DHARMSINH DESAI UNIVERSITY

FACULTY OF TECHNOLOGY

B. TECH. – COMPUTER ENGINEERING

Teaching Scheme and Detailed Syllabus

DHARMSINH DESAI UNIVERSITY FACULTY OF TECHNOLOGY
B. TECH. – COMPUTER ENGINEERING
Teaching scheme

SEMESTER – I

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/VIVA	TW		
AF 111	MATHEMATICS - I	3	1	-	60	40	-	--	100	4
AF 122	BASIC ELECTRI.&ELECTRO.ENGG	4	-	2	60	40	25	25	150	5
CT 116	ELE. OF LINUX OS & C PROG.-I	4	-	2	60	40	25	25	150	5
AF 117	ENGINEERING MECHANICS	3	-	2	60	40	25	25	150	4
CT 112	ENGINEERING GRAPHICS	4	-	3	60	40	--	50	150	5.5
AF 136	WORK SHOP - I	-	-	2	--	--	50	--	50	1
ES 110	ENVIRONMENTAL SCIENCE	3	-	-	60	--	--	40	100	3
								Total	850	27.5

SEMESTER – II

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
AF 201	MATHEMATICS - II	3	1	-	60	40	--	--	100	4
AF 212	ELECTRONIC PRINCIPLE	4	-	2	60	40	25	25	150	5
CT 215	C PROGRAMMING II	4	-	2	60	40	25	25	150	5
AF 214	MECHANICS OF SOLID	3	-	2	60	40	25	25	150	4
AX 215	ELEMENTS OF MECHANICAL ENGINEERING	4	-	2	60	40	25	25	150	5
CT 217	ELECTRONIC WORKSHOP	-	-	2	--	--	--	50	50	1
AM210	ENGG. ECO. & PRINCIPLES OF MANAGEMENT	3	-	-	60	--	--	40	100	3
EN 201	ENGLISH									
								Total	850	27

SEMESTER – III

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
AF 301	MATHEMATICS - III	4	-	-	60	40	--	--	100	4
CE 310	DATA STRU. & ALGO	4	-	2	60	40	25	25	150	5
CE 314	OBJECT ORI. PROG. WITH C++	4	-	2	60	40	25	25	150	5
CE 308	DESIGN OF DIGITAL CIRCUITS	4	-	2	60	40	25	25	150	5
CE 313	DATABASE MANAGEMENT SYSTEMS	4	-	2	60	40	25	25	150	5
AF 310	FINANCIAL & MANGERIAL ACCOUNTING	3	-	-	60	-	-	40	100	3
								Total	800	27

SEMESTER – IV

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
CE 415	DISCRETE MATHEMATICS	4	-	2	60	40	25	25	150	5
	ELECTIVE – I	4	-	2	60	40	25	25	150	5
CE 414	DESIGN & ANALYSIS OF ALGO	4	-	2	60	40	25	25	150	5
CE 417	COMPUTER SYSTEM ARCH	4	-	2	60	40	25	25	150	5
CE 421	SOFTWARE ENGINEERING PRINCIPLES AND PRACTICES	4	-	2	60	40	25	25	150	5
CE 409	COMPUTER PERIPHERALS	-	-	2	--	--	25	25	50	1
CE 419	SOFTWARE PROJECT	-	-	2	--	--	25	25	50	1
								Total	850	27
ELECTIVE – I : (1) JAVA TECHNOLOGIES (2) CE 411 - VISUAL TECHNOLOGIES										

SEMESTER – V

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
CE 502	MICROPROCESSOR FUN. & PROG	4	-	2	60	40	25	25	150	5
CE 509	WEB DEVELPMENT IN .NET	4	-	2	60	40	25	25	150	5
CE 513	OPERATING SYSTEMS	4	-	2	60	40	25	25	150	5
CE 514	ADVANCED ALGORTHMS	4	-	2	60	40	25	25	150	5
CE 515	ADVANCED TECHNOLOGIES	3	-	4	60	40	25	25	150	5
								Total	750	25

SEMESTER – VI

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
CE ELECTIVE-I		4	-	2	60	40	25	25	150	5
CT 614	THEORY OF AUTO. & FORMAL LAN.	4	-	-	60	40	--	--	100	4
CE 619	SERVICE ORIENTED COMPUTING	4	-	2	60	40	25	25	150	5
CE 622	MACHINE LEARNING	4	-	2	60	40	25	25	150	5
CE 611	COMPUTER NETWORKS	4	-	2	60	40	25	25	150	5
CE 621	SYSTEM DESIGN PRACTICE	-	-	2	--	--	25	25	50	1
								Total	750	25

ELECTIVE-I: (I) CE 610 : ADV. COMPUTER ARCHITECTURE (II) CE 618 : NETWORK & INFORMATION SECURITY

SEMESTER – VII

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
CE 701	ARTIFICIAL INTELLIGENCE	4	-	2	60	40	25	25	150	5
CE	ELECTIVE I	4	-	2	60	40	25	25	150	5
CE	ELECTIVE II	4	-	2	60	40	25	25	150	5
CE	ELECTIVE III	4	-	2	60	40	25	25	150	5
CE 718	COMPILER CONSTRUCTION	4	-	2	60	40	25	25	150	5
								Total	750	25

ELECTIVE I, II & III (Any three from the followings):

(1) CE 710 - EMBEDDED SYSTEMS
(2) CE 702 - COMPUTER GRAPHICS
(3) CE 713 - ADVANCED COMPUTER NETWORK
(4) CE 716 - DISTRIBUTED OPERATING SYSTEM
(5) CE 714 - IMAGE PROCESSING
(6) CE-715-KNOWLEDGE DISCOVERY
(7) CE-717-MOBILE APPLICATION DEVELOPMENT
(8) CE720-BIG DATA AND ANALYTICS

SEMESTER – VIII

Subject code	Subject	Teaching scheme			Exam scheme				Total	Credit
		LEC.	TUT.	PRAC.	TH.	SESS.	PRAC/ VIVA	TW		
AF 801	PROJECT/INDUSTRIAL TRAINING	-	-	30	--	--	300	100	400	14
AF 802	SEMINAR	-	-	-	--	100	--	--	100	4
								Total	500	18

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
AF111 - MATHS I

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
3	1	-	60	40	-	-	100	4	-	-	4

A. OBJECTIVES OF THE COURSE

- Ability to analyse and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solvestructured andunstructured Engineeringproblems.
- Understandandbeabletousethelanguage,symbolsandnotationofmathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

B. DETAILED SYLLABUS

DIFFERENTIAL CALCULUS :
Applications of differential calculus to geometrical problems,equation of tangent & normal, angle between two curves, subtangent, subnormal, length of tangent & length of normal,pedal equation, radius of curvature of plane curves in cartesian, polar and parametric equations, radius of curvature at origin by newton's method and by method of expansion.

SUCCESSIVE DIFFERENTATION :

Leibnitz's theorem, Maclaurin's theorem, Taylor's theorem, Applications to obtain expansion of functions.

INTEGRAL CALCULUS:

Curve Tracing, applications for finding area, length of arc, volume and surface area of solids of revolutions.

REDUCTION FORMULA FOR

sin x dx, cos x dx, sin x cos x dx , tan x dx and cot x dx etc.

BETA AND GAMMA FUNCTION:

Definition, properties, relation between Beta and Gamma functions, use in evaluation of definite integrals.

ELLIPTIC AND ERROR FUNCTIONS:

Definitions and Properties and use in evaluation of definite integrals.

FIRST ORDER DIFFERENTIAL EQUATION:

Formation of differential equations, general and particular solution, equations of first order & first degree of the type variables separable, homogenous, reducible to homogenous, linear & exact and reducible to these forms. Application to geometrical and physical problems.

C. LEARNING OUTCOMES

- To answer at least about the convergence or divergence of integral when integral is not easily evaluated using techniques known.
- Able to evaluate the volume and surface area of the solid generated by revolving the solids by Integration.
- Apply the knowledge of differential equation to solve some practical problems such as electrical circuits, Newton"s Law of cooling and problem related to orthogonal trajectories.
- Apply the knowledge of differentiation to obtain the series of function.
- Able to evaluate curvature of the given function.

D. RECOMMENDED TEXTBOOKS

1) Engineering Mathematics-II By : Shanti Narayan, S. Chand & Company (PVT.) Ltd. Ram nagar, Delhi
2) Higher Engineering Mathematics. By : Dr. B.S.Grewal, Khanna publishers, Delhi

E. REFERENCE BOOKS

A. Engineering Mathematics-I, By : Shanti Narayan, S. Chand & Company (PVT.) Ltd.
B. Applied Mathematics, By : P.N. & J.N. Wartikar,
C. Engineering Mathematics-I By : I.B. Prasad

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD: Not applicable

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
AF 122 – BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES

To expose the students to the concepts of various types of electrical, electronic and magnetic circuits and their applications.

B. DETAILED SYLLABUS

[1] FUNDAMENTALS OF CURRENT ELECTRICITY AND DC CIRCUITS
Introduction, Computation of Resistance at constant temperature, Temperature dependence of Resistance, Computation of Resistance at different temperatures, Ohm's law statement, Illustration and limitation, Kirchhoff's laws-statement and illustration, Resistance in parallel and current division technique, Method of solving a circuit by Kirchhoff"s laws.

[2] MAGNETIC CIRCUITS
Introduction, Definition of Magnetic quantities, Magnetic circuit, Leakage flux, Fringing effect, Comparison between magnetic and electric circuits.

[3] ELECTROMAGNETIC INDUCTION
Introduction, Magnetic effect of electric current, Current carrying conductor in magnetic field, Law of electromagnetic induction, Induced emf, Self-Inductance (L), Mutual Inductance (M), and Coupling coefficient between two magnetically coupled circuits (K), inductor in series.

[4] AC FUNDAMENTALS
Introduction, Waveform terminology, Concept of 3-phase emf generation, Root mean square (RMS) or effective value, Average Value of AC, Phasor representation of alternating quantities, Analysis of AC circuit.

[5] SINGLE PHASE AC CIRCUITS
Introduction, j operator, Complex algebra, Representation of alternating quantities in rectangular and polar forms, RL series circuit, RC series circuit, RLC series circuit, Admittance and its components, Simple method of solving parallel AC circuits, Resonance.

[6] ELECTRICAL MACHINES
Working principles of DC machine, Transformer, Three phase Induction Motor.

[7] DIODE THEORY
Semiconductor theory, Conduction in crystals, Doping source, The unbiased diode, Forward bias, Reverse bias, Linear devices, The diode graph, Load lines, Diode approximations, DC resistance of a diode.

[8] DIODE CIRCUITS
The sine wave, The transformer, The half wave rectifier, The full wave rectifier, The bridge rectifier, The capacitor input filter, Diode clipper and clamper circuit.

[9] SPECIAL PURPOSE DIODES
The Zener diode, The Zener regulator, Optoelectronic devices

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Analyse the various electric and magnetic circuits.
- Understand 1-phase and 3-phase supply terminology.
- Understand the effect of R, L and C in single phase ac circuit.
- Compare various diode circuits and rectifier circuits.
- Understand significance of resonance in series and parallel RLC circuit.
- Identify the various parts of electrical machines and their working.

D. TEXTBOOKS

1. Basic Electrical, Electronics and Computer Engineering
   Authors : R. Muthusubramanian, S. Salivahanan, K. A. Muraleedharan
   Edition : 2nd Edition
   Publisher : Tata McGraw Hill
2. Electronics Principles
   Authors : Albert Paul Malvino
   Edition : 6th Edition
   Publisher : Tata McGraw Hill

E. REFERENCE BOOKS

1. Electrical Engineering
   Authors : B. L. Theraja
   Edition : 23rd Edition
   Publisher : S. Chand & Company Ltd
2. Electrical Machines
   Authors : B. L. Theraja
   Edition : 23rd Edition
   Publisher : S. Chand & Company Ltd

F. LIST OF EXPERIMENTS

1. Basic Electronic Devices
2. Verification of Ohm's Law
3. Resistance, Inductance and Power Factor of Single Phase Circuit
4. Charging and Discharging of a Capacitor
5. R-L and R-C Circuit
6. Resonance in R-L-C Series Circuit
7. Diode Characteristic
8. Half Wave and Full Wave and Bridge Rectifier Circuits
9. Clipper Circuit and Clamper Circuit

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
CT 116 – ELE. OF LINUX OS & C PROG.-I

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- The course aims to provide exposure to Linux operating system and problem-solving through C programming.
- Linux commands with shell script and fundamental C programming is covered in the theory component. Lab component of the course gives students hands-on experience with the concepts.

B. DETAILED SYLLABUS

Basics of Operating System

Linux Architecture
Kernel, shell and applications, Features of Linux, Basics of Command: Locating Commands, Types of Commands [Internal and External], Structure of Commands, Getting HELP: Commands like man, whatis, aprpos

Linux Usage
Logging in to a Linux System, Switching between virtual consoles and the graphical environment, Changing your password, The root user, Editing text files.

General Purpose Utility
cal, date, echo, bc, script, who, uname

The File System
Linux File Hierarchy Concepts, Some Important Directories, Current Working Directory, File and Directory Names, Absolute and Relative Pathnames, Changing Directories, Listing Directory Contents, Copying Files and Directories, Moving and Renaming Files and Directories, Creating and Removing Files, Creating and Removing Directories,

The File System In-depth
Partitions and Filesystems, Inodes and Directories, cp and inodes, mv and inodes, rm and inodes, Hard Links, Symbolic (or soft) Links, The Seven Fundamental Filetypes, Checking Free Space, Mounting storage devices, Compressing and Archiving Files.

Users, Groups and Permissions
Users, Groups, Permission Types, Examining Permissions, Interpreting Permissions, Changing File Ownership, Changing Permissions – Symbolic Method, Changing Permissions – Numeric Method, User and Group ID Numbers, /etc/passwd, /etc/shadow and /etc/group files, User Management tools, System Users and Groups, Default Permissions, Special Permissions for Executables, Special Permissions for Directories.

Finding and Processing Files
locate, locate Examples, find, Basic find Examples, find and logical Operators, find and Permissions, find and Numeric Criteria, find and Access Times, Executing commands with find, find Execution Examples, The GNOME Search Tool.

Basics of Process

Text Editor: vi

Shell Programming
Scripting Basics, Creating Shell Scripts, Generating Output, Handling Input, Exit Status, Control Structures, Conditional Execution, File Tests, String Tests, for and sequences, continue and break, Using positional parameters, handling parameters with Spaces, Scripting at the command line, Shell Script debugging.

Overview of C

Constants, Variables and Data Types

Operators and Expressions

Managing Input Output Operations

Decision making and Branching

Decision making and Looping

C. LEARNING OUTCOMES

After completion of the course students will be

- Familiar with fundamentals and high-level architecture of Linux operating system.
- Clear on role of kernel, shell, and other basic utilities. They will also understand basics of files, processes, and vi editor.
- Able to understand, write, and execute basic shell scripts on a Linux system.
- Able to understand, write, compile, run and debug basic C programs on a Linux system.

D. RECOMMENDED TEXTBOOKS

1. Unix : Concepts and Applications by Sumitabha Das, 4th Ed., Tata McGraw Hill
2. Programming in ANSI C by Balaguruswamy, 5th Ed., Tata McGraw Hill

E. REFERENCE BOOKS

1) Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
2) Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education
3) Linux Programming By Example : The Fundamentals 1st Edition, Pearson Education

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No	Aim
1	Introduction to UNIX architecture and UNIX commands
2	General purpose UNIX commands with appropriate options
3	Study of directory and file commands
4	Study searching with find and process related commands
5	Understanding and writing basic shell scripts
6	Study of conditional execution, expr, command line inputs with script
7	Study of looping structure with script
8	Study of general purpose C programming, compiling and executing C code in linux
9	C programming condition flow with if-else and switch-case (branching)
10	Study of while, for and do while loops by practicing pattern programs (Looping)

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
AF 117 – ENGINEERING MECHANICS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
3	0	2	60	40	25	25	150	3	0	1	4

A. OBJECTIVES OF THE COURSE

Comprehensive and theory-based understanding of the natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.

B. DETAILED SYLLABUS

Statics

1	Introduction, engineering and S.I. units, accuracy in engineering calculations, Vectors composition and resolution, concept of Rigid Body	[1]
2	Concurrent Coplanar Force System and their Resultant of a force system using analytical as well as graphical method	[3]
3	Non-concurrent Coplanar Force System, parallel and non-parallel force system,	[2]
4	Equilibrium of force system. Concept of internal force, free body diagram	[2]
5	Friction: Friction on an inclined plane, ladder friction, wedge friction, screw friction, belt and rope drive	[4]
6	Centre of gravity of lines, plane figures, volumes, bodies and Pappu's Theorems.	[4]
7	Principle of Virtual Work and its application	[2]
8	Support Reaction for statically determinate beams, Types of Beams, Types of Supports	[2]
9	Simple cases of concurrent force system in space, Equation of Static for rigid body assemblies for general force system	[4]

Dynamics

10	Review of Particle Kinematics, Motion of connected bodies, D"Alemberts principle	[4]
11	Impact, Momentum and Principle of Momentum	[2]
12	Instantaneous centre in plane motion	[2]
13	work power and Energy	[2]
14	Mass Moment of Inertia in Rotational Motion	[1]
15	vibrations of SDOF systems.	[1]

Term work: **-** Problems based on theory of engineering mechanics and Practical

C. LEARNING OUTCOMES

The students get knowledge of methods of analysis, Use scalar and vector analytical techniques

- Determine resultants and apply conditions of static equilibrium to plane force systems.
- Apply fundamental concepts of kinematics and kinetics of particles and rigid bodies to the analysis of simple and practical problems
- Solve problems in kinematic and dynamic systems
- A basic understanding of the laws and principles of mechanics.

D. RECOMMENDED TEXTBOOKS

1. Engineering Mechanics by A. K. Tayal
2. Engineering Mechanics Vol-I and II by Beer & Johnson

E. REFERENCE BOOKS

1. Engineering Mechanics by R.S. Khurmi
2. Engineering Mechanics by S. Ramamrutham
3. Engineering Mechanics byRussell Hibbeler

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1. Co-planar Con-current Forces system in Equilibrium
2. Lami"s Theorem
3. Co-planar Non-current Forces system in Equilibrium
4. Centroid of Different Plane Laminas
5. Friction
6. Support Reactions

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
CT 112 – ENGINEERING GRAPHICS

Teaching Scheme (Hours)			Examination Scheme					Credit Structure			
Lect	Tut	Prac	Theory	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	3	60	40	50	---	150	4	---	1.5	5.5

A. OBJECTIVES OF THE COURSE

- The course is aimed at developing basic graphic skills in preparation of basic drawings
- Developing skills in reading and Interpretation of engineering drawings to efficiently communicate ideas graphically
- To understand dimension and annotation two-dimensional engineering drawings
- To understand objects in two-dimensional views to improve visualization skills
- Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional

B. DETAILED SYLLABUS

ENGNEERING CURVES:
Introduction to different curves & their applications, constructions of curves used in engineering such as Conics (Ellipse, Parabola, Hyperbola), Cycloidal curves (Cycloid, Epi-Cycloid, Hypo-Cycloid), Involutes, Archemedian spirals with tangents & normals.

PROJECTIONS OF POINTS AND STRAIGHT LINES:
Introduction to principal planes, Projections of points, Projections of Lines, construction for H.T. & V.T. Simple applications of projection of points and lines

PROJECTIONS OF PLANES:
Introduction to different types of planes, Projections of regular planes such as square, rectangle, triangle, circle, pentagon, hexagon, rhombus etc

PROJECTIONS OF SOLIDS:
Introduction to different types of solids,Projections of Right & Regular Solids (Prisms, Pyramids, Cylinder and Cone)

ORTHOGRAPHIC PROJECTIONS:
First angle projection method and third angle projection method. Dimensioning techniques and methods, Conversion of pictorial views into Orthographic Projections with dimensions, Sectional orthographic projection, Orthographic vies with full and half section, special sections.

ISOMETRIC PROJECITIONS:
Introduction to Isometric planes, Isometric scale, Conversion of Orthographic views into Isometric Projections and views

DEVELOPLMENT OF SURFACES:
Introduction, methods of development, Development of lateral surfaces of right regular solids (Prism, Cylinder, Pyramid and Cone)

C. RECOMMENDED TEXTBOOKS

1. Engineering Drawing, N. D. Bhatt, Charotar Publication
2. Engineering Drawing Vol.1 & Vol. 2., P. J. Shah

D. REFERENCE BOOKS

1. Fundamentals of Engineering Drawing, Luzadder
2. A Text Book of Geometrical Drawing, P. S. Gill, S. K. Kataria Publication
3. A Text Book of Machine Drawing, P. S. Gill, S. K. Kataria Publication

E. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

The term work contents shall be based on the above syllabus.

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
AF 136 – WORKSHOP-I

Teaching Scheme (Hours)			Examination Scheme					Credit Structure			
Lect	Tut	Prac	Theory	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	2	--	---	---	50	50	---	---	2	1

A. OBJECTIVES OF THE COURSE:

- Students belonging to all branches of engineering are made understand workshop layout, importance of various sections/shops of workshop, General safety rules and work procedure of work shop
- Students belonging to all branches of engineering are made understand importance or workshop practice in engineering and are given exposure to use practically by themselves of basic tools and equipment used for performing basic operations related to carpentary, tin smithy and plumbing individually.

B. DETAILED SYLLABUS

INTRODUCTION TO WORKSHOP

Workshop layout, importance of various sections/shops of workshop, type of jobs done in each shop, General safety rules and work procedure of work shop

TIN SMITHY (ONE JOB)

Tin smithy tools like –hammers, stakes, scissors etc. sheet metal operations such as shearing, bending, joining, safety precautions, demonstration of various operations

CARPENTRY (ONE PRACTICE JOB AND ONE JOINT JOB)

Carpentry tools like –saw, planner, chisels, hammers, pallet, making gauge, vice, tee square, rule etc., carpentry operations such as marking, sawing, planning, chiselling, grooving, boring, joining, type of woods and carpentry hardware, safety precaution, demonstration of various operations by using hardware

PIPE FITTING (ONE JOB)

Pipe fitting tools, pipe fitting operations such as marking, cutting, bending, threading, assembling, dismantling etc. Types of various spanners such as flat, fix, ring box-adjustable etc, Safety precautions, demonstration of various operations.

C. LEARNING OUTCOMES

After successful completion of this course, students belonging to all branches of engineering would be able to understand and able to use themselves of basic workshop tools used in carpentry, tin smithy and plumbing.

D. TEXT BOOKS

1) Manual Developed by Mechanical Engineering Department.
2) Work shop technology, A. K. Hajrachaudhari & S. K. Hajrachaudhari

E. REFERENCE BOOKS

1. ITB Hand book, Engineering industry training board
3. Work shop Technology Vol. I & II, Gupta & Kaushik

B. TECH. SEMESTER I
SCHEME & SYLLABUS FOR THE SUBJECT
ES 110-ENVIRONMENTAL SCIENCE

Teaching Scheme (Hours)			Examination Scheme					Credit Structure			
Lect	Tut	Prac	Theory	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	--	--	60	---	40	--	100	3	---	--	3

A. Objective:

The objective for this course is to bring awareness about sustainable development is a key to the future of mankind. Continuing problems of pollution, solid waste disposal, degradation of environment, issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues. Managing environmental hazards have become very important. It is now even more critical than ever before for mankind as a whole to have a clear understanding of environmental concerns and to follow sustainable development practices.

B. Detailed Syllabus:

Unit 1: The multidisciplinary nature of environmental studies (2 lectures)

Definition, scope and importance & Need for public awareness

Unit 2: Natural resources (8 lectures)

- **Renewable and non-renewable resource**: **Natural resources and associated problems**
- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification
- Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

Unit 3: Ecosystems (8 lectures)

- Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem
- Ecological succession, Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4: Biodiversity and its conservation (8 lectures)

- Introduction definition: Genetic, species and ecosystem diversity
- Bio-geographical classification of India
- Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels
- India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India
- Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

Unit 5: Environmental Pollution (8 lectures)

- Definition, Causes, effects and control measures of:
- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards
- Solid waste management, causes, effects and control measures of urban and industrial wastes
- Role of an individual in prevention of pollution, Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

Unit 6: Social issues and the environment (8 lectures)

- From unsustainable to sustainable development, Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people: its problems and concerns. Case studies
- Environmental ethics: Issues and possible solutions
- Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Case studies
- Wasteland reclamation, Consumerism and waste products
- Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention &Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

Unit 7: Human Population and the Environment (8 lectures)

- Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education
- HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health
- Case studies

Unit 8: Field work

- Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain)
- Visit to a local polluted site - Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems – pond, river, hill, slopes etc.

Termwork: (40 marks)

1. Students will be required submit assignment based on field work related to biodiversity of the ecosystems, waste management, environmental pollution, and social issues of environment.

C. Learning Outcomes:

After completion of this course students will be able to understand:

1. The meaning of environment, ecology, ecosystems, biotic & abiotic components, food chains & webs
2. Natural resources, biodiversity, hotspots, threats to biodiversity
3. Factors causing environmental pollution, prevention of pollution, role of an individual in pollution control & abatement and disaster management
4. Social issues related to environmental science, water conservation, rain water harvesting, environmental ethics, climate change, wasteland reclamation, consumerism and waste products, environment protection act and public awareness
5. Issues of population growth, population explosion, human health and rights
6. Field work related to ecosystems, polluted sites, and species

D. Text Books:

1. Erach Bharucha *Textbook of Environmental Studies*; Second Edition, Universities Press: Hyderabad, 2013.
2. Poonia, M. P.; Sharma, S. C. *Environmental studies*; Khanna Publishing House: New Delhi, 2017.
3. Rajagopalan, R. *Environmental Studies*; Oxford University Press: India, 2015.

E. Reference Books:

1. Varandani, N. S. *Basics of Environmental studies*; Lambert Academic Publishing: Germany, 2013.
2. Basak, A. *Environmental Studies*; Dorling Kindersley: India, 2009.
3. Dhameja, S. K. *Environmental studies*; S. K. Kataria and Sons: New Delhi, 2007.
4. Rao, C. S. *Environmental Pollution Control Engineering*; Wiley publishers: New Delhi, 2006.
5. Brunner, R. C. *Hazardous Waste Incineration*; McGraw Hill: Michigan, 1989.
6. Clark, R. S. *Marine Pollution*; Clanderson Press Oxford: Bath, 2001.
7. Trivedy, R. K. *Handbook of Environmental Laws, Acts, Guidelines, Compliances & standards*; B. S. publications: Hyderabad, 2005.
8. Jadhav, H.; Bhosale, V. M. *Environmental Protection and Laws*; Himalaya Pub. House: Delhi, 1995.
9. Agarwal, K. C. *Environmental Biology*; Nidi Publ.: Bikaner, 2001.
10. Bharucha, E. *The Biodiversity of India*; Mapin Publishing: Ahmedabad, India, 2002.
11. Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., *Environmental Encyclopedia;* Jaico Publ. House: Mumbai, 2001.
12. De, A. K. *Environmental Chemistry;* Wiley Eastern: New Delhi, 2006.
13. Gleick, H. P. Water in crisis, Pacific Institute for Studies in Dev., *Environment & Security*; Stockholm Env. Institute Oxford Univ. Press: New York, 1993.
14. Hawkins, R.E., *Encyclopedia of Indian Natural History*; Bombay Natural History Society: Bombay, 1987.
15. Heywood, V. H.; Waston, R. T. *Global Biodiversity Assessment;* Cambridge Univ. Press: Cambridge, 1995.
16. Mckinney, M.L.; School, R.M. *Environmental Science systems & Solutions*; Web enhanced edition: USA, 1996.
17. Miller, T.G. Jr.; Spoolman, S. E. *Environmental Science*; Cengage learning: Wadsworth, 2014.
18. Odum, E.P. *Fundamentals of Ecology*; W.B. Saunders: USA, 1971.
19. Rao, M. N.; Datta, A.K. *Waste Water treatment*; Oxford & IBH Publ.: New Delhi, 1987.
20. Sharma, B. K., *Environmental Chemistry*; Goel Publ. House: Meerut, 2001.
21. Townsend, C., Harper, J.; Michael, B. *Essentials of Ecology*; Blackwell: Oxford, 2008.
22. Trivedi, R. K., *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol I and II; B. S. Publications, Hyderabad, 2010.
23. Trivedi, R. K.; Goel, P. K. *Introduction to air pollution*; ABD Publishers: Jaipur, 2003.
24. Wanger, K. D., *Environmental Management;* W.B. Saunders Co. Philadelphia, USA, 1998.

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
AF 201 – MATHEMATICS-II

Teaching Scheme (4 Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	1	-	60	40	-	-	100	4	-	-	4

A. OBJECTIVES OF THE COURSE

- Ability to analyse and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solvestructuredand unstructured Engineering problems.
- Understandandbeabletousethelanguage,symbolsandnotationofmathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

B. DETAILED SYLLABUS

PARTIAL DIFFERENTIATION & ITS APPLICATIONS :
Partial derivatives, Homogenous functions Euler's theorem, Total derivatives-Differentiation of implicit functions, Change of variables, errorsand approximations, Maxima & Minima of functions of two variables, Lagrange's methodof undetermined multipliers.

MULTIPLE INTEGRALS & THEIR APPLICATIONS :
Double integrals, definition evaluation, change of order of integration, double integrals in polar co-ordinates, area enclosed by plane curves, Triple integrals, change of variables, volume ofsolids.

INFINITE SERIES :
Introduction, Definitions, Convergence, divergence and Oscillation of a series, P-test, Comparision test, Ratio test, Root test, Higher ratio test, Rabbe's test, Log test, Alternating Series, Leibnitz's rule.

COMPLEX NUMBER:
Definition, elementary operations, Argan's diagram, De-Moivre's theorem, and its applications To expand Sinné, Cosné in powers of siné, cosé respectively, To expand sinné , Cosn and Sinmé. Cosné in a series of Sines or Cosines of multiples of é, Hyperbolic functions, Formulae of hyperbolic functions, Inverse hyperbolic functions, Logarithm of complex quantities. Separation of real and imaginary parts. C + iS method.

LAPLACE TRANSFORMS:
Introduction, Definition Transforms of elementary functions, properties of Laplace transforms, Inverse transforms, Note on partial fractions, Transforms of derivatives, Transforms of integrals. Multiplication and division by t, convolution theorem.

C. LEARNING OUTCOMES:
At the end of the course student should be able to

- Obtain Laplace transform of standard Mathematical functions.
- Evaluate Partial Derivatives and apply the knowldege to solve some practical problems such has constrined optimization problems and other problems involving Partial Differentiation.
- Understand the concept of Multiple Integrationanditsapplicationsviz. Areaand Volume.
- Obtain the bahaviour of Infinte series.
- Evaluate Exponential, Trignometric and Hyperbolic Functions ofacomplex number

D. RECOMMENDED TEXTBOOKS

1) Higher Engineering Mathematics By : Dr. B.S. Grewal, Khanna publisers, Delhi.

E. REFERENCE BOOKS

1) Applied Mathematicsfor Engineersand Physicists. By : Pipes& Harvill, Mc-Graw Hill Kogakusha Ltd.
2) Applied Mathematics By : P.N. & J.N. Wartikar

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE) Not applicable

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
AF 212 – ELECTRONIC PRINCIPLE

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES

To present a perceptive understanding of the fundamentals of a bipolar junction transistor and its application. Further, nurturing the ability to design and analyze the performance of transistor amplifier using different types of biasing techniques. Expose the students to the concepts of various types of digital circuit as well as concept of signal and systems.

B. DETAILED SYLLABUS

[1] BIPOLAR JUNCTION TRANSISTOR
The unbiased transistor, The biased transistor, Forward-reverse bias, The CE connection, Transistor characteristics, The Base and Collector curves.

[2] TRANSISTOR FUNDAMENTALS
DC load lines, Base bias, Emitter bias, The Operating Point, The Transistor switch.

[3] TRANSISTOR BIASING
Voltage divider bias, VDB analysis, VDB load line, Two-supply emitter bias, other types of bias, PNP Transistors.

[4] AC MODELS
Base biased amplifier, Coupling and bypass capacitors, The superposition theorem for amplifiers, AC resistance of the emitter diode, AC beta, The grounded emitter amplifier, The AC model of a CE stage, Introduction to h - Parameters & Comparison with T & PI models.

[5] VOLTAGE AMPLIFIERS
Voltage gain, The loading effect of input impedance, Multistage amplifiers, Swamped amplifier.

[6] CC AND CB AMPLIFIERS
The CC amplifier, the AC model of an Emitter Follower, Types of coupling, Direct coupling, Darlington connections.

[7] CLASS A AND B POWER AMPLIFIERS
The AC load line of a CE amplifier, AC load lines of other amplifier, Class A operation.

[8] OSCILLATORS
Theory of sinusoidal oscillation.

[9] FREQUENCY DOMAIN
The Fourier series, The spectrum of a signal, Frequency spectrum of periodic signal

[10] FREQUENCY MIXING
Nonlinearity, Medium-signal, operation with one sine wave, Medium signal operation with Two sine waves.

[11] AMPLITUDE MODULATION
Basic idea, Percent modulation, AM spectrum, the envelope detector, the super heterodyne Receiver.

[12] DIGITAL CIRCUITS
Number systems, Complements, Error detecting codes, Boolean algebra, Logic gate ICs, RTL & DTL logic circuits, and Simple Combinational circuits, Half adder, Full adder

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Analyse and designing of the various transistor amplifier circuits.
- Understand the importance of R_E, R_C, C_B and C_E in transistor circuit.
- Compare various biasing techniques and its importance in design of circuit.
- Understand significance of feedback in amplifier circuit.
- Build their notion about the digital electronics circuit and its applications.
- Gain insight of the signal and its frequency spectrum for random signal.
- Understand the concept of the modulation and its application in wireless communication.

D. TEXTBOOKS

1. Electronic Principles
   Authors : Albert Malvino and David Bates
   Edition : 7th Edition
   Publisher : Tata McGraw Hill
2. Digital Electronics
   Authors : Morris Mano
   Edition : 3rd Edition
   Publisher : Prentice Hall of India

E. REFERENCE BOOKS

1. Electronic Devices and Circuit Theory
   Authors : Robert Boylestad and Louis Nashelsky
   Edition : 7th Edition
   Publisher : Prentice Hall of India
2. Digital Electronics
   Authors : Anand Kumar
   Edition : 1st Edition

Publisher : Prentice Hall of India

F. LIST OF EXPERIMENTS

1. Study and performance of different types of logic gates.
2. Performance verification of NAND and NOR as universal gate.
3. Application of transistor as a switch.
4. Computation of voltage gain in transistor as an amplifier.
5. Significance of Emitter Resistance (RE) and Collector Resistance (RC) on voltage gain of CE amplifier.
6. Multistage amplifier using BJT.
7. Study loading effect on multistage amplifier using emitter follower as a buffer.
8. Analysis of common base configuration of transistor amplifier.
9. Binary to Gray code and Gray to Binary code conversion using combinational circuit.
10. Performance analysis of Half adder and Full adder using basic logic gates.
11. Combinational circuit analysis of half and full subs tractor using basic logic gates.
12. Study of amplitude modulation for different modulation index.

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
CT 215 – C PROGRAMMING II

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To develop problem solving skills among students, using the fundamental concepts of C programming Language.
- To teach effective usage of arrays, strings, structures, unions, functions, pointers, and dynamic memory.
- To familiarize students with file organization and the usage of files.

B. DETAILED SYLLABUS

Arrays
One-dimensional arrays, Multi-dimensional arrays, Dynamic arrays

Character Arrays and Strings
String variables, Arithmetic Operations on Characters, Comparison of Strings, String handling functions, Table of Strings

User-defined Functions
Need for user defined functions, A multi-function program, Elements of user defined function, Definition of functions, Return values and their types, Function calls, Function declarations, Functions with arguments, Function with multiple return values, Nesting of functions, Recursion, Passing arrays to functions

Structures and Unions
Introduction, Structures definition, Giving values to members, Structure initialization, Comparison of structure variables, Arrays of structures, Arrays within structure, Structure and function, Unions, Size of structures, Bit fields.

Pointers
Introduction, Understanding of pointers, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointers, Pointers expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers on pointers, Pointer as function argument, Functions returning pointer, Pointers to functions, Pointers and structures.

File management in C
Introduction, Defining and opening a file, Closing a file, Input/output operations on files, Error handling during I/O operations, Random access to files, Command line arguments.

Dynamic Memory Allocation
Allocating memory, Releasing the used space, Altering size of a block

The Preprocessor
Macro substitution, File Inclusion, Compiler control directives

C. LEARNING OUTCOMES

After completion of the course students will be

- Able to understand and debug basic C language programs.
- Able to solve problems using C programming concepts like arrays, strings, structures, unions, functions, pointers, and dynamic memory.
- Understanding benefits of the re-usability and hence would properly divide their code in smaller and reusable functions.
- Able to develop applications which may include file handling, data structure like linked lists and will be efficient in memory utilization by using dynamic memory and pointers.
- Able to write readable code by using proper indentation and naming convention (for names of variables and functions).

D. RECOMMENDED TEXTBOOKS

1) Programming in ANSI C by Balagurusamy, 5th Ed., Tata McGraw Hill

E. REFERENCE BOOKS

1) Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
2) Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education
3) The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No	Aim
1	Handling multiple similar typed data using Array
2	Study of string and string manipulation with string handing functions.
3	Modular programming approach using function
4	Multidimensional and scattered data handling using structure and union
5	Study of pointers with different data types
6	Development of mini application using the concept of array, function, structure and function
7	String handling using the pointer
8	Handling the files and command line arguments in C language
9	Dynamic memory handling using pointers
10	Study of preprocessor concepts in C language

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
AF 214 – MECHANICS OF SOLID

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
3	0	2	60	40	25	25	150	3	0	1	4

A. OBJECTIVES OF THE COURSE

- The objective of this course is to make the students understand the concept of stress and strain under different type loading conditions and different types of structures.
- Understanding of basic knowledge of maths and physics to solve real-world problems and to analyse simple problems in solid mechanics.

B. DETAILED SYLLABUS

[A] SIMPLE STRESSES AND STRAINS: [08]
Introduction, stress, strain, tensile, compressive and shear stresses, Elastic limit, Hooke's law, Poisson's Ratio, Modulus of Elasticity, Modulus of Rigidity, Bulk Modulus, Bars of Varying sections, Extension of tapering rods, Bars of uniform strength, temperature stresses, Hoop stress, stress on oblique sections, State of simple shear, Relation between Elastic constants

[B] MECHANICAL PROPERTIES OF MATERIALS: [02]
Ductility, Brittleness, Toughness, Malleability, Behaviour of ferrous and nonferrous metals in tension and compression, shear and bending tests, Standard test pieces, Influence of various parameters on test results, True and nominal stress, Modes of failure, Characteristic stress-strain curves, Strain hardening, Hardness, Different methods of measurement, Izod, Charpy and tension impact tests, Fatigue, Creep, Correlation between different mechanical properties

[C] BENDING MOMENT AND SHEAR FORCE: [06]
Bending moment, shear force in statically determinate beams subjected to uniformly distributed,concentrated and varying loads. Relation between bending moment, shear force and rate of loading

[D] MOMENT OF INERTIA: [02]
Concept of moment if Inertia, Moment of Inertia of plane areas, polar moment of Inertia, Radius of gyration of an area, Parallel Axis theorem, Moment of Inertia of composite Areas, product of Inertia, Principal axes and principal Moments of Inertia

[E] STRESSES IN BEAMS: [06]
Theory of simple bending, bending stresses, moment of resistance, modules of section, Built up and composite beam section, Beams of uniform strength, Distribution of shear stress in different sections

[F] TORSION: [04]
Torsion of circular. solid and hollow section shafts, shear stress angle of twist, torsional moment ofresistance, power transmitted by a shaft, keys and couplings, combined bending and torsion, close coiled helical springs

[G] Stresses in cylindrical and spherical shells under fluid pressure [02]

[H] Inelastic bending of beams [02]

[I] Principal stresses and strain [04]

Term work: - Problems based on theory of engineering mechanics and Practical

C. LEARNING OUTCOMES

The students get knowledge of

- Solve practical problems through evaluating the relationship between stress and strain
- Generate and sketch shear force and bending moment diagrams
- Derive and apply stress and strain relationships in single and compound members subject to axial force, bending moment and torsion
- Analysis of composite beams and shafts

D. RECOMMENDED TEXTBOOKS

1. Strength of Materials by S. Ramamruthum
2. Strength of Materials by Sadhu Singh

E. REFERENCE BOOKS

1. Mechanics of Solid by R.S. Khurmi
2. Introduction to Solid Mechanics byShames and Pitarresi
3. Strength of Materials S. S. Bhavikatti
4. Mechanics of Solid by Stephen H. Crandall

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1 Compression Test on Timber material
2 Modulus of Rupture of timber material

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
AX 215 – ELEMENTS OF MECHANICAL ENGINEERING

Teaching Scheme (Hours)			Examination Scheme					Credit Structure			
Lect	**Tut**	**Prac**	**Theory**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	---	2	5

A. OBJECTIVES OF THE COURSE:

Students belonging to all branches of engineering are made to learn certain fundamental topics related to mechanical engineering so that they will have a minimum understanding of mechanical processes and basic equipment like boilers, compressors, I.C. engines, refrigeration and air conditioning etc…

B. DETAILED SYLLABUS

1. INTRODUCTION

Systems of units, Pure and working substance, properties of substance, energy, thermodynamic system, surroundings and system boundary, Path and point functions, Thermodynamic equilibrium, law of conservation of energy, Specific heat capacity, thermodynamic process and cycle

2. PROPERTIES OF STEAM:

Distinction between gas and vapour, Steam formation, Sensible heat, Latent heat, Total heat and super heat of steam, Condition of steam, Dryness fraction, Properties of steam i.e. Enthalpy, Internal energy, Density and Specific volume, Critical pressure and temperature of steam, External work of evaporation and internal latent heat. Combined separating and throttling calorimeter

3. PROPERTIES OF GASES

Zeroth, first and second laws of thermodynamics, laws of perfect gases (Boyle"s law, Charle"s law, Regnault"s law, Joule"s law), Characteristic equation of gas, gas constants, internal energy, specific heat at constant pressure and specific heat at constant volume, relationship between specific heats, thermodynamic processes of perfect gases (constant volume, constant pressure, constant temperature, isentropic and polytropic)

4. FUELS AND COMBUSTION

Introduction, Classification of Solid fuels, Liquid Fuels, Gaseous fuels, LPG, CNG and bio fuels, Calorific values, Combustion of fuels, Minimum air required for combustion of fuels

5. REGRIGERATION AND AIR CONDITIONING

Introduction, Evaporation, Refrigerating effect, Unit of refrigeration and COP, Important refrigerants, Refrigerating systems i.e. Air refrigerating system, Ammonia absorption refrigerating system and Vapour compression refrigerating system, Analysis of vapour compression refrigeration system, i.e. COP, mass flow rate, heat rejected from condenser, power consumption etc. Window and split air conditioners: principles and working

6. BOILERS

Introduction, Classification, Cochran & Babcock-Wilcox boiler, Evaporation in boiler, Equivalent evaporation, Boiler efficiency, Functioning of boiler mountings and accessories. Boiler draught, Classification and comparison of boiler draught systems

7. I.C. ENGINES

Prime mover and its classification, advantages of I.C. engines over E.C. engines, classification of I.C. engines, thermodynamic air cycles i.e. Carnot cycle, Constant volume OTTO cycle and Diesel cycle, Air standard efficiency, construction and working of 2–stroke and 4–stroke cycle engines, p-v diagrams, I.C. engine performance. Calculations of Indicated power, brake power, efficiencies, specific fuel consumption

8. AIR COMPRESSORS

Introduction, Classification, Working of reciprocating air compressors, air compressor terminology, Work of compression, Reciprocating compressor efficiency, Introduction and classification of rotary air compressors, Comparison between reciprocating and rotary compressor

C. LEARNING OUTCOMES

After successful completion of this course, students belonging to all branches of Engineering would be able to understand fundamental aspects related to important mechanical processes and basic equipment like boilers, compressors, I.C. engines etc…

D. RECOMMENDED TEXTBOOKS

1. Elements of Heat Engines (S.I. Units) Vol. 1, R. C. Patel & C. J. Karamchandani, Acharya Book Depot, Vadodara
2. Elements of Mechanical Engineering, A. V. Mehta, Everest publishing house, Pune
3. Elements of Mechanical Engineering, P. S. Desai & S. B. Soni, Atul Prakashan, Ahmedabad

E. REFERENCE BOOKS

1. Heat Engine, P. L. Ballaney, Khanna Publishing Company
2. A course in Thermal Engineering, Domkundwar, S and Kothandaraman, C. P., Dhanpat Rai and Sons

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Term work/ Practicals contents shall be based on above syllabus contents.

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
CT 217 – ELECTRONIC WORKSHOP
(FOR BATCH: 2018-2022 or Earlier)

Teaching Scheme (Hours)			Examination Scheme					Credit Structure			
Lect	**Tut**	**Prac**	**Theory**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
-	-	2	-	-	50	-	50	--	---	1	1

A. OBJECTIVES OF THE COURSE:

To acquaint the students with the basic knowledge of electric & electronic components, their working & application and power supply.

To familiarize the students with the fundamentals of computer hardware, LAN cables & its types and installation of Linux OS and packages

B. DETAILED SYLLABUS

- Introduction to Electrical Components : Switches, MCB, ELCB, Tube-light, Bulb, parallel connection of electrical components, wiring in fan and motor
- Introduction to Electronic Components : active and passive components
- Use of basic source & measuring instruments (Power supply, function generator, CRO, DMM)
- Measure voltage, current, frequency, phase difference, power, power factor for single and three phase supply
- Identify various types of ports, cables and connectors
- Linux installation
- Network cabling and crimping for wired and wireless network
- PCB layout design (like proteus) Software installation and layout design using the same
  - Solder and de-solder electronic components on PCB
  - Identify and rectify open circuit and short circuit faults in PCB/system.
- Test assembled electronic circuit for various parameters and faults

MINI Project :

Apart from above experiments a group of students has to undertake a mini project.

Following are some examples for the same :

- To design a device for charging small battery during door opening and closing.
- To design a mobile charger using solar PC cell panel for offices and house hold.
- To design/develop an electronic weighing machine.
- To design/develop an electronic lock for house in the workshop.
- To design/develop and innovative electrical bell using electronics components

C. LEARNING OUTCOMES

- After completion of the course, the students will be able to make a working circuit of AC to DC convertor that can be used as a DC power source for digital circuits.
- The students will be able to install Linux OS and packages for different software applications.
  The students will be able to differentiate different LAN cables and prepare them

E. REFERENCE BOOKS

1) Electronic Principles, Albert Malvino and David J. Bates , McGraw Hill (7^{th} Edition)
2) Electronic Devices, Thomas L. Floyed, Pearson (7^{th} Edition)

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

No.	Experiment
1	To study AC power supply, DC power supply and connections in a switch board
2	To study the working of MCB, RCCB, ELCB and Fluorescent light
3	To verify ICs and implement a boolean function
4	To perform the installation of Linux Operating System
5	To perform the installation of packages in Linux OS
6	To study various computer sockets and prepare LAN cables
7	To study the working of MOSFET, LED and SCR as a switch
8	To study and implement AC to DC convertor (Soldering and Desoldering)
9	To learn Proteus Simulator and implementation of LED, MOSFET and SCR as a switch in Proteus.
10	To implement of boolean function in Proteus Simulator

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CT 217 – ELECTRONIC WORKSHOP
(FOR BATCH: 2019-2023 onwards)

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
-	-	2	-	-	25	25	50	-	-	1	1

A. OBJECTIVES OF THE COURSE

This course aims to make students familiar with the Arduino microcontroller through hands-on work in the laboratory. This course focuses on creating simple sensor-driven physical computing systems and various making simple interactive projects. This course makes students aware about a basic understanding of the use, terminology, and potential of the Arduino. This course also emphasize on understanding of basic concept & structure of Computer Hardware & Networking Components.

B. DETAILED SYLLABUS

- Arduino uno board introduction.
- Development of Digital Input digital output based smart systems using LEDs and buzzers.
- Development of Analog Input and Output based smart systems using various sensors and PWM.
- LCD display
- Serial communication
- Mother boards and functions of hardware ports and the parts of the motherboard.

C. LEARNING OUTCOMES

Upon completing the course, students will be:

- Familiar with Arduino IDE and its applications.
- Able to understand Arduino programming
- Able to Design Smart systems applications.
- Be aware about various mother boards and functions of hardware ports and the parts of the motherboard.
-

D. RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS:

1. Programming Arduino – Getting Started with Sketches, Simon Monk (2016)
2. PC Upgrade and Maintainance, by Mark Minasi
3. IBM PC and clones, by Govind Rajalu

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1.	Introduction to arduino and its programming
2.	• To study basic inbuilt LED Experiments with Arduino. • To interface a single LED with Arduino • To interface multiple LEDs with Arduino and to study programming for the generation of various patterns.
3.	Write an arduino sketch to implement, • Traffic light at junction of four roads • 3 bit up counter and down counter • To study and implement interfacing of PUSH button and LEDs with Arduino.
4.	Write an arduino sketch to implement, • LED dice • Nand gate IC tester • Memory game
5.	To study about pizeo buzzer. Write an arduino program to make 3 key tiny keyboard and generate melodies like "Happy Birth day" and "mario video game" tunes.
6.	To study about serial communication using arduino. To study about interfacing of potentiometer to arduino.
7.	To study about interfacing of LCD to arduino and write an arduino sketech to implement count down timer and dynamic marquee style notice board.
8	To study about LM 135- a temperature sensor and LDR- light dependent register. Write an arduino program to implement, 1. Digital thermometer 2. Automatic Street light on/off management system 3. Torch Light sensitive security system of a locker room
	To study about IR sensor. Write an arduino program to implement, 1. obstacle avoidance using IR sensor 2.Home automation system. 3. Black(dark) and white(bright) color detection 3. Line follower system
9	To study about Distance sensor. Write an arduino sketch to measure, 1. Distance of the obstacle 2. Speed of the obstacle 3. gesture of a person- gesture recognition and gesture dependent actions
10	To study mother board and functions of hardware ports and the parts of the motherboard.

B. TECH. SEMESTER II
SCHEME & SYLLABUS FOR THE SUBJECT
AM210- ENGG. ECO. & PRINCIPLES OF MANAGEMENT

Teaching Scheme			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	-	-	60	-	40	-	100	3	-	-	3

A. Course Objective:

The need to understand the basics concepts of economics & management are important for the allocation of scarce resources of economy and proper utilization to generate the required products and services. Demand analysis and consumer behavior are the factors which teach about the equilibrium price. Knowledge about types of markets, product pricing and factor pricing leads to a better understanding of a particular product or service demanded by the consumers. Production cost and revenue analysis is important for operation of a profitable business. Monetary & fiscal policies are important for the understanding of consumption, government expenditure, investment, exports and imports. It also educates us about the ways in which the government generates revenue and handles its expenditure for a stable economy.

B. Detailed Syllabus:

Unit 1- Basic concepts and definitions: **(4 lectures)**

- Marshall, Robbins and Samuelson"s definition of economics
- Positive and normative economics, micro and macroeconomics
- Utility, goods and services
- Money and wealth
- Consumer and Producer surplus

Unit 2- Demand analysis and consumer behavior: **(6 lectures)**

- Demand function
- Law of demand
- Elasticity of demand and its types
- Price, income and cross-elasticity
- Measures of demand elasticity
- Factors of production
- Advertising elasticity
- Law of supply and demand, equilibrium between demand and supply

Unit 3- Markets, product pricing and factor pricing: **(7 lectures)**

- Concepts of perfect competition
- Monopoly and monopolistic competition (meaning and characteristics)
- Control of monopoly
- Price discrimination and dumping
- Concept of Duopoly and Oligopoly
- Kinked demand curve (price leadership model with reference to oligopoly)

Unit 4- Production cost & revenue analysis: **(7 lectures)**

- Production and production function
- Short run & long run production function
- Cost analysis
- Various concepts of cost
- Total fixed cost, total variable cost
- Average fixed cost, average variable cost, average cost & marginal cost opportunity cost
- Basic concepts of revenue
- Relationship between average revenue and marginal revenue
- Breakeven analysis; meaning and explanation

Unit 5- Money: **(7 lectures)**

- Meaning, functions, types, monetary policy
- Meaning, objectives, tools, fiscal policy
- Meaning, objectives, tools, Banking; meaning, types, functions, central bank- RBI, it"s function, concepts, Cash reserve ratio, bank rate, repo rate, reverse repo rate, statutory liquidity ratio, functions of central & commercial banks, inflation, deflation, stagflation, monetary cycles, new economic policy, liberalization, globalization, privatization, fiscal policy of the government.

Unit 6- Principles of management: **(5 lectures)**

- Meaning of management
- Management process: planning, organizing, leading and controlling
- Managerial role, types of managers, management skills
- Theory of management by Taylor, Gilbreth, Gantt, Fayol, Weber, Barnard, Follett, McGregor.
- Planning: Meaning, goals, feature, steps in planning process, hierarchy of organizational plans, importance and limitations, types of planning, BCG matrix, Porter"s Five forces model.
- Organization: Organizational design and structure, types of organizational structure, integration, downsizing, power and its types, human resource management, HR planning, recruitment, selection, socialization, training and development.

- Leading: Meaning, qualities of a leader, types of leadership styles, Maslow"s hierarchy of needs, Theory X and Theory Y, Herzberg"s dual factor theory.
- Control: Meaning, steps in control process, key result areas, responsibility centers, role of budget personnel, budget department, budget committee, types of budgets, different types of costs, and auditing.

Termwork: **(40 marks)**

1. Students will be required submit assignment based on topics covered in the syllabus such as calculation of breakeven point, demand analysis of a product or service, GDP, and inflation.

C. Learning Outcomes:

After completion of this course students will be able to understand:

1. The definitions of economics, micro & macroeconomics, utility, money, wealth, consumer and producer surplus.
2. Demand, function of demand, elasticity, factors of production, supply & demand equilibrium.
3. Types of markets, price discrimination, dumping and kinked demand curve.
4. Production, short & long run production function, cost analysis, fixed cost, variable cost, revenue, breakeven analysis.
5. Monetary policy, fiscal policy, banking, instruments of monetary policy, liberalization, globalization, privatization, role of government in policy making and business cycles
6. Process of management, planning, organizing, leading, controlling, organization, departments involved in organization, theories related to management, tools used in management.

D. Text Books:

1. Ahuja, H. L.*Modern economics*;S.Chand: New Delhi, 2002
2. Dewett, K. K. *Modern economics theory*; S Chand: New Delhi, 2006
3. Seth, M. L.*Monetary economics*; Lakshmi Narain Agarwal: Agra, 2018

E. Reference Books:

1. Paneerselvam, R.*Engineering economics*; PHI publication: New Delhi,2014
2. Robbins, S.;Decenzo, D. A.*Fundamentals of management: Essential concepts and applications*; Pearson education: New Jersey,2015
3. Mankiw, N. G.*Economics: Principles of economics*; Cengage learning: USA, 2017
4. Williamson, T. R.*Introduction to economics*; D.C. Health & Company: Chicago, 1923

B.TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
AF 301 – MATHEMATICS-III

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	-	60	40	-	-	100	4	-	-	4

A. OBJECTIVES OF THE COURSE

- Ability to analyze and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solve structured and unstructured Engineering problems.
- Understand and be able to use the language, symbols and notation of mathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them

B. DETAILED SYLLABUS

FOURIER SERIES :
Euler's Formulae, condition for a Fourier expansion, functions having points of discontinuity, change of interval, odd & even functions, Expansion of odd & even periodic functions, Half-range series.

MATRICES:
Fundamental concepts, operations, associated with matrices, matrix method of solution of simultaneous equations, Rank of Matrix, Linear dependence of vectors, consistency of a system of linear equations, characteristic equations, Eigen vectors and Eigen roots, Cayley Hamilton theorem.

ORDINARY DIFFERENTIAL EQUATIONS:
Linear differential equations of higher order with constant coefficients, equations reducible to linear equations with constant coefficients, Simultaneous linear equations with constant coefficients. Application to engineering problems.

PARTIAL DIFFERENTIAL EQUATIONS :
Introduction, formation, linear equation of first order, non-linear equations of first order-Charpit's method, homogenous linear equations with constant coefficient to find the complementary functions & the particular integral, non-homogenous linear equations with constant coefficients. Method of separation of variables - vibrating string problem, Heat flow equation etc.

LAPLACE TRANSFORMS :
Application to differential equation, simultaneous linear equation with constant coefficients.

C. LEARNING OUTCOMES

At the end of the course students are able to

- Obtain Fourier series of a periodic function into the sum of a (possibly infinite) set of simple oscillating functions, namely sines and cosines.
- Able to apply the method of solving linear system of equations, linear transformation and Eigen value problem as they arise, for instance from electrical networks, framework in mechanics, curve fitting, other optimization problems and processes in statistics.
- Model physical processes using partial and ordinary differential equation and same can be solved analytically as well numerically.
- Solve basic initial value problems, directly without determining a general solution with the help of Laplace Transformation.
- Characterize the solutions of a differential equation with respect to initial values and analyze the behavior of solutions.
- Solve wave and heat equation.

D. RECOMMENDED TEXTBOOKS

1) Higher Engineering Mathematics, Dr. B.S.Grewal

E. REFERENCE BOOKS

1) A Text Book of Applied Mathematics, P.N. & J.N. Wartikar
2) Mathematics for Engineering, Chandrika Prasad
3) A Text Book of engineering Mathemetics, Dr. K.N.Srivastva & G.K.Dhawan

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

Not applicable

B.TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
CE 310 – DATA STRUCTURE & ALGORITHMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

This course will introduce some of the most fundamental concepts in Computer Science like how data is represented and manipulated in computer systems in the form of stacks, queues, linked lists etc. To provide an in-depth knowledge in problem solving techniques and data structures.

B. DETAILED SYLLABUS

Basic concepts
Algorithm specifications

Arrays
Array as an abstract data type, representation of Arrays

Stacks & Queues
Stack as an abstract data type, queue as an abstract type, evaluation of expressions

Linked Lists
Singly linked lists, doubly linked list, circular list, linked stacks and queues, polynomials, generalized lists.

Trees
Introduction, binary trees, binary tree traversal and tree iterators, additional binary tree operations, threaded binary trees, heaps, binary search tree, forests, Huffman algorithm.

Graphs
The graph abstract data type, graph traversal, directed graph, weighted graph, shortest path-Dijkastra's algorithm, minimum spanning tree.

Sorting
Insertion sort, quick sort, merge sort, heap sort, shell sort, count sort, sorting on several keys, list and table sort, summary of internal sorting.

Hashing
Hash table, hash function, collision, collision resolution techniques.

Search Techniques
Sequential search, Binary search, AVL trees, 2-3 trees, 2-3-4 trees, read-black trees, B-trees, Digital search trees, Tries.

C. LEARNING OUTCOMES

Students will be able to select and use appropriate data structures that efficiently
address program requirements.Students will be able to gain insight knowledge and applicability of data structure in real life.

D. RECOMMENDED TEXTBOOKS

1) Data Structures and Algorithms in Java (4th edition) by Michael T. Goodrich and Roberto Tamassia Publisher: John Wiley & Sons, Inc

E. REFERENCE BOOKS

1) Data Structures and Program Design in C, Second Edition, by Robert L. Kruse, Bruce P. Leung, Pearson Education.
2) Data Structures And Algorithms Made Easy In JAVA by Narasimha Karumanchi, Publisher: Careermonk Publications (Sep 2011).
3) An Introduction to Data Structures with Applications, Second Edition, by Tremblay and Sorenson, McGraw Hill.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr.No	Topics
1.	1) Implement Stack data structure with operations push, pop, change and peep.
2.	1) Write a program to evaluate postfix expression. 2) Implement solution to classic Tower of Hanoi problem using recursion. 3) Write a program to validate palindrome strings.
3.	1) Implement circular and doubly linked list. Perform following operations. • Insert at the beginning. • Insert at the end. • Delete given element.
4.	1) Implement Basic Queue data structure with operations insert and delete. 2) Implement Circular Queue data structure with operations inert and delete.
5.	Implement Binary Search tree traversal-Inorder, Preorder and Postorder and additional Operations.
6.	1) Write a program to create adjacency list and adjacency matrix. Convert adjacency matrix into adjacency list using program. 2) Write a program to create a graph and perform DFS and BFS traversal.
7.	1) Write a program to implement min and max heap data structure.
8	Objective: Implement following sorting techniques: A. Quick sort B. Merge sort C. Insertion sort
9.	Objective: Implement following search techniques: • Sequential search • Binary Search
10.	Objective: Implement Static hashing method.

B. TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
CE 314 – OBJECT ORIENTED PROGRAMMING WITH C++

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

[A] OBJECTIVES OF THE COURSE

Object oriented programming is widely used in industry for software development. C++ is used to develop many system software including but not limited to modern operating systems. C++ has also become the de-facto standard for solving problems at international competitive coding events. This subject aims to introduce the basic concepts of OOP – classes, objects, abstraction, encapsulation, inheritance, and polymorphism - using C++ language. It also introduces advance topics like exception handling templates and STL (Standard Template Library).

[B] DETAILED SYLLABUS

Basics of C++: Overview, Program structure, keywords, identifiers, constants, data types, symbolic constants, declaration of variables, operators, namespaces, control structures, dynamic memory – new and delete keywords, reference and pointer, const pointer vs const reference

Functions in C++: main function, function prototype, inline functions, call and return by reference, default parameters, function overloading

Introduction to Object Oriented Programming: Procedural Vs Object Oriented Programming, Principles of OOP, Benefits and applications of OOP

Classes and Objects – Encapsulation and Abstraction: Introduction, private and public members, Defining member functions, static members, Objects as function arguments and return type, friend functions, const member functions, Constructors and their types, Destructors, Operator overloading, type conversion

Inheritance: Introduction, types of inheritance – single, multiple, multilevel, hierarchical, and hybrid inheritance, Protected members, overriding, virtual base class

Polymorphism: Introduction, Pointers and Objects, this pointer, pointer to derived classes, virtual and pure virtual functions

Input/Output: Introduction to streams, standard I/O stream objects, stream classes, unformatted and formatted I/O, manipulators

Exception Handling: Basics of exception handling, try-catch-throw, rethrowing exceptions, user defined exceptions

Templates and STL: Basics of class templates and function templates, Introduction to STL, Components of STL – containers, algorithms, and iterators

Introduction to C++ string class

[C] LEARNING OUTCOMES

- Familiarity with Object-oriented programming concepts – classes, objects, abstraction, encapsulation, inheritance, polymorphism.
- Ability to design object-oriented C++ program for solving real world problems.
- Effective use of exception handling while solving problems using C++.
- Ability to use templates and STL library while solving coding problems

[D] RECOMMENDED TEXTBOOKS

1. Object-Oriented programming with C++, Seventh Edition, by E Balagurusamy, TMH publication

[E] REFERENCE BOOKS

1. The C++ Programming Language, Fourth Edition, by Bjarne Stroustrup, Addison-Wesley publication
2. Object-Oriented Programming in C++, Fourth Edition, by Robert Lafore, SAMS publication
3. Accelerated C++: Practical Programming by Example, First Edition, by Andrew Koenig and Barbara E. Moo, Addison-Wesley publication
4. C++ Black Book, First edition, by Steven Holzner, Paraglyph Press
5. C++: The Complete Reference, Fourth Edition, by Herbert Schildt, McGraw Hill Education

[F] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

No.	Aim
1.	Understanding C++ program structure, use of standard library, new and delete keywords
2.	Learning to develop inline functions, call and return by reference, default parameters, function overloading
3.	Learning to map real world problem into C++ classes and objects, familiarity with private and public members
4.	Understanding static members, friend functions, Constructors, and Destructors
5.	Familiarizing with concept of inheritance and its types – single, multiple, multilevel, Protected members, overriding, virtual base class
6	Understanding polymorphism using this pointer, pointer to derived classes, virtual and pure virtual functions
7.	Learning to use C++ streams and manipulators
8.	Using exception handling in real world application - try-catch-throw, rethrowing exceptions, user defined exceptions
9.	Understanding template using real world problem
10	Using STL containers to quickly and efficiently solve coding problems

B. TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
CE 308 – DESIGN OF DIGITAL CIRCUITS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

To introduce number systems and codes, basic postulates of Boolean algebra and shows the correlation between Boolean expressions. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits and to introduce the concept of memories and programmable logic devices

B. DETAILED SYLLABUS

Binary Systems :
Introduction to Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, complements, binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits.

Boolean Algebra and Logic Gates :
Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, IC Digital Logic Families.

Simplification of Boolean Functions :
The Map Method, Two and Three Variable Maps, Four-Variable Map, Five and Six Variable Maps, Product of Sums Simplification, NAND and NOR Implementations, Don't-Care Conditions, The Tabulation Method, Determination of Prime-Implicants, Selection of Prime-implicants, Concluding Remarks.

Combinational Logic:
Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive OR and Equivalence Functions.

Combinational Logic With MSI and LSI:
Introduction, Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, Read-Only Memory (ROM), Programmable Logic Array (PLA), Concluding Remarks.

Sequential Logic:
Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

Registers, Counters and The Memory Unit:
Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, The Memory Unit, Examples of Random Access Memories.

Digital Integrated Circuits:
Introduction, Bipolar Transistor Characteristics, RTL and DTL Circuits, Integrated-Injection Logic, Transistor-Transistor Logic, Emitter-Coupled logic, Metal-Oxide Semiconductor, Complementary MOS.

Verilog:
Introduction, Overview of Digital Design with Verilog HDL, Gate-level Modeling (full addre, multiplexer, full substractor, comparator, decoder, demultiplexer, Flip-flops)

C. LEARNING OUTCOMES

Able to Design combinational circuits on bread board. Able to design different flip-flops.

D. RECOMMENDED TEXTBOOKS

1) Digital Logic and Computer Design, M.Morris Mano

E. REFERENCE BOOKS

1) Microelectronics, Jacob Millman & Arvin Grabel, Second Edition, McGraw – Hill International Edition

2) VERILOG HDL, Samir Palmitkar, Pearson Education

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr.No	Topics
1	To study basic Logic gates.
2	To implement half adder and full adder.
3	To design a code coversion circuit.
4	To study 3*8 decoder and 4*16 decoder.
5	To study 8*1 multiplexer and implement the given function.
6	To study 4 bit comparator as well as 8-bit magnitude comparator using 4-bit comparator
7	To implement full subtractor using decoder.
8	To implement various Flip-Flops.
9	Gate level programming for Multiplexer,Decoder,4-bit adder
10	Basic circuits using SILOS-III

B. TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
CE 313-DATABASE MANAGEMENT SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

To understand the overall structure and design of DBMS (software). To cover three major aspects of data: relation, integrity, and security.How to efficiently store and retrieve the data from database. To give the motivations behind development of DBMS, relational database design And SQL (Structured Query Language) used with relational databases.

B. DETAILED SYLLABUS

Basic Concepts:
Purpose of database system, View of data, Database abstraction and Models, Database Languages, Transaction management, Storage management, Database administrator, Database users, Overall system structure.

Entity Relationship Model:
Entity sets, Relationship sets, Attributes, Constraints, Keys, Entity relationship diagrams, Weak entity sets, Generalization, Specialization, Aggregation, Design of an E-R database schema, Reduction of an E-R schema to tables.

Relational Database Management System :
Relational Model, Structure of database, Relational algebra, Extended relational algebra operation, tuple relational calculus, Domain relational calculus, Modification of database, Views, Structured Query Language, Background, Basic structure, Integrity Constraints,
Domain constraints, Referential integrity, Assertions, Triggers, Functional Dependencies, Database Pitfalls in relational database design, Decomposition, Normalization, I,II,III normal Forms, Normalization using functional dependencies, Normalization using multi valued dependencies, Domain key normal form, Alternative approach to database design.

File System Structure :
Indexing & Hashing, File organization, Organization of records in files, Data dictionary storage, Basic concepts of indexing, Order indices, B- Tree index files, B+ -Tree index files, Static hashing & Dynamic Hashing.

Query Processing :
Overview, Catalog information for cost estimation, Measures of query cost, Selection operation, Sorting, Join operation, Other operations, Choice of evaluation plans.

Transaction Processing :
Transaction concepts, Transaction state, Implementation of atomicity & durability, Concurrent executions, Serializability, Conflict serializability, View serializability, Testing of conflict and view serializability.

Concurrency Control :
Lock based protocols, Time-stamp based protocol, Validation based protocol, Multiple granularity, Multi-version schemes, Deadlock handling, Insert & delete operations, Concurrency in index structures.

Recovery System:
Failure classification, Storage structure, Recovery & Atomicity, Log-based recovery, Shadow paging, Recovery with concurrent transactions, Buffer management, Failure with loss of non-volatile storage, Advance recovery techniques.

Distributed Data Bases
Security and Integrity of data base

C. LEARNING OUTCOMES

Students will be able to translate written business requirements into conceptual entity-relationship data models. Students will be able to analyze business requirements and produce a viable model. Students will be able to convert conceptual data models into relational database schemas using the SQL Data Definition Language (DDL).

D. RECOMMENDED TEXTBOOKS

1) "Data Base System Concepts", Henry F.Korth and A.Silberschatz. 2nd Ed., McGraw-Hill 1991.

E. REFERENCE BOOKS

1) “An Introduction to Database Systems”, C.J.Date, Pearson Publication

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No	List of experiments
1.	Logging into SQL, An exercise on data types in SQL & data definition language commands, Quitting from SQL.
2.	Exercise on data manipulation language and transaction control commands
3.	Exercise on Joins (single table or multi table) and using normalization.
4.	Aggregate functions 1. max, min, avg, sum, count
5.	Math functions 2. abs, ceil, floor, sqr, mod, etc.
6.	String functions - use of like, % , -
7.	Exercise on group by clause and date arithmetic. Order-by and group-by Date arithmetic includes Difference months, days, years. Add months, days, years. Etc.
8.	Exercise on different types of sub-queries. Using union, intersection, except set operation. And create table … as select clause…
9.	Exercise on creation, modification, deletion of view of a database.
10.	Exercise on index creation.

B. TECH. SEMESTER III
SCHEME & SYLLABUS FOR THE SUBJECT
AF 310 -FINANCIAL AND MANAGERIAL ACCOUNTING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	-	-	60		40		100	3	-	-	3

A.OBJECTIVES OF THE COURSE

The need to understanding concepts of accountancy is essential in daily life of individuals as well as company where engineering is applied. Thus for better decision making, principles of accounting are applied to produce financial statements which can be appealing to the prospective stakeholders. Traditional and modern approach provides learning to understand different perspectives of accountancy which have evolved over the years. Management accounting is for understanding the Cost-Volume-Profit analysis. Concepts such as ratio analysis along with breakeven analysis are important to compare different companies of the same industry, to do fundamental

B. DETAILED SYLLABUS

Unit 1- Financial Accounting – An Introduction: **(5 lectures)**

- Introduction
- Meaning of Accountancy
- Book-keeping and Accounting
- Accounting Process
- Objectives for accounting
- Differences between book-keeping and accounting
- Users of accounting information
- Limitations of Accounting
- Basic terminologies

Unit 2- Accounting Concepts, Principles, Bases and Policies: **(4 lectures)**

- Introduction
- Accounting Concepts
- Principles
- Policies and Standards
- Types of accounting concepts
- Business Separate entity concept
- Going concern concept
- Money measurement concept
- Periodicity concept
- Accrual concept
- Accounting Principles
- Principle of Income recognition
- Principle of expense
- Principle of matching cost and revenue
- Principle of Historical costs
- Principle of full disclosure
- Double aspect principle
- Modifying Principle
- Principle of materiality
- Principle of consistency
- Principle of conservatism or prudence
- Accounting Policies
- Changes in Accounting Policies
- Disclosure in case of changes in Accounting Policies
- Accounting Standards
- Scope and functions of Accounting Standards Board
- International Financial Reporting System

Unit 3- Double Entry Accounting: **(5 lectures)**

- Introduction
- Meaning of double entry accounting
- Classification of accounts under Traditional approach
- Classification of accounts under Accounting Equation approach
- Comparison of traditional approach with Modern approach equal approach
- Accounting Trail
- Transactions and events
- Meaning and roles of debit and credit
- Accounting equation

Unit 4- Secondary Books: **(3 lectures)**

- Introduction
- Secondary books
- Purchases Book/Purchases Day book

- Cash discount, Trade discount
- Difference between cash discount and trade discount, Sales Book or Sales Day book
- Purchase Returns Book
- Sales Returns Book
- Bills receivable book
- Bills payable book
- Cash book
- Posting to Ledger accounts

Unit 5-Trial Balance: **(4 lectures)**

- Introduction
- Meaning
- Objectives of preparing a trial balance
- Methods of preparing a trial balance
- Preparation of Trial balance
- Adjusting Entries
- Errors and their rectification
- Errors disclosed by Trial Balance
- Errors not disclosed by Trial Balance
- Steps to locate the errors

Unit 6- Final Accounts: **(3 lectures)**

- Introduction
- Adjustments before preparing final accounts
- Depreciation
- Bad Debts and accounting treatment of bad debts
- Provision for doubtful debts
- Reserves for Discount on Debtors
- Reserve for Discount on Creditors
- Closing Stock
- Trading Account
- Profit and Loss Account
- Balance Sheet

Unit 7- Introduction to Management Accounting: **(3 lectures)**

- Introduction
- Meaning of Management accounting
- The Role of Management Accounting
- Management Accounting Framework
- Functions of Management Accounting
- Tools of Management Accounting
- The Balanced Scorecard
- Cost Management System
- Value Added Concept
- Merits of Management Accounting
- Demerits of Management Accounting
- Distinction between Management Accounting and Financial Accounting

Unit 8- Financial Statement Analysis: **(3 lectures)**

- Introduction
- Meaning of Ratio
- Steps in Ratio Analysis
- Classification of Ratios
- Du Pont Chart
- Solved Problems
- Advantages of Ratio Analysis
- Limitation of Ratio analysis

Unit 9- Cash Flow Analysis: **(4 lectures)**

- Introduction
- Meaning of Cash Flow Statement
- Purpose of Cash Flow Statement
- Preparation of Cash Flow Statement
- Format of Cash Flow Statement (AS3: Revised Method)
- Cash Flow from Operating Activities
- Cash Flow Statement under Direct Method
- Different between Cash Flow Analysis and Fund Flow Analysis
- Uses of Cash Flow Statement

Unit 10- Marginal Costing and Break Even Analysis: **(3 lectures)**

- Introduction
- Concept of Marginal Costing

- Characteristics of Marginal Costing
- Difference between Absorption Costing and Marginal Costing
- Marginal Cost
- Contribution
- Cost Volume Profit (CVP) Analysis
- Break Even Chart
- Break Even Point
- Profit Volume ratio or MCSR
- Target profit
- Margin of Safety
- Application of Marginal cost
- Limitations of Marginal cost
- Solved Problems

Unit 11- Basics of Financial Management: (3 lectures)

- Introduction of Financial Management
- Objectives of financial management
- Role of finance manager
- Functions of financial management
- Concept of time value of money
- Present value
- Future value
- Annuity concept
- Solved problems

Termwork: (40 marks)

2. Students will be required submit assignment based on the topics covered in the syllabus such as ratio analysis for a company, calculation of breakeven point for a product, time value of money

C. LEARNING OUTCOMES

After completion of this course students will be able to understand:

1. Concepts and principles of accounting, double-entry bookkeeping, limitations and objectives of accounting.
2. Process of accounting
3. Balance sheet, profit & loss statement, cash flow statement, and contents of an annual report.
4. Breakeven point, marginal cost and breakeven analysis
5. Concepts of time value of money, present value, future value, annuity, growing annuity, and perpetuity.

D.RECOMMENDED TEXTBOOKS

1. Bhattacharya, S. K.; Dearden, J. *Accounting for Management – Text book & cases*; Vikash Publishing House: New Delhi, 2009.
2. Kishore, R. M. *Advanced Management Accounting*; Taxman: New Delhi, 2018.

E. REFERENCE BOOKS

1. Arora, M. N. *A Text Book of Cost Accountancy*; Vikas Publishing: Mumbai, 2010.
2. Horngren, C. T.; Foster, S. M.; Datar, G. *Cost Accounting – A Managerial Emphasis*; Prentice Hall: New Jersey, 1997.
3. Prasad, N. K.; A.K. Prasad *Cost Accounting*; Book Syndicate: Kolkata, 2016.
4. Edmonds, T. P.; Edmonds, C. D.; Tsay, B,-Y *Fundamental Managerial Accounting Concept*; Irwin McGraw Hill: Boston, 2013.
5. Bhattacharya, A. *Principles and Practice of Cost Accounting*; Sultan Chand: New Delhi, 2004.
6. Pillai, R. S. N.; Bhagavati, V. *Cost and Management Accounting*; Sultan Chand: New Delhi, 2010.
7. Banerjee, B. *Cost Accounting – Theory & Practices;* Sultan Chand: New Delhi, 2014.
8. Saxena V. K.; Vashist, C. D. *Advanced Cost & Management Accounting – Problems & Solutions*; Prentice Hall of India: New Delhi, 2015.
9. Maheshwari, S. N. *Studies in Cost Management*; Sultan Chand & Sons: New Delhi, 2013.
10. Rao, M. E. T. *Cost and Management Accounting*; New Age International: New Delhi 2004.
11. Rao, M. E. T.*Management Accounting*; New Age International: New Delhi 2003.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE): N/A

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 415 – DISCRETE MATHEMATICS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

- Learn basic logic, set theory, permutations, combinations, and discrete probabilities.
- Learn concepts of relations and functions and proof techniques
- Learn core ideas in graph theory and tree and solving related problems
- Learn core concepts of Finite- state machines
- Learn how to perform Analysis of algorithms and how to form and solve Recurrence relations for given problems
- Learn to solve counting problems and use combinatorial mathematics
- Learn ideas of grouping and apply to solve practical problems
- Learn ordered structure such as lattices and learn abstract type of algebra: Boolean Algebra

B. DETAILED SYLLABUS

Major Topics : Sets, propositions, permutations, combinations, discrete probabilities, relations, functions, graphs, trees and cut-sets, Finite-state machines, analysis of algorithms, computability and Formal languages, recurrence relations, generating functions, discrete numerical functions, group, rings, lattices and Boolean algebras.

Course contents :

Sets and propositions :
Combination, finite, uncountably infinite and infinite sets, mathematical induction,
principles of inclusion and exclusion, propositions.

Permutations, combinations, discrete probabilities :
rules of sums and products, permutations, combinations, generation, discrete probability, conditional probability, information.

Relations and functions :
Relational model of data bases, properties of binary relations, equivalence relation, partitions, partial ordering, lattices, chains and antichains, functions and pigeon-hole principle.

Graphs :
Basic terminology, multi- and weighted graphs, paths, circuits, shortest path, Eulerian path, Travelling Salesman problem, factors of a graph, planar graphs.

Trees :
Trees, rooted trees, path length, prefix codes, binary search trees, spanning trees and cut-sets, minimum spanning trees, transport networks.

Finite-state machines :
FSM as models of physical systems, equivalent machines, FSM as language recognizer.

Analysis of algorithms :
Time complexity of algorithms, example of shortest path algorithm, complexity, tractable and non-tractable problems.

Computability and Formal languages :
Russel's paradox and non-computability, ordered sets, languages, phrase structured grammars, types of grammars and languages.

Recurrence relations :
Linear recurrence relations with constant coefficient, homogeneous, particular and total solutions, generating functions, sorting algorithms, matrix multiplication.

Discrete numerical functions :
Manipulations of numerical functions, asymptotic behavior, generating functions, combinatorial problems.

Group :
Groups and sub-groups, generators, evaluation of powers, cosets, Lagrange's theorem, permutation group and Burnsides theorem, group codes, isomorphism, automorphism, homomorphism, normal subgroups, rings, integral domains and fields, ring homomorphism, polynomial rings and cyclic codes.

Lattices and Boolean algebras :
Lattices and algebraic systems, principle of duality, properties of algebraic systems, distributive lattices, boolean algebras, uniqueness, boolean functions and expressions, propositional calculus.

C. LEARNING OUTCOMES

- Students will learn how to apply logical reasoning to solve a variety of problems and how to apply the operations of sets and use Venn diagrams to solve practical problems

- Students will learn identifying types of relations and functions for given problems, how to construct correct direct and indirect (contradiction and contraposition) proofs and learn how to how to use Principle of Mathematical Induction to prove theorems.
- Students will understand the notations and language of graphs and trees and will learn (i) how to determine if a given graph is simple or a multigraph, directed or undirected, cyclic or acyclic, and determine the connectivity of a graph and (ii) types of trees and methods for traversing trees.
- Students will learn formulating FSM for given problem statements.
- Students will understand types of algorithms and the issue of efficiency of algorithms.
- Students will learn which grouping techniques/theorems to apply for given practical problems.
- Students will understand how to apply combinatorial ideas to real life problems.
- Students will learn how to apply principle of duality and how to use Boolean algebras.

D. RECOMMENDED TEXTBOOKS

1) "Elements of Discrete Mathematics", C.L. Liu, 2nd Ed., McGraw-Hill

E. REFERENCE BOOKS

1) "Modern Applied Algebra", Birkoff and Bartee, McGraw-Hill, CBS.
2) "Discrete Mathematics - A Unified Approach", Stephen A. Wiitala, Computer Science Series, McGraw-Hill.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

The students will design, implement in a programming language like C, PASCAL or PROLOG and test various algorithms based on the concepts as above.

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
JAVA TECHNOLOGIES

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network and also to make the students familiar with the concepts of hibernate and Spring Frameworks.

B. DETAILED SYLLABUS

Introduction: Introduction to JavaEE technology, Web Server, N-tier Architecture, Introduction to web Container and Structure of web Application

JDBC Concepts: Introduction to Java Database Connectivity(JDBC), Types of JDBC Drivers, Steps to create JDBC Application, JDBC API Classes and Interfaces

Java Servlets: A simple Web Application, HTTP Protocol, Servlet Interface, Servlet LifeCycle, Servlet Configuration and Exceptions, Servlet Request and Responses, Session Tracking with Java Servlet, Servlet Context, Servlet Listeners

Java Sever Pages: Introduction to JSP, its lifecycle, Scripting Elements, Comments, Implicit objects, JSP Directives, Standard Actions and using Beans, Scope, JSP Standard Tag Library (JSTL), Tag Library Descriptors, JSP tag Extensions (Custom Tags), Tag Handlers, Using Tag Extensions in JSP Pages.

Filters: Introduction to Filters, Configuration of Filters, Request and Response Filters.

Spring Framework: Introduction, Beans and Containers, The Application Context, Data Validation and Conversion, Aspect Oriented Programming, Spring Web MVC, Spring and Persistence.

Hibernate Framework: Introduction to O-R Mapping Hibernate Basics, Hibernate Architecture, Hibernate Configurations, POJO (Plain Old Java Classes) classes and O/R Mapping Object Identifier, Hibernate mapping (One-to-One Association, One-to-Many Association Many-to-One Association, Many-to-Many Association, Collection Mapping, Component mapping), Inheritance Mapping, Hibernate Query Language, Criteria Queries, Hibernate in Web Application.

C. LEARNING OUTCOMES

- Identify advance concepts of java programming with database connectivity.
- Design and develop platform independent applications using a variety of component based Frameworks
- Able to implement the concepts of Hibernate, Spring, XML for building enterprise applications.

D. RECOMMENDED TEXTBOOKS

1. "Professional Java Server Programming, SPD Pub., Subrimanyan & Cedric
2. Spring in Action,4th edition, MANNING Pub., Craig Walls
3. Java Persistence with Hibernate, 2ed, MANNING Pub., Christian Bauer, Gavin King, Gary Gregory & Linda Demichiel

E. REFERENCE BOOKS

1. Head First Servlets and JSP,2nd edition, O"Reilly Media, Bert Bates, Kathy Sierra & Bryan Basham
2. J2EE Complete Reference, TMH, James Keogh

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

Sr No.	Experiments
1.	Programs to demonstrate working of JDBC
2.	Programs to demonstrate use of JDBC in Servlet
3.	Programs to demonstrate use of different API (Classes/Interfaces and its methods) of Servlet
4.	Programs to demonstrate integration of Servlet and JSP
5.	Programs to demonstrate concept of session management using • HTML hidden form field • URL rewriting • Cookies • HttpSession
6.	Programs to demonstrate use of Filters
7.	Programs to demonstrate use of JSTL and Custom Tags
8.	Programs to demonstrate use of Hibernate Framework for O/R mappings
9.	Programs to demonstrate Spring Web MVC
10.	Programs to demonstrate AOP in Spring Framework

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 411 – VISUAL TECHNOLOGY

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The objective is to make the students familiar with the windows programming and VC++ and also to enable them to develop dialog based applications.

B. DETAILED SYLLABUS

Introduction to windows programming
Introduction to Vc++ IDE
Windows GUI programming (SDI & MDI Application)
- Messages (Message passing and handling)
- GDI Objects (Pen, Brush, etc.)
- Mouse Handling
- Keyboard Handling
- Mapping Modes
- Menu, Tool bar and Status bar
- Scrolling and Splitting views

Document / View Architecture
- Serialization (storing and retrieving to and from disk)

Multithreaded Programming
Dialog Based Application
- Model and Modeless dialogs
- Windows dialog controls
- Buttons, Edit box, Check box
- Radio Button, combo box, list box
- Animation control, spin control, slider control,
- Tree view control, List view control.

Active x controls
- Using Active x controls
- Creating Active x controls

Database Connectivity using DAO
DLL Development

C. LEARNING OUTCOMES:

After completion of the course students will be able to
- To do windows GUI programming and Multithreded Programming.
- To develop Dialog based Application
- To create Active X controls and to do DLL developement

D. RECOMMENDED TEXTBOOKS

1) Mastering Visual C++ 6.0, By: Michael J. Young.

E. REFERENCE BOOKS

1) Programming with Microsoft visual C++ 6.0, By Devid J. Kruglicnski, George Shepherd., Scot Wings.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr.No	Experiment
Lab-1	Understanding of Programming Environment using VC++ 6.0 IDE. 1. Write a program which will display "Welcome" message in center of the view window. 2. Study about different basic classes of an SDI application.
Lab-2	Implementation of application using different MFC classes such as CPen, CBrush, CRect, CGdiobject, CDC, CClientDC and Message Mapping. 1. Write a program which will display a line and an ellipse. For a line it should be solid and of blue color. For an ellipse it should have red border and vertical green lines in the fill area. 2. Write a program which will display "Hello" in blue color whenever left mouse key is pressed in the view window. 3. Write a program which will allow user to draw a line in the view area. 4. Write a program which will fill the view area with blue color if left mouse key is down first time and for second time it will fill it with red color.(Hint: use FillRect function of device context class. Also, use CRect class)

Sr.No	Experiment
Lab-3	Different controls of Dialog based application. 1. Calculator Like application 2. Demonstration of List box and Combo Box 3. Slider, progress, List view, tree view control, property sheet. 4. Difference between modal and modeless Dialog. 5. Stopwatch application using Timer control. 6. Create an application having dialog as a control. Also, it has one list box control, one edit box and 4 push buttons for Add, Delete, Reset and Count. If any text is within the edit box and user selects Add button that text should be added as an item to the list box. On the selection of Delete it should clear the list box. And Count displays number of items available in the list box.
Lab-4	Implementation of Database application which demonstrates the insert, delete and update operation with appropriate filtering of data.
Lab-5	Implementation of Menu based application and understanding of Command message(COMMAND) and user interface message.(UPDATE_COMMAND_UI) 1. Write a program which is having 2 menus: Rect and Ellipse. If user clicks Rect menu then it displays rectangle and if user clicks Ellipse menu then it displays ellipse in the view area. Every time there should be only one drawing. 2. SDICoin application.
Lab-6	Implementation of StatusBar 1. Write an application having a status bar with two message panes. If user moves mouse inside the view area it should display the x co-ordinate in the first pane and y co-ordinate in the second message pane.
Lab-7	Implementation of ToolBar 1. Write an application which has two docking toolbars. One toolbar has three tool buttons related to shapes (rectangle, line and ellipse) and second toolbar has three tool buttons related to color (red, blue and green). According to selection of tools it should display the proper drawing object.
Lab-8	Implementation of application which demonstrate Splitting of client area and Scrollbar 1. Write an application which has two splitter windows (static). If user draws a line in the first view area second view displays the starting and ending co-ordinates 2. Create an application having dialog as a control. Also, it has three vertical scroll bars. Each is related with one color red, green and blue. According to current value of the scroll position it should fill the color into the group box.
Lab-9	Keyboard Handling, Font, Serialization, Bitmap and Mapping Mode. 1. Create a bitmap and display it in the center of the view area. 2. Write an application which displays "Hello" message in the center of the view area. It is having facility of 3 menus: Line, Rectangle and Ellipse. Whatever menu is selected by user according to the caption of the menu it will display string in the view area. Also, provide saving and loading facility. (use different class for this) 3. Write an application which is having HIMETRIC Mapping Mode and one ellipse with gray fill color in the view area. If user presses left mouse key within the area of ellipse it should toggle the fill color from gray to white and vice –versa. 4. For the above program add the facility of key-board handling. If user presses „L" then Line menu should be executed. If user presses „R" or "E" then it should execute Rectangle and Ellipse menu respectively. 5. Create an application having dialog as a control. Also, it has three check boxes named Italic, Underline and Strike out. According to selection it should reflect the effect on the message which is displayed in the center of the group box control. 6. Write an application which displays "Welcome" message when application is initialized. It is having one menu- ChangeTime. Whenever user selects this menu it displays current date and time of the system. 7. For the above program provide the facility of saving and loading the data of view area.(for saving use only Document class)
Lab-10	Multithreading ,ActiveX control and DLL 1. Multithreading To implement Banner Application 2. DLL development. 3. To implement Activex control whichdisplays Frame around.

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 414 – DESIGN & ANALYSIS OF ALGORITHM

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The main objectives for offering the course Design and Analysis of Algorithm are:

- To explain the fundamentals of computer algorithm and create analytical skills, enable students to design algorithms for various applications, and analyze the algorithms.
- To introduce mathematical aspects and analysis of algorithms, sorting and searching algorithms, algorithmic techniques and algorithmic design methods which help in development of software.

B. DETAILED SYLLABUS

- Introduction to algorithms
- Elementary Data Structures
- Methods for solving recurrence relations for finding time complexity
- Overview of searching & sorting techniques
- The Greedy Methodology
- Dynamic Programming
- Graph Traversal & Searching
- Backtracking Techniques
- Branch & Bound Techniques
- Lower bound theory
- NP-hard & NP-complete problems

C. LEARNING OUTCOMES

After completion of the course students will be able to

- Develop efficient and effective computer algorithm. This will help for development of efficient and optimized software and problem solving approach.
- Apply their theoretical knowledge in practice (via the practical component of the course).
- Accustom to the description of algorithms in both functional and procedural styles
- Analyze algorithms and estimate their worst-case and average-case behavior.

D. RECOMMENDED TEXTBOOKS

1. Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub.

E. REFERENCE BOOKS

1. Fundamentals of Algorithms by Brassard & Brately, PHI.
2. Introduction to Algorithms by Coreman, Tata McGraw Hill.
3. Design & Analysis of Computer Algorithms, Aho, Ullman, Addision Wesley.
4. The art of Computer Programming Vol.I & III, Kunth, AddisionWesley.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr.No	Topics
1.	Learn the use of GDB debugger and GProf tool. Write a program to sort N numbers using Merge sort and Quick sort.
2	Write a program to solve following problems using greedy strategy: a) Fractional knapsack problem, b) Make change Problem
3.	Write a program to find minimum spanning tree from a given graph using Kruskal"s algorithm (Greedy Strategy).
4.	Write a program to multiply two matrices using Strassen"s Matrix Multiplication algorithm. (Divide and Conquer approach)
5.	Write a program to find shortest paths from the given source vertex for any graph using Dijkstra"s algorithm.
6.	Write a program to solve following problems using Dynamic Programming: a) 0/1 Knapsack Problem, b) Make Change Problem
7.	Write a program to solve Longest Common Subsequence problem using Dynamic Programming.
8.	Write a program to solve Sum of Subsets problem using Backtracking.
9.	Write a program to solve Graph Coloring problem using Backtracking.
10.	Write a program to solve job-assignment problem using Branch and Bound method.

B. TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 417 – COMPUTER SYSTEM ARCHITECTURE

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The main objectives for offering the course Computer Organization & Peripherals are:

- To explore the basic concepts of computer organization & computer architecture design.
- To explore Computer System Components: Processor, Memory, and I/O Devices, Performance evaluation
- To provide insight details in Processor Components : Control Unit, Registers, Caches Memory, ALU, Instruction Execution Unit
- To provide introduction to Instruction Set Architecture and Practical exposure through simulation tools.

B. DETAILED SYLLABUS

Basic functional blocks of a computer:
CPU, memory, input-output subsystems, control unit, datapath design, interconnection structure, register transfer language, register transfer, bus and memory transfers, arithmetic logic shift unit

Data representation:
signed number representation, fixed and floating point representations, character representation, IEEE 754 standard of representation

Basic computer organization and design:
Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, memory reference instructions, I/O instructions, design of accumulator logic.

Datapath design:
Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic

Control unit design:
Hardwired control, micro programmed control, nano programmed control

Programming the basic computer:
Introduction, machine language, assembly language, the assembler, program loops, programming arithmetic and logic operations, subroutines, I/O programming.

Central Processing unit:
Register organization, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, RISC processors.

Pipelining:
Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Input-Output organization:
Peripheral devices, I/O interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processors, serial communication

Memory organization:
Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policy**.**

Case study:
8085 Microprocessor

C. LEARNING OUTCOMES

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

- Students will able to understand the concepts computer organization.
- Students will use knowledge of internal architecture of the system to develop an assembly language programs

D. RECOMMENDED TEXTBOOKS

1. Computer System Architecture by Morris Mano, 3rd Ed., PHI
2. Computer Architecture and Organization by John P. Hayes, Computer science series, McGRAW-HILL
3. Microprocessor Architecture, Programming and Applications With The 8085 by R.S. Gaonkar 5th Ed., CBS Publisher

E. REFERENCE BOOKS

1. Computer Organization and Design: The Hardware/Software Interface by David A. Patterson and John L. Hennessy, Elsevier.
2. Computer Organization by Carl Hamachar, Zvonco Vranesic and Safwat Zaky, McGraw Hill.
3. Computer Organization and Architecture: Designing for Performance by William Stallings, Pearson Education.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

Sr No.	List of experiments
1.	Introduction to 8085 Micro processor. Writing assembly language programming like Addition,sub, and, or etc.
2.	Write an ALP to move a block starting at location „X“ to location „Y“. Write an ALP to perform the addition of data stored consecutively in memory
3.	Write an ALP to perform the multiplication of two 8 bit numbers using 8085. A set of ten current reading is stored in memory locations starting at C050H. The reading are expected to be positive<127. Write a ALP to D. check each reading to determine whether it is positive or negative E. reject all negative readings F. add all positive readings G. output FFH to PORT1 at any time when the sum exceeds eight bits to indicate overload; otherwise, display the sum.
4.	A set of three reading is stored at C050H. Sort the readings in ascending order. Data(H): 87,56,42
5.	Implement a program to find a factorial of given number using 8085 instruction set.
6.	To study about Instruction Cycle, Machine Cycle and T-states. Calculations of T-states and Time period required to perform operation. Implement Hexadecimal, Decimal Counter.
7.	Implement a code that demonstrate the multiplication of two numbers(-ve) using booth algorithm
8	Implement BCD to Binary Conversion code in assembly 8085. Write a program to find Square of a given number and store output at memory location
9	Implement a code that demonstrate the division of two numbers(-ve) using restoring and non-restoring algorithm
10	Implementation a code that demonstrates FIFO and LRU page replacement algorithm.

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 421-SOFTWARE ENGINEERING PRINCIPLES AND PRACTICES

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	100	4	-	1	5

A. OBJECTIVES OF THE COURSE

- To describe the concepts of Software requirements gathering and analyzing, Software design techniques, coding standards, SQA plan, agile process model and development, software as service(SAAS)
- To explain CASE tools, design concepts, automated Software Testing, Documentation and Maintenance.

B. DETAILED SYLLABUS

Introduction to Software Engineering

Process Models:
Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Unified Process

An Agile view of a Process

Project Management and Estimation

Project Scheduling

Requirement engineering:
Requirement engineering tasks, initiating the requirement engineering Process, Eliciting requirements, SRS

Design Engineering:
Design concepts and principles, Architectural design, User interface design, Component level design, Deployment-level Design Elements, Pattern-Based Software Design

Risk Management:
Risk identification, Risk Projection, Risk Refinement, Risk mitigation, Monitoring and management, RMMM plan
Change Management:
Software configuration management, The SCM process

Testing Strategies and Tactics:
Software Testing strategies, White box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing

Quality Management

Component-Based Development

C. LEARNING OUTCOMES

After completion of the course, students will be able to Prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document. They will be able to apply the concept of Functional Oriented and Object Oriented Approach for Software Design.

D. RECOMMENDED TEXTBOOKS

1. Software Engineering - A practitioner's Approach by Roger S. Pressman, 7th Ed., McGraw Hill Pub.

E. REFERENCE BOOKS

1. Fundamentals if software engineering by Rajib Mall, II ed. Prentice Hall, Indian
2. Software Engineering by Ian Sommerville, 6 Ed., Pearson Education
3. SOFTWARE ENGINEERING: Principles and Practice by Waman S Jawadekar, Tata Mcgraw hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No	Aim
1	Create tables, insert data, develop and test SQL for provided questionnaires.
2	To Manupulate the Operations on the table.
3	To Implement the restrictions on the table.
4	To Implement the structure of the table
5	To implement the concept of Joins
6	To implement the concept of grouping of Data. Grouping Data From Tables.
7	To implement the concept of Sub Questionnaires.
8	To implement the concept of Indexes and views.
9	To Implement the concept of Triggers and TCL statements.
10	To Implement the concept of Forms and reports.

B.TECH. SEMESTER IV
SCHEME & SYLLABUS FOR THE SUBJECT
CE 409 - COMPUTER PERIPHERALS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
-	-	2	-	-	25	25	50	-	-	1	1

A. OBJECTIVES OF THE COURSE

This course aims to make students familiar with the Arduino microcontroller through hands-on work in the laboratory. This course focuses on creating simple sensor-driven physical computing systems and various making simple interactive projects. This course makes students aware about a basic understanding of the use, terminology, and potential of the Arduino. This course also emphasize on understanding of basic concept & structure of Computer Hardware & Networking Components.

B. DETAILED SYLLABUS

- Arduino uno board introduction.
- Development of Digital Input digital output based smart systems using LEDs and buzzers.
- Development of Analog Input and Output based smart systems using various sensors and PWM.
- LCD display
- Serial communication
- Mother boards and functions of hardware ports and the parts of the motherboard.

C. LEARNING OUTCOMES

Upon completing the course, students will be:

- Familiar with Arduino IDE and its applications.
- Able to understand Arduino programming
- Able to Design Smart systems applications.
- Be aware about various mother boards and functions of hardware ports and the parts of the motherboard.
-

D. RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS:

4. Programming Arduino – Getting Started with Sketches, Simon Monk (2016)
5. PC Upgrade and Maintainance, by Mark Minasi
6. IBM PC and clones, by Govind Rajalu

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1.	Introduction to arduino and its programming
2.	• To study basic inbuilt LED Experiments with Arduino. • To interface a single LED with Arduino • To interface multiple LEDs with Arduino and to study programming for the generation of various patterns.
3.	Write an arduino sketch to implement, • Traffic light at junction of four roads • 3 bit up counter and down counter • To study and implement interfacing of PUSH button and LEDs with Arduino.
4.	Write an arduino sketch to implement, • LED dice • Nand gate IC tester • Memory game
5.	To study about pizeo buzzer. Write an arduino program to make 3 key tiny keyboard and generate melodies like "Happy Birth day" and "mario video game" tunes.
6.	To study about serial communication using arduino. To study about interfacing of potentiometer to arduino.
7.	To study about interfacing of LCD to arduino and write an arduino sketech to implement count down timer and dynamic marquee style notice board.
8	To study about LM 135- a temperature sensor and LDR- light dependent register. Write an arduino program to implement, 1. Digital thermometer 2. Automatic Street light on/off management system 3. Torch Light sensitive security system of a locker room
	To study about IR sensor. Write an arduino program to implement, 1. obstacle avoidance using IR sensor 2.Home automation system. 3. Black(dark) and white(bright) color detection 3. Line follower system
9	To study about Distance sensor. Write an arduino sketch to measure, 1. Distance of the obstacle 2. Speed of the obstacle 3. gesture of a person- gesture recognition and gesture dependent actions
10	To study mother board and functions of hardware ports and the parts of the motherboard.

B.TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE 502 – MICROPROCESSOR FUNDAMENTALS & PROGRAMMING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

This course is intended to teach the internal architecture, memory organizations, addressing modes and interrupts of 8086 processor. This course also intended to expose students to the basic of the various peripheral such as 8255, 8254, 8251, 8237, 8279 & 8259 used for interfacing and the various functional units of 8051 microcontroller

B. DETAILED SYLLABUS

INTRODUCTION
Basic micro-processor architecture, ALU, registers, system bus, Peripherals. Introduction to assembly language.

8086 ASSEMBLY LANGUAGE PROGRAMMING TECHNIQUES
Objectives, Program Development Steps, Constructing the Machine Codes for 8086 Instructions, Writing Programs for Use with an Assembler, Assembly Language Program Development Tools, Flags, Jumps and WHILE-DO Implementation, REPEAT-UNTIL Implementation and Examples, Debugging Assembly Language Programs.

IF-THEN-ELSE STRUCTURES, PROCEDURES & MACROS
Objectives, IF-THEN, IF-THEN-ELSE, & Multiple IF-THEN-ELSE Programs, Writing and Using Procedures, Writing and Using Assembler Macros.

8086 INSTRUCTION DESCRIPTION & ASSEMBLER DIRECTIVES
Instruction Description, Assembler Directives.

8086 SYSTEM CONNECTIONS, TIMING AND TROUBLESHOOTING
Objectives, 8086 Hardware Review, Addressing Memory and Ports in Microcomputer Systems, 8086 Timing Parameters, Troubleshooting a Simple 8086-based Microcomputer

Interfacing
Interfacing RAM, ROM and I/O with the microprocessor

INTERRUPTS AND INTERRUPT SERVICE PROCEDURES
Objectives, 8086 Interrupts and Interrupt Response, Hardware Interrupt Applications

GENERAL-PURPOSE PROGRAMMABLE PERIPHERAL DEVICES
Basic Programming Concepts & Programmable Devices

- 8259 - Programmable Interrupt Controller
- 8251 - Programmable Interface device - Serial I/O
- 8255 - Programmable Peripheral Interface
- 8254 - Programmable Interval Timer
- 8279 – Programmable Keyboard/Display Interface
- 8237 - DMA Controller

Introduction to Microcontroller
8051 architecture, pin diagram, instruction set, memory interfacing

C. LEARNING OUTCOMES

Students will be able to:

- Understand the internal architecture, memory organizations, instruction set and addressing modes of 8086 processor
- Understand the interfacing of various peripheral devices as 8255, 8254, 8251, 8237, 8279 & 8259 using 8086 microprocessor.
- Understand the architecture and functional block of 8051 micro controller

D. RECOMMENDED TEXTBOOKS

1) Microprocessors And Interfacing (Programming & Hardware), Douglas V. Hall, McGraw Hill
2) 8086 Prrogramming and Advance Processor Architecture, M. T. Savaliya, WIND Series, 2012

E. REFERENCE BOOKS

1) INTEL MICROPROCESSORS 8086/8088, 80186/80188, 80286, 80386, 80486, PENTIUM AND PENTIUM PRO PROCESSOR BY BARRY B. BREY
2) Architecture, Programming & applications with 8085/8-8080A, R. S. Gaonkar
3) 8051 Microcontroller. by K.J.Ayela, Penron publication

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1	Introduction to DEBUG utility.
2	Introduction to TASM assembler. 1) small program related to different types of number used in DATA segment 2) Multiplication using repetitive ADD instruction. 3) ALP for taking character from user and display that character on the screen.(using 01,02,08 function calls)
3	1) ALP for taking string form user and display that string on the screen.(using 0a,09 function calls) 2) ALP for conversion of Packed BCD to Unpacked BCD 3) ALP for conversion of Unpacked BCD to Packed BCD
4	Write an assembly language programs related segmentation and addressing modes.
5	Indexing and Data manipulation. 1) Program related to basic arithmetic instructions 2) manipulation of arrays
6	Arithmetic and logical instruction & other program related to number system conversions.
7	Shift, Rotate and Jump instruction
8	Subroutine Handling instruction and macros
9	String Handling instruction
10	Program related to PUBLIC and EXTRN directive
11	Program related to Interrupts.

B.TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE-509 WEB DEVELOPMENT IN .NET

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The objective of this course is to develop web development skills specifically in .NET technologies. This course includes basic Web Development techniques along with advanced architectures like MVC and ORM framework such as Entity Framework. Introduction of these advanced technologies is very helpful in establishing web-programming skills of students as per current standard and trend of the industry.

B. DETAILED SYLLABUS

Introduction to .NET Framework
Framework Architecture, Versions and components of .NET Framework, Common Language Runtime (CLR), Single file and Multi File Assembly , Two Step compilation process of ASP.NET

ASP.NET Web Applications
Page life cycle of ASP.NET Application, Introduction to Visual Studio Editor, Use of Global.asax, Web.config, Machine.config files, Web server controls (Button, TextBox, CheckBox, Image etc.), Validation Server Controls

Programming in C#
Introducing C#., Understanding .NET: C# Environment.,Literals, Variables and Data Types.,Operators and Expressions,Handling arrays, Manipulating strings.,Classes and objects, Inheritance.,Interfaces, Delegates,Lambada Expression, Events.,Exception handling.

Session Management
Session management in ASP.NET using Query String, Cookies, Session and Application variables, Cross Page Posting etc.

Database Programming
Introduction to ADO.NET and basics of Direct and Disconnected Architecture, Introduction to Data Controls, Entity Framework (Database First, Code First and Model First Approach, Building Relations with Code first approach, Migration in Entity Framework), Language Integrated Query (LINQ), Lazy and Early execution Model, Different LINQ Operators. (Where, Grouo By, Join etc), Use of LINQ queries with Entity Framework

Security in ASP.NET
Authentication and Authorization, Forms Authentication configuration, Using Default Authentication Database.

ASP.NET MVC
Introduction to MVC (, Routing, Controller, Action Method, Action Result, Action Selectors, Action Verb, Model, View, Razor view engine, Razor Syntax, HTML helpers, Model binding, ViewBag, ViewData, TempData and Validations, MVC Application building with Entity Framework, Searching, Sorting and Paging functionality, Authentication and Authorization in MVC (Including 3rd party Authentication), MVC Unit Testing and Repository Pattern

Introduction to .NET Core
.NET Core Architecture, Installation on Windows and Linux Platform, Building basic MVC Application in .NET core.

C. LEARNING OUTCOMES

Students will have in depth understanding of .NET framework and they will be able to create web applications in .NET with C# language. They will be able to design, configure and deploy full fledge data driven web applications with advanced functionality developed in MVC framework and coupled with unit testing facility. Students will also learn introduction to Open source version of .NET framework (.NET core)

D. RECOMMENDED TEXTBOOKS

1) Begining ASP.NET 4.5 in C#. Author : Matthew Macdonald, Publisher : Apress

E. REFERENCE BOOKS

1) Pro ASP.NET MVC 5 (Expert's Voice in ASP.Net), Author : Adam Freeman, Publisher: Apress
2) C# 7.0 in Nutshell: The Definitive Reference , Author: Joseph Albahari and Ben Albahari

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

SR NO	Experiments
1	• Introduction to Visual Studio Editor and basic Hello World Program in C#. • Develop Single File Assembly and Use it in another source program.
2	• Develop Multi-File assembly and deploy it to GAC (Global Assembly Cache) and use it globally. • Introduction to Nuget Package Manager.
3	Implement Basic Web Application with use of following Web Controls : Button, TextBox, ListBox, RadioButton, CheckBox, DropdownList etc.
4	Implement C# Programs which implements following concepts : Inheritance, Polymorphism, Generic and Non Generic Collections.
5	Implement Following Session Management techniques in Web Application : Cookies, Query String, Session Variable, Cross Page Posting.
6	Implement C# Programs for following concepts : Events, Delegates, Lambda Expression, Func and Action in built delegates.
7	Implement Data Driven application with use of Entity Framework"s Database First, Code First and Model First Approach with LINQ queries.
8	Implement Simple MVC Application with entity framework.
9	Implement MVC Application which includes Searching, Sorting and Paging functionality.
10	Implement Authentication and Authorization in MVC Application. • Default Authentication • Custom Authentication • Third Party Authentication

B. TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE 513 – OPERATING SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

To describe the basic concepts of operating systems, Process scheduling, process synchronization issues and techniques, Concepts of process based deadlock, various aspects of memory management, File and Disk Management concepts

B. DETAILED SYLLABUS

Introduction
What is an OS?, Simple Batch Systems, Multi programmed Batched Systems, Time Sharing Systems, Personal-Computer Systems, Parallel Systems, Distributed Systems, Real-Time System

Computer-System Structure
Computer-System Operation, I/O Structure, Storage Structure, Storage Hierarchy, H/W protection, General System Architecture

Operating Systems Structures
System components, OS services, System calls, System programs, system structure, Virtual machines, System Design & implementation, System Generation

Processes
Process concept, Process Scheduling, Operation on Processes, Cooperating processes, Interprocess Communication

CPU Scheduling
Basic concepts, Scheduling criteria, Scheduling algorithms

Process Synchronization
Background, The critical-section Problem, Synchronization H/W, Semaphores, classical problems of synchronization, Critical Regions, Monitors

Deadlocks
System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from deadlocks, Combined Approach to deadlock handling

Memory Management
Background, Logical versus Physical Address space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging

Virtual Memory
Background, Demand Paging, Performance of Demand Paging, Page Replacement, Page-replacement algorithms, Allocation of frames, Thrashing, Other Considerations, Demand segmentation

File-System Interface
File concept, Access methods, Directory Structure, Protection, Consistency semantics

File-System Implementation
File-System Structure, allocation methods, Free-space Management, Directory Implementation, Efficiency and performance, Recovery

I/O Systems
Overview, I/O H/W, Application I/O interface, Kernel I/O subsystem, Transforming I/O Requests to H/W operations. Performance

Secondary-Storage Structure
Disk Structure, Disk scheduling, Disk Management, Swap-space management, Disk reliability

Distributed System Structures
Network operating Systems, Distributed Operating Systems, Remote services, Robustness, Design issues

Distributed File Systems
Features of good DFS, Naming and Transparency, Remote File Access, Stateful Versus stateless service, File replication, Example systems

Case studies on :

1. UNIX operating system
2. LINUX operating system
3. Windows NT

C. LEARNING OUTCOMES

After completion of the course, students will be able to understand detailed concepts of operating systems, the way in which processes are handled by the operating system, different aspects of memory management, file system structures and disk operations and various algorithms related to operating systems.

D. RECOMMENDED TEXTBOOKS

1) Operating Systems, internals and design principles by William Stallings, PHI

E. REFERENCE BOOKS

1) Operating System Concepts : Silbertschatz, Galvin, Addison Wesley.
2) Modern Operating System : Design and Implementation Tanenbaum, PHI
3) Operating system Concepts : Milan Malinkovic, TMI.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No.	List of experiments
	All the practical are performed on Linux Platform using GCC compiler using C language.
1	Implementation of "cat" and "cp" command in C. (use of open, read, write, and close system calls)
2	Implementation of "ls" command. (Use of opendir, closedir, readdir, rewinddir system calls.)
3	Process Creation and Termination (Use of fork, exec, wait, waitpid, getpid, and getppid system calls)
4	Thread creation and Termination. Synchronization using mutex lock and unlock. (Use of pthread_create, ptread_join, pthread_mutex_lock and pthread_mutex_unlock library functions of Pthread library)
5	Inter Process Communications (Use of pipe, and mkfifo system calls)
6	Implementation of dup System call and program of "ls|sort" command
7	IPC and synchronization: Solving "Producer-Consumer Problem" using semaphore (Use of sem_open, sem_close, sem_wait, sem_post and sem_destroy system calls).
8	Implementation of Readers-Writers Problem using semaphore.
9	Implementation of "ps" command. (Use of /proc filesystem.)
10	Implementation of Banker"s algorithm

B.TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE 514 - ADVANCED ALGORITHMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE :

Computer Algorithms is a fundamental subject of Computer Engineering. The aim of the course is to provide students with latest knowledge of the subject and develop programming skills.

B. DETAILED SYLLABUS :

Randomized Algorithm :
Probability and random variables, Probabilistic analysis, Randomized algorithms, Monte Carlo Algorithm, Las Vegas Algorithm, Primality Testing algorithms.

Flow Network :
Max Flow Problem, Max Flow - Min Cut duality, Ford Fulkerson Algorithm, Various algorithms to solve Max-Flow problem, Applications of Network Flow problems.

String Algorithms :
Naive String Matching algorithm, The Rabin-Karp algorithm, The Knuth-Morris-Pratt algorithm.

Computational Geometry :
Line-Segment properties, Determine intersection between line segments, Finding Convex Hull, Finding Closest pair of points.

Reduction :
Theory of reduction, Linear time reduction, Polynomial time reduction, Identifying lower bound using reduction

NP-Hard and NP-Complete Problems :
Unsolvable problem classes, NP-Hard Problems, Proving a problem NP-Hard, NP-Complete Problems, NP-Completeness proof

Linear Programming :
Standard and slack form, Formulating problem as linear programs, The simplex algorithm, Duality, basic feasible solutions.

Approximation Algorithm :
Approximation technique to solve hard problems, randomization and linear programming based approximation, Polynomial time approximation

C. LEARNING OUTCOMES :

The subject will help students in development of programing, analytical and problem solving skills.

D. RECOMMENDED TEXTBOOKS

1. Introduction to Algorithms, Thomas H. Corman, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, Third addition, PHI Learning private ltd.

E. REFERENCE BOOKS

1. Fundamentals of computer algorithms, Second Edition, Ellis Horowitz, Sartaj Sahni, S. Rajasekaran, Universities Press
2. Fundamentals of Algorithmics, Gilles Brassard, Paul Bratley, PHI Learning private ltd
3. Algorithm Design, Pearson/Addison-Wesley, Jon Kleinberg, Eva Tardos, Addison-Wesley

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No.	Aim
1	Write a program for Randomized Quick Sort
2	Write a Program for Primality Testing algorithm.
3	Write a program to solve Network Flow problem using Ford-Fulkerson algorithm.
4	Write a program for string matching using Rabin-Karp"s algorithm.
5	Write a program to find Closest Pair of Points.
6	Write a program to determine intesection between line segments.
7	Write a program to find Convex Hull.
8	Write a linear program to demonstrate simplex algorithm.
9	Write an approximation algorithm based program to solve Set Cover Problem.
10	Write an approximation algorithm based program to solve Vertex Cover problem.

B.TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE 515 -ADVANCED TECHNOLOGIES

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	-	4	60	40	25	25	150	3	-	2	5

A. OBJECTIVES OF THE COURSE

This course is intended to teach the basics involved in publishing content on the World Wide Web, more advanced topics such as programming and scripting and frameworks. This will also expose students to the basic tools and applications used in Web publishing.

B. DETAILED SYLLABUS

XML
Introduction to XML
Declaration, tags, elements, attributes
CDATA sections, well-formed document and validation
XML Namespaces
XML DTDs: Internal and external DTD, elements, attributes, entities
XML Schema (XSD): elements, attributes, restrictions, complex data type

Javascript & JSON
Introduction to Javascript
Variables, operators, loops and functions
Events, coockies, page redirection, dialog boxes
Data types, Arrays, Date, Math, RegExp, HTML DOM
Error handling, validations, debugging
Introduction to JSON, syntax, datatypes, objects and schema

AJAX
Introduction to AJAX
Browsers support, Action, XMLHttpRequest, database operations

JQuery
Introduction to JQuery
Selectors and attributes, traversing, CSS and DOM
Events, AJAX and effects

Bootstrap
Introduction to Bootstrap
Bootstrap controls (buttons, labels, progress bar, pagination, panels, etc.)
Bootstrap grids and themes
Bootstrap CSS and JS plugins

Node.js
Introduction to Node.js
Using events, listeners, timers and callbacks
Buffers, streams and file system
ExpressJS framework
Introduction to MongoDb
Connecting Node.js to database
Mongoose module
Working with Data and Socket services
Processes and Clusters

AngularJS
Introduction to AngularJS
Learning directives, expressions and controllers
Learning filters, tables, forms and includes
Learning AJAX, views and scopes
Learning modules and dependency injection

C. LEARNING OUTCOMES

The student will be able to:

- Design User Interface
- Build dynamic web pages using JavaScript (Client side programming).
- Client-side (angular.js) and server side web programming (node.js).
- Time efficient web access using AJAX

D. RECOMMENDED TEXTBOOKS

1. "Node.js, MongoDB, and AngularJS Web Development" by Brad Dayley, Addison Wesley
2. "HTML 5 Black Book" by DT Editorial Services, 2nd edition, Dreamtech Press
3. "Bootstrap" by Jake Spurlock, O"Reilly

E . REFERENCE BOOKS

1. "Beginning XML" by Liam R.E. Quin, Danny Ayers Joe Fawcett, 5th edition, Wiley
2. "Professional Node.js" by Pedro Teixeria, Wiley
3. "AngularJS" by Green and Brad, O"Reilly
4. "Learning Web Development with Bootstrap and AngularJS" by Stephen Radford, Packt Publishing Limited

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr.No	List of Experiment
1	XML validation and verification using DTD and XSD.
2	Client side validation using Javascript.
3	Understanding AJAX action and XMLHttpRequest.
4	Use of JQuery selectors and event handling.
5	Use of Bootstrap controls, grids and themes.
6	Learning AngularJS directives, models and data-binding and learning AngularJS scope, filters, services.
7	Learning AngularJS events, validation and routing
8	Learning callback concepts in Node.js and learning callback, event loop and event emitter concepts in Node.js
9	Learning buffers, streams and file system concepts in Node.js
10	Working with Express.js framework. Working with MongoDB.

B.TECH. SEMESTER V
SCHEME & SYLLABUS FOR THE SUBJECT
CE 610 – ADVANCED COMPUTER ARCHITECTURE

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

- To get familiarity with 8087 Math Co-Processor and Maximum mode of 8086
- To understand advanced processor architectures like 80286, 80386 and Protected Virtual Addressing Mode, segmentation, paging.
- To understand Parallel Processing techniques like loop splitting, expression splitting using shared memory and multiple processes
- To learn about pipelining, its issues and solutions, parallel processor architectures.
- To learn Parallel algorithms like Bitonic sorting, Gauss Elimination for solving system of Linear equations and to evaluate performance of the algorithms

B. DETAILED SYLLABUS

- 8086 Maximum Mode Operation, Signal Description, 8087 Math Co-Processor, Architecture of 8087 Floating Point Processor, Pin Functions of 8087,Register Set-Control Word Register, Status Word Register, Tag Word Register, Stack Registers, Instruction Set and Programming.

- 80286 Processor Architecture, Pin Functions, Register set-Programmer Invisible Registers, Features of 80286, Real Addressing Mode, Protected Virtual Addressing Mode-Protection Level Mechanisms for Code and Data, Segmentation in Protected Mode, Instruction Set and features of 80287.

- 80386 Processor Architecture, Pin Functions, Register set-General Purpose, Debug Registers, Test Registers, EFLAG, Control Registers Features of 80386, Real Addressing Mode, Protected Virtual Addressing Mode-Protection, Multitasking, Interrupt Handling, Segmentation, Paging Mechanism in PVAM, Instruction Set, Addressing Mode, Virtual 8086 Mode.

- Features of 80486 Processor, Cache Types-L1, L2 cache, TLB, M-Way Set Associative Cache Organization, Differences between 80386 and 80486. Pentium Processor Architecture and Features, Memory Management Unit of Pentium, New Instructions of Pentium, Features of Pentium PRO, Pentium2 and Pentium 4.

- Parallel Processing
  Introduction, Different Types of Parallelism, Pipelining, Hazards-Structural, Data, Control hazard, Super-pipelining, Super Scalar Architecture, BTB(Branch Target Buffer), BPB(Branch Prediction Buffer), Distributed Memory, Shared Memory, Symmetric Multiprocessing, Array Processors, Vector Processors, Systolic Arrays.

- Programming using Shared Memory

- Loop Splitting, Self Scheduling, Contention or Race Conditions in Parallel Computing, Solution to Contention using Spin Locks, Expression Splitting, Indirect and Block Scheduling, Barriers.

- Parallel Algorithm Design and Analysis- Sorting, Searching, Matrix Multiplication, Solving System of Linear Equations etc.

C. LEARNING OUTCOMES

- To be able to make programs using instructions of 8087
- To learn and implement shared memory multi-programming
- To learn about advanced processor architectures
- To learn about MPI (Message passing Interface) library and to make programs using that.
- To learn, analyze working of Parallel Algorithms and its issues, limitations, overheads etc.

D. RECOMMENDED TEXTBOOKS

1. INTEL MICROPROCESSORS 8086/8088, 80186/80188, 80286, 80386, 80486, PENTIUM AND PENTIUM PRO PROCESSOR BY BARRY B. BREY
2. Walter A. Tribal, The 80386, 486 and Pentium Processor
3. "Parallel Computers Architecture and Programming", V.Rajaraman, C. Siva Ram Murthy, PHI, New Delhi
4. Parallel Processing By Stevens Brawer
5. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar "Introduction to Parallel Computing", Second Edition, Addison Wesley, 2003. ISBN: 0-201-64865.

E. REFERENCE BOOKS

1. Advance Microprocessor and Peripherals –by A K RAY, K M BHURCHANDI, Second-Edition, The McGraw-Hill
2. S.G.Akl, "The Design and Analysis of Parallel Algorithms", PHI, 1989.
3. F.T.Leighton, "Introduction to Parallel Algorithms and Architectures: Arrays, Trees, Hypercubes", MK Publishers, San Mateo California, 1992.
4. Wilkinson, M.Allen,"Parallel Programming Techniques and Applications using networked workstations and parallel computers", Prentice Hall, 1999.
5. Michael J. Quinn, "Parallel computer theory and practice", McGraw Hill, Second Edition, 1994

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1	(i) Write a program in 8086 to check whether entered number is Armstrong or not. (ii) Write a program to find Greatest Common Divisor of two numbers using procedure.
2	Introduction to 8087 Math-co processor and Turbo Debugger (i)Write a program to implement Pythagoras theorem. (ii)Write a program to find resonance frequency. (ii)Write a program to find volume of sphere.
3	Write a program to find x to the power y in 8087.Where x and y both are real numbers.
4	(i) Write a program to find roots of the quadratic equation. (ii) Write a program to find compound interest.
5	Introduction to Shared Memory and Loop splitting technique for parallel processing. (i)Write a program to find summation of first n numbers using 5 processes.
6	Loop Splitting Programs (i)Write a program to find factorial of a given number. (ii)W.A.P. to find Matrix Multiplication using n processes. (iii) Program to copy one array to another using loop splitting.
7	Introduction to Self Scheduling Technique of Parallel Computing and implementation of related programs.
8	Contention problems, Race Conditions in Loop Splitting and Self scheduling Techniques and introduction to Spin locks to sove the problem of contention.
9	Introduction to Message Passing Interface and implementation of basic Program.
10	Write a Program to find Frequency Distribution using Histogram using loop splitting and self scheduling without contention.

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CE 618– NETWORK & INFORMATION SECURITY

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE:

- To understand important goals of security i.e. Confidentiality, Integrity and Availability and to learn about different types of Security Attacks
- To learn Symmetric key Cryptography algorithms like DES, AES with its pre-requisite Mathematical Theory of Groups, Field and Galois Fields. To understand Cryptanalysis of algorithms against attacks and its power
- To learn Public key cryptography algorithms like RSA, ECC, Elgamal etc. with pre-requisite Number Theoretic Ideas. . To understand Cryptanalysis of algorithms against attacks and its power.
- To learn about Digital signature, Hashing and corresponding attacks
- Use of all the above ideas for achieving Transport Layer and Network Layer security.

B. DETAILED SYLLABUS

1. Conventional Encryption:
   Conventional Encryption Model, Steganography, Classical Encryption Techniques

2. Conventional Encryption Techniques:
   Simplified Des, Block Cipher Principles, Data Encryption Standards, Differential And Linear Cryptography Principles, Block Cipher Design Principles, Modes Of Operations, Algorithms Like Triple Des, International Data Encryption Algorithm, Blowfish, Rc5, Cast-128, Rc2, Characteristics Of Advanced Symmetrical Block Cipher, Issues Of Conventional Encryption Like Traffic Distribution, Random Number Generation, Key Distribution

3. Public Key Cryptography:
   Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange

4. Number Theory:
   Prime And Relative Prime Numbers, Modular Arithmetic, Euler"s Theorem, Euclid"s Algorithm, Discrete Logarithm Tics

5. Message Authentication And Hash Functions:
   Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Ripemd-160, Hmac

6. Introduction To E-Commerce:
   Introduction To E-Commerce, Transactions On E-Commerce, Requirement Of Security On E-Commerce

7. Network Security:
   Digital Signatures, Authentication Protocols, Digital Signature Standards, Application Authentication Techniques Like Kerberos, X.509 Directory Authentication Services, Active Directory Service Of Windows NT/Windows 2000

8. IP Security E-Mail Security:
   IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Combining Security Association, Key Management, Pretty Good Privacy, S/Mime And Types

9. Web Security:
   Web Security Requirement, SSL And Transport Layer Security, Secure Electronic Transactions, Firewall Design Principles, Trusted Systems

C. LEARNING OUTCOMES

- Students will be able to understand the security aspects of the cryptographic/hashing algorithms and its vulnerabilities
- Can understand Mathematical ideas required for implementation of cryptographic algorithms and its cryptanalysis to analyze how good or bad the algorithm is with respect to other algorithms or with respect to the known attacks.
- Students will learn security aspects over the Internet traffic and the techniques required for avoiding attacks using Transport layer and Network Layer security.
- Can understand system level security threats, Anti-virus ideas, Firewall etc.

D. RECOMMENDED TEXTBOOKS:

Cryptography And Network Principles And Practice Fourth Edition, William Stallings, Pearson

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1	Implementation of Caesar cipher
2	Implementation of Playfair cipher
3	H. Implementation of Extended Euclidean algorithm to find multiplicative inverse with respect to modulo n. I. Implementation of Additive Inverse modulo n
4	3. Implementation of Multiplicative cipher and cryptanalysis of it 4. Implementation of Affine cipher and cryptanalysis of it.
5	Implementation of Auto-key cipher
6	Implementation of Vigenere cipher
7	Implementation of Hill Cipher
8	Implementation of RSA algorithm of public key cryptography.
9	Implementation of DES cipher
10	Case study: Elliptic curve Cryptography and Digital Signature

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CT 614 – THEO. OF AUTOMATA AND FORMAL LANGUAGES

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	-	60	40	-	-	100	4	-	-	4

A. OBJECTIVES OF THE COURSE

Automata, Formal Languages and Computation have been an important part of the curriculum in computer science for several decades. The automata theory is the study of abstract machines and their applications in solving computational problems. The Chomsky Hierarchy, which includes Finite Automata, Push-Down Automata, Linear Bounded Automata and Turing Machine, is a major part of this course

B. DETAILED SYLLABUS

Major Topics:

Formal languages, Automata, Computability, introduction to computational complexity, NP-completeness.

Course contents:

Review of Mathematical background:

- Sets, functions, logical statements, proofs, relations, languages, Mathematical induction, strong principle, Recursive definitions.

Regular Languages and Finite Automata:

- Regular expressions, regular languages, applications, Finite automata, memory requirement in a recognizer, definition, representation, extended notation, string recognition, union, intersection and complement of regular languages. Non- deterministic finite automata, lambda transitions, equivalence, algorithms, examples. Kleen's theorem. Minimization of Finite automata. Non-regular and regular languages, criterion, Pumping Lemma, decision problems and decision algorithms, Regular languages in relation to programming languages.

Context-Free Languages and Push-Down Automata:

- Context-free languages, definition, union, concatenation, examples etc. derivation tree and ambiguity.
- Simplified and Normal forms, Chomsky normal form. Push-Down Automata, definition, examples, deterministic PDA, two types of acceptances and their equivalence.
- Equivalence of CFG and PDA.
- Introduction to parsing, top-down and bottom-up parsing.
- Non-CFL and CFL, Pumping Lemma for CFL, intersection and complement.

Turing Machines:

- Models of computation, TM definition, combining TMs, computing a function with TMs. variations on Turing Machines, doubly infinite and more than one Tapes, non-deterministic and Universal TM, Recursively Enumerable languages, Unrestricted and context-sensitive grammars and their relation to TM, Linear Bounded Automata, Chomsky hierarchy, Unsolvable problems, Halting problem, Post's correspondence, applications to CFLs.

- Computability, Primitive recursive functions, computable functions, PR functions, bounded operations. Non-primitive recursive functions.

Introduction to Computational complexity :

- Tractable problems, growth rate, time complexity of TM. NP-completeness.

C. LEARNING OUTCOMES

It provides students with a detailed evolution of the theories related to computer science and highlights tradeoff between computation power and memory. At the end of the course, students come to know that the Universal Turing Machine is actually a theoretical model of our computer system

D. RECOMMENDED TEXTBOOKS

1) "Introduction to Languages and Theory of Computation", John C. Martin, McGraw-Hill.

E. REFERENCE BOOKS

1) "Computation : Finite and Infinite", Marvin L. Minsky, Prentice-Hall

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD:N/A

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CE-619 SERVICE ORIENTED COMPUTING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE:

Study and understand the principles of service oriented architecture for developing enterprise level applications. Study various standards for developing interoperable web applications.

B. DETAILED SYLLABUS:

1. Introducing SOA with Evolution-comparing SOA to past architectures-client server, distributed internet, hybrid web service architectures.
2. Web Services and primitive SOA- Web Services Framework, Service Descriptions with WSDL and Messaging with SOAP, UDDI basics.
3. Web Services and contemporary SOA - Service activity, Atomic transactions, coordination, business activities, orchestration, choreography.
4. Web Services and contemporary SOA - addressing, reliable messaging, correlation, policies, metadata exchange, security, notification and events.
5. Principles of Service Orientation- common principles, interrelation between principles, comparing service orientation with object orientation.
6. Service Layers - abstraction with configuration of layers
7. Service Layers - business application and orchestration layers
8. Windows Communication Foundation: WCF introduction, Operations, Service, data and message contracts, Fault management, Instancing and concurrency management.
9. Web API: Introduction, controller, configuration, routing, parameter binding, action return type, media type formatters, message handlers, filters, CRUD operation, consuming Web API, dependency injection.

C. LEARNING OUTCOMES:

Design and develop service oriented applications. Design and develop SOAP and RESTful web services. Design and develop interoperable applications. Learn the Web service implementation on .NET platform.

D. RECOMMENDED TEXT:

1) Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design",Pearson Education.
2) Juval Lowy & Michael Montgomery, "Programming WCF Services", O"Reilly, 4th Edition.
3) Tugberk Ugurlu, Alexander Zeitler and Ali Kheyrollahi, "Pro. ASP .NET Web API", Apress,

E. REFERENCE BOOKS:

1) Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl).
2) Kurtz, Jamie, Wortman, Brian,"ASP.NET Web API 2: Building a REST Service from Start to Finish", APress,
3) Scott Klein, "Professional WCF Programming", Wiley Publishing, Inc.
4) Bipin Joshi, "Beginning XML with C# 2008", Apress

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiment
1	WCF basic service creation and consumption
2	WCF service connecting with database
3	WCF service data and message contracts
4	WCF fault contracts and message exchange patterns (one-way, request-reply and duplex)
5	WCF service instancing and concurrency
6	Web API service creation.
7	Routing in Web API.
8	HTTP verbs (GET, PUT, POST and DELETE) and Action method return types in Web API.
9	Web API service having CRUD operations with database and writing an HTTP client.
10	Message handlers and Action filters in Web API.

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CE-622 MACHINE LEARNING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

This course introduces several fundamental concepts and methods for machine learning. The objective is to familiarize the audience with some basic learning algorithms and techniques and their applications, as well as general questions related to analyzing and handling large data sets. Several software libraries and data sets publicly available will be used to illustrate the application of these algorithms. The emphasis will be thus on machine learning algorithms and applications, with some broad explanation of the underlying principles.

B. DETAILED SYLLABUS

Introduction:
Overview ,Supervised and unsupervised learning, Learning task, instances, features, labels, reward/loss, training, testing

Classification:
Overview of classification: setup, training, test, validation dataset, overfitting. Classification families: linear discriminative, non-linear discriminative, decision trees, probabilistic (conditional and generative), nearest neighbor.

Decision tree classification:
Purity, Gini index, entropy, Algorithms for constructing a decision tree, Pruning methods to avoid over-fitting, Regression trees

Probabilistic classifiers:
Basics of Probability, Classifiers, LDA, QDA, Generative classifiers: Naive Bayes classification, Conditional classifier: Logistic

Regression: **Linear regression, Logistic regression**

Hyper Plane Classifier and convex optimization:
Loss regularization framework for classification, loss functions: square, perceptron, logistic, hinge, regularizer. Review of convex optimization and unconstrained function.

Support Vector Machine:
Max margin motivation: low density, high stability, Margin geometry to primal SVM formulation for separable training data, Dual formulation and role of alpha in a form of sparse local regression, Inseparable data, slack variables, hinge loss, upper bound on 0/1 training loss Handling non-linear regression by lifting data points to higher dimension,Polynomial, Gaussian, RBF kernels, Sequential minimal optimization (SMO) algorithm

Clustering:
Mixture model and Expectation maximization, K-Means Clustering, Distance based clustering, Density based clustering techniques

Ensamble learning:
Bagging and Boosting, Random forest, Adaboost

Dimensionality reduction:
Curse of dimensionality, Principal Component Analysis, Latent Semantic Analysis

C. LEARNING OUTCOMES

- Familiarity with the concepts of machine learning.
- Modeling real world problems using machine learning techniques.
- Capability to implement machine learning algorithms (Using Python)

D. RECOMMENDED TEXTBOOKS

1. Machine Learning. T. Mitchell. McGraw-Hill, 1997.
2. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017
3. Pattern recognition and machine learning by Christopher Bishop, Springer Verlag,2006.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No.	Aim
1	Introduction to Python
2	Machine Learning libraries in Python
3	Data set and feature engineering
4	Implementing Naïve bayes classifier
5	Implementing Support Vector Machine
6	Implementing Decision Tree classifier
7	Experiment on regression learning
8	Implementing K-Means clustering algorithm
9	Experiments on boosting and bagging
10	Implementation of Principal component analysis

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CE 611 – COMPUTER NETWORKS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The objective of this course is to familiarize the students with the concepts and fundamentals of computer networks starting with Reference Models, design issues, functionalities and performance issues of different layers, Protocols at different layers and Routing algorithms.

B. DETAILED SYLLABUS

Introduction
Uses of computer Networks, Network Hardware-LAN,MAN,WAN, internetworks. Network Software - Design Issues, interfaces & Services, Connection Oriented & Connectionless services. Service primitives. Relationship of services to protocols. Reference Models - OSI & TCP/IP, their comparison & critiques.

The Physical Layer
Transmission Media – magnetic media, twisted pair, baseband & broadband, fiber optics. Wireless Transmission – radio, microwave, infrared & lightwave. Narrowband ISDN, Broadband ISDN & ATM. Cellular Radio- Paging systems, cordless telephones, analog & digital telephones.

The Data Link Layer
DLL Design issues, Error Detection & Correction. Elementary Data link Protocols - Utopia, Stop N Wait, Automatic Repeat Request. Sliding Window Protocols - 1 bit sliding window, Go Back N, Selective Repeat Protocols.

Medium Access Sublayer
Channel Allocation Problem - Static & Dynamic. Multiple Access protocols - ALOHA, CSMA, Collision Free Protocols, Limited contention protocols, WDMA protocol, wireless LAN protocols. IEEE standards 802 for LAN & MAN - 802.2, 802.3, 802.4, 802.6 & related numericals. Bridges - From 802.x to 802.y, transparent Bridges, Spanning Tree, Source Routing Bridges, remote bridge & problems. Comparison of 802 bridges, High Speed LANs - FDDI, fast ethernet.

The Network Layer
Network layer Design issues. Routing Algorithms. Congestion Control Algorithms - general policies, congestion prevention policies, traffic shaping, flow specifications, congestion control in VC subnets, choke packets, load shedding, jitter control and congestion control for malfunctioning. The network layer in the internet - the IP protocol, IP addresses & subnets

The Transport Layer
The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols - TCP service model, TCP protocol, TCP Segment Header, TCP Connection Management, TCP Transmission Policy, TCP Congestion Policy. UDP & overview of Socket. Performance Issues - Performance problems in Computer Networks (case study), Measuring Network Performance (case study).

The Application Layer
Network Security - Traditional Cryptography, Two Fundamental Cryptographic Principles, Secret-Key Algorithms, Public-key Algorithms, Authentication protocols, Digital Signatures, Social Issues., E-mail (case study), SNMP (case study).

C. LEARNING OUTCOMES

The student will be able to:

- Comprehend reference models with layers, protocols and interfaces.
- Illustrate design issues, functionalities and performance issues of different layers of network models.
- Describe and analyze various basic protocols of computer networks and how they can be used to assist in network design and implementation.

D. RECOMMENDED TEXTBOOKS

1) Computer Networks - Andrew Tanenbaum, 3ed, PHI

E. REFERENCE BOOKS

1) Data & Computer Communications - William Stallings, 2ed, Maxell Macmillan Int.
2) Communication Networks, Fundamental Concepts & key Architecture - Leon-Garcia & Widjaj, Tata-McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No	List of experiment
1	Study of UART and RS232 standard
2	Character and string transfer between two computer by using RS 232
3.	File transfer by using RS 232
4	Single line two way communication between two computers(chatting) using RS232
5.	multiple lines two way communication between two computers(chatting) using RS232
6.	Implementation of Stop and Wait protocol between a transmitter and a receiver.
7	Study and practical demonstration of network commands: ping, tracert, traceroute, ftp, telnet, ipconfig, route etc
8	Implementation of shortest path routing algorithm.
9	Analyze IP header and TCP header using wireshark
10	Analyze Ethernet frame and padding using wireshark

B.TECH. SEMESTER VI
SCHEME & SYLLABUS FOR THE SUBJECT
CE 621 – SYSTEM DESIGN PRACTICE (MINI PROJECT)

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
--	-	2	-	-	25	25	50	-	-	1	1

A. OBJECTIVES OF THE COURSE

To sustain competitive advantage among the students by acquiring domain skills with the help of different technologies. To promote creative thinking, to provide hands on actual technology.

B. DETAILED SYLLABUS

Student at the beginning of a semester may be advised by his/her supervisor (s) for recommended courses.

Students will work together in a team (at most three) with any programming language.
Students are required to get approval of project definition from the department.

After approval of project definition students are required to report their project work on weekly basis to the respective internal guide.

Project will be evaluated at least once per week in laboratory Hours during the semester and final submission will be taken at the end of the semester as a part of continuous evaluation.

C. LEARNING OUTCOMES

After the completion of the course students will able to

- Explore the new ideas & the possible areas to work ahead.
- Able to use the various methodologies useful for doing project work.

D. RECOMMENDED TEXTBOOKS

Not applicable

E. REFERENCE BOOKS

Not applicable

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

Not applicable

B.TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 701 – ARTIFICIAL INTELLIGENCE

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The main objective of this course is to make students aware about achievements and vast opportunities present in the fields of AI. The course covers importantly three main facets of AI designing: Search Technique, Knowledge Representation and Learning. The course additionally covers advanced topics in the field such as Fuzzy Logic, Game Playing, Natural Language Processing, Evolutionary Computations and Expert Systems.

B. DETAILED SYLLABUS

Introduction to Artificial Intelligence
Introduction problems, problem space, production systems, problem characteristics

Search Techniques
Uniformed search techniques (best-first search, Depth-First search), Heuristic search techniques (General and test, Hill climbing, Simulated anncalling, A* algorithm, Constraint satisfaction, Means-end-analysis) Adverserial search techniques (Game playing, MINIMAX algorithm, alpha-Beta pruning)

Knowledge Representative
Propositional Logic, predicate logic, Instance and isa relationship, semantic net, frames.

Fuzzy Logic
Definition, need fuzzy set, fuzzy operators, fuzzy control systems, limitations

Inference techniques
Representing knowledge using rules, procedure versus declarative knowledge, forward versus backward reasoning, unification, resolution.

Natural Language Processing
Introduction NLP, NLU, phase of NLP (Morphological analysis, syntactic analysis, semantic analysis, discourse integration), introduction to Machine Translation.

Expert System
ES architectures, representation and use of domain knowledge, expert system shells, knowledge acquisition.

PROLOG
Facts and predicate, data types, goal finding, backtracking, simple object, compound objects, use of cut and fail predicates, recursion, lists, simple input/output.

C. LEARNING OUTCOMES

The course outcomes are as follows:

- The students will be able to understand Conceptual and Contextual meaning of AI and views of AI.
- The students will be able to analyze and represent an AI problem. They will be familiar with informed and uninformed search techniques for designing search space of a given AI problem.
- The students will be aware of several logic based techniques for knowledge representation and inference.
- The students will be capable of creating interactive programs using declarative programming language PROLOG.
- The students will be familiar with representing problem with uncertain information with the use of fuzzy logic representation and solving using fuzzy inference mechanism.
- The students will be capable of designing intelligent systems for Game Playing and Expert Systems and solving computationally hard problems using algorithms of Evolutionary Computations**.**
- The students are known to apply concept of Natural Language processing to problems leading to understand cognitive computing.

D. RECOMMENDED TEXTBOOKS

1) Artificial Intelligence by Elaine Rich and Kevin Knight, TMH
2) Introduction to Turbo PROLOG by Carl Townsend, BPB

E. REFERENCE BOOKS

1) Artificial Intelligence : A Modern Approach by Stuart Russell and Peter Norvig, PHI
2) Artificial Intelligence and Expert System by D.W. Patterson, PHI
3) Introduction to Applied Fuzzy Logic by Ahmed Abraham, PHI

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

SR. No.	List of the experiments
1	Study of Facts, Objects, Predicates and Variables in PROLOG. o Expressing facts and objects o Use of variables o Bound and free variables o Anonymous variables o Compound goals o Backtracking
2	Study of RULES & UNIFICATION. o Use of rules to solve problems o Variables in rules o Prolog execution rules o Use of „trace“ for debugging the program o Unification o Execution control o Input and output predicates in prolog o Build rule based consultation program.
3	To learn arithmetic operations and recursion in Prolog.
4	To study about controlling execution in prolog using cut and fail predicate.
5	To study LIST data structure in PROLOG.
6	To study uninformed and informed search techniques and implement a program to solve 8 puzzle problem using Best First Search algorithm.
7	To study Compound object and Functors in PROLOG.
8	To study importance of choosing write heuristic using TSP. Heuristics: Nearest Neighbour, Greedy TSP
9	To learn the use of dynamic database in Prolog.
10	To implement Knapsack problem solution using Genetic Algorithm.

B.TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 710 – EMBEDDED SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

- To introduce the concepts of an embedded system design, top down design methodology, customized single purpose processor design, programming language for embedded system design.
- To describe the concepts of standard SPP peripheral, digital camera design, Introduction to Real-time system, Real-time task scheduling, Handling Resource Sharing and Dependencies among Real-Time Tasks, RTOS.

B. DETAILED SYLLABUS

Programming languages for embedded systems :
Desirable characteristics of programming languages for embedded systems, low-level versus high-level language, main language implementation issues : control, typing, exdception handling, modularity and multithreading, major programming languages for embedded systems : Assembly, C/C++, Java and Esterel. Timing characteristics of embedded systems : hard, soft and firm systems : fail-safe and fail-operational systems, guaranteed- response, bes-effort, event and time-triggered systems, timing constraints in embedded systems.

Performance analysis of embedded systems :
software timing characterization and analysis methods.

Runtime and operational systems design :
Real time and non-real time applications, task assignment and scheduling : characteristics of tasks, task assignments and multi-tasking, Static and dynamic scheduling under constrains.

Memory management and synchronization for embedded software :
Mutual exclusion, deadlock, starvation and lockouts : priority assignments, inversion, event flags and signals, software optimization techniques under constraints : size, performance, embaddedibility metrics.

Compilation techniques for embedded software :
code generation, re- targetability, code optimization.

Examples of embedded and real-time software systems, real time applications.

C. LEARNING OUTCOMES

- After completion of the course, students will be able to design customized single purpose processor, write program to design embedded system and real-time system and solve problems of task scheduling and resource sharing for real-time system.

D. RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS

1) Software design methods for concurrent and real-time systems by Gomaa, Addision-Wesley 1993.
2) Real-time systems by H. Kopetz, Kluwer 1997
3) Co-synthesis of hardware and software for Embedded Systems by R. Gupta, Khuwer 1995
4) Introduction to real-time software design by S. Allworht, Springer-Verlag, 1984.
5) Real Time Systems by C.M. Krishna, Mc-Graw Hill 1997
6) Code generation for Embedded Processors by Peter Marwedel, G. Goosens, Kluner Academic Pub. 1993.
7) Embedded system design : Aunified hardware software introduction by Frank Vahid and Tony Givargis,John Wiley & Sons
8) Additional reading from selected journal papers.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Lab	Aim
1	Write programs to measure execution time of a program, process creation and debugger usage.
2	Write a programs for basic constructs and instructions of programming language.
3	Write programs to design Counter, Speed meter and Vending Machine.
4	Write a program to implement Stopwatch Controller.
5	Write a program to implement Temperature Controller.
6	Write a program to implement Belt Controller.
7	Write a program to implement Traffic Light Controller.
8	Write a program to implement Lift Controller.
9	Write a program to implement bridge-serial to parallel converter.
10	Write programs for Real-time task scheduling algorithms, RMA, DMA, EDF.
11	Term project/seminar.

B.TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 713 – ADVANCED COMPUTER NETWORKS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

B. DETAILED SYLLABUS

Introduction
Introduction to internetworking, TCP/IP protocol stack, Internetworking concepts.

TCP/IP Protocols
Addressing scheme (classful and classless), subnetting and supernetting, Ipv6, ARP, RARP, ICMP, IGMP, RIP, OSPF, BGP, DNS, application layer protocols : FTP, TFTP, NFS.

Sockets interface
Introduction to socket function, connect, accept, listen, bind function calls, TCP client server, concurrent server to server multiple clients.

I/O multiplexing
I/O models : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.

UDP socket:
UDP socket functions, difference : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.

Domain name server
Introduction to DNS, resource record and resolver function, mapping between IP address and domain name.

IPv4 and IPv6 interoperability
Introduction, IPv4 client-server, IPv-6 address testing macro, source code portability.

Daemon process
Introduction to daemon process, syslog, creating a daemon process, i net daemon.

Advance UDP socket
Receiving flags, destination address and interface info, adding reliability to UDP, concurrent UDP server.

Broadcasting and multicasting
Broadcast address structure, broadcast client-server, multicasting address structure, multicasting on WAN, multicasting v/s broadcasting, multicast example.

C. LEARNING OUTCOMES:

After completing this course students will be able to understand advanced computer network concepts like TCP/IP protocols, Socket Interface and IPV4 and IpV6 interoperability etc.

D. RECOMMENDED TEXTBOOKS

1) Unix network programming vol. 1 by W.R. Stevens
2) TCP/IP protocol suite by B.A. Forouzan

E. REFERENCE BOOKS

1) TCP/IP vol. 1 by D.E. Comer
2) TCP/IP Vol. 1 by W.R. Stevens

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD:

Sr No	Experiment
1.	WRITE A PROGRAM TO PRINT PID (PROCESS ID) AND PPID (PARENT PROCESS ID) OF ANY PROCESS.
2.	WRITE A PROGRAM USING FORK() SYSTEM CALL.
3.	WRITE A PROGRAM TO MAKE A SIMPLE TCP CLIENT-SERVER PROGRAM FOR CONCURRENT CLIENT.
4.	WRITE A CLIENT-SERVER PROGRAM FOR UDP ECHO CLIENT.
5.	WRITE A TCP CLIENT SERVER PROGRAM USING SELECT FUCTION AT CLIENT SIDE.
6.	WRITE A TCP CLIENT SERVER PROGRAM USING SELECT FUCTION AT SERVER SIDE
7.	WRITE A TCP AND UDP CLIENT SERVER PROGRAM USING SELECT FUCTION AT SERVER SIDE
8.	WRITE A PROGRAM TO FIND THE IP OF "www.google.com" AND DOMAIN NAME OF A GIVEN IP 66.94.230.32.
9.	WRITE A PROGRAM FOR DAEMON SERVER
10.	WRITE A PROGRAM TO GET RELIABLE ACKNOWLEDGEMENT FROM UDP

B.TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 716 - DISTRIBUTED OPERATING SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The objective of the course is to learn the principles, architectures, algorithms and programming models used in distributed systems and to gain knowledge on Distributed operating system concepts that includes Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.

B. DETAILED SYLLABUS

- Intro to Distributed Systems
- Interprocess Communication and Coordination
- State Maintenance
- Distributed Mutual Exclusion Algorithms
- Election Algorithms
- Fault Tolerance and Distributed Agreement
- Database Techniques
- Check Point and Recovery
- Distributed Deadlock Detection
- Load Balancing & Scheduling
- Security

C. LEARNING OUTCOMES

The students should be able to:

- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Learn the various resource management techniques for distributed systems
- Summarize the major security issues associated with distributed systems along with the range of techniques available for increasing system security

D. RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS:

1) "Distributed Operating Systems and Algorithms" by Randy Chow and Theodore Johnson, Addison Wesley, 1997

B.TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 714 – IMAGE PROCESSING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The main goal of digital image processing is to learn about different image processing tasks such as image acquisition, transformation, filtering, restoration, compression, and segmentation.

B. DETAILED SYLLABUS

- Introduction
- Image Transformation Techniques
- Image Enhancement Algorithms
- Image Restoration Methods
- Image Compression Techniques
- Image Segmentation Schemes

C. LEARNING OUTCOMES

Learning fundamentals of digital image processing is the first step towards the applications of images. It will help students to design and analyze arduous problems in the domain such as computer vision, artificial intelligence.

D. RECOMMENDED TEXTBOOKS AND REFERENCE BOOKS

1. R.C.Gonzalez and R.E.Woods, "Digital Image Processing", Addison-Wesley Longman, Inc, 1999
2. A.K.Jain, "Digital Image Processing", PHL
3. M.Sonka, V.Hlavac, and R.Boyle – Image processing, Analysis and Machine vision, Thomson Asia pvt. Ltd, 1999.

F. **LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD**

Sr. No.	Aim
1	Introduction to Matlab and Image processing toolbox. Matlab Commands: Pwd, dir, cd, help, lookfor, who, whos, figure, plot, subplot, disp, pause, zeros, ones, rand, randn. IP toolbox commands: imread, imshow, imwrite, iminfo, im2bw, im2double, imcrop, imresize, imhist, rgb2gray.
2	i) Arithmetic and Logic operations on images. ii) Image negative and thresholding. iii) Log transformation. iv) Power-law (Gamma) transformation.
3	Write a Matlab code for the following techniques. i) Contrast stretching. ii) Intensity level slicing. iii) Bit-plane slicing.
4	Write a Matlab code for the following techniques. i) Write a program to find the histogram of an image without using imhist function. Compare it with imhist function. ii) Write a program for histogram equalization.
5	i) Write a Matlab code for the following techniques. ii) Write a program to smooth an image using standard box filter of 3x3 size. iii) Write a program to smooth an image using weighted average filter of 3x3 size. Compare the result with the image obtained in (i). iv) Change the window size to 5x5, 7x7, 15x15 etc and Observe the impact of it on smoothness of the resulting image. v) Observe the impact of padding on resulting image for all window size. vi) Write a program for unsharp maksing and highboost filtering.

Sr. No.	Aim
6	i) Study of following noises, which affects an image. • Gaussian Noise • Rayleigh Noise • Erlang (Gamma) Noise • Exponential Noise • Uniform Noise • Impulse (Salt and-Pepper) Noise ii) Write a program to implement uniform noise with 0.5 probability. iii) Write a program to restore a pixel value using contra-harmonic mean filter. Design arithmetic and harmonic mean filter by changing value of Q. (use "cirpepper.tif" and "cirsalt.tif "as a reference image)
7	i) Use imnoise function to add noise such as Gaussian and salt-and-pepper in the image. Restore it using Alpha-trimmed mean filter. (Use "circuit.tif "as a reference image) ii) Write a program to implement median, max and min filter. iii) Write a program to implement adaptive median filter.
8	i) Write a program for following morphological operations. • Erosion • Dilation • Opening • Closing ii) Use imerode, imdilate, imopen and imclose function. iii) Write a program for following applications using morphological operations. • Boundary extraction • Hole filling • Extraction of connected components (Optional)
9	i) Implement ideal low pass filter, Butterworth filter and Gaussian filter in frequency domain. ii) Observe blurring and ringing effect in the image as function of cut off frequency for each case. iii) Observe the impact of the order of the Butterworth filter on ringing effect.
10	i) Write a program to generate huffman code for an image. ii) Compute compression ratio and relative data redundancy.

B.TECH. SEMESTER VII
SYLLABUS & TEACHING SCHEME
CE 715 - KNOWLEDGE DISCOVERY

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

To describe the need of data mining and data warehousing, various techniques to perform data mining tasks, Methods of data warehouse and management, Identifying patterns from various kinds of data, Concepts of web mining, text mining and multimedia mining

B. DETAILED SYLLABUS

Introduction

An Overview of data warehousing and data mining

Data Pre-Processing

Overview, Need for pre-processing
Issues related to efficient data handling (Extraction, Transformation, And updating of large databases (ADDED) Data Cleaning
Data Integration & Transformation
Data Reduction
Discretization & Concept Hierarchy Generation

Data warehouse and OLAP technology

Multi-dimensional Data Cubes
Star, Snow Flakes, & Fact Constellation Schema
Concept Hierarchies
OLAP
Data Warehouse Architecture
Steps for design and construction of data warehouse
A 3-tier data warehouse architecture
ROLAP, MOLAP, HOLAP.
Data Warehouse Implementation

Mining Frequent Patterns, Association and Correlation

Basic Concepts,
Item set mining methods
Mining association rules
Correlation analysis

Classification & prediction

An Overview & Basic Concepts
Classification by decision tree induction
Bayesian Classification

Cluster Analysis

An Overview & Basic Concepts
Partitioning methods
Hierarchical methods
Density-Based methods
Outlier analysis

Graph Mining

Methods for Mining Frequent Subgraphs
Mining Variant and Constrained Substructure Patterns
Applications: Graph Indexing, Similarity Search, Classification and Clustering

Mining Multimedia, Text, and Web Data

Multimedia Data Mining

- Similarity Search in Multimedia Data
- Multidimensional Analysis of Multimedia Data
- Classification and Prediction Analysis of Multimedia Data
- Mining Associations in Multimedia Data
- Audio and Video Data Mining

Text Mining

- Text Data Analysis and Information Retrieval
- Dimensionality Reduction for Text
- Text Mining Approaches

Mining the World Wide Web

- Mining the Web Page Layout Structure
- Mining the Web"s Link Structures to Identify
- Authoritative Web Pages
- Mining Multimedia Data on the Web
- Automatic Classification of Web Documents
- Web Usage Mining

C. LEARNING OUTCOMES

After completion of the course, students will be able to understand and apply different data mining tasks on different kinds of datasets and they will be able to analyze the results obtained. They will be able to create data warehouse and perform different operations on the same.

D. RECOMMENDED TEXTBOOKS

1. Jiawei Han & Micheline Kamber, "Data Mining – Concepts & Techniques",2nd edition, Morgan Kaufmann Publishers

E. REFERENCE BOOKS

1. Data mining: multimedia, soft computing, and bioinformatics By Sushmita Mitra, Tinku Acharya, published by John Wiley and Sons
2. Introduction to Data Mining. Tan, Steinbach, Kumar. Addison-Wesley. 2006.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr No.	List of experiments
1	Introduction to R
2	Introduction to Data sets of real world
3	Data Visualization using R
4	Data Preprocessing using R
5	Data Warehousing using R
6	Association rule mining and Correlation analysis using R
7	Supervised learning using R
8	Unsupervised learning using R
9	Content mining using R
10	Outlier analysis using R

B. TECH. SEMESTER VII COMPUTER ENGINEERING
SYLLABUS & TEACHING SCHEME
CE 717 – MOBILE APPLICATION DEVELOPMENT

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

Mobile Application Development course is designed to make students writing mobile applications for the Android devices that use basic and advanced phone features, and Deploy applications to the Android marketplace for distribution.

B. DETAILED SYLLABUS

Getting started with Mobility

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development

Building blocks of mobile apps

App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities. Application functionality beyond user interface - Threads, Async task, Services – states and life cycle, Notifications, Broadcast receivers, Telephony and SMS APIs. Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)

Sprucing up mobile apps

Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)

Testing mobile apps

Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk

Taking apps to Market

Versioning, signing and packaging mobile apps, distributing apps on mobile market place

C. LEARNING OUTCOMES

By the end of the course, student will be able to

- Apply layout management and multi-layout definition techniques to create adaptable user interfaces for mobile applications that share a common data model.
- Manage user data and multimedia on a mobile device via the Android framework libraries.
- Use the sensors available on mobile devices to enhance user interaction and feedback.
- Publish Applications to the Google Play Store.

D. RECOMMENDED TEXTBOOKS

1) Android – Wireless Application Development by Lauren Darcey and Shane Conder, 3rd Ed., Pearson Education

E. REFERENCE BOOKS

1) Beginning Android Application Development by Wei-Meng-Lee, Wiley Publication
2) Professional Android 4 Application Development by Reto Meier, Wiley Publication

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

NA as Students do a Project in the Laboratory

B. TECH. SEMESTER VII COMPUTER ENGINEERING
SYLLABUS & TEACHING SCHEME
CE-719 MACHINE LEARNING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

E. OBJECTIVES OF THE COURSE

This course introduces several fundamental concepts and methods for machine learning. The objective is to familiarize the audience with some basic learning algorithms and techniques and their applications, as well as general questions related to analyzing and handling large data sets. Several software libraries and data sets publicly available will be used to illustrate the application of these algorithms. The emphasis will be thus on machine learning algorithms and applications, with some broad explanation of the underlying principles.

F. DETAILED SYLLABUS

Introduction:
Overview ,Supervised and unsupervised learning, Learning task, instances, features, labels, reward/loss, training, testing

Classification:
Overview of classification: setup, training, test, validation dataset, overfitting. Classification families: linear discriminative, non-linear discriminative, decision trees, probabilistic (conditional and generative), nearest neighbor.

Decision tree classification:
Purity, Gini index, entropy, Algorithms for constructing a decision tree, Pruning methods to avoid over-fitting, Regression trees

Probabilistic classifiers:
Basics of Probability, Classifiers, LDA, QDA, Generative classifiers: Naive Bayes classification, Conditional classifier: Logistic

Regression: **Linear regression, Logistic regression**

Hyper Plane Classifier and convex optimization:
Loss regularization framework for classification, loss functions: square, perceptron, logistic, hinge, regularizer. Review of convex optimization and unconstrained function.

Support Vector Machine:
Max margin motivation: low density, high stability, Margin geometry to primal SVM formulation for separable training data, Dual formulation and role of alpha in a form of sparse local regression, Inseparable data, slack variables, hinge loss, upper bound on 0/1 training loss Handling non-linear regression by lifting data points to higher dimension,Polynomial, Gaussian, RBF kernels, Sequential minimal optimization (SMO) algorithm

Clustering:
Mixture model and Expectation maximization, K-Means Clustering, Distance based clustering, Density based clustering techniques

Ensamble learning:
Bagging and Boosting, Random forest, Adaboost

Dimensionality reduction:
Curse of dimensionality, Principal Component Analysis, Latent Semantic Analysis

G. LEARNING OUTCOMES

- Familiarity with the concepts of machine learning.
- Modeling real world problems using machine learning techniques.
- Capability to implement machine learning algorithms (Using Python)

H. RECOMMENDED TEXTBOOKS

4. Machine Learning. T. Mitchell. McGraw-Hill, 1997.
5. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017
6. Pattern recognition and machine learning by Christopher Bishop, Springer Verlag,2006.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No.	Aim
1	Introduction to Python
2	Machine Learning libraries in Python
3	Data set and feature engineering
4	Implementing Naïve bayes classifier
5	Implementing Support Vector Machine
6	Implementing Decision Tree classifier
7	Experiment on regression learning
8	Implementing K-Means clustering algorithm
9	Experiments on boosting and bagging
10	Implementation of Principal component analysis

B. TECH. SEMESTER VII COMPUTER ENGINEERING
SYLLABUS & TEACHING SCHEME
CE-720 BIG DATA AND ANALYTICS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

The tombs of data are no more futuristic because of the Volume, Velocity add Variety of demand driven data sources. To handle the Big Data, technological advancement is the key to stay up on the edge. Today's happening is the footprint of tomorrows and hence the Analytics of Big Data can help us generate the results we need to build a better tomorrow. The horizontal scalability infrastructure and up to the mark usage is more than necessity of the time.

B. DETAILED SYLLABUS

- Types of Digital Data (Structured, Semi-Structured, Unstructured)
- Introduction to Big Data
- The Big Data Technology Landscape
    a. NoSQL – NewSQL
    b. Hadoop - Introduction to Eco system.
- Hadoop – Distributed File System and Processing using MapReduce.
- Introduction to MapReduce Programming
- Introduction to Big Data Analytics
- Data Storage and Handling (Apache Cassandra/mongoDB)
- Querying Data using Hive/Pig like components
- Data Reporting Tools (i.e. Community Edition : Jasper Soft)
- The realm of Data Science

C. LEARNING OUTCOMES

The end to end steps, followed from data handling to reporting visionaries or any individual for day to day life, is the goal of efforts laid in the subject. Students shall become familiar of notions of Big Data. The importantly storage options and processing for results. Not only pro grammatically but also querying is possible and interfacing to different components for Analytics.

D. RECOMMENDED TEXTBOOKS

1. Big Data and Analytics – Seema Acharya and Subhashini C – Wiley India

E. REFERENCE BOOKS

1. Hadoop: The Definitive Guide by Tom White
2. Big Data Analytics: Methods and Applications by B. L. S. Prakasa Rao (Editor), S. B. Rao (Editor)

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No	List of the Experiment
1	Recording types of data and various file formats. Identifying data sources. Handling traditionally to start with at small scale.
2	Configuring and experiencing Hadoop Stand Alone Mode. Start/stop script and monitoring.
3	Interfacing to Distributed File System – HDFS commands and gui file system browser usage
4	Write a map-reduce program to count the frequencies of words from distributed storage source and understand the phases involved in map-reduce programming.
5	Map-reduce solution to a custom problem at hand. Molding the problem into mapreduce architecture.
6	Connecting to NoSQL database/s and querying to provide analysis using api like aggregation, etc. To be able to successfully import/export from CSV.
7	Crud operations and more using hive query language.
8	Establishing user equivalence and configuring Hadoop Cluster. Experiencing Big Data handling / scaling horizontally. Monitoring the health of cluster.
9	Leveraging machine learning using Mahout like tools.
10	Delivering Reports including visualizations and customized properties.

B. TECH. SEMESTER VII
SCHEME & SYLLABUS FOR THE SUBJECT
CE 718 – COMPILER CONSTRUCTION

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	-	2	60	40	25	25	150	4	-	1	5

A. OBJECTIVES OF THE COURSE

- To get familiarity with different phases of compiler
- To learn detailed algorithms for Top Down and Bottom up Parsing with corresponding theory with its usefulness in Semantic Analysis
- To understand different algorithms of Machine Independent Code Optimization
- To learn about Run Time Environment, Symbol table organization etc.

B. DETAILED SYLLABUS

Introduction
Language processor, Structure of compiler, the science of building compilers, Applications of language processors

Lexical analysis
The role of lexical analyzer, input buffering, specification of tokens, recognition of tokens, lexical analyzer generator (lex)

Syntax Analysis
Top-down parsing, Bottom-up parsing, Introduction to LR parsing, More powerful LR parsers, Using ambiguous grammars, Parser generators (yacc)

Syntax directed translation (SDT)
Syntax directed definitions (SDD), Evaluation order of SDD"s, Applications of SDT, SDT schemes

Intermediate code generation
Variants of syntax tree, three-address code, types and declarations, translation of expressions, type checking

Runtime Environments
Storage organization, stack allocation of space, access to non-local data on the stack, heap management

Code Generation
Issues in the design of code generator, the target language, addresses in the target code, basic blocks and flow-graphs, optimization of basic blocks, peephole optimization, register allocation and assignments

C. LEARNING OUTCOMES

- Students will know how compiler tokenizes, parses the input program and how different phases of compiler are involved in Error Detection and Recovery.
- Students will be able to make programs using LEX (Tool for Automatic Lexical Analyzer) and YACC (tool for Automatic Parser Generator).
- Students will be able to understand how different code optimization techniques reduce time or space required for the run-time.
- Students will be able to understand semantic aspects of compilation like how type insertion, checking, code generation etc. can be done.

D. RECOMMENDED TEXTBOOKS

1) Compilers: Principles, techniques and tools by Aho, Ullman and Sethi, 2nd Ed., Pearson Education

E. REFERENCE BOOKS

1) Theory and Practice of Compiler Writing, Jean-Paul Tremblay, Paul G. Sorenson, McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No	Topics
1.	Implementation of Finite Automata and String Validation
2.	Introduction to Lex Tool.
3.	Implement following Programs Using Lex a. Generate Histogram of words b. Ceasor Cypher c. Extract single and multiline comments from C Program
4.	Implement following Programs Using Lex a. Convert Roman to Decimal b. Check weather given statement is compound or simple c. Extract html tags from .html file
5.	Implementation of Recursive Descent Parser without backtracking Input: The string to be parsed. Output: Whether string parsed successfully or not. Explanation: Student has to implement the recursive procedure for RDP for a typical grammar. The production no. are displayed as they are used to derive the string.
6.	Finding „First" set Input: The string consists of grammar symbols. Output: The First set for given string. Explanation: The student has to assume a typical grammar. The program when run will ask for the string to be entered. The program will find the First set of the given string.
7.	Generate 3-tuple intermediate code for given infix expression
8.	Extract Predecessor and Successor from given Control Flow Graph
9.	Introduction to YACC and generate Calculator Program
10.	Finding „Follow" set Input: The string consists of grammar symbols. Output: The Follow set for given string. Explanation: The student has to assume a typical grammar. The program when run will ask for the string to be entered. The program will find the Follow set of the given string.

B.TECH. SEMESTER VIII
SCHEME & SYLLABUS FOR THE SUBJECT
AF 801 – PROJECT/INDUSTRIAL TRAINING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
-	-	30	-	-	100	300	400	-	-	14	14

SCHEME & SYLLABUS FOR THE SUBJECT
AF 802 – SEMINAR

Teaching Scheme (Hours)			Marks					Credit Structure
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Total**
-	-	-	-	100	-	-	100	4

Each student has to give two seminars on project/ given topic during their project duration.

The students will undertake project work for the period of full semester. They should design/develop the hardware and/or software system. They may also undertake project involving study and analysis of hardware and system in the organization.

They are supposed to prepare and submit a project report as a part of their term work and give seminars on their project work. The students may be sent to the industry / organization for their project and they are to timely report to the Institute regarding monitoring and necessary guidance. The faculties should arrange visits at the places of projects.

They should arrange for demonstration of the project work, if any. They are to be examined based on viva and/or demonstration.

The main purpose of industrial training is to acquaint students with the administrative and organizational details of a company. They should know what are the basic rules followed in a company and how a employee should behave and work in the company.