics: Principles and Practice in C,* Addison Wesley Professional, Second Edition, 2013.

2. Nigel Chapman and Jenny Chapman, *Digital Multimedia,* Wiley Dreamtech, Second Edition, 2004.

IV B.Tech. I Semester

14BT41501: COMPUTER GRAPHICS

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

PREREQUISITES: A Course on "Engineering Mathematics", "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Introduction to Computer Graphics; Output Primitives; 2-D Geometric Transformations and Viewing; 3-D Geometric Transformations and Viewing; 3-D object representation; and Visible Surface Detection Methods.

COURSE OUTCOMES:

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

1. Gain knowledge on graphical interactive devices, viewing transformations, 3-D object representations, surface detection methods.

2. Design algorithms to generate points, lines, polygons for 2-D, 3-D objects.

3. Apply Transformations and Clipping algorithms for 2-D and 3-D objects.

Detailed Syllabus:

UNIT - I: INTRODUCTION AND OUTPUT PRIMITIVES (10 periods)
Raster-scan systems, Random scan systems, Graphics monitors and work stations and input devices.

Output Primitives: Points and lines, Line drawing algorithms, Mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, Boundary-fill and flood-fill algorithms.

UNIT - II: 2-D GEOMETRICAL TRANSFORMS AND 2-D VIEWING (10 periods)
Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, Viewing coordinate reference frame, Window to view-port coordinate transformation, Viewing functions, Cohen-Sutherland line clipping algorithms, Sutherland -Hodgeman polygon clipping algorithm.

UNIT - III: 3-D OBJECT REPRESENTATION (08 periods)
Polygon surfaces, Quadric surfaces, Spline representation, Hermite curve,

Bezier curve and B-Spline curves, Bezier and B-Spline surfaces.

UNIT - IV: 3-D GEOMETRIC TRANSFORMATIONS (08 periods)
Translation, Rotation, Scaling, Reflection and shear transformations, Composite transformations.

3-D Viewing: Viewing pipeline, Viewing coordinates, Projections and clipping.

UNIT - V: VISIBLE SURFACE DETECTION METHODS (09 periods)
Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods, Shading: Gouraud Shading, Phong shading.

Total Periods: 45

TEXT BOOK:

1. Donald Hearn and M. Pauline Baker, **"Computer Graphics C version,"** Pearson Education, 2006.

REFERENCE BOOKS:

1. Steven Harrington, **"Computer Graphics,"** TMH, 1982.

2. Neuman and Sproul, **"Principles of Interactive Computer Graphics,"** TMH, 2005.

III B.Tech. - I Semester

(16BT51231) CASE TOOLS AND COMPUTER NETWORKS LAB

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

PRE-REQUISITES: Courses on "Object Oriented Analysis and Design", "Computer Networks" and "Java Programming".

COURSE DESCRIPTION: Modeling case studies -Online Ticket Reservation system; Point of sales; Hands-on Experience on data link Framing methods; CRC; Routing algorithms; Congestion Control Algorithms; Substitution Techniques and Network Simulation using NS-2.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on:
- UML architecture
- Routing algorithms
- Error detection and correction techniques.

CO2. Analyze real world problems and study the applicability of UML design.

CO3. Apply Unified Modeling Language to design software and design routing algorithms Shortest path using Dijkstra's, and Distance vector.

CO4. Demonstrate independent problem solving skills in designing and developing software solutions.

CO5. Use NS-2 tool for simulating computer network processes.

CO6. Build network models and UML models suitable 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:

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.

1. Case Study : 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.

2. Case Study : 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.

3. Case Study : 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. Meanwhile HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

4. Case Study : 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.

5. Case Study : Two Floor Elevator Simulator

Problem Statement:

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

and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

6. Case Study : 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.
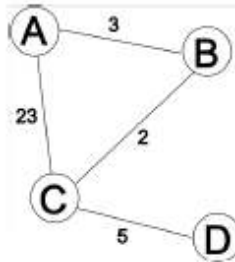
7. **Implement the following data link layer framing methods:**

a. Character Count.

b. Character stuffing.

c. Bit stuffing.

8. Design a program to compute checksum for the given frame

1101011011 with the generator Polynomial of CRC 12, CRC 16 and CRC CCIP. Display the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end.

9. Implement Dijkstra's algorithm to compute the Shortest path through the following graph.
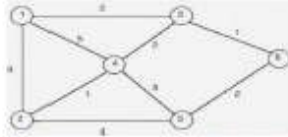
10. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.

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., 2003.

3. Andrew S.Tanenbaum and David J.Wetherall, *Computer Networks,* Pearson Education, Fifth Edition, 2012.

4. Behrouz A. Forouzan, *Data communication and Networking,* Tata McGraw-Hill, Fourth Edition, 2006.

III B.Tech. I Semester

14BT51221: UNIX & COMPUTER NETWORKS LAB

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

PREREQUISITES: A course on "Unix Internals", "Computer Networks", "Object Oriented Programming" and "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on Experience on Unix Commands; Shell Scripting; IPC; Sockets; data link Framing methods; CRC; Routing algorithms; Congestion Control Algorithms; Substitution Techniques.

COURSE OUTCOMES:

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

1. Demonstrate analysis skills on:
   a. Framing mechanisms for data link layer
   b. CRC
   c. Unix utilities and shell scripting
2. Simulate routing algorithms:
   a. Shortest path using Dijkstra's
   b. Distance vector
3. Apply IPC techniques in Unix Environment to establish communication among the processes.

List of Experiments:

PART-A: UNIX INTERNALS

1. Create two files source.txt and dest.txt using vi editor which contains some text and practice the following commands on that files cat, tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, cp, mv, ln, rm, unlink.

2. a) Write a shell script that takes a command line argument and reports on whether it is directory, a file, or something else.

   b) Write a shell script that accepts one or more file names as arguments and converts all of them to uppercase, provided they exist in the current directory.

3. a) Simulate Uniq command using C.

   b) Simulate grep command using C.

4. a) Write a Program to handle the Signals like SIGINT, SIGQUIT, and SIGFPE.

   b) Write a Program to create a Zombie Process.

   c) Create a Process using fork() and display Child and Parent Process Id's.

5. Implement the Following IPC Forms:
    a) FIFO.
    b) PIPE.
6. Write a program to:
    a) Create the semaphore.
    b) Set values to semaphores.
    c) Get the values from the semaphore.
    d) Remove semaphore.
7. a) Implement file transfer using Message Queue form of IPC.

    b) Write a program to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions.
8. Perform Socket Programming using:
    a) UDP socket.
    b) TCP socket.

PART-B: COMPUTER NETWORKS

1. Implement the following data link layer framing methods:
a. Character Count.
b. Character stuffing.
c. Bit stuffing.
2. Design a program to compute checksum for the given frame 1101011011 with the generator Polynomial of CRC 12, CRC 16 and CRC CCIP. Display the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receivers end.
3. Implement Dijkstra 's algorithm to compute the Shortest path through the following graph.
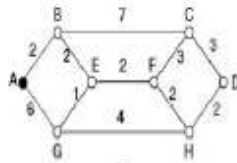
4. Design a program to obtain routing table for each node using distance vector routing algorithm by considering the given subnet with weights indicating delay between nodes.
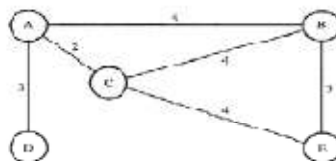
5. Simulate Random Early Detection congestion control algorithm.
6. Encrypt the message "COMPUTER NETWORKS LAB" using Caesar cipher with a key of 20. Ignore the space between words. Decrypt the message to get the original plain text.

REFERENCE BOOKS:

1. B.A. Forouzan and R.F. Giberg, Thomson, **"Unix and shell Programming -A text book,"** Pearson Education, 2009.
2. Andrew S. Tanenbaum and David J. Wetherall, **"Computer Networks,"** Pearson Education, Fifth Edition. 2012.
3. Richard Stevens, **"Advance UNIX Programming in the UNIX Environment,"** Pearson Education, Second Edition, 2005.
4. Behrouz A. Forouzan, **"Data communication and Networking,"** Tata McGraw-Hill, Fourth Edition, 2006.

36

III B.Tech. II Semester
14BT61221: OOAD AND DATA MINING LAB

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

PART-A: OOAD

PREREQUISITES: 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 the successful completion of the course, the student will be able to:
1. Apply Unified Modeling Language to design software system.
2. Analyze the static and dynamic aspects of software system.
3. Model the design for given set of requirements.
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.

List of Experiments:

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

successful completion of all rounds of interview, the selected candidates names are displayed. Mean while HR gives all the details about the salary, working hours, terms and conditions and the retirement benefit to the candidate.

CASE STUDY 6: ONLINE AUCTION SALES

Problem Statement:

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

CASE STUDY 7: TWO FLOOR ELEVATOR SIMULATOR

The elevator has the basic function that all elevator systems have, such as moving up and down, open and close doors, and of course, pick up passengers. The elevator is supposed to be used in a building having floors numbered from 1 to MaxFloor, where the first floor is the lobby. There are car call buttons in the car corresponding to each floor. For every floor except for the top floor and the lobby, there are two hall call buttons for the passengers to call for going up and down. There is only one down hall call button at the top floor and one up hall call button in the lobby. When the car stops at a floor, the doors are opened and the car lantern indicating the current direction the car is going is illuminated so that the passengers can get to know the current moving direction of the car. The car moves fast between floors, but it should be able to slow down early enough to stop at a desired floor. When an elevator has no requests, it remains at its current floor with its doors closed.

In order to certificate system safety, emergency brake will be triggered and the car will be forced to stop under any unsafe conditions.

CASE STUDY 8: HOME APPLIANCE CONTROL SYSTEM

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

PART-B: DATA MINING

PREREQUISITES: Courses on "Database Management Systems Lab and Data warehousing and data mining".

COURSE DESCRIPTION: Hands-on experience on Data preprocessing techniques; Mining frequent patterns; classification and clustering techniques using R and Weka open source machine learning tools.

COURSE OUTCOMES:

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

1. Analyze and predict the information for forecasting applications.
2. Identify and design suitable algorithms to mine knowledge from real-time databases.
3. Apply Weka and R tools to extract interesting patterns from large databases.

List of Experiments:

I. 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.

II. Experiments on R 2.15.1:

13. Create an EMP Dataset in R environment and perform the following functions

i. Display the EMP dataset with all rows and columns

ii. Edit the dataset and perform few manipulations and display the updated dataset

iii. Perform Data Exploration functions on EMP Dataset.

iv. Generate various visualizations such as Plot, Scatter plot matrix etc.

REFERENCE BOOKS:

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

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, **"UML 2 Toolkit,"** WILEY-Dreamtech India Pvt. Ltd., 2003.

3. Meilir Page-Jones, **"Fundamentals of Object Oriented Design in UML,"** Pearson Education, 2000.

4. Pascal Roques, **"Modeling Software Systems Using UML2,"** WILEY-Dreamtech India Pvt. Ltd, 2004.

5. Craig Larman, **"An introduction to Object - Oriented Analysis and Design and Unified Process Applying UML and Patterns,"** Pearson Education, 2002.

6. Ian. H. Witton and Eibe Frank **"Data Mining: Practical Machine Learning Tools and techniques,"** Second Edition, Elsevier Publication, 2005.

7. Joseph Adler, **"R in a Nutshell,"** First Edition, O'Reily Publishers, 2010.

III B.Tech. - I Semester
(16BT51232) COMPUTER GRAPHICS AND MULTIMEDIA LAB

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

PRE-REQUISITES: Courses on "Computer Graphics and Multimedia" and "Java Programming".

COURSE DESCRIPTION: Hands on experience in developing graphics, Animating Flash Movies and Developing Applications using a Flash Tool.

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

CO1. Demonstrate knowledge on creation of 2D, 3D objects and compression techniques.

CO2. Analyze real world problems and identify solutions based on computer graphics and multimedia concepts.

CO3. Design and develop various algorithms for graphics, user authoring applications and animation movies.

CO4. Demonstrate independent problem solving in developing multimedia applications.

CO5. Apply various programming principles to implement graphics and to animate interactive flash movies for presenting multimedia content.

CO6. Build multimedia applications suitable for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

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

LIST OF EXERCISES:

1. Write a program for the implementation of Bresenham's line drawing algorithm.

2. Write a program to implement Bresenham's circle drawing algorithm.

3. Write a program to implement Bresenham's ellipse drawing algorithm.

4. Write a program to implement DDA line drawing algorithm.

5. Write a program to implement 2D Transformation.

6. Write a program to implement Window Viewport Mapping.

7. Write a program to implement Cohen-Sutherland 2D Clipping.

8. Write a program to convert between color models.

9. Write a program to implement text compression algorithm

10. Write a program to implement image compression algorithm

11. Case study1: Create an animation using flash tool.

12. Case study2: Apply basic operations on image using Adobe Photoshop.

Note: 1 to 10 programs can be implemented using C

REFERENCE BOOKS:

1. Herbert Schildt, *Java the complete reference*, TMH, Seventh Edition, 2007.

2. Macromedia Flash8 tutorial, http://www.teacherclick.com/flash8.

3. Donald Hearn and M. Pauline Baker, *Computer Graphics C version*, Prentice-Hall, Second Edition, 2006.

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:

45

b. Catalogue Page:

The catalogue page should display the following details of available books.

    i. Snap shot of cover page   ii. Title of the text book
    iii. Author name   iv. Publisher
    v. Price   vi. More details link.

Logo		Name of the Book Store		
Home	Latest Arrivals	Best Sellers	Contact Us	Search
Computers Electronics Electrical Bio-Tech	HTML5 Black Book	**HTML5 Black Book** Kogent Learning Solutions Dreamtech Press Rs. 570/-	More Details	
	PHP and MySQL	**Beginning PHP and MySQL** 4th Edition W Jason Gilmore Apress Rs. 520/-	More Details	

c. Registration Page:

Design the Registration page with the following fields and navigate it with create an account link.

    i. First Name   ii. Last Name
    iii. Gender   iv. Date of Birth
    v. Username   vi. Password
    vii. Confirm Password   viii. Address
    ix. Postal Code   x. Mobile No.
    xi. Email-Id

2. a. Design a web page to store username and password information using the local storage concept.

   b. Design a web page to store employee information including Name, Emp. Id, Department, Salary and Address on a client's machine using a real SQL database.

3. Apply the following styles to all web pages of online book store web application.

   a. Fonts and Styles: font-family, font-style, font-weight and font-size.

   b. Backgrounds and colors: color, background-color, background-image and background-repeat.

c. Text: text-decoration, text-transformation, text-align and text-indentation, text-align

d. Borders: border, border-width, border-color and border-style

e. Styles for links: A: link, A: visited, A:active, A:hover

f. Selectors, Classes, Layers and Positioning elements.

4. Write a JavaScript/JQuery code to validate the following fields of the Registration web page.

a. First Name/Last Name - should contain only alphabets and the length should not be less than 8 characters.

b. Username - It should contain combination of alphabets, numbers and underscore. It should not allow spaces and special symbols.

c. Password - It should not less than 8 characters in length and it contains one uppercase letter and one special symbol.

d. Date of Birth - It should allow only valid date; otherwise display a message stating that entered date is invalid. Ex. 29 Feb. 2009 is an invalid date.

e. Postal Code: It must allow only 6 digit valid number.

f. Mobile No. - It should allow only numbers and total number of digits should be equal to 10.

g. e-mail id - It should allow the mail id with the following format: Ex. mailid@domainname.com

5. Design a web page with the following features using HTML5, JavaScript and JQuery

a. Displaying of images with Custom animated effects

b. Playing of selected video from the list of videos

c. Showing the animated text in increasing and decreasing font size

d. Changing the size of the area in a web page using DIV tag

e. Hiding and Showing elements in a web page.

6. Design a web page with the following features using Bootstrap and Media Query.

a. Components

b. Responsive tables

c. Responsive images and videos

7. a. Deploy and navigate web pages of online book store using WAMP/XAMPP web server.

   b. Write a PHP program to read user name and favorite color from the HTML form. Display the name of the user in green color and sets user favorite color as a background for the web page.

8. Write a PHP code to read the username and password entered in the Login form of the online book store and authenticate with the values available in cookies. If user enters a valid username and password, welcome the user by username otherwise display a message stating that, entered details are invalid.

9. Write a PHP code to read user details entered through the registration web page and store the same into MySQL database.

10. Write a PHP code for storing books details like Name of the book, author, publisher, edition, price, etc into MySQL database. Embed a PHP code in catalogue page of the online book store to extract books details from the database.

11. a. Mini Project - 1: Design a web application for selling products online with the following features.

Mobile website option - The online store should be built on a responsive design template and its features need to be available to all users, at any time, from anywhere and in any device.

Image options - The photos should also be taken from different points of view to give you a clearer idea of the product. Image options should include viewing angles, zoom, multiple images, and more.

Detailed product description - The description should often include the important details, such as the expiration date, size dimensions, weight, manufacturers date, and practical uses must be included in a good product description.

Order Tracking - The customers should be able to track their ordered products by logging into an account created upon registration.

Payment Options - An online website should allow credit card/ debit card/net banking for payment.

   b. Mini Project - 2: Design a social website with the following features

Build Profile - Members allow to build their profiles.

Upload content - The Social Networking Sites allow members to upload text messages, photographs, audio and video files. All posts are arranged in descending order with the last post coming first.

Build conversations - Content posted by members can be browsed and commented upon by all members who form part of the community. Content can also be tagged from third party sites on subjects that interest the group.

REFERENCE BOOKS:

1. Kogent Learning Solutions Inc, *HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery,* Dreamtech Press, Second Edition, 2016.

2. W. Jason Gilmore, *Beginning PHP and MySQL,* APress, Fourth Edition, 2011.

3. Snig Bahumik, *Bootstrap Essentials,* PACKT Publishing, 2015. (e-book).

III B.Tech. II Semester
14BT61222: **WEB PROGRAMMING LAB**
(Common to CSE and IT)

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

PREREQUISITES: Courses on "Problem Solving and Computer Programming".

COURSE DESCRIPTION: Hands-on experience on HTML; HTML5; CSS; JavaScript; JQuery; PHP; MySQL; XML and AJAX.

COURSE OUTCOMES:
After the successful completion of the course, the student will be able to:
1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript, JQuery, XML, AJAX, PHP and MySQL.
2. Apply client-server principles to develop scalable and enterprise web applications.

List of Experiments:
1. Design the following static web pages required for an online book store web site.

A. Home Page:

Logo	Name of the Book Store			
Home	Latest Arrivals Best Sellers	Contact Us	Search	

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.

Logo		Name of the Book Store		
Home	Latest Arrivals	Best Sellers	Contact Us	Search
Computers				
Electronics		**HTML5 Black Book**		
Electrical		Kogent Learning Solutions		More Details
Bio-Tech		Dreamtech Press		
		Rs. 570/-		
		Beginning PHP and MySQL		
		4th Edition		More Details
		W Jason Gilmore		
		Apress		
		Rs. 520/-		

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. II Semester
14BT81201: CLOUD COMPUTING
(Common to CSE, CSSE and IT)

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

PREREQUISITES: Courses on "Computer Networks" and "Operating Systems"

COURSE DESCRIPTION: Cloud computing fundamentals; cloud computing architecture; cloud computing mechanisms; cloud security; working with clouds, virtualization and case studies.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:
1. Demonstrate knowledge on services, architecture, types of infrastructural models, Disaster Recovery and Virtualization.
2. Analyze the issues in cloud computing.

Detailed Syllabus:

UNIT - I: FUNDAMENTAL CLOUD COMPUTING   (09 periods)

Understanding Cloud Computing: Origins and Influences, Basic Concepts and Terminology, Goals and Benefits, Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries, Cloud Characteristics, Cloud Delivery Models, Cloud Deployment Models.

UNIT - II: CLOUD COMPUTING MECHANISMS AND ARCHITECTURE
(09 periods)

Cloud-Enabling Technology: Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.

Fundamental Cloud Architectures: Architecture - Workload Distribution, Resource Pooling, Dynamic Scalability, Elastic Resource Capacity, Service Load Balancing, Cloud Bursting, Elastic Disk Provisioning, Redundant Storage.

UNIT - III: CLOUD COMPUTING ADVANCED ARCHITECTURES
(10 periods)

Advanced Cloud Architectures: Architecture-Hypervisor Clustering, Load Balanced Virtual Server Instances, Non-Disruptive Service Relocation, Zero Downtime, Cloud Balancing, Resource Reservation, Dynamic Failure Detection and Recovery, Bare-Metal Provisioning, Rapid rovisioning,

54

storage Workload Management.

Specialized Cloud Architectures: Architecture - Direct I/O Access, Direct LUN Access, Dynamic Data Normalization, Elastic Network Capacity, Cross-Storage Device Vertical Tiering, Intra-Storage Device Vertical Data Tiering, Load Balanced Virtual Switches, Multipath Resource Access, Persistent Virtual Network Configuration, Redundant Physical Connection for Virtual Servers, Storage Maintenance Window.

UNIT - IV: WORKING WITH CLOUDS   (09 periods)

Cloud Delivery Model Considerations: Cloud Delivery Models - The Cloud Provider, Cloud Delivery Models - The Cloud Consumer, Case Study Example.

Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations.

UNIT - V: INTRODUCTION TO VIRTUALIZATION   (08 periods)

History of Virtualization, Objectives of virtualization, Benefits of Virtualized Technology, VMware, Microsoft Hyper-V and Ubuntu.

Total Periods: 45

TEXT BOOKS:

1. Thomas Erl and RicardoPuttini **"Cloud Computing- Concepts, Technology and Architecture,"** Pearson, First Edition 2013.

2. Ivanka Menken, **"Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book,"** First Edition, 2009.

REFERENCE BOOKS:

1. Barrie Sosinsky, **"Cloud Computing Bible,"** Wiley India Pvt Ltd, First Edition, 2011.

2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, **"Cloud computing principles and paradigms,"** John Wiley and Sons, 2011.

3. John W. Rittinghouse, James F. Ransome, **"Cloud Computing implementation, Management and Security,"** CRC Press, Taylor & Francis group, First Edition 2010.

55

III B.Tech. - II Semester
(16BT61203) ADVANCED DATABASES
(Program Elective - 1)

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

PRE-REQUISITES: Courses on "Database Management Systems" and "Computer Networks".

COURSE DESCRIPTION: Parallel Databases; Object based Databases; Distributed Databases; Distributed Transaction Management; Emerging Database Technologies and Applications.

COURSE OUTCOMES:

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

CO1. Demonstrate knowledge on:
- Parallel databases.
- Object based and Object Relational databases.
- Distributed databases, horizontal and vertical data fragmentations.
- Mobile databases, Geographic Information Systems, Genome Data Management, Multimedia Database and NoSQL.

CO2. Demonstrate skills in Query optimization, Data Fragmentation, Transaction Management and Concurrency Control for Distributed Transactions.

CO3. Design Parallel, Object-Oriented, Object-Relational and NoSQL databases.

CO4. Solve Concurrency Problems in Distributed Transactions.

CO5. Use database techniques for Mobile, Geographic Information Systems, Genome Data Management, and Multimedia Data.

CO6. Create databases as per societal needs.

DETAILED SYLLABUS:

UNIT-I: PARALLEL DATABASES   **(9 Periods)**

Introduction, I/O Parallelism, Inter query parallelism, Intra query parallelism, Intra operation parallelism, Interoperation parallelism,

Query optimization, Design of parallel systems, Parallelism on multi-core processors.

UNIT-II: OBJECT-BASED DATABASES　　　(9 Periods)

Overview, Complex data types, Structured types and inheritance in SQL, Table inheritance, Array and multi set types in SQL, Object-identity and reference types in SQL, Implementing O-R features, Persistent programming languages, Object-Relational mapping, Object-Oriented versus Object-Relational.

UNIT-III: DISTRIBUTED DATABASES　　　(9 Periods)

Features of distributed versus centralized databases, Reference architecture for distributed databases, Types of data fragmentation, Integrity constraints in distributed databases, Distributed database design.

UNIT-IV: DISTRIBUTED TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL　　　(9 Periods)

Distributed Transaction Management: Framework for transaction management, Supporting atomicity of distributed transactions, Concurrency control for distributed transactions, Architectural aspects of distributed transactions; Concurrency Control: Foundation of distributed concurrency control, Distributed deadlocks, Concurrency control Based on timestamps.

UNIT-V: EMERGING DATABASE TECHNOLOGIES AND APPLICATION　　　(9 Periods)

Mobile database, Geographic information systems, Genome data management, Multimedia database; NoSQL-An overview of NoSQL, Characteristics of NoSQL, NoSQL storage types.

Total Periods: 45

TEXT BOOKS:

1. A. Silberschatz, H. F. Korth and S. Sudarshan, *Database System Concepts*, Tata McGraw hill, Sixth Edition, 2010.

2. Stefand Ceri and Giuseppe Pelagatti, *Distributed Databases Principles and Systems*, McGraw hill, 2008.

III B.Tech. - II semester
(16BT61231) CLOUD COMPUTING LAB

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

PRE-REQUISITES: A course on "Cloud Computing".

COURSE DESCRIPTION: Hands-on experience on creating virtual machines on Windows and Linux platforms; Development of service based web applications and their deployment.

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

CO1. Demonstrate hands-on experience on Virtualization models and Cloud Environment.

CO2. Analyze the given experiment and relate to existing cloud architectures.

CO3. Apply API development skills in web applications for cloud deployment.

CO4. Demonstrate independent problem solving skills in developing dynamic web applications.

CO5. Use advanced programming languages to access cloud services.

CO6. Build suitable cloud environment for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

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

LIST OF EXPERIMENTS:

1. Create VM's with given set of configuration on Hyper-V Ubuntu 14LTs files with 2GB RAM and 200GB Hard Disk through Infrastructure Services (IaaS).

2. Create Virtualization on VMware Windows 7 OS with 4GB RAM and 500GB Hard Disk" through Infrastructure as a Service (IaaS).

3. Develop a simple web application for student details and operative using Salesforce.com in Cloud Platform under Software as Service (SaaS).

4. Develop a simple web application for personal Homepage, Attributes, Controllers, GUI, Visual Page, Forms, and Templates under Software as Service (SaaS).

5. Develop a web application for performing calculator operations. Deploy this application on Salesforce.com Cloud Platform under Software as Service (SaaS).

6. Develop a web application on IBM Bluemix Cloud Platform for executing application using Eclipse under Platform as a Service.

7. Create virtual machine instance with given set of configuration on Amazon web Services (AWS) under Infrastructure as a Service (IaaS).

8. Create virtual machine instance with set of configuration on Amazon S3 (Simple Storage Service) in Amazon Web Service (AWS) under Infrastructure as a Service (IaaS).

9. Develop a web application on IBM Bluemix Cloud Platform for implementing IoT application.

10. Develop a calculator web based application on MS-Azure Platform i.e. Platform as a Service (PaaS).

11. Develop a student home page web based application on MS-Azure Platform i.e. Platform as a Service (PaaS) Cloud.

12. Develop a mobile app on Google App Engine for uploading a resume into a website, collaborated with Drop box. The resume should be encrypted. (PaaS)

13. Develop a service call to run on Drop box resumes for picking the resumes of given skill set. (PaaS)

i. 6+ years of Exp in Java Development.

ii. 10 years of experience in Automation Testing.

iii. 15+ years of Managerial experience with technical background.

iv. 5-7 years of on-site experience in .NET support and programming.

REFERENCE BOOKS:

1. Barrie Sosinsky, *Cloud Computing Bible*, Wiley India Pvt Ltd, 2011.

2. Rajkumar Buyya, James Broberg and Andrzej Goscinski, *Cloud computing principles and paradigms*, John Wiley and Sons, 2011.

3. Thomas Erl and RicardoPuttini, *Cloud Computing-Concepts*, Technology and Architecture, Pearson, 2013.

4. John W. Rittinghouse and James F. Ransome, Cloud *Computing implementation, Management and Security*, CRC Press, Taylor and Francis group, 2010.

III B.Tech. - II semester
(16BT61232) KNOWLEDGE ENGINEERING LAB

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

PRE-REQUISITES: A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Hands-on experience on Data preprocessing techniques; Mining frequent patterns; classification and clustering techniques using Weka and R Studio tools.

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

CO1. Demonstrate knowledge on: preprocessing techniques, Descriptive and predictive mining tasks.

CO2. Identify suitable algorithms to mine knowledge from real-time databases.

CO3. Classify and predict the information for forecasting applications.

CO4. Demonstrate independent decision making skills for business analysis applications.

CO5. Apply Weka and R tools to extract interesting patterns from large databases.

CO6. Prepare analytical reports suitable for societal requirements.

CO7. Work effectively as an individual and member of a team to implement mini-project.

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

LIST OF EXPERIMENTS:

I. Experiments on Weka:

1. Create a dataset using ARFF and CSV formats and load into the Weka Explorer.

2. Perform the following preprocessing filters on 'Weather' dataset.
    (i) Add   (ii) Remove   (iii) Discretize
    (iv) Replace Missing values   (v) Normalize

3. List all the categorical attributes and the real-valued attributes separately in 'German credit' data set.
4. Generate strong Association rules by using Apriori algorithm on 'German_credit' dataset with Min_Sup=60% and Min_Conf=80%.
5. (i) Implement the Classification using Decision Tree algorithm on 'Weather' dataset.
   Draw the confusion matrix and report the model with accuracy.
   (ii) Implement Bayesian Classification and analyze the results on 'iris' Dataset.
6. (i) Implement Simple Linear Regression on an 'Employee' dataset.
   (ii) Demonstrate the simple k-Means clustering algorithm on 'iris' dataset.
7. (i) Rank the performance of j48, PART and oneR Algorithms on 'Weather' dataset using Experimenter.
   (ii) Perform an experiment using 'Knowledge Flow' in Weka 3.8.1 tool.

II. Experiments using R Studio

8. Create an EMP Dataset in R studio and perform the following functions
(i) Display the EMP dataset with all rows and columns
(ii) Perform few manipulations and display the updated dataset
9. Perform an exploratory data analysis using R Studio.
10. (i) Perform Association rule mining by using Apriori Algorithm on Sales Dataset.
    (ii) Train the Decision Tree on 'Weather' Dataset and report the Decision Tree and
    cross-validation results. Convert the Decision Trees into "if-then-else rules".
11. Implement simple linear regression using R Studio.
12. Mini-project: Implement all data mining functionalities on the following real datasets after performing data preprocessing filters.
    (i) Supermarket   (ii) Weather   (iii) Airlines
    (iv) Breast Cancer   (v) Forest fires

REFERENCE BOOKS:

1. Ian. H. Witten and Eibe Frank, *Data Mining: Practical Machine Learning Tools and Techniques,* Elsevier Publication, Second Edition, 2005.

2. Joseph Adler, *R in a Nutshell,* O'Reily Publishers, 2010.

3. Pang-Ning Tan, Vipin Kumar and Michael Steinbach, *Introduction to Data Mining,* Pearson Education, 2006.

4. Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques,* Morgan Kaufmann Publishers, Second Edition, 2006.

IV B.Tech. - I semester
(16BT71201) BIG DATA TECHNOLOGIES

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

PRE-REQUISITES: A course on "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Hadoop; Hadoop Distributed File Systems; Hadoop I/O; MapReduce; Hive; Pig; HBase; Zookeeper; Sqoop and Case studies.

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

CO1. Demonstrate knowledge on Big Data characteristics, storage, processing, querying and reporting.

CO2. Analyze large dataset issues and solve using data analytic techniques.

CO3. Design and Develop classification and clustering models for dataset analysis.

CO4. Use research knowledge to manage large datasets.

CO5. Apply MapReduce, Hive, Pig, Sqoop, HBase, and Zookeeper tools for data analytics.

CO6. Use data analytics tools to solve societal problems.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION TO BIG DATA AND HADOOP
(9 Periods)

Introduction to Big Data: Evolution and definition of Big Data, Structure of Big Data, Characteristics, Advantages, Applications and Tools.

Hadoop: Data storage and analysis, Comparison with other systems, History of Hadoop, Apache Hadoop and the Hadoop ecosystem, Hadoop releases.

UNIT-II: HADOOP DISTRIBUTED FILE SYSTEM AND HADOOP I/O (9 Periods)

Hadoop Distributed File system: HDFS concepts, Command-Line Interface, Hadoop file systems, Java interface, Data flow, Hadoop archives.

Hadoop I/O: Data integrity, Compression, Serialization, File-based data structures.

UNIT-III: MAPREDUCE, TYPES and FORMATS AND FEATURES (9 Periods)

MapReduce: Analyzing the data with Hadoop, Scaling out, Hadoop streaming, Hadoop pipes.

Types and Formats: MapReduce types, Input formats, Output formats.

Features: Counters, Sorting, Joins, Side data distribution and MapReduce library classes.

UNIT-IV: HIVE, PIG AND HBASE (9 Periods)

Hive: Comparison with traditional databases, HiveQL, Tables, Querying data, and User-defined functions.

Pig: Comparison with databases, Pig latin, User-defined functions, Data processing operators.

HBase: HBasics, Concepts, Clients, HBase vs. RDBMS, Praxis.

UNIT-V: ZOOKEEPER, SQOOP AND CASE STUDIES (9 Periods)

Zookeeper: Zookeeper service, Building applications with Zookeeper, Zookeeper in production.

Sqoop: Database imports, Working with imported data, Importing large objects, Performing an export.

Case Studies: Mahout, Healthcare, Facebook and Twitter.

Total Periods: 45

TEXT BOOK:

1. Tom White, *Hadoop: The Definitive Guide,* O'REILLY Publications, Third Edition, 2012.
2. Anil Maheswari, *Big Data,* Tata McGraw Hill, 2017.

14BT80502: **BIG DATA**
(Professional Elective-IV)
(Common to CSE, CSSE and IT)

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

PREREQUISITEs: Courses on "Data Base Management Systems" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Big Data, Types of Data Sources, Hadoop Frameworks and HDFS, Map Reduce, Hadoop Ecosystem Components.

COURSE OUTCOMES:

After the successful completion of the course, the student will be able to:
1. Demonstrate knowledge in:
   * Analytic Paradigms
   * Big data Characteristics
   * Hadoop Framework.
2. Analyze the need for database systems for storing the large data.
3. Design and model an effective and sustainable database for better performance using Big data tools.

Detailed Syllabus:

UNIT - I: INTRODUCTION TO BIG DATA   (09 periods)

Big Data Characteristics: Volume-Variety-Velocity-Veracity, Analytics, Basic Nomenclature, Analytics Process Model, Analytical Model Requirements, Types of Data Sources, Sampling, Types of Data Elements, Missing Values, Standardizing Data, Outlier Detection and Treatment, Categorization.

UNIT - II: HADOOP FRAMEWORKS AND HDFS   (08 periods)

Frameworks: A Brief History of Hadoop, The Hadoop Ecosystem, Hadoop Releases, The Building Blocks of Hadoop: Name Node-Data Node-Secondary Name Node-Job Tracker-Task Tracker.

The Hadoop Distributed File system: The Design of HDFS, HDFS Concepts, Hadoop File Systems .

UNIT - III: MAP REDUCE   (09 periods)

Map Reduce: Anatomy of a Map Reduce: Map Reduce1, Map Reduce2
Failures: Failures in Classic MapReduce, Failures in YARN.

Job Scheduling: The Fair Scheduler, the Capacity Scheduler. Shuffle and Sort, Input Formats, Output Formats.

UNIT - IV: HIVE AND PIG   (10 periods)

Hive: The Hive Shell, Hive Services, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions.

Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators.

UNIT - V: CASE STUDY   (09 periods)

Case Study: Hadoop Usage at Last.fm, Hadoop and Hive at Facebook, Nutch Search Engine, Log Processing at Rackspace, Mahout, Sqoop.

Total Periods: 45

TEXT BOOKS:
1. Bart Baesens, **"Analytics in a Big Data World: The Essential Guide to Data Science and its Applications,"** Wiley Publications ,2014.
2. Tom White, **"Hadoop: The Definitive Guide,"** Third Edition, O'REILLY Publications, 2012.

REFERENCE BOOKS:
1. Paul Zikopoulos, IBM, Chris Eaton, Paul Zikopoulos **"Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data,"** The McGraw-Hill Companies, 2012.
2. Chuck Lam **"Hadoop in action,"** Manning Publications, 2011.

IV B.Tech. - I semester
(16BT71207) E - COMMERCES
(Program Elective - 3)

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

PRE-REQUISITES: A course on "Computer Networks".

COURSE DESCRIPTION: Electronic Commerce Framework; Consumer Oriented Electronic Commerce; Electronic Payment Systems; Inter and Intra Organizational Commerce; Corporate Digital Library; Advertising and Marketing on Internet; Consumer Search and Resource Discovery; Multimedia and Digital Video.

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

CO1.   Demonstrate knowledge on:
- The basic concepts and technologies used in the field of E-Commerce.
- E-Payment systems
- Inter and Intra Organizational E-Commerce
- Advertising and Marketing on Internet
- Key Multimedia Concepts

CO2.   Analyze the Mercantile Process Models in different views.

CO3.   Apply compression and decompression techniques and codec required for Video Conferencing.

CO4.   Solve security issues in E-Commerce using encryption mechanisms.

CO5.   Follow ethics in the usage of E-Commerce.

DETAILED SYLLABUS:

UNIT-I: INTRODUCTION AND NETWORK SECURITY
                                        (9 Periods)

Introduction: Electronic commerce frame work, Electronic commerce and media convergence, The anatomy of E-commerce applications, E-Commerce consumer applications, E-Commerce organization applications.

Network Security: Client-Server network security, Emerging client-server security threats, Firewalls and network security, Data and message security, Encrypted documents and electronic mail - Security and the web.

UNIT-II: CONSUMER ORIENTED ELECTRONIC COMMERCE AND ELECTRONIC PAYMENT SYSTEMS   (10 Periods)

Consumer Oriented Electronic Commerce: Consumer oriented applications, Mercantile process models from the consumer's perspective, Mercantile process models from the merchant's perspective.

Electronic Payment Systems: Types of electronic payment systems, Digital token-based, Smart cards, Credit cards, Risks in electronic payment systems.

UNIT-III: INTER ORGANIZATIONAL COMMERCE AND INTRA ORGANIZATIONAL COMMERCE   (9 Periods)

Inter Organizational Commerce: EDI, EDI implementation, MIME and value added networks.

Intra Organizational Commerce: Work flow automation and coordination, Customization and internal commerce, Supply chain management.

UNIT-IV: CORPORATE DIGITAL LIBRARY and ADVERTISING AND MARKETING ON THE INTERNET   (9 Periods)

Corporate Digital Library: Making a business case for a document library, Types of digital documents, Issues behind document infrastructure, Corporate data warehouses.

Advertising and Marketing on the Internet: Advertising and marketing - Information based marketing, Advertising on internet, On-line marketing process, Market research.

UNIT-V: CONSUMER SEARCH and RESOURCE DISCOVERY AND MULTIMEDIA AND DIGITAL VIDEO   (8 Periods)

Consumer Search and Resource Discovery: Information search and retrieval, Electronic commerce catalogs or directories, Information filtering.

Multimedia and Digital Video: Key multimedia concepts, Digital video and electronic commerce, Desktop video processing, Desktop video conferencing.

Total Periods: 45

288

SVEC16 - B.TECH - INFORMATION TECHNOLOGY

TEXT BOOK:

1. Ravi Kalakota and Andrew B. Whinston, *Frontiers of Electronic Commerce,* Pearson Education, Seventh Edition, 2009.

REFERENCE BOOKS:

1. Hendry Chan, Raymond Lee, Tharam Dillon and Ellizabeth Chang, *E-Commerce Fundamentals and Applications,* John Wiley, Third Edition, 2007.

2. S.Jaiswal, *E-Commerce,* Galgotia, 2008

3. Efrain Turbon, Jae Lee, David King and H.Michael Chang, *E-Commerce,* Pearson Education Asia, 2001.

4. Gary P. Schneider and James T. Perry, *Electronic Commerce,* Thomson Learning, 2001.

IV B.Tech. - I semester
(16BT71209) MACHINE LEARNING
(Program Elective - 4)

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

PRE-REQUISITES: Courses on "Probability and Statistics" and "Data Warehousing and Data Mining".

COURSE DESCRIPTION: Introduction to Machine Learning; Planning for Machine Learning; Bayesian Techniques; Decision Trees; Bayesian Networks; Artificial Neural Networks; Association Rules Learning; Support Vector Machines; Clustering; Machine Learning as a Batch Process; Case Studies, Data Science Fundamentals.

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

CO1.   Demonstrate knowledge on:
- Decision Trees and Bayesian Networks
- Artificial Neural Networks and Association Rules
- Support Vector Machines, Data Science fundamentals.

CO2.   Analyze complex datasets and identify suitable machine learning algorithms.

CO3.   Design decision making algorithms using supervised and unsupervised approaches.

CO4.   Solve complex data analytical problems using machine learning and data science techniques.

CO5.   Use Apache Spark and R tools for real-time and batch processing applications.

CO6.   Develop machine learning based solutions as per societal needs.

DETAILED SYLLABUS:

UNIT - I: INTRODUCTION AND PLANNING FOR MACHINE LEARNING   (9 Periods)

Introduction to Machine Learning: History of machine learning, Algorithm types for machine learning, Uses for machine learning, Languages for machine learning, Software used for machine

learning, Data repositories.

Planning for Machine Learning: Machine learning cycle, Defining the process, Building a data team, Data processing, Data storage, Data privacy, Data quality and cleaning, Thinking about input data and output data.

UNIT - II: DECISION TREES, BAYESIAN NETWORKS AND ARTIFICIAL NEURAL NETWORKS (9 Periods)

Decision trees, Bayesian networks, Association rule mining concepts and algorithms

Artificial Neural Networks: Usage and breaking down the artificial neural network, Artificial neural networks with weka, Implementing a neural network in java.

UNIT-III: SUPPORT VECTOR MACHINES AND CLUSTERING (9 Periods)

Support Vector Machines using Weka: Usage of support vector machines, Basic classification principles, Support vector machines approach classification.

Clustering using Weka: Usage of clustering, Clustering models, k-means clustering.

UNIT-IV: MACHINE LEARNING AS A BATCH PROCESS AND CASE STUDIES (9 Periods)

Machine Learning as a Batch Process: Considerations for batch processing data, Practical examples of batch processes, Using the hadoop framework, Mining the hashtags mining sales data, Scheduling batch jobs.

Case Studies: Apache Spark and R.

UNIT-V: DATA SCIENCE FUNDAMENTALS (9 Periods)

Deep learning, Semi-supervised learning, Active learning, Multi-task learning, k-nearest neighbors, Recommender systems, SimFple and multiple linear regression.

Total Periods: 45

TEXT BOOKS:

1. Jason Bell, *Machine Learning for Big Data,* Wiley Big Data Series, 2016.
2. Avrim Blum, John Hopcroft and Ravindran Kannan, *Foundations of Data Science,* 2016.

IV B.Tech. - I semester
(16BT71508) INTERNET OF THINGS
(Program Elective - 4)
(Common to CSE, IT and CSSE)

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: 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 (8 Periods)

Definition, Characteristics, Things, Protocols, Logical Design, Functional Blocks, Communication models, APIs, Enabling Technologies, Levels and Deployment templates.

UNIT- II: DEVICES AND END POINTS   (10 Periods)

IoT Devices-Examples-Raspbe rry PI interfaces, Arduino interfaces, Programming Raspberry PI with Python, Other IOT devices, Domain Specific IoTs.

UNIT-III: SENSORS and CONNECTIVITY   (8 Periods)

Sensors-Types of Sensor Nodes; Internet Communications, IP Addresses, MAC Address, TCP and 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   (9 Periods)

Analytics, Apache Hadoop, Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Chef and 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
(16BT71231) BIG DATA TECHNOLOGIES LAB

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

PRE-REQUISITES: Courses on "Big Data Technologies" and "Java Programming".

COURSE DESCRIPTION: Hands-on experience in Big data storage, processing, querying, reporting, predictive analytics, classification, clustering, recommendation system using Data-parallel programming model of Hadoop, MapReduce, HDFS, Hive, Pig, HBase, Zookeeper and Sqoop Big Data Tools.

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

CO1. Demonstrate knowledge on Big Data characteristics, storage, processing, querying and reporting.

CO2. Analyze large dataset issues and solve using data analytic techniques.

CO3. Design and Develop classification and clustering models for dataset analysis.

CO4. Solve large data analysis problems using Big data techniques.

CO5. Apply Big Data Tools: Sqoop, HBase, Hive, Pig, MapReduce and Zookeeper for large data management and knowledge extraction.

CO6. Build Hadoop environment suitable for societal requirements.

CO7. Work effectively as an individual and as a member in team for mini-project implementation.

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

LIST OF EXPERIMENTS:

1. Practice on Hadoop:

    i. Hadoop installation and Cluster Configuration.

    ii. Create Name node, Secondary Name node in Safe mode.

iii. Create Hadoop File system Shell and Read and write Data.

2. Practice on MapReduce:

   i. Create file to count the number of words and display the same.

   ii. Apply MapReduce for Video Streaming file.

3. Count number of Objects in a given video file using Pig programming Tool.

4. Practice on Hive:

   i. Table Creation and Deletion.

   ii. Querying and reporting.

5. Import and Export data from RDBMS database using Sqoop tool.

6. Practice on HBase:

   i. Table Creation and Deletion.

   ii. Querying and reporting.

7. Create Workflow, Deploy and Run using Oozie Tool.

8. Perform data storage and management using Zookeeper tool.

9. Case study 1: Insurance Domain

   i) Perform Classification Technique on Insurance Dataset

   ii) Perform Clustering Technique on Insurance Dataset

10. Case study 2: Healthcare Domain

    i) Perform Classification Technique on Healthcare Dataset

    ii) Perform Clustering Technique on Healthcare Dataset

11. Case study 3: Retail Store data

    i) Perform Recommendation Engine on Retail Store Dataset

    ii. Perform Association rule mining on Retail Store Dataset.

REFERENCE BOOKS:

1. Tom White, *Hadoop: The Definitive Guide,* O'reilly and Yahoo Press, Third Edition, 2012.

2. Frank J. Ohlhorst, *Big Data Analytics: Turning Big Data into Big Money,* Wiley Publication, December, 2012.

3. Kevin Roebuck, *Big Data: High-Impact Strategies - What You Need to Know: Definitions, Adoptions, Impact, Benefits, Maturity, Vendors,* Tebbo Publisher, 2011.

4. Alex Holmes, *Hadoop in Practice,* Manning Publications Publisher, 2012.

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. – 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

(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 <mark>applications of optical fibers</mark>.

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.

<mark>**Nanomaterials:** Introduction, principles of nanomaterials, properties of nanomaterials, synthesis of nanomaterials by ball milling and pulsed laser deposition and applications of nanomaterials.</mark>

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

(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.

TEXT BOOK:

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

REFERENCE BOOKS:

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

(16BT6HS08) INDIAN ECONOMY
(Open Elective)

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

PRE-REQUISITES: --

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

COURSE OBJECTIVES:

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

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

CO1: Acquire the knowledge in
  ➢ Micro and Macro Economics.
  ➢ Traditional and Modern methods of Capital Budgeting.
  ➢ Five year plans and NITI Aayog.
CO2: Analyze
  ➢ Capital Budgeting.
  ➢ Value Analysis and Value Engineering.
  ➢ Economic analysis
  ➢ Law of supply and demand
CO3 : Ability to understand the nuances of project management and finance

DETAILED SYLLABUS:

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

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

UNIT – III: ELEMENTARY ECONOMIC ANALYSIS **(9 Periods)**

Economic Analysis – Meaning, Significance, Simple Economic Analysis; Material Selection for a Product, Substitution of Raw Material; Design Selection for a Product; Material Selection-Process Planning, Process Modification.

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

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

Total Periods: 45

TEXT BOOKS

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

REFERENCE BOOKS
1. 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.

(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.

(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).

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.

(16BT6HS12) PHILOSOPHY OF EDUCATION
(Open Elective)

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

PRE-REQUISITES: ---

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

COURSE OBJECTIVES:

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

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

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

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

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

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

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

DETAILED SYLLABUS :

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

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

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

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

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

Different branches of philosophy- meaning, Epistemology: nature and scope; Knowledge acquiring methods; Kinds and instruments of knowledge; Re-shaping of educational thoughts by Indian thinkers: Rabindranath Tagore, Sri Aurobindo Gosh, Mahatma Gandhi, Jiddu Krishnamurthy and Swamy Vivekananda.

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

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

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

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

Total periods: 45

TEXT BOOKS :

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

REFERENCE BOOKS :

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

(16BT6HS13) PUBLIC ADMINISTRATION
(Open Elective)

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

PRE-REQUISITES: Nil

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

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

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

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

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

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

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

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

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

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

DETAILED SYLLABUS :

UNIT – I: INTRODUCTION   (9 Periods)

Public and Private Administration- Differences and Similarities, Meaning, Scope; Importance of Public Administration in Modern Era; Public Administration and its implications in the field of Engineering.

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

UNIT – II: PUBLIC POLICY   **(9 Periods)**
Meaning and Scope; Policy Formulation in India; Policy making process; Policy Implementation
Engineering and Public Policy**,** Social, ethical, Monetary and fiscal policies; policy implications of engineering; The engineer's role in Public Policy.

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

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

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

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

Case Study: e-Housing System for Bhavana 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.

(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., 2ndEdition, 2007.
3. Ibrahim A. Mirsa, *Soil Pollution: Origin, Monitoring & Remediation*, Springer, UK, 2ndEdition, 2008.

REFERENCE BOOKS:

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

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

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

PREREQUISITES: Environmental Sciences

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

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

DETAILED SYLLABUS:

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

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

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

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

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

Total Periods: 45

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

REFERENCE BOOKS:
1. M.N. Rao and H.V.N. Rao, *Air Pollution,* 19th Edition, Tata McGraw–Hill Education Pvt. Ltd., 2010.
2. Daniel Vallero, *Fundamentals of Air Pollution,* 5th Edition, Academic Press (Elsevier)*,* 2014.
3. S.M.Khopkar , *Environmental Pollution Monitoring and Control,* 2nd Edition, New Age International Pvt Ltd., 2007.
4. S.Deswal and K.Deswal, *Environmental Science,* 2nd Edition, Dhanpat Rai & Co, 2011.

(Common to CSE, IT and CSSE)
(interdisciplinary Elective-1)

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

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

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

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1: Demonstrate knowledge in:
- Internal Hardware details of Intel 8086, 8051 & programming devices like 8255, 8257, 8259, 8279 and 8251.
- Interfacing various peripherals to build standalone systems

CO2: Analyze various peripherals and interfacing techniques.

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

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

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

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

DETAILED SYLLABUS:
UNIT I – INTEL 8086 ARCHITECTURE AND PROGRAMMING
(09 periods)
Evolution of Microprocessors, Architecture of 8086 microprocessor, Register organization, Physical Memory Organization, Signal description of 8086, General Bus Operation Minimum and Maximum mode operation of 8086, Timing diagram, Addressing modes.

127

UNIT II – ASSEMBLY LANGUAGE PROGRAMMING WITH 8086 AND INTERRUPTS   (11 periods)

Instruction set of 8086, Assembler directives and Operators; Interrupts and Interrupt service routines, Interrupt Cycle of 8086, Non Maskable interrupt, Maskable interrupt (INTR), Interrupt Programming, Passing Parameters to procedures, MACROS.

UNIT III – BASIC PERIPHERALS AND THEIR INTERFACING WITH 8086   (08 periods)

Semiconductor memory Interfacing, Dynamic RAM interfacing, Interfacing I/O ports, Programmable Input-Output Port (PIO) 8255, Modes of operations of 8255, Interfacing analog to digital and digital to analog converters, stepper motor interfacing.

UNIT IV – SPECIAL PURPOSE PROGRAMMABLE PERIPHERAL DEVICES   (09 periods)

Programmable Interrupt Controller 8259A; The keyboard/Display Controller 8279-Architecture, Signal Description, Modes of operations; Programmable Communication Interface 8251 USART; DMA Controller 8257, DMA Transfers and Operations.

UNIT V – INTRODUCTION TO 8051 MICROCONTROLLER   (09 periods)

Microprocessors Vs Microcontrollers, The 8051 Architecture: Introduction, 8051 Microcontroller Hardware, input/output pins, Ports and circuits, External Memory, Counters and Timers, Serial Data Input / Output, Interrupts; Addressing Modes, Instruction set of 8051, simple programs on arithmetic operations using 8051.

Total Periods: 46

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

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

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

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

L	T	P	C
3	1	-	3

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

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

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

DETAILED SYLLABUS

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

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

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

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

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

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

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

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

(Total Periods: 45)

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

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

118

(16BT60441) PATTERN RECOGNITION
(Interdisciplinary Elective-2)

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

PRE-REQUISITES: --

COURSE DESCRIPTION: Importance of pattern recognition; Baye's Decision Theory; Linear and non linear classifiers; Feature selection based on statistical hypothesis testing; Feature Generation; KL Transform; SVD; ICA; Clustering of features and clustering algorithms.

COURSE OUTCOMES:

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

CO1. Apply the knowledge of engineering fundamentals on:

- Classifying the features and patterns.
- Feature selection and generation.
- Clustering patterns of objects.

CO2. Analyze numerical and analytical problems of features and patterns of object using pattern recognition algorithms.

CO3. Design and develop algorithms to optimize classification of patterns, feature selection and generation and clustering of objects.

CO4. Interpretation and synthesis the features of objects to validate the performances of pattern recognition algorithms.

CO5. Apply appropriate techniques and algorithms to identify patters of objects with an understanding of limitations.

CO6. Use pattern recognition techniques for societal needs.

DETAILED SYLLABUS

UNIT – I: INTRODUCTION TO PATTERN RECOGNITION   (10 Periods)

Importance of pattern recognition, Features, Feature Vectors and Classifiers, Supervised, Unsupervised and Semi Supervised Learning, Classifiers based on Baye's Decision Theory **-** Baye's decision theory, Discriminant Functions and decision surfaces, Bayesian classification for Normal Distributions, Estimation of Unknown probability density functions, The Nearest Neighbor Rule.

UNIT – II: LINEAR CLASSIFIERS   (9 Periods)

Linear Discriminant functions and Decision Hyperplanes, The perceptron Algorithm, Least Squares Method- Mean Square Error Estimation, Stochastic Approximation and the LMS Algorithm, Sum of Error Squares Estimation Least Squares Method; Mean Square Estimation Revisited- Mean Square Error Regression; Support Vector Machine**-** Separable classes, Nonseparable classes

UNIT – III: NON LINEAR CLASSIFIERS   (9 Periods)

The XOR problem, The two layer perceptron, Three layer perceptrons, The Back propagation Algorithm, The cost function choice, choice of the network size, A simulation example,

Networks with weight sharing, generalized linear classifiers, polynomial classifiers, Radial basis Function Networks.

UNIT – IV: FEATURE SELECTION AND GENERATION   (9 Periods)

Feature Selection- Pre processing, The peaking phenomenon, Feature selection based on statistical hypothesis testing, ROC curve, class separability measures, feature subset selection; Feature Generation - Basis Vectors and Images, The KL Transform, The Singular Value Decomposition, Independent Component Analysis, Non negative Matrix Factorization, Regional features, Features for shape and size characterization.

UNIT-V: CLUSTERING   (8 Periods)

Introduction, Types of Features, Definitions of Clustering, Proximity Measures-Proximity Measures between Two Points, Proximity Functions between a Point and a Set, Proximity Functions between Two Sets; Categories of Clustering Algorithms, Sequential Clustering Algorithms, A Modification of BSAS, A Two-Threshold Sequential Scheme Refinement Stages

Total Periods: 45

TEXT BOOK:

1. Sergios Theodoridis, Konstantinos Koutroumbas**,** *Pattern Recognition,* Academic Press, Second Edition, 2009.

REFERENCE BOOKS:

1. Richard Duda, Peter E Hart, David G Stork, *Pattern Classification,* John Wiley and Sons, Second Edition, 2001.

2. Christopher M.Bishop, *Pattern Recognition and Machine Learning,* Springer Publications 2006.

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.

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.

III B. Tech. – I Semester
(16BT50502) LINUX PROGRAMMING

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

PRE-REQUISITES:
A Course on "Operating Systems"

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

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

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

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

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

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

CO5. Provide appropriate Linux solutions for real time applications

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

DETAILED SYLLABUS:

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

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

121

UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS
(9 Periods)

Linux File Structure and Commands: File structure - Directories, Files and devices, System calls and Device drivers; Library functions - Low-level file access, write, read and open commands, Initial permissions, Other system calls for managing files; File and directory maintenance commands - chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd.

Input-Output Commands: The standard I/O library commands - fopen, fread, fwrite, fclose, fflush, fseek, fgetc, getc, and getchar, fputc, putc and putchar, fgets and gets; Formatted input and output commands - printf, fprintf, sprintf, scanf, fscanf, sscanf.

UNIT-IV: PROCESS AND SIGNALS   (8 Periods)

Process structure - Process table, Viewing processes, System processes, Process scheduling; Starting new processes - Waiting for a process, Zombie processes, Input and output redirection, Threads; Signals - Sending signals, Signal sets.

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS
(10 Periods)

Inter-Process Communication: Pipe definition, Process pipes, Sending output to popen - Passing more data, popen, implementation, The pipe call; Parent and child processes - Reading closed pipes, pipes used as standard input and output; Named pipes – FIFOs, Accessing a FIFO, Client/Server using FIFOs.

Socket Connections: Socket attributes, Creating a socket, Socket addresses, Naming a socket, Creating a socket queue, Accepting connections, Requesting connections, Closing a socket, Socket communications, Host and network byte Ordering.

Total Periods: 45

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

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

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

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

L	T	P	C
3	1	-	3

PREREQUISITES : A Course on "Operating Systems".

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

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

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

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

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

DETAILED SYLLABUS

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

UNIT-II: SHELL PROGRAMMING

(8 periods)

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

UNIT-III: FILE SYSTEM STRUCTURE AND SYSTEM CALLS

(10 periods)

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

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

UNIT-IV: PROCESS, SIGNALS AND FILE LOCKING

(9 periods)

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

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

UNIT-V: INTER-PROCESS COMMUNICATION AND SOCKETS

(9 periods)

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

(Total periods: 45)

TEXT BOOKS:

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

REFERENCE BOOKS:

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

(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.

(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.

155

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.

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.

80

SVEC16 - B.TECH - COMPUTER SCIENCE AND ENGINEERING

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
(16BT60501) SOFTWARE TESTING

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

PRE-REQUISITES:
A course on "Software Engineering"

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

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

CO1. Demonstrate knowledge on
- Software Testing Life Cycle.
- Testing Techniques.
- Test Management & Metrics.
- Regression Testing
- Test Automation

CO2. Analyze testing circumstances and their resultants in software development.

CO3. Design and develop the appropriate test cases in accordance to the software development model.

CO4. Use problem solving skills to control and monitor the testing process

CO5. Apply testing tools for testing the software quality.

CO6.   Apply contextual knowledge to perform testing on software related to societal applications

DETAILED SYLLABUS:
UNIT-I: INTRODUCTION TO SOFTWARE TESTING

(9 periods)

Evolution of Software Testing, Software Testing—Myths and Facts, Goals of software testing, Psychology for software testing, Software testing definitions, Model for software testing, Effective software testing vs. exhaustive software testing. Effective testing is hard, Software testing as a process. **Terminology and Methodology**: Software testing terminology, Software Testing Life Cycle (STLC), Software testing methodology.

149

137

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

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

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

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

                              Total Periods: 45

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

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

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

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

L	T	P	C
3	1	-	3

PREREQUISITES: A Course on "Software Engineering".

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

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

DETAILED SYLLABUS:

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

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

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

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

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

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

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

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

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

UNIT-V: TESTING TOOLS AND TEST PLANNING

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

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

(Total periods: 45)

140

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

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,* Faster 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. Ian 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.

<center>

III B.Tech. - II semester
(16BT60404) IMAGE PROCESSING
(Program Elective – 1)
(Common to ECE & CSSE)

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

PREREQUISITES: Courses on Digital signal processing and Digital communications.

COURSE DESCRIPTION:
Fundamentals of image processing; Image transforms; Image enhancement techniques in spatial and frequency domains; Restoration techniques; Image segmentation techniques; Image compression techniques.

COURSE OUTCOMES:
On successful completion of the course, students will be able to:
CO1. Demonstarte knowledge in
- Image Fundamentals
- Image Enhancement & Restoration Techniques
- Image Segmentation & Compression Techniques
- Color image processing

CO2. Analyze different images using various processing techniques.
CO3. Design and develop various image processing algorithms to process the images in Real Time Applications.
CO4. Solve problems related to images for feasible and optimal solutions in the core area of Image Processing.
CO5. Apply appropriate techniques to complex engineering problems in the field of image processing.
CO6. Understand the impact of the image processing for societal needs.

DETAILED SYLLABUS:

UNIT-I: IMAGE FUNDAMENTALS   (10 Periods)
Fundamental steps in Image Processing, Image sampling & quantization, some basic relationships between pixels, Arithmetic operations, Logical operations, Spatial operations,
IMAGE TRANSFORMS: 2D-DFT and properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar-Transform, Slant Transform, Hotelling Transform.

UNIT-II: IMAGE ENHANCEMENT   (11 Periods)
Basic Intensity transformation functions, Histogram processing, Fundamentals of Spatial Filtering, Smoothing spatial filters, Sharpening spatial filters, Combining spatial Enhancement methods.
Basics of filtering in frequency domain, Correspondence between filtering in the spatial and frequency domains, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Homomorphic filtering.

UNIT-III: IMAGE RESTORATION   (07 Periods)
Image degradation/Restoration model, Noise models, Restoration in the presence of Noise only-spatial filtering - mean, order- statistic and adaptive filters. Estimating the degradation function, Inverse filtering, Weiner filtering, Constrained least squares filtering.

UNIT-IV: IMAGE COMPRESSION (08 Periods)
Classification of redundancy in Images, Image Compression models, Run length coding, Arithmetic coding, Dictionary based compression, bit-plane coding, Transform based coding, Fidelity Criteria, Image compression standards.

UNIT-V: IMAGE SEGMENTATION AND COLOR IMAGE PROCESSING (09 Periods)
Detection of discontinuities- Point, line and edge Detection.Thresholding- global thresholding, adaptive thresholding. Region based Segmentation. Color image fundamentals - RGB, HSI models, conversions, Pseudo Color Image Processing, Color transformations.

Total Periods: 45

TEXT BOOKS:

1. Rafael C. Gonzalez & Richard E. Woods, *Digital Image Processing*, Pearson Education, 3rd Edition, 2008
2. S.Sridhar, *Digital Image Processing*, Oxford University, 2nd Edition, 2016

REFERENCE BOOKS:

1. William K. Pratt, *Digital Image Processing*, John Wiley and Sons, 3rd Edition, 2002.
2. Anil K.Jain, *Fundamentals of Digital Image processing,* Prentice Hall, 2007.

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

238

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)