CRITERION 1
CURRICULAR ASPECTS

1.3 CURRICULUM ENRICHMENT

1.3.2 : Percentage of students undertaking project work , field work And internship

1.3 HIGHLIGHTED CURRICULUM

BCA

Experimental learning highlighted in page number	
MINOR	55
MAJOR	134

Mahatma Gandhi University, Priyadarshini Hills

Kottayam

Bachelor's Degree Programme in Computer Applications and Science

Prepared By

Board of Studies in Computer Applications

And

Faculty of Science and Technology

May 2017

CONTENTS

Acknowledgement

There are many profound personalities whose relentless support and guidance made this syllabus restructuring 2017 a success. I take this opportunity to express my sincere appreciation to all those who were part of this endeavor for restructuring of the syllabus and curriculum of Under Graduate Programme in Computer Applications and Science under Mahatma Gandhi University, Kottayam.

I express profound gratitude to the Honorable Vice-Chancellor, Pro-Vice chancellor, Registrar, Members of the syndicate and Academic Council for their leadership and guidance for completion of this work. I place on record my whole hearted gratitude to the members of Faculty of Science and Technology and Board of Studies (UG) in computer Applications for their untiring efforts. I also appreciate the efforts of members of University Academic section and other staff.

I am also grateful to all faculty members of various colleges who participated in the workshops organized by the University for restructuring the syllabus and curriculum. I also place on record my gratitude to all professionals, academicians and other stakeholders who gave valuable suggestions in this regard.

<div align="right">

Dean, Faculty of Science and Technology,

Mahatma Gandhi University,

Kottayam.

</div>

1. Introduction

Mahatma Gandhi University introduced choice based credit and semester and grading system in colleges affiliated to University from the academic year 2009-2010 under direct grading system. Regulations for undergraduate programmes under choice based course-credit-semester system and grading was introduced in the university from the academic year 2013-2014 onwards under indirect grading system. The university Grants Commission, in order to facilitate student mobility across institutions within and across countries and also to enable potential employers to assess the performance of students, insisted to introduce uniform grading system in universities. The academic council of M G University resolved to introduce the UGC guidelines for choice based credit semester system from the academic year 2016-17 onwards . Meanwhile the Hon'ble Supreme Court of India has issued orders to include core courses on Environmental Studies and Human Rights in the Syllabi and curricula of all U G programmes of all Universities all over India. In continuation to this the U.G.C has issued circular regarding the implementation of the above said changes by accepting the direction of the Honorable Supreme Court as a national policy. Hence, the syndicate of M G University has decided to modify the syllabi and curricula of all UG programmes in accordance with the directions of the Honourable Supreme Court and U.G.C. Further, the syndicate has decided to implement the new regulations and syllabi with effect from the academic year 2017-18. In view of this, the Board of Studies of Computer Applications and the Faculty of Science and Technology has prepared the following syllabus for U G programmes in Computer applications and Science.

2. Scope

The revised syllabus for Computer Application and Science provides a strong foundation to pursue post graduation programme in computer science / applications. The knowledge acquired by the students may also equip them to meet the industrial need, and get placed.

3. Programme Objective

The Programme in Computer Application and Science is designed with the following specific objectives.

(a)   To attract young minds to the potentially rich & employable field of computer applications.

(b) To be a foundation graduate programme which will act as a feeder course for higher studies in the area of Computer Science/Applications.

(c) To develop skills in software development so as to enable the graduates to take up self-employment in Indian & global software market.

(d) To Train & Equip the students to meet the requirement of the Industrial standards.

4. Course Design

The UG programme in Computer Applications and Science includes Common courses, Core courses, Complementary courses, Open courses, Seminar, Project and viva voce. No course shall carry more than four credits. The student shall select any one open course in semester V offered by various departments of the College.

5. Duration of Course

The pogramme shall normally extend over a period of three academic years consisting of six semesters.

Consolidated Scheme – I to VI Semesters of BCA

Sem	Title with Course Code	Course Category	Hours per week	Credit	Marks Intl	Extl	Total
I	English-I	**Common**	5	4	20	80	100
	Mathematics	**Complementary**	4	4	20	80	100
	Basic Statistics	**Complementary**	4	4	20	80	100
	CA1CRT01 -Computer Fundamentals and Digital Principles	**Core**	4	4	20	80	100
	CA1CRT02-Methodology of Programming and C Language	**Core**	4	3	20	80	100
	CA1CRP01-Software Lab I (Core)	**Core**	**4**	2	20	80	100
II	English-II	**Common**	5	4	20	80	100
	Discrete Mathematics	**Complementary**	4	4	20	80	100
	CA2CRT03 -Data Base Management Systems	**Core**	4	3	20	80	100
	CA2CRT04-Computer Organization and Architecture	**Core**	4	4	20	80	100
	CA2CRT05-Object oriented programming using C++	**Core**	3	4	20	80	100
	CA2CRP02-Software Lab- II	**Core**	**5**	2	20	80	100
III	Advanced Statistical Methods	**Complementary**	4	4	20	80	100
	CA3CRT06-Computer Graphics	**Core**	4	4	20	80	100
	CA3CRT07-Microprocessor and PC Hardware	**Core**	3	4	20	80	100
	CA3CRT08-Operating Systems	**Core**	4	4	20	80	100
	CA3CRT09-Data Structure using C++	**Core**	4	3	20	80	100
	CA3CRP03-Software Lab III	**Core**	**6**	2	20	80	100
IV	Operational Research	**Complementary**	4	4	20	80	100
	CA4CRT10-Design and Analysis of Algorithms	**Core**	4	4	20	80	100
	CA4CRT11- System Analysis & Software Engineering	**Core**	4	4	20	80	100
	CA4CRT12-Linux Administration	**Core**	4	4	20	80	100
	CA4CRT13-Web Programming using PHP	**Core**	3	3	20	80	100
	CA4CRP04-Software Lab IV	**Core**	**6**	2	20	80	100

	CA5CRT14-Computer Networks	**Core**	3	4	20	80	100
	CA5CRT15-IT and Environment	**Core**	4	4	20	80	100
V	CA5CRT16-Java Programming using Linux	**Core**	3	3	20	80	100
	CA5OPT-- Open Course	**Core**	4	3	20	80	100
	CA5CRP05 -Software Lab V	**Core**	**5**	2	20	80	100
	CA5CRP06-Software Development Lab I (Mini Project in PHP)	**Core**	**6**	2	20	80	100
VI	CA6CRT17 -Cloud Computing	**Core**	4	4	20	80	100
	CA6CRT18 -Mobile Application development- Android	**Core**	4	4	20	80	100
	CA6PET-- -Elective	**Core**	4	4	20	80	100
	CA6CRP07 –Software Lab VI & Seminar	**Core**	6	2	100	-	100
	CA6CRP08 -Software Development Lab II (Main Project)	**Core**	**7**	3	20	80	100
	CA6VVT01-Viva Voce	**Core**		1	-	100	100

Open Course(OP): CA5OPT01 : Informatics and Cyber Ethics, CA5OPT02 : Computer Fundamentals, Internet & MS Office.

Electives (PE): CA6PET01: Data Mining, CA6PET02: Digital Image Processing, CA6PET03: Soft Computing Techniques.

Consolidated Scheme for I to VI Semesters – B.Sc. Computer Science

Sem	Course Code & Title	Course Category	Hours per Week		Credits	Marks		
			Theory	Lab		Internal	External	Total
I	English-I	Common	5		4	20	80	100
	Mathematics-I	Complementary	4		4	20	80	100
	CS1CRT01 Computer Fundamentals and Basics of PC Hardware	Complementary	4		4	20	80	100
	CS1CRT02 Methodology of Programming and C Language	Core	4		3	20	80	100
	CS1CMT01 Fundamentals of Digital Systems	Complementary	4		4	20	80	100
	CS1CRP01 Software Lab-I	Core		4	2	20	80	100
II	English-II	Common	5		4	20	80	100
	Mathematics-II	Complementary	4		4	20	80	100
	CS2CRT03 Data Communication	Complementary	4		3	20	80	100
	CS2CRT04 Computer Organization and Architecture	Core	4		4	20	80	100
	CS2CRT05 Object Oriented Programming using C++	Core	4		3	20	80	100
	CS2CCP02 Software Lab-II	Core		4	2	20	80	100
III	Probability and Statistics	Complementary	4		4	20	80	100
	CS3CRT06 Database Management Systems	Core	4		4	20	80	100
	CS3CRT07 System Analysis and Design	Core	4		4	20	80	100
	CS3CRT08 Networking Fundamentals	Complementary	4		4	20	80	100
	CS3CRT09 Data Structure using C++	Core	4		3	20	80	100
	CS3CRP03 Software Lab-III	Core		5	2	20	80	100
IV	CS4CRT10 LINUX Administration	Core	4		4	20	80	100
	CS4CRT11 Microprocessor and Assembly Language Programming	Complementary	4		4	20	80	100
	CS4CRT12 Computer Aided Optimization Techniques	Core	4		4	20	80	100
	CS4CRT13 Web Programming Techniques	Core	4		4	20	80	100

Sem	Course	Type						
	CS4CRP04 Assembly Language Programming Lab	Complementary		5	2	20	80	100
	CS4CRP05 Software Lab IV	Core		4	2	20	80	100
V	CS5CRT14 System Software and Operating System	Core	4		4	20	80	100
	CS5CRT15 IT and Environment	Core	4		4	20	80	100
	CS5CRT16 Java Programming using Linux	Core	4		3	20	80	100
	CS5CRT17 Computer Security	Core	4		3	20	80	100
	CS5OPT Open Course	Core	4		4	20	80	100
	CS5PRP06 Software Development Lab I (Mini Project)	Core		5	2	20	80	100
VI	CS6CRT18 Computer Graphics	Core	5		4	20	80	100
	CS6CRT19 Big Data :Analytics	Core	5		4	20	80	100
	CS6PET Programme Elective	Core	5		4	20	80	100
	CS6SMP07 Seminar	Core		3	2	100	0	100
	CS6PRP08 Software Development Lab II (Main Project)	Core		7	3	20	80	100
	CS6VVP Viva Voce	Core		0	1	0	100	100
Grand Total			**113**	**37**	**120**	**780**	**2820**	**3600**

Open Course(OP): CA5OPT01 : Informatics and Cyber Ethics, CA5OPT02 : Computer Fundamentals, Internet & MS Office.

Consolidated Scheme for I to VI Semesters – B.Sc. Computer Application (Triple Main)

Sem	Course	Course Category	No. of hrs/ week		Duration of exam in hrs.	Maximum Mark			Credits
			Lect.	Lab		Intl	Extl	Tot	
I	English-I	Common	5		3	20	80	100	4
	Statistics	Core	4		3	20	80	100	3
	Mathematics	Core	4		3	20	80	100	3
	CA1CRT01-Computer Fundamentals and Digital principles	Core	4		3	20	80	100	3
	CA1CRT02-Methodology of programming and C language.	Core	4		3	20	80	100	3
	CA1CRP01 - Software Lab – I	Core		4	3	20	80	100	2
II	English	Common	5		3	20	80	100	4
	Statistics	Core	4		3	20	80	100	3
	Mathematics	Core	4		3	20	80	100	3
	CA2CRT03-Database Management System	Core	4		3	20	80	100	3
	CA2CRT04-Object Oriented Programming using C++	Core	4		3	20	80	100	3
	CA2CRP02-Software Lab II	Core		4	3	20	80	100	2
III	Statistics	Core	5		3	20	80	100	4
	Mathematics	Core	5		3	20	80	100	4
	CA3CRT05-Data Structure Using C++	Core	4		3	20	80	100	3
	CA3CRT06-Computer Network	Core	3		3	20	80	100	4
	CA3CRT07-System	Core	4		3	20	80	100	3

	Analysis and Software Engineering								
	CA3CRP03-Software lab-III	Core		4	3	20	80	100	2
IV	Statistics	Core	5		3	20	80	100	4
	Statistics	Core	5		3	20	80	100	4
	Mathematics	Core	5		3	20	80	100	4
	CA4CRT08-Linux Administration	Core	3		3	20	80	100	3
	CA4CRT09-Web Programming Using PHP	Core	3		3	20	80	100	3
	CA4CRP04- Software Lab IV	Core		4	3	20	80	100	3
V	Environmental Studies Human rights and Design of experiments	Core	5		3	20	80	100	4
	Mathematics	Core	5		3	20	80	100	4
	Mathematics	Core	5		3	20	80	100	4
	CA5CRT10-Java Programming	Core	4		3	20	80	100	4
	CA5OPT-Open Course	Core	4		3	20	80	100	4
	CA5CRP05-Software Lab V	Core		2	3	20	80	100	3
VI	Mathematics	Core	5		3	20	80	100	4
	Mathematics	Core	5		3	20	80	100	4
	CA6CRT11-Operating Systems	Core	5		3	20	80	100	4
	CA6PET-Elective	Core	5		3	20	80	100	4
	CA6CRP06-Software Development Lab (Main Project)	Core		5		20	80	100	3
	CA6VVT01 Course Viva	Core					100	100	1

Consolidated Scheme for I to VI Semesters – B.Sc. IT

Sem	Course	Course Category	No. of hrs/week		Duration of exam in hrs.	Maximum Mark			Credits
			Lect.	Lab		Intl	Extl	Tot	
I	English-I	Common	5		3	20	80	100	4
	Mathematics	Complementary	4		3	20	80	100	4
	IT1CRT01-Computer Fundamentals and Basics of PC Hardware	Core	4		3	20	80	100	4
	IT1CRT02-Digital Electronics	Core	4		3	20	80	100	3
	IT1CRT03-Methodology of programming and C language.	Core	4		3	20	80	100	3
	IT1CRP01 - Software Lab – I	Core		4	3	20	80	100	2
II	English-II	Common	5		3	20	80	100	4
	Probability & Statistics	Complementary	4		3	20	80	100	4
	IT2CRT04-Operating Systems	Core	4		3	20	80	100	4
	IT2CRT05-Computer Organization and Architecture	Core	4		3	20	80	100	4
	IT2CRT06-Object Oriented Programming using C++	Core	4		3	20	80	100	3
	IT2CRP02-Software Lab II	Core		4	3	20	80	100	2
	IT3CRT07-Software	Core	4		3	20	80	100	4

	Engineering								
	Operation Research	Complementary	4		3	20	80	100	4
III	ITCRT08-Data Structure Using C++	Core	4		3	20	80	100	4
	IT3CRT09- Database Management Systems	Core	4		3	20	80	100	3
	IT3CRT10- Computer Graphics	Core	4		3	20	80	100	3
	CA3CRP03- Software lab-III	Core		5	3	20	80	100	2
IV	IT4CRT11- Design & Analysis of Algorithms	Core	4		3	20	80	100	4
	Discrete Mathematics	Complementary	4		3	20	80	100	4
	IT4CRT12-Linux Administration	Core	4		3	20	80	100	4
	ITCRT13-Paralle processing	Core	4		3	20	80	100	4
	IT4CRT14-Web Programming Using PHP	Core	4		3	20	80	100	3
	IT4CRP04- Software Lab IV	Core	-	5	3	20	80	100	2
	ITCR5T15- Computer Networks	Core	4		3	20	80	100	4
	IT5CRT16- Java Programming using Linux	Core	3		3	20	80	100	3
	IT5CRT17-IT and Environment		4		3	20	80	100	4

V	IT5OPT- Open Course	Core	4		3	20	80	100	4
	IT5CRP05- Software Lab V	Core		4	3	20	80	100	3
	IT5CRP06- Software Development Lab I (Mini project in PHP)	Core		6	3	20	80	100	3
VI	IT6CRT18- Mobile Application Development- Android	Core	4	4	3	20	80	100	4
	IT6CRT19- System Software	Core	4		3	20	80	100	4
	IT6PET- Elective	Core	4		3	20	80	100	4
	IT6CRP08- Software Lab VI & Seminar	Core		6					2
	IT6CRP09- Software Development Lab II	Core		7		20	80	100	3

Consolidated Scheme for I to IV Semesters – B.Sc Mathematics Vocational Model-II

Semester	Course	No. of hours per week		Durn. of Exam in hours	Maximum Mark			Credit
		Lecture	Lab.		Internal	External	Total	
I	CA1VOT01 : Computer Fundamentals	4	-	3	20	80	100	4
	CA1VOP01Software Lab –I- Introduction to WEB Technologies		4	3	20	80	100	3
II	CA2VOT02 : Object Oriented Programming with C++	4	-	3	20	80	100	4
	CA2VOP02 : Software Lab-II using C++	-	4	3	20	80	100	3
III	CA3VOT03 :Database Management Systems	6	-	3	20	80	100	4
	CA3VOP03 :Software Lab -II using SQL	-	6	3	20	80	100	3
IV	CA4VOT04:Operating System	6	-	3	20	80	100	4
	CA4VOP04 : Software Lab – IV Project	-	6	3	20	80	100	3

Consolidated Scheme for I to IV Semesters – B.Sc Physics Vocational Model-II

Semester	Title of the Course	Hours/week	Credits	e st er		marks	
						IA	EA
1	English I	5	4	90	3	20	80
	Second Language I	5	4	90	3	20	80
	PH1CRT01 – Methodology and Perspectives of Physics	2	2	36	3	10	60
	Complementary I – Mathematics I	5	3	90	3	20	80
	CA1VOT01 - Computer Fundamentals	2	2	36	3	20	80
	CA1VOT02 Computer Networks & Internet Technologies	2	2	36	3	10	60
	Core Practical I: PH2CRP01 Mechanics and Properties of Matter	2	-	36	-	-	-
	Vocational Practical I: CA2VOP01 Introduction to Computers & ANSI C Programming	2	-	36	-	-	-
	English II	5	4	90	3	20	80
	Second Language II	5	4	90	3	20	80

2	PH2CRT02 – Mechanics and Properties of Matter	2	2	36	3	10	60
	Complementary I – Mathematics II	5	3	90	3	20	80
	CA2VOT03 Word and Data processing Packages	2	2	36	3	20	80
	CA2VOT04 - Programming in ANSI C	2	2	36	3	10	60
	Core Practical I: PH2CRP01 Mechanics and Properties of Matter	2	2	36	3	20	40
	Vocational Practical 2: CA2 VOP01 Introduction to Computers & ANSI C Programming	2	2	36	3	20	40
	English III	5	4	90	3	20	80
	PH3CRT03 – Optics, Laser and Fiber Optics	3	3	54	3	10	60
	Complementary I – Mathematics III	5	4	90	3	20	80

3	CA3VOT05 Concepts of Object Oriented Programming	3	4	54	3	10	60
	CA3VOT06 – Operating System	3	3	54	3	10	60
	Core Practical II: PH4CRP02	2	-	36	-	-	-

	Optics and Semiconductor Physics						
	Vocational Practical II: CA4VOP02 **Data Processing Packages, Operating** **System and Visual Basic Programming**	**2**	**-**	**36**	**-**	**-**	**-**
	Vocational Practical III: CA4VOP03 **C++ Programming and Web Development**	**2**	**-**	**36**	**-**	**-**	**-**

	English IV	5	4	90	3	20	80
	PH4CRT04 - Semiconductor Physics	3	3	54	3	10	60
	Complementary I – Mathematics IV	5	4	90	3	20	80
	CA4VOT07 - Visual Basic Programming	3	4	54	3	10	60
4	CA4VOT08 Web Development and PHP Programming	3	3	54	3	10	60
	Core Practical II: PH4CRP02 Optics and Semiconductor Physics	2	2	36	3	20	40
	Vocational Practical II: CA4VOP02 Data Processing Packages, Operating System and Visual Basic Programming	2	2	36	3	20	40
	Vocational Practical III: CA4VOP03 C++ Programming and Web Development	2	2	36	3	20	40

Consolidated Scheme for III to VI Semesters – B.Com Computer Application Vocational Model-II

Semester	Course	No. of hours per week		Durn. of Exam in hours	Maximum Mark			Credit
		Lecture	Lab.		Internal	External	Total	
III	CO3OCT02- Information Technology for Business	3		3	10	60	100	3
	CO3OCP01-Information Technology for Business		2	3				1
IV	CO4OCT02 – Information Technology for Office	3	-	3	10	60	70	3
	CO4OCP02 – Information Technology for Office(P01&P02)	-	2	3				1
	Software Lab I				10+10	40	60	
V	CO5CMT04- Programming in C	3	-	3	10	60	70	3
	CO5CMP01- Programming in C	-	2	3				1
	CO5OCT02 – Computerized accounting	3		3	10	60	70	3
	CO5OCP01 – Computerized accounting		2					1
VI	CO6CMT04- Database Management System	3	-	3	10	60	70	3
	CO6CMP01- Database Management System		2	3				1
	CO6OCT02- Software for Business and Research	3		3	10	60	70	3
	CO6OCP01- Software for Business and Research		2					1

					10+10	40	60	
Software Lab II					10+10	40	60	
Software Lab III					10+10	40	60	

Consolidated scheme for I to IV Semesters-BA Economics Programme (Vocational) Model II Computer Application

Semester	Course	No. of hours per week		Durn. of Exam in hours	Maximum Mark			Credit
		Lecture	Lab.		Internal	External	Total	
I	CA1CMT01 : Computer Fundamentals	3	-	3	10	60	70	3
	Practical – I Office Automation		2					
II	CA2CMT02 : Computerized Techniques for Office	3	-	3	10	60	70	3
	Practical – II Computerized Techniques for Office	-	2					
	CA2CMP01 : Practical – I & II external				10+10	40	60	2
III	CA3CMT03 : Database Management System	2	-	3	10	60	70	3
	Practical – III DBMS and MS Access	-	2					
IV	CA4CMT04 : Visual Programming Techniques	2	-	3	10	60	70	3
	Practical – IV based on VB.NET	-						
	CA4CMP02 : Practical – III & IV external			3	10+10	40	60	2

Consolidated scheme for I to IV semesters-B.Sc Petrochemicals Complementary Papers

Semester	Course	No. of hours per week		Durn. of Exam in hours	Maximum Mark			Credit
		Lecture	Lab.		Internal	External	Total	
I	CA1CMT01 : Computer Fundamentals	3	-	3	10	60	70	2
	Practical – I Office Automation		2					
II	CA2CMT02 : Programming in C language	3	-	3	10	60	70	3
	Practical – II using C	-	2					
	CA2CMP01 : Software lab I – Lab I & Lab II			3	10+10	40	60	2
III	CA3CMT03 : Web Technology and Programming	4	-	3	10	60	70	2
	Practical – III Web Technology based	-	2					
IV	CA4CMT04 : Visual Programming Techniques	3	-	3	10	60	70	3
	Practical – IV based on VB.NET	-	2					
	CA4CMP02 : Software lab II – Lab III & Lab IV			3	10+10	40	60	2

Consolidated scheme for I to IV semesters -Model- I Complementary Paper For B.Sc. Statistics, B.Sc. Mathematics

Semester	Course	No. of hours per week		Durn. of Exam in hours	Maximum Mark			Credit
		Lecture	Lab.		Internal	External	Total	
I	CA1CMT01 : Computer Fundamentals	2	-	3	10	60	70	2
	Practical – I Office Automation		2					
II	CA2CMT02 : Programming in C Language	2	-	3	10	60	70	3
	Practical – II using C	-	2					
	CA2CMP01 : Software lab I – Lab I & Lab II			3	10+10	40	60	2
III	CA3CMT03 : Web Technology and Programming	3	-	3	10	60	70	2
	Practical – III Web Technology based	-	2					
IV	CA4CMT04 : Visual Programming Techniques	3	-	3	10	60	70	3
	Practical – IV based on VB.NET	-	2					
	CA4CMP02 : Software lab II – Lab III & Lab IV			3	10+10	40	60	2

SYLLABUS- BCA- SEMESTER I

CA1CRT01 : Computer Fundamentals and Digital Principles (Core)

Theory:4 hrs. per week

Credits:4

Unit-1: (12 hrs.)

Introduction: Functional units of a computer system, Different types of computers, Computer Software and Hardware, Types of software-System software and Application programme. Characteristic of computers. Input Devices – Keyboard, Mouse, Optical input devices, Output devices – Monitors and Printers.

Unit-2: (10 hrs.)

Introduction to Operating Systems and Networking: Definition of an Operating System - Different types of PC Operating Systems. Computer Networks- categories of networks - LAN, WAN,MAN. The Internet - Working of Internet - Major Features of Internet.

Unit 3: (12 hrs.)

Number Systems: Base or radix ,Positional number system, Popular number systems(Decimal, Binary, Octal and Hexadecimal), Conversion-From one number system to another, Concept of binary addition and subtraction, Complements in binary number systems,1^s Complement, 2^s Complement and their applications, Signed magnitude form, BCD numbers- concept and addition.

Unit 4: (20 hrs.)

Boolean Algebra and Gate Networks: Logic gates- AND, OR, NOT, NAND and NOR Truth tables and graphical representation, Basic laws of Boolean Algebra, Simplification of Expressions, De Morgans theorems, Dual expressions, Canonical expressions, Min terms and Max terms, SOP and POS expressions, Simplification of expression using K-MAP (up to 4 variables), Representation of simplified expressions using NAND/NOR Gates, Don't care conditions, XOR and its applications, parity generator and checker.

Unit5: (18 hrs.)

Sequential and Combinational Logic. Flip flops- Latch, Clocked, RS, JK, T, D and Master slave , Adders-Half adder, Full adder(need and circuit diagram), Encoders, Decodes, Multiplexers and Demultiplexers(working of each with diagram), Analog to digital and digital to analog converters (Diagram and working principle), : Concept of Registers, Shift Registers

Books of study :

1. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

3. M Morris Mano-Digital Logic and Computer design, Fourth Edition, Prentice Hall.

References Text:

 1. Thomas C Bartee- Digital computer Fundamentals, Sixth Edition, TATA McGraw Hill Edition

2. Thomas L Floyd- Digital Fundamentals, Ninth edition, PEARSON Prentice Hall.

3. Malvino & Leach- Digital Principles and Applications, Sixth Edition, Tata McGraw Hill, 2006

CA1CRT02 -Methodology Of Programming And C Language (Core)

Theory:4 hrs. per week

Credits:3

UNIT 1 (12 hrs.)

Introduction to programming, Classification of computer languages, Language translators (Assembler, Compiler, Interpreter), Linker, Characteristics of a good programming language, Factors for selecting a language, Subprogram, Purpose of program planning, Algorithm, Flowchart, Pseudocode, Control structures (sequence, selection, Iteration), Testing and debugging

UNIT 2(12 hrs.)

C Character Set, Delimiters, Types of Tokens, C Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data types, C data types, Declaring and initialization of variables, Type modifiers, Type conversion, Operators and Expressions- Properties of operators, Priority of operators, Comma and conditional operator, Arithmetic operators, Relational operators, Assignment operators and expressions, Logical Operators, Bitwise operators.

UNIT 3 (15 hrs.)

Input and Output in C – Formatted functions, unformatted functions, commonly used library functions, Decision Statements If, if-else, nested if-else, if-else-if ladder, break, continue, goto, switch, nested switch, switch case and nested if. Loop control- for loops, nested for loops, while loops, do while loop.

UNIT 4(15 hrs.)

Array, initialization, array terminology, characteristics of an array, one dimensional array and operations, two dimensional arrays and operations. Strings and standard functions, Pointers, Features of Pointer, Pointer and address, Pointer declaration, void wild constant pointers, Arithmetic operations with pointers, pointer and arrays, pointers and two dimensional arrays.

UNIT 5(18 hrs.)

Basics of a function, function definition, return statement, Types of functions, call by value and reference. Recursion -Types of recursion, Rules for recursive function, direct and indirect recursion, recursion vs iterations, Advantages and disadvantages of recursion. Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef , bitfields , enumerated data types, Union, Dynamic memory allocation, memory models, memory allocation functions.

Book Of Study:

    1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education

    2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

Reference Text

1. E. Balaguruswamy -Programming in ANSI C ,Seventh Edition , McGraw Hill Education
2. Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill

CA1CRP01-Software Lab I (Core)

Software Lab: 4 hrs. per week

Credits:2

Syllabus

1. Programs to familiarize printf() and scanf() functions.

2. Programs Based on Decision statements , break, goto, continue, switch and Loop controls statements.

3. Programs Based on One dimensional and two dimensional arrays.

4. Programs on Strings and string handling functions.

5. Programs based on Pointers, operations on pointers, Arrays & Pointers,

6. Programs based on functions, Call by value, Call by reference, Recursion,

7. Programs based on structure and union, array of structures, Pointer to structure, structure and functions

8. Simple programs using pointers and malloc().

Scheme of Evaluation for software lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program from part 1& 2   **- 25 marks**

      1.Flowchart   - 5 marks

      2.Logic   – 10 marks

      3.Successful compilation   – 5 marks

      4.Result   – 5 marks

Second program should be based on advanced concepts ,part 3 to part 8   **- 35 marks**

      1.Logic   – 20 marks

      2.Successful compilation   – 10 marks

      3. Result   – 5 marks)

Viva Voce   **- 10 marks**

Lab Record (minimum of 25 Programs)   **- 10 marks**

Total Marks   **- 80 marks**

BCA- SEMESTER II

CA2CRT03- Database Management Systems (Core)

Theory:4 hrs. per week

Credits:3

Unit 1: Introduction (12 hrs.)

Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three-Schema Architecture and Data Independence.

DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.

Unit 2: Relational Model (16 hrs.)

Entity Relationship Modeling: Introduction –Entity Types , Entity Sets , Attributes and Keys – Relationship Types ,Relationship Sets, Roles , and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams.

Relational Model concepts: Domains ,Attributes , Tuples , and Relations – Characteristics of Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints , Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .

Unit 3: SQL(14 hrs.)

Data Types – Data Definition commands : CREATE , ALTER ,DROP - Adding constraints in SQL –

Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views.

Unit 4: Normalization and Indexing Structures for Files(15 hrs.)

Normalization: Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms –BCNF.

Indexing Structures for files: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.

Unit 5: Transaction Processing and Database Security (15 hrs.)

Transaction Processing: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions.

Database Security and Authorization: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges.

*Books of study***:**

1.Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS , Sixth Edition, Pearson

   Education.

References:

1. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003

2. Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems , Third edition, Mc Graw Hill International Edition.

3. Dipin Desai , An Introduction to Database Systems , First Edition, Galgoria Publications .

CA2CRT04 : Computer Organization and Architecture (Core)
Theory:4 hrs. per week

Credits:3

Unit 1: (12 hrs.)

Basic computer organization and design

 Operational concepts, Instruction codes, Computer Registers, Computer Instructions, Memory locations and addresses, Instruction cycle, Timing and control, Bus organization.

Unit 2: (15 hrs.)

Central Processing Unit:

General Register Organization, Stack Organization, Addressing modes, Instruction Classification, Program control.

Unit 3: (16 hrs.)

Memory Organization

 Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory-ROM-PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4: (15 hrs.)

 Parallel Computer Structures:

Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

Unit 5: (14 hrs.)

Pipelining and Vector processing: Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.

Book of study :
1. M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education
2. Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills,1990

Reference
1. Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.
2. John P Hayes -Computer Architecture & Organization–Mc Graw Hill
3. William Stallings-Computer Organization and Architecture , Seventh Edition, Pearson Education

CA2CRT05- Object Oriented Programming using C++ (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Principles of Object Oriented Programming, Beginning with C++

Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program-Structure of C++ program-C++ data types- Symbolic constants- Reference by variables-Operators in C++- Operator precedence-Control structures- Function in C++ - The main function, Function prototyping- Call by reference- Return by reference- Inline function- Default arguments- Function overloading.

Unit 2: (10 hrs.)

Classes and Objects : Specifying a class- Defining member functions- Nesting of member functions - Private member functions - Arrays within a class - Memory allocation for objects-Static data members - Static member functions -Arrays of objects - objects as function arguments -Friendly functions- Returning Objects.

Unit 3: (12 hrs.)

Constructers and Destructors, Overloading

Constructors- Default constructor-Parameterized constructor-Copy constructor- Multiple constructors-Constructors with default arguments- Dynamic constructor-Destructors- Operator overloading- Unary and Binary operator overloading- Overloading using friends- Rules for overloading- Type conversion.

Unit 4: (10 hrs.)

Inheritance: Inheritance - Defining derived classes-Visibility modes-Single, Multilevel, Multiple, Hierarchical and Hybrid inheritance- Virtual base classes- Abstract classes- Constructors in derived classes- Nesting of classes.

Unit 5: (12 hrs.)

Pointers, Virtual Functions and Polymorphism, Working with Files : Pointers- Pointers to objects-this pointer-Pointers to derived classes- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.

Book of Study:

1. E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

Reference:

1. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
2. Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.
3. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

CA2CRP02-Software Lab II (Core)

Software Lab: 5 hrs. per week

Credits:2

I. SQL Commands (2 hrs. per week)

1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary

   key, foreign key, unique key, check, not null.

2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables,

   ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT,

   INTERSECT, Substring   Comparison using LIKE operator, BETWEEN operator.

3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL

   values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

4. Managing views, Simple stored procedures.

5. Data Control commands - Access Control and Privilege commands.

II. Object Oriented Programming using C++ (3 hrs. per week)

1. Programs based on default arguments, function overloading.
2. Programs based on array of objects, friend functions, passing objects as arguments to function.

3. Programs based on operator overloading (binary, unary) using member functions and friend functions.
4. Programs based on constructors, different types of constructors.
5. Programs based on inheritance, different types of inheritance.

Scheme of Evaluation for software lab II external is as follows:

(There will be two questions; the first from DBMS and second from C++)

Division of Marks (Practical - 3 hours External)

First program - questions from DBMS   **- 25 marks**

    1. Logic   – 10 marks

    2.Successful compilation   – 8 marks

    3. Result   – 7 marks

Second program – questions from Object Oriented Programming using C++ **- 35 marks**

    1. Logic   – 20 marks

    2.Successful compilation   –10 marks

    3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(DBMS   -Minimum of 10 Programs

 C++   -Minimum: of 15 Programs)

Total Marks   **- 80 marks**

CA3CRT06 - **Computer Graphics (Core)**

Theory:4 hrs. per week

Credits:4

Unit 1 : (12 hrs.)

Introduction: A survey of Computer Graphics, overview of graphics systems-Video display devices-Refresh CRT, Raster-Scan and Random-Scan Displays ,Color CRT Monitors, DVST, Flat-Panel Displays , Raster Scan systems, Random scan systems, Input devices, Hard copy devices, Graphics software.

Unit 2: (14 hrs.)

Output primitives: Line drawing algorithms: DDA algorithm, Bresenham's line algorithm, Circle generating algorithm- Midpoint circle algorithm, Character generation.

Unit 3: (18 hrs.)

2D geometric Transformations: Basic transformations: Translation, Rotation, Scaling; Other transformations-Reflection and shear, Matrix representation and homogenous coordinates, Composite transformation, Interactive picture construction Techniques.

Two-dimensional viewing: viewing pipeline, window and viewport, window to viewport transformation. Clipping operations- Point clipping, Line clipping:- Cohen Sutherland line clipping, Polygon clipping:-Sutherland- Hodgeman polygon clipping, Text Clipping.

Unit 4: (14 hrs.)

Three-dimensional concepts: Three dimensional display methods, Three dimensional object representations- Polygon surfaces, Sweep representations, Constructive solid geometry methods, octrees and quadtrees.

Unit 5 (14 Hrs)

Computer Animation: Design of animation sequences, raster animations, computer animation languages, key-frame systems, morphing, motion specifications.

Book of study :
   1. Donald D.Hearn & M. Pauline Baker, Computer Graphics C Version, Second Edition,, PHI Pvt. Ltd.

References:
   1. Newman W M & R F Sproul, Principles of Interactive Computer Graphics, Second Edition Mc-Graw Hill Publishers.
   2. Plastock R & Xiang Z, Theory and problems of computer Graphics, Second Edition Schaum Series, McGraw Hill Publishers.

CA3CRT07 -Microprocessors and PC Hardware (Core)

Theory:3 hrs. per week

Credits:3

Unit1: (10 hrs.)

Introduction : Evolution of microprocessors. **Introduction to the concept of 8085 microprocessor:** Intel 8085 introduction, Architecture ,Pin diagram, Instruction cycle, Timing diagrams, Interrupts of Intel 8085.

 Unit 2 : (10 hrs.)

Instruction Set of Intel 8085 : Introduction, Instruction and data format, Addressing modes, Status flags, Intel 8085 instruction set.

Unit3: (12 hrs.)

Motherboard : Components of motherboard — expansion slots, Processor socket, coprocessor, memory modules, BIOS and CMOS, chipset. Super I/O chip, ROM BIOS, System buses- Processor Buses, Memory buses, I/O Bus(ISA,PCI Local Bus, AGP, USB), Motherboard selection criteria.

Unit4: (10 hrs.)

Hard disk: Hard Disk drive, Definitions, Hard Disk operations, Disk formatting, Basic hard disk drive components, Hard disk features, Hard disk drive installation procedure, FAT Disk, VFAT, FAT 32, NTFS.

Unit5: (12 hrs.)

Types of memory: Physical Memory, Memory modules:- SIMMs, DIMMs, RIMMs, Brief study of conventional base memory, Upper memory area, High memory area, Extended memory, Expanded memory.

Book of study :
1. B Ram -Fundamentals of microprocessors and microcontrollers, Seventh revised edition, Dhanpat Rai Publications.
2. Manahar Lotia and Pradeep Nair- All about motherboard, First edition, 2005, BPB Publications..
3. Manahar Lotia and Pradeep Nair- Modern all about Hard Disk Drive , First edition, BPB publications.

References:

1. Scott Mueller - Upgrading and repairing PCs , 18th Edition, Pearson.

2. R S. Gaonkar- Micro processor Architecture, Programming and applications with 8085, Sixth Edition, PENRAM International Publishing.

CA3CRT08 - Operating Systems (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction: OS Definition, Functions, Evolution of OS,OS Structure Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2: (14 hrs.)

Process: Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3: (18 hrs.)

Process Coordination: Synchronization - The Critical Section problem, Semaphores, Classic Problems of Synchronization, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit 4: (16 hrs.)

Memory Management: Memory Management Strategies - Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement.

Unit 5: (14 hrs.)

Storage Management: File System: - File Concept, Access Methods, Directory structure. Implementing File Systems:-File System Structure, Allocation Methods, Free Space Management, Disk Scheduling.

Book of study:
1. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley

2. William Stallings - Operating Systems, Sixth Edition, Prentice Hall of India, Pearson

Reference:
1. Milan Kovic - Operating Systems, 2ndEdition, (TMH)

CA3CRT09 - Data Structures using C++

Theory:4 hrs. per week

 Credits:3

Unit 1 (12 hrs. **)**

Concept of Structured data - Data structure definition, Different types and classification of data structures, Arrays – Memory allocation and implementation of arrays in memory, array operations, Applications - sparse matrix representation and operations, polynomials representation and addition, Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.

Unit 2 (12 hrs.**)**

Stacks – Concepts, organization and operations on stacks using arrays (static), examples, Applications - Conversion of infix to postfix and infix to prefix, postfix evaluation, subprogram calls and execution, Multiple stacks representation.

Queues - Concepts, organization and operations on queues, examples.

Circular queue – limitations of linear queue, organization and operations on circular queue. Double ended queue, Priority queue.

Unit 3 (18 hrs.**)**

Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular linked list, doubly linked lists

Applications- linked stacks and queues, memory management basic concepts, garbage collection.

Unit 4 (15)

Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees, strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree, binary search trees, Creation of binary search tree, tree traversing methods – examples, binary tree representation of expressions.

Unit 5 (15)

File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning, hashing – hash tables, hashing functions, collisions, collision resolving methods.

Books of study :

1. G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.

2. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaums Outline Series,2006, McGraw Hill

2. Yedidyah Lanngsam, Moshe Augustein, Aaron M Tenenbaum- Data structures using C and C++ , Second Edition, Prentice Hall

CA3CRP03-Software Lab III (Core)

Software Lab: 6 hrs. per week

Credits:2

Syllabus

Module I

Array – Insertion , Deletion, Polynomial addition using arrays

Sort – Selection, Insertion, Quick

Search – Linear search, Binary search

Sparse matrix – Sparse form representation, transpose and addition using the sparse form

Module II

Stack - Implementation using arrays (linear stack), Infix to postfix conversion, Postfix evaluation

Queue – Implementation using arrays (linear queue), Implementation of circular queue

Module III

Singly linked list – Implementation using dynamic memory allocation techniques, arrange the list based on the ascending or descending order of the information field, concatenate two linked lists, interchange any two nodes in a list, Implementation of circular list, Implementation of linked stacks and queues.

Doubly linked list – Implementation of doubly linked list, Implementation of circular doubly linked list.

Module IV

Creation of binary search trees, Insertion and deletion of nodes, Tree traversals.

Scheme of Evaluation for software lab III external is as follows:

(There will be two questions)

Division of Marks (Practical - 3 hours External)

First program - questions from module 1 & II   **- 25 marks**

     1. Logic   – 10 marks

     2.Successful compilation   – 8 marks

     3. Result   – 7 marks

Second program – questions from module III & IV   **- 35 marks**

     1. Logic   – 20 marks

     2.Successful compilation   –10 marks

     3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(Minimum of 25 Programs)

Total Marks   **- 80 marks**

BCA - SEMESTER IV

CA4CRT10 - Design and Analysis of Algorithms (Core)

Theory:4 hrs. per week

 Credits:4

Unit 1: (12 hrs.)

Introduction, Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, performance analysis - space complexity, time complexity, Best, Worst, And average case complexity.

 Unit 2 (14 hrs.)

Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Strassen's matrix multiplication.

Unit 3 (18 hrs.)

Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Knapsack problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm).

Unit 4: (16 hrs.)

Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

Unit 5: (12 hrs)

Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Book of study:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan, Computer algorithms/C++,Second Edition, Universities Press.

References:

1. Anany Levitin- Introduction to design and analysis of algorithms, Third Edition, Addison Wesley Low price edition.
2. Richard Neapolitan & Kumarss Naimipour, Foundation of Algorithms using C++ Pseudocode, Third edition, Jones And Bartlett Publishers.

CA4CRT11 - System Analysis & Software Engineering (Core)

Theory:4 hrs. per week

 Credits:4

Unit 1: (12 hrs.)

Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; SDLC Life cycle activities- life cycle flow chart, task, management review, baseline specifications, role of system analyst.

Unit 2: (14 hrs.)

Introduction to Software Engineering - Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models , Definition, Waterfall model, Increment process models- Iterative , RAD , Evolutionary process models-Prototyping ,Spiral. Selection of a life cycle model.

Unit 3: (18 hrs.)

Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation – Use Case, DFD, Data Dictionaries , Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).

Unit 4: (14 hrs.)

Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software quality model, Capability Maturity Model.

Unit 5: (14 hrs.)

Software Testing : What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing path testing, Graph matrices, Data flow testing; Levels of testing Unit testing, integration testing, system testing, validation testing,

Book of Study:

1. Marvin Gore & John Stubbe -Elements Of System Analysis, Fourth Edition, Galgotia Book Source.

2. K K Aggarwal, Yogesh Singh - Software Engineering,Third Edition, New Age International Publications.

References :

1. Roger S Pressman - Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw-Hill Higher Education.
2. Ian Sommerville - Software Engineering , Seventh Edition, Pearson Education.
3. Pankaj Jalote - An Integrated approach to Software Engineering, Second Edition, Narosa Publishing Company.

CA4CRT12 - Linux Administration (Core)

Theory:4 hrs. per week

 Credits:4

Unit-1 (12 hrs.)

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit 2 (15 hrs.)

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit 3 (15 hrs.)

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash.Conditional and looping statements, case

statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-4 (18 hrs.)

System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-5: (12 hrs.)

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed **Understanding various Servers :**DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :
1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India

2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.

3. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

CA4CRT13 -Web Programming Using PHP

Theory:3 hrs. per week

 Credits:3

Unit 1 (8 hrs.)

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

Unit 2 (10 hrs.)

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

Unit 3 (10 hrs.)

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays

Unit 4 (12 hrs.)

PHP functions, PHP form, Passing information between pages, $_GET, $_POST, $_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

Unit 5 (14 hrs.)

Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - "Beginning PHP", Wiley Publishing, Inc
2. Ivan Bayross - "HTML, DHTML, JavaScript, Pearl & CGI ", Fourth Revised Edition, BPB Publication.
3. "Programming PHP",Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd

4. "Beginning PHP", Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc

CA4CRP04 - Software Lab IV (Core)

Software Lab: 6 hrs. per week

Credits:2

I.   Linux (2 hrs. per week)

Sl.No	Topic and Details
1	Getting started –Commands
2	The Linux Architecture and command usage – Commands, General-purpose utilities
3	The File system –Commands
4	Process related commands
5	Handling ordinary files, Basic file attributes
6	The vi editor
7	Simple Filters, Filters using regular expressions-use of grep command
8	Introduction to shell concept and writing shell script
9	Introduction to shell concept and writing shell script, Essential Shell Programming
10	User management, monitoring system performance, disk usage etc.

II. **Web Programming using PHP** (4 hrs. per week)

   1. Creating programs based on HTML

2.Creating Java script based programs

3.Creating simple programs based on PHP

4.Programs using PHP functions

5.Programs based on MY SQL

Scheme of Evaluation for software lab IV external is as follows:

(There will be two questions; the first from LINUX and second from PHP)

Division of Marks (Practical - 3 hours External)

First program - questions from LINUX   **- 25 marks**

      1. Logic   – 10 marks

      2.Successful compilation   – 8 marks

      3. Result   – 7 marks

Second program – questions from PHP   **- 35 marks**

      1. Logic   – 15 marks

      2.Successful compilation   –15 marks

      3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

 (LINUX   -Minimum of 10 Programs

 PHP   -Minimum of 15 Programs)

   Total Marks   **- 80 marks**

CA5CRT14 : Computer Networks (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction to Networks, Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation, distortion and noise.

Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

Unit 2: (10 hrs.)

Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum.

Transmission Media- guided media and unguided media.

Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

Unit 3: (12 hrs.)

Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).

Multiple Access Protocols. Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, wireless LANs-Bluetooth, Cellular Telephony

Unit 4: (12 hrs.)

Network layer and Transport layer: Repeaters, Bridges, Gateways and routers. Logical addressing – IPV4 and IPV6 addressing, Internet protocol - IPV4 and IPV6. Connectionless and Connection Oriented Services: UDP and TCP. Congestion Control, Quality of Service.

Unit 5: (10 hrs.)

Application layer: HTTP, FTP, SMTP, DNS. Network security: Common Threats- Firewalls (advantages and disadvantages), Cryptography.

Book of study:

1. B. A. Forouzan - Data communication and Networking, Fourth edition-,TMH
2. Andrew S Tanenbaum - Computer Networks ,Fourth Edition, Prentice Hall of India.

CA5CRT15 - IT & Environment (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (18 hrs.)

Multidisciplinary nature of environmental studies : Definition, scope and importance, Need for public awareness.   (**2 hrs**)

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) **Forest resources**: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) **Food resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.   e) **Energy resources**: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. f) **Land resources**: Land as a resource, land degradation, man induced landslides, soil erosion   and desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles.   (**10hrs**)

Ecosystems : 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 given ecosystem:- Forest ecosystem

                                                                                               (**6 hrs**)
Unit 2: (26 hrs)
Biodiversity and its conservation: Introduction, Biogeograhical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values., India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

                                                                                               (**8 hrs**)
 Environmental Pollution : 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.   (**8 hrs**)
 Social Issues and the Environment : 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, Consumerism and waste products, Environment Protection Act , Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.   (**10hrs**)

Unit 3: (10 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET . (**10hrs**)

Unit 4: (10 hrs.)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages, Green Computing Concept. (**10hrs**)

Unit 5: (8 hrs.)

 Human Rights– An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic,   Social and Cultural Rights).

Human Rights and United Nations – contributions, main human rights related   organs   - UNESCO,UNICEF, WHO, ILO, Declarations for women and children,   Universal   Declaration   of Human Rights. **Human Rights in India** – Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Environment and Human Rights - Right to Clean Environment and Public   Safety: Issues   of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment **Conservation of natural resources and human rights**: Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthurirengan report. Over exploitation of ground water resources, marine fisheries, sand mining etc. (**8 Hrs**)

Internal: Field study

- Visit to a local area to document environmental grassland/ hill /mountain
- Visit a local polluted site – Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds etc

- Study of simple ecosystem-pond, river, hill slopes, etc

(Field work Equal to 5 lecture hours)

References:

1. ''Technology in Action'' Alan Evans, Kendall Martin, Mary Anne Poatsy, Pearson
2. Bharucha Erach, Text Book of Environmental Studies for undergraduate Courses. University Press, IInd Edition 2013 (TB)
3. Clark.R.S., Marine Pollution, Clanderson Press Oxford (Ref)
4. Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)
5. Dc A.K.Enviornmental Chemistry, Wiley Eastern Ltd.(Ref)
6. Down to Earth, Centre for Science and Environment (Ref)
7. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)
8. Jadhav.H & Bhosale.V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)
9. Mekinney, M.L & Schock.R.M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)
10. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
11. Odum.E.P 1971. Fundamentals of Ecology. W.B. Saunders Co. USA 574p (Ref)
12. Rao.M.N & Datta.A.K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)
13. Rajagopalan. R, Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)
14. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)
15. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)
16. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (Ref)
17. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)

18. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p (Ref)

19. M-Magazine, R-Reference   TB- Text Book

CA5CRT16 – Java Programming using Linux (Core)

Theory:3 hrs. per week

Credits:3

UNIT 1 (10 hrs.)

Concepts of Object oriented programming, Benefits of OOP, Features of java. Java environment, java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

UNIT 2 (10 hrs.)

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT 3 (12 hrs.)

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface, Thread life cycle.

UNIT 4 (10 hrs.)

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT 5 (10 hrs.)

Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics -Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.

2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.
Reference:

1.   Patrick Naughton - Java2 The Complete Reference, Seventh Edition:

2.   Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.

3.   Java 6 Programming Black Book 2007 Edition, Dreamtech press.

CA5CRP05 : Software Lab V (core)

Software Lab**: 5** hrs. per week

Credits: 2

 Syllabus

Part I. Applet, JDBC connection and swing based Programs

Part II (using class and read inputs from keyboard)

Java Programs: Method Overloading- Method Overriding-inheritance-abstract class, interfaces- packages- Exception Handling-Multithreading

Scheme of Evaluation for software lab V external is as follows:

(There will be two questions; the first from Part I and second from Part II)

Division of Marks (Practical - 3 hours External)

First program - questions from Part I   **- 25 marks**

  1. Logic   – 10 marks

  2.Successful compilation   – 8 marks

  3. Result   – 7 marks

Second program – questions from Part II   **- 35 marks**

1. Logic	– 20 marks	
2.Successful compilation	–10 marks	
3. Result	– 5 marks	

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(Minimum   of 25 Programs)

Total Marks   **- 80 marks**

OPEN COURSES

CA5OPT01 -Informatics and Cyber Ethics

Theory:4 hrs. per week, Credits:4

Unit I (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic mail.

Unit II (16 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET.

Unit III (16 hrs.)

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV (14 hrs.)

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes– categories –person, property, Government–types-stalking, harassment, threats, security & privacy issues.

Unit V(14 hrs.)

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy - "Technology in Action", Pearson

References:

1. Dinesh Maidasani "Learning Computer Fundamentals, MS Office and Internet & Web Technology",

 Firewall Media, Lakshmi Publications.

2. V Rajaraman - "Introduction to Information Technology", Prentice- Hall of India.

3. Barkhs and U. Rama Mohan - HTML Black Book 3. "Cyber Law Crimes", Asia Law House,

   New Edition

4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

CA5OPT02 - Computer Fundamentals, Internet & MS Office

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic Email

Unit III (14 hrs.)

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV (18 hrs.)

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V (16 hrs.)

Microsoft PowerPoint: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. Dinesh Maidasani, Firewall Media - "Learning Computer Fundamentals, MS Office and Internet & WebTechnology", , Lakshmi Publications.

References:

1. Harley Hahn - "Internet Complete Reference", , Second Edition, Tata McGraw Hill Education

2. Gary B. Shelly, Misty E. Vermaat - "Microsoft Office 2010: Advanced" , CENGAGE Learning 2010

BCA - SEMESTER VI

CA6CRT17 - CLOUD COMPUTING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (14 hrs.)

Introduction: Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing.

Unit 2: (14 hrs.)

Virtualization: Introduction, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

Unit 3: (14 hrs.)

Cloud Computing Architecture :Introduction, Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.

Unit 4: (16 hrs.)

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud Programming and Management, Data Intensive Computing: Map-Reduce Programming - What is Data-Intensive Computing?, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

Unit 5: (16 hrs.)

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Cloud Applications: Scientific Applications, Business and Consumer Applications.

Book of Study:

1. Rajkumar Buyya, Christian Vecchiola, S ThamaraiSelvi- Mastering Cloud Computing, Tata McGraw Hill Publications.

References:

1. Kumar Saurabha, "Cloud Computing " Wiley Publication Krutz ,Vines "Cloud Security".

   Wiley Publication.

2. A Srinivasan & J. Suresh " Cloud Computing : A Practical Approach for learning and

   Implementation " , First edition ,Pearson

CA6CRT18 -**Mobile Application Development – Android** (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 (10 hrs.)

Introduction to Android, Android Versions, Android Activity, Android Features and Architecture, Java JDK, Android SDK, Android Development Tools, Android Virtual Devices,

Emulators, Dalvik Virtual Machine, Layouts – Linear, Absolute, Frame, Relative and Table.

Unit 2 (16 hrs.)

Android User Interface- Fundamental UI design , User interface with View- Text View, Buttons, Image Button, Edit Text, Check Box, Toggle Button, Radio Button and Radio Group, Progress Bar, Autocomplete Text View, Spinner, List View, Grid View, Image View, Scroll View, Custom Toast Alert and Time and Date Picker.

Unit 3 (14 hrs.)

Activity - Introduction, Intent, Intent_filter, Activity Life Cycle, Broadcast Life Cycle, Services, multimedia-Android System Architecture, Play Audio and Video, Text to Speech.

Unit 4 (16 hrs.)

SQLite Database in Android- Introduction to SQLite Database, Creation and Connection of the

Database, Extracting values from Cursors, Transactions, Telephoning and Messaging-SMS Telephony, Sending SMS, Receiving SMS, Wi-Fi Activity.

Unit 5 (16 hrs.)

Introduction to JSON and XML, Use of JSON, Syntax and Rule of JSON, JSON Name, JSON

Values, JSON Objects, JSON Arrays, Parsing JSON and XML.

Google Play services, Location services, Maps

Book of Study:

1. Prasanna Kumar Dixit - ANDROID, Vikas Publishing House.

2. Anubhav Pradhan, Anil Deshpande, Composing Mobile Apps using Android, Wiley India Pvt.Ltd,2014

References:

1. Kevin Grant and Chris Haseman, Beginning Android Programming – Develop and Design, Pearson.

Software Lab Work (**Four** hours per week)

Module II

Installation and configuration of Eclipse and Development Tools

Module III

Creating simple apps using Interface Tools

Module IV

Creating Andoid Apps using SQLite

Module V

Familiarizing with JSON and XML, Creation and distribution of Android Apps.

Elective papers (core)

CA6ELT01- DATA MINING (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

 Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 2: (12 hrs.)

 Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining.

 Unit 3: (18 hrs.)

 Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction.

 Unit 4: (18 hrs.)

 Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods.

Unit 5: (12 hrs.)

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Book of study:

1. Jiawei Han and Micheline Kamber - Data Mining - Concepts and Techniques,Second Edition, Elsevier, 2006

Reference:

1. Witten and Frank - Data Mining Practical Machine Learning Tools and Techniques, Second Edition,   Elsevier, 2005

2. Soman, Divakar and Ajay, Data Mining Theory and Practice, PHI, 2006

3. Margaret H Dunham- Data Mining –Introductory and Advanced Topics, Fourth Edition, Person 2006

CA6ELT02 -Digital Image Processing

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Digital Image Fundamentals

Image, Digital Image, Digital image processing-definitions, Examples of fields that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image processing system.

Unit 2 : (14 hrs.)

Elements of visual perception

Elements of visual perception- Image Formation, Brightness adaptation and Discrimination, Image sampling and quantization- basic concepts, spatial and Intensity resolution, Basic relationship among Pixels.

Unit 3: (16 hrs.)

 Image Enhancement in Spatial and Frequency Domain

Intensity Transformation and spatial Filtering Basics, Intensity transformation functions- Image Negatives, Log Transformations, Power Law Transformations, Histogram Processing, Spatial filtering-correlation and convolution; Fourier transform and frequency domain.

Unit 4: (15 hrs.)

Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and

Closing, Hit or miss transformation.

Unit 5: (17 hrs.)

Image Segmentation

Point, Line, Edge detection-detection of isolated points, Basic edge detection- Gradient operators; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; Region based segmentation-region growing, region splitting and merging.

Book of Study:

1. Rafael C. Gonzalez, Richard E. Words- Digital Image Processing, Third Edition, Pearson.

References:

1. Anil K Jain- Fundamentals of Digital Image Processing , Pearson Education.
2. Er. Rishabh Anand, Digital Image Processing, MEDTEC Publications.

CA6ELT03- Soft Computing Techniques

Theory:4 hrs. per week

Credits:4

Unit 1 (14 hrs.)

Soft Computing, Difference between soft computing and hard computing. **Neural Networks:** Basic concepts of Neural Networks, Human Brain, Artificial Neuron model, Activation functions,Neural network architecture,Single layer and multilayer feedforward networks, Recurrent networks, Neural network characteristics, Learning methods, Rosenblatt's perceptron,Perceptron and linearly separable tasks, XOR problem, Neural network applications.

Unit 2 : (14 hrs.)

Back Propagation Networks: Architecture- perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning- input layer computation, hidden layer computation, output layer computation, calculation of error, Training of neural network, effect of learning rate coefficient, Back propagation algorithm.

Unit 3: (15 hrs.)

Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets, Operations on crisp sets, Properties of crisp sets, Partition and covering, Fuzzy sets, Membership functions, Basic fuzzy set operations, Properties of fuzzy sets, Crisp relations, Operations on crisp relations, Fuzzy relations, Fuzzy cartesian product, Operations on fuzzy relations.

Unit 4 : (15 hrs.)

Fuzzy Systems: Crisp logic, Laws of propositional logic, Inference in propositional logic, Predicate logic, Interpretations of predicate logic formula, Inference in predicate logic, Fuzzy logic, Fuzzy propositions, Fuzzy connectives, Fuzzy quantifiers, Fuzzy inference, Fuzzy rule based system, Defuzzification methods, Applications.

Unit 5: (14 hrs.)

Genetic Algorithm: History, Basic concepts, Biological background, Creation of offsprings, Encoding, Fitness function, Reproduction, **Genetic Modeling**:Crossover, Inversion and deletion,Mutation,Bit-wise operators used in geneticalgorithm, Generational cycle, Convergence of a genetic algorithm, Issues and benefits of GA, Application domains.

Book of study:

1. S. Rajasekaran and G.A VijayalakshmiPai- Neural Networks, Fuzzy Logic, and Genetic AlgorithmsSynthesis and Applications, Prentice-Hall of India Pvt.Ltd ,2004.

References:

1. S. N. Sivanandan and S. N. Deepa, Principles of Soft Computing, Wiley India 2nd Ed, 2011.
2. B K Tripathy, J. Anuradha, Soft computing Advances and Applications, Cengage Learning.
3. B Yegnanarayana, Prentice, Artificial Neural Network, Hall of India Pvt.Ltd ,2012.

CA6CRP07 : Seminar (core)

Seminar Presentation: 2 hrs. per week

Credits: 2

Each student can choose a latest topic of current day interest in the areas of Computer Science / Information Technology and present a seminar presentation using appropriate presentation media. A seminar presentation report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) should be submitted. There will not be any external evaluation for Seminar Presentation.

Scheme of Evaluation of Seminar Presentation (core) for INTERNAL is as follows:

Division of Marks

Seminar Presentation Internal (100 marks)

Presentation	**- 40 marks**
Discussion(Questions and Answers)	**- 30 marks**
Documentation	**10 marks**
Seminar report with proper Content	
and Binding	**- 20 marks**
Total Marks	**-100 marks**

CA6CRP08 : Software Development Lab II (Main Project) (Core)

Software development lab: 7 hrs. per week

Credits: 3

Individual project.

The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.

Scheme of Evaluation for Software Development Lab II external is as follows:

Division of Marks (Software Development Lab II)

Project demonstration and Presentation   **- 40 marks**

Viva related to project   **- 20 marks**

Project report with proper content and binding   **-20 marks**

Total Marks   **- 80marks**

CA6VVT01 –VIVA VOCE (Core)

Credit :1

Scheme of Evaluation of Viva voce (core) for External is as follows:

Each student should attend a course viva voce based on syllabus from semester I to semester IV.

Total Marks – 100 marks

SYLLABUS- B.Sc. Computer Science

SEMESTER I

CS1CRT01 : Computer Fundamentals and Basics of PC Hardware (Complementary)

Theory: 4 hrs. per week

Credits : 4

Unit I:

Introduction to Computers: Generations of Computer (I-V), Classification of Computers: Analog, Digital and Hybrid Computers, Micro, Mini, Mainframe, Super Computers, Servers, Laptop and Block Diagram of a Computer, Functions of the Different Units: Input unit, Output unit, Memory unit, CPU (ALU+CU). Booting Process- POST, BIOS, clock speed, memory speed, memory capacity.

Unit II:

Introduction to Computer Hardware, DC regulated power supply- Block Diagram, Concepts of Switch Mode Power supply, Inverters, UPS and their applications. Basic Components of CPU, Mother Board.

Unit III:

Expansion Slots- ISA, EISA, MCA, VESA, PCI local bus, Processor, Connectors, CMOS memory, SMPS, Serial and Parallel Ports, USB, BIOS chip, Steps for assembling a PC.

Unit IV:

Input Devices: Keyboard, Point and draw devices: mouse, joystick, track ball, light pen, Data Scanning devices: image scanner, OCR, OMR, MICR, Bar code reader, Voice Recognition Device: Microphone, Output Devices: Monitor- CRT displays, Non-CRT displays, TFT: LED, LCD, Plasma. Printer, Impact and non-impact, Character, line and Page Printers.

Unit V:

Memory: Primary Memory, RAM- SRAM, DRAM, ROM, PROM, EPROM, EEPROM, flash memory, Secondary memory: Hard Disk: Structure of a hard disk, how data is stored in a hard disk, concept of tracks, sectors, clusters, cylinders, CD-R, RW, DVD-RW, Blue-ray disk, HVD, PC memory Units: SIMM, DIMM, RIMM.

Book of study:

1. Pradeep Sinha and Priti Sinha - Computer Fundamentals, Fourth Edition- 2007, BPB Publications
2. B. RAM, "Computer Fundamentals: Architecture and Organization", New age international (P) Limited.
   .

Reference:

1. Balagurusamy - Fundamentals of Computer, First Edition- 2009, McGraw-Hill
2. Anita Goel - Computer Fundamentals, First Edition-2010, Pearson.
3. Peter Norton, "Introduction to Computers", McGraw Hill

CS1CRT02 : Methodology Of Programming And C Language (Core)

Theory: 4 hrs. per week

Credits: 3

UNIT 1

Introduction to programming, Classification of computer languages, Language translators (Assembler, Compiler, Interpreter), Linker, Characteristics of a good programming language, Factors for selecting a language, Subprogram, Purpose of program planning, Algorithm, Flowchart, Pseudocode, Control structures (sequence, selection, Iteration), Testing and debugging

UNIT 2

C Character Set, Delimiters, Types of Tokens, C Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data types, C data types, Declaring and initialization of variables, Type modifiers, Type conversion, Operators and Expressions- Properties of operators, Priority of operators, Comma and conditional operator, Arithmetic operators, Relational operators, Assignment operators and expressions, Logical Operators, Bitwise operators

UNIT 3

Input and Output in C – Formatted functions, unformatted functions, commonly used library functions, Decision Statements If, if-else, nested if-else, if-else-if ladder, break, continue, goto, switch, nested switch, switch case and nested if. Loop control- for loops, nested for loops, while loops, do while loop.

UNIT 4

Array, initialization, array terminology, characteristics of an array, one dimensional array and operations, two dimensional arrays and operations. Strings and standard functions, Pointers, Features of Pointer, Pointer and address, Pointer declaration, void wild constant pointers, Arithmetic operations with pointers, pointer and arrays, pointers and two dimensional arrays.

UNIT 5

Basics of a function, function definition, return statement, Types of functions, call by value and reference. Recursion -Types of recursion, Rules for recursive function, direct and indirect recursion, recursion vs iterations, Advantages and disadvantages of recursion. Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef, bitfields , enumerated data types, Union, Dynamic memory allocation, memory models, memory allocation functions.

Book Of Study:

1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education

2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

Reference :

1. E. Balaguruswamy -Programming in ANSI C ,Seventh Edition , McGraw Hill Education

2. Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill

CS1CMT01 : Fundamentals of Digital Systems (Complementary)

Theory: 4 hrs. per week

Credits: 4

Unit I: Number Systems, Operations and Codes

Decimal Numbers, Binary Numbers, Decimal to Binary Conversion, Binary Arithmetic,

1's and 2's complement of binary numbers, Signed numbers, Arithmetic operations with signed numbers, Hexadecimal numbers, Binary to hexadecimal conversion, Hexadecimal to binary conversion, Hexadecimal to decimal conversion, Decimal to Hexadecimal conversion, Hexadecimal addition and subtraction, Octal numbers, Octal to decimal conversion, Decimal to Octal conversion, Octal to binary conversion, Binary to Octal conversion, Binary coded decimal, 8421 BCD code, BCD addition, Digital codes- gray code, binary to gray code conversion, Alphanumeric codes, parity codes.

Unit II: Logic Gates, Logic Levels and Waveforms

Logic Levels and Digital waveforms, Logic Gates: AND, OR, NOT, XOR, XNOR, NAND (Definition, Symbols, Truth Tables and Operation). Universal Property of NAND and NOR gates. Logic gate operations with pulse waveforms.

Unit III: Boolean Algebra and Logic Simplifications. Boolean operations and expressions, Laws and rules of Boolean algebra, De-morgans theorems, Boolean analysis of logic circuits, simplification using Boolean algebra, standard forms of Boolean expression, Boolean expressions and truth tables. The Karnaugh Map, Karnaugh SOP minimization, Karnaugh POS minimization, Five variable Karnaugh maps.

Unit IV: Combinational Logic and its functions.

Basic combinational Logic circuits, Implementing combinational logic, combinational logic using NAND and NOR gates, Basic overview of logic functions, Basic adders, parallel binary adders, comparators, decoders, encoders, code converters, multiplexers, demultiplexers, parity generators/ checkers.

Unit V: Sequential Circuits.

Latches, RS flip flop using NAND/ NOR gates, Clocked RS, D, JK and T flip flops, Edge triggered flip flops, Master slave flip flops, Asynchronous counter operation, Synchronous counter operations, Up/ Down Synchronous counter, Design of synchronous counters. Basic shift register functions. Serial in- Parallel out shift registers, Parallel in -Serial out shift registers, Serial in- Serial out shift registers, Parallel in Parallel out shift registers.

Book of Study:

1. Floyd and Jain- Digital Fundamentals, Eighth Edition, Pearson Education

Reference:

1.A P Malvino and D P Leach - Digital Principles and Applications, Fourth edition, Tata McGraw Hill

Publishers, co Ltd.

CS1CRP01 : Software Lab - I

Software Lab: 4 hrs. per week

Credits:2

Syllabus

1. Programs to familiarize printf() and scanf() functions.

2. Programs Based on Decision statements , break, goto, continue, switch and Loop controls statements.

3. Programs Based on One dimensional and two dimensional arrays.

4. Programs on Strings and string handling functions.

5. Programs based on Pointers, operations on pointers, Arrays & Pointers,

6. Programs based on functions, Call by value, Call by reference, Recursion,

7. Programs based on structure and union, array of structures, Pointer to structure, structure and functions

8. Simple programs using pointers and malloc().

Scheme of Evaluation for software lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program from part 1& 2   **- 25 marks**

    1.Flowchart   - 5 marks

     2.Logic   – 10 marks

3.Successful compilation   – 5 marks

4.Result   – 5 marks

Second program should be based on advanced concepts ,part 3 to part 8   **- 35 marks**

1.Logic   – 20 marks

2.Successful compilation   – 10 marks

3. Result   – 5 marks)

Viva Voce   **- 10 marks**

Lab Record (minimum of 25 Programs)   **- 10 marks**

Total Marks   **- 80 marks**

B.Sc. Computer Science - SEMESTER II

CS2CRT03 : Data Communication(Complementary)

Theory: 4 hrs. per week

Credits: 3

Unit I: Data and Signals

Analog and Digital Data, Analog and Digital Siginals, Periodic and Nonperiodic,   Periodic   Analog signals, Time and Frequency Domains, Composite Signals, Bandwidth, Digital Signals, Bit Rate, Digital Signal as a Composite Analog Signal, Transmission of Digital and Analog Signals,   Transmission Impairment, Attenuation, Distortion, Noise, Data rate limits, Noiseless channel: Nyquist bit rate, Noisy Channel: Shannon Capacity, Simplified Communication & Data Communication models. Data Flow-Simplex, Half Duplex, Full Duplex.

Unit II : Transmission Media

Guided media, Twisted-pair cable – UTP, STP, Connectors Coaxial Cable, Connectors Fiber-Optic Cable Propagation Modes, Unguided Media - Wireless Transmission - Terrestrial

Microwave, Satellite Microwave, Radio Waves. Infrared.

Unit III: Digital Transmission

Analog to Digital Conversion : Block Diagram of Digital Communication System. Parallel and serial ports Pulse Code Modulation(PCM), Sampling, Sampling Rate, Quantization, Delta modulation, Adaptive Delta Modulation, Transmission modes, Parallel   Transmission, Serial Transmission, Asynchronous Transmission, Synchronous Transmission.

Unit IV: Analog Transmission

Digital to Analog Conversation, Modulation of Digital Data, Bit Rate, Baud Rate, Carrier signal, ASK, FSK, PSK, QAM. Analog to Analog modulation, Amplitude   Modulation, Frequency Modulation, and Phase Modulation. Bandwidth Utilization : Multiplexing and Spectrum Spreading :   Multiplexing, FDM, WDM, TDM, Synchronous TDM, Digital Siginal Services, Statistical TDM, Spread Spectrum, FHSS, DSSS.

Unit V: Switching

Circuit-Switched Networks, Three Phases, Packet Switching, Datagram Networks, Virtual-Circuit networks, Three Phases, Connection Oriented and Connectionless   Services.

Telephone Network :Major Components, Local Loops, Trunks, Switching Offices, Dial-Up service, Digital Subscriber Line, Cable Networks, Traditional Cable Networks, HFC Network, Cable TV for data transfer.

Book of Study:

1. Behrouz A.Forouzan - Data Communications and Networking, Fifth Edition, TATA McGraw Hill Education.

References:

1. William Stallings- Data and Computer communications,Eighth Edition, Pearson.
2. Willaim L.Sechwebar- Data Communications, First Edition, Tata McGraw Hill Publishing Co Ltd .

CS2CRT04: Computer Organization and Architecture (Core)

Theory: 4 hrs. per week

Credits: 4

Unit 1:Basic computer organization and design:

Operational concepts, Instruction codes, Computer Registers, Computer Instructions, Memory locations and addresses, Instruction cycle, Timing and control, Bus organization.

Unit 2: Central Processing Unit:

General Register Organization, Stack Organization, Addressing modes, Instruction Classification, Program control.

Unit 3: Memory Organization:

Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory-ROM-PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4: **Parallel Computer Structures**:

Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

Unit 5: **Pipelining and Vector processing**: Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.

Book of study :

1.M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education
2.Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills,1990

Reference

1.Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.
2. John P Hayes -Computer Architecture & Organization–Mc Graw Hill
3. William Stallings-Computer Organization and Architecture , Seventh Edition, Pearson

Education

CS2CRT05 : Object Oriented Programming using C++

Theory: 4 hrs. per week

Credits: 3

Unit I:Principles of Object Oriented Programming, Beginning with C++

Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program-Structure of C++ program-C++ data types- Symbolic constants- Reference by variables-Operators in C++- Operator precedence-Control structures- Function in C++ - The main function, Function prototyping- Call by reference- Return by reference- Inline function- Default arguments- Function overloading.

Unit II: Classes and Objects

Specifying a class- Defining member functions- Nesting of member functions -Private member functions - Arrays within a class - Memory allocation for objects-Static data members -Static member functions - Arrays of objects - objects as function arguments -Friendly functions- Returning Objects.

Unit III: **Constructers and Destructors, Overloading**

Constructors- Default constructor-Parameterized constructor-Copy constructor- Multiple constructors-Constructors with default arguments- Dynamic constructor-Destructors- Operator overloading- Unary and Binary operator overloading- Overloading using friends- Rules for overloading- Type conversion.

Unit IV:Inheritance

Inheritance- Defining derived classes-Visibility modes-Single, Multilevel, Multiple, Hierarchical and Hybrid inheritance- Virtual base classes- Abstract classes- Constructors in derived classes- Nesting of classes.

UnitV: Pointers, Virtual Functions and Polymorphism, Working with Files

Pointers- Pointers to objects- this pointer-Pointers to derivedclasses- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.

Book of Study:

1.E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

Reference:

1.Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
2.Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.
3.D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

CS2CRP02 : Software Lab - II

1. Programs based on default arguments, function overloading.

2. Programs based on array of objects, friend functions, passing objects as arguments to function.

3. Programs based on operator overloading (binary, unary) using member functions and friend

 functions.

4. Programs based on constructors, different types of constructors.

5. Programs based on inheritance, different types of inheritance.

CS3CRT06 : Database Management Systems (Core)

Unit I: Introduction

Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three-Schema Architecture and Data Independence.

DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.

Unit II: Relational Model

Entity Relationship Modeling: Introduction –Entity Types , Entity Sets , Attributes and Keys – Relationship Types ,Relationship Sets, Roles , and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams.

Relational Model concepts: Domains ,Attributes , Tuples , and Relations – Characteristics of Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints , Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .

Unit III: SQL

Data Types – Data Definition commands : CREATE , ALTER ,DROP - Adding constraints in SQL – Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations :UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views.

Unit: Normalization and Indexing Structures for Files

Normalization: Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms –Boyce-Codd Normal Form.

Indexing Structures for files: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.

Unit V: Transaction Processing and Database Security

Transaction Processing: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions.

Database Security and Authorization: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges.

*Books of study***:**

1.Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS , Sixth Edition, Pearson

Education.

References:

1. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003

2. Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems , Third edition, Mc Graw Hill International Edition.

3. Dipin Desai , An Introduction to Database Systems , First Edition, Galgoria Publications .

CS3CRT07 : System Analysis And Design

Unit1

Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; the system development life cycle concepts;hardware and software end products. Life cycle activities- life cycle flow chart, task,

management review, baseline specifications, role of system analyst.

Unit II

Basic tool of system analysis: identification codes – definition, need for codes, code plan, code dictionary, common type of codes, forms design – basic parts of form, style and types of form, principles of form design .Tools for structure analysis and design: Types of basic charts, decision tables, decision trees,

structured English, data flow diagram, data dictionary, system flow charts, flow charting symbols, information oriented flow charts, process oriented flow charts, HIPO charts.

Unit III

Study phase: Study phase activities, information service request, initial investigation, fact finding techniques, fact analysis techniques, steps in feasibility analysis, study phase report.

Unit IV

Design phase: Design phase activities, structure design, input design- input data, input media and devices, output design, design phase report.

Unit V

Development phase: Development phase activities, bottom up and top down computer program development, training- programmer, operator, user trainings ; convertion; change over plan; steps in computer program development; structured programming; development phase report.

Unit VI

Operation phase: Operation phase activities; change over crisis; change over activities; routine operations; security; performance evaluation.

Book of study :

   1.Marvin Gore & John Stubbe- Elements Of System Analysis, Galgotia Book Source.

References:

1. Elias M Awad - System Analysis And Design , Second Edition, Galgotia Publications.

2. Richard Fairley - Software Engineering Concepts , Tata McGraw Publication,2001.

CS3CRT08 : Networking Fundamentals (Complementary)

Unit I

Network: Definition-Models-LAN, WAN, MAN, Network Criteria, Type of connections-point-to-point, multipoint. Topology-Categories-Mesh, Star, Bus, Ring. Internet-History, service providers. Protocol and standards

Connecting Devices: Hubs, Repeaters, Bridges, Switches, Gateways. Connecting remote LANS

Unit II

Reference Models : OSI Reference model, TCP/IP Reference model, Addressing. Data Link Layer: Error Detection and Correction, Block Coding-Linear Block Codes, Cyclic Codes, Cyclic Redundancy Check-Advantages, Checksum-One's Complement

Unit III

Framing- Flow Control, Error Control, Noisy and Noiseless Channels. Network Layer: Logical Addressing, IPV4 Address-Address Space Notation, Network Address Translation.IPV6 address-structure, address space, advantages, tunnelling, Address mapping.

Unit IV

Routing and Forwarding: Forwarding techniques, Routing table, Distance vector routing, multicast routing, and routing protocols. User Datagram Protocol-ports, user datagram, uses, TCP-features, segment, connection.

Unit V

Congestion Control- Open loop and Closed loop, Quality of Service. Application Layer -Domain Name Space, Distribution, TELNET, FTP, SMTP, URL, Cookies, HTTP-Definition, Proxy Sever

Book of study:

 1. Behrouz A Forouzan - Data communication and Networking , Fourth Edition, McGraw Hill

References:

1. Andrew S Tanenbaum - Computer Networks, Fourth Edition, Prentice Hall.

2. .William Stallings- Data and Computer Communications , Eighth Edition, Prentice Hall

3. Fred Halsall, Lingana Gauda Kulkarni - Computer Networking & Internet, Fifth Edition, Addison-

   Wesley .

CS3CRT09 Data Structures using C++ (Core)

Unit I

Concept of Structured data - Data structure definition, Different types and classification of data structures, Arrays – Memory allocation and implementation of arrays in memory, array operations, Applications - sparse matrix representation and operations, polynomials representation and addition, Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.

Unit II

Stacks – Concepts, organization and operations on stacks using arrays (static), examples, Applications - Conversion of infix to postfix and infix to prefix, postfix evaluation, subprogram calls and execution, Multiple stacks representation.

Queues - Concepts, organization and operations on queues, examples.

Circular queue – limitations of linear queue, organization and operations on circular queue. Double ended queue, Priority queue.

Unit III

Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular linked list, doubly linked lists

Applications- linked stacks and queues, memory management basic concepts, garbage collection.

Unit IV

Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees, strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree, binary search trees, Creation of binary search tree, tree traversing methods – examples, binary tree representation of expressions.

Unit V

File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning, hashing – hash tables, hashing functions, collisions, collision resolving methods.

Books of study :

     1.G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.

  2. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

References:

1.Seymour Lipschutz, Theory and Problems of Data Structures, Schaums Outline Series,2006, McGraw

  Hill

2.Yedidyah Lanngsam, Moshe Augustein, Aaron M Tenenbaum- Data structures using C and C++ ,

  Second Edition,   Prentice Hall

CS3CRP03 : Software Lab – III

(There will be two questions; the first from DBMS and second from Data structures.)

I. SQL Commands (2 hrs. per week)

  1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary

    key, foreign key, unique key, check, not null.

  2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables,

    ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT,

    INTERSECT, Substring   Comparison using LIKE operator, BETWEEN operator.

  3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL

    values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

  4. Managing views, Simple stored procedures.

  5. Data Control commands - Access Control and Privilege commands

II. Data Structures using C++. (3 hours per week)

Section I

Array – Insertion , Deletion, Polynomial addition using arrays

Sort – Selection, Insertion, Quick

Search – Linear search, Binary search

Sparse matrix – Sparse form representation, transpose and addition using the sparse form

Section II

Stack - Implementation using arrays (linear stack)

Queue – Implementation using arrays (linear queue)

Section III

Singly linked list – Implementation using dynamic memory allocation techniques, arrange the list based on the ascending or descending order of the information field, concatenate two linked lists, interchange any two nodes in a list.

Section IV

Creation of binary search trees, Insertion and deletion of nodes.

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CS4CRT10: Linux Administration (Core)

Unit-I

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit II

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit III

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash. Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-IV

System administration- Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-V:

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed **Understanding various Servers :**DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :
1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India

2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.

4. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

CS4CRT11: Microprocessors and Assembly Language Programming (Complementary)

Unit I

Microprocessor architecture and its operations – microprocessor initiated operations and 8085 bus organization, internal data operations, 8085 registers, externally initiated operations. Memory – memory map, memory and instructions, peripheral mapped I/O.8085 Microprocessor and its architecture.

Unit II

8086 Internal architecture. Basic 8086 microcomputer system – system overview, 8086 bus, Read machine cycle,Write machine cycle. Assembly language programming – program development steps, 8086 instructions – data transfer instructions, arithmetic instructions, bit manipulation instructions, string instructions, program execution, Constructing the machine codes for 8086 instructions. Implementing standard program in 8086 - unconditional jump instructions, condition flags, conditional jump instructions, If-then, If-then else, and multiple if-then-else, while-do , repeat-until , loop instructions, instruction timing and delay loops.

Unit III

Strings, Procedures and Macros – 8086 string instructions, writing and using procedures,CALL and RET instructions, stack, using PUSH and POP to save register contents, passing parameters, reentrant and recursive procedures, writing and using macros.

Unit IV

8086 interrupts – program examples, interrupt Types, 8254 software – programmable TIMER/ COUNTER – basic 8253 and 8254 operations, 8255A, 8259A Priority interrupt controller. Direct Memory Access data transfer – circuit connections and operations of the Intel 8257 DMA controller, DMA transfer timing diagram.

Unit V

Intel 80286 microprocessor – architecture, signals and system connections, Real address mode operation, protected mode operation. Intel 80386 32-bit microprocessor – architecture, pins and signals. Introduction to 80486 microprocessor. Introduction to RISC machines.

Book of study:

1. A.Nagoor Kani - Microprocessor 8086 programming & interfacing,Second edition, Tata McGraw Hill Education.
2. Microprocessors and Interfacing , Programming and Hardware, Douglas V- Hall. Tata McGraw-Hill,1990.

References:

1. Barry B.Brey - Architecture, Programming and Interfacing ,Eighth Edition, Prentice – Hall India.
2. The Intel Microprocessors 8086 / 8088 , 80186 / 80188 , 80286 , 80386 , 80486 , Pentium, and Pentium Pro processor

CS4CRT12 : Computer Aided Optimization Techniques (core)

Unit I

OR: Introduction, origin and development, nature and features, scientific methods, modelling, advantages and limitations of models, solution methods for models, methodology, OR and decision making, applications, opportunities and shortcomings.

Linear Programming Problem: Introduction, Mathematical formulation of LPP, Graphical solution method and exceptional cases, General LPP, Canonical and Standard forms of LPP.

Unit II

Linear Programming Problem: Simplex method - Introduction, Properties, Computational Procedure of simplex method, Artificial variables, Two-Phase method, Big-M method.

Duality in Linear Programming: Introduction, General Primal-Dual pair, Formulating Dual problem, Dual Simplex Method.

Unit III

Transportation Problem: Introduction, LP formulation, Existence of solution, Transportation Table, Loops, Solution – Initial Basic Feasible Solution (North West Corner method, Least Cost method and VAM) and Optimal Solution (MODI method and Stepping Stone method), Tran-shipment problems.

Assignment Problems: Introduction, Mathematical formulation, Solution – using Hungarian method, Special cases, Traveling Salesman problem.

Unit IV

Sequencing Problem: Introduction, Problem of Sequencing, Basic Terms, Processing n jobs through 2 machines, Processing n jobs through k machines, Processing 2 jobs through k machines and Maintenance Crew Scheduling.

Unit V

Network Routing Problems: Introduction, Network Flow Problems, Minimal Spanning Tree problem, Shortest Route problem, Maximal Flow problems – Augmenting path and Maxflow-Mincut methods.

Network Scheduling: Introduction, Basic Components, Logical Sequencing, Rules, Concurrent Activities, Critical Path Analysis – CPM, Probability Considerations and PERT method, Distinction between PERT and CPM, Applications, Advantages and Limitations.

Book of study:

1.   Kanti Swarup, P.K. Gupta, Man Mohan, Operations Research, 16th edition , Sultan Chand & Sons.

References:

1. Hamdy A. Taha, Operations Research: An Introduction, 9th edition, Pearson
2. Prem Kumar Gupta and D.S. Hira, Problems in Operations Research, Sultan Chand & Sons.
3. K. V Mital and C. Mohan, Optimization Methods in Operations Research and System Analysis, Third edition, New Age International.

CS4CRT13 : Web Programming Using PHP(Core)

Unit I

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

Unit II

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

Unit III

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays

Unit IV

PHP functions, PHP form, Passing information between pages, $_GET, $_POST, $_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

Unit V

Introduction to MySQL, data types, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi- "Beginning PHP5", Wiley Publishing, Inc

2. Ivan Bayross -"HTML, DHTML, JavaScript, Pearl & CGI ", , BPB Publication

Reference Books:

1. Rasmus Lerdorf and Kevin Tatore, "Programming PHP", Shroff Publishers & Distributors Pvt. Ltd

2. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, "Beginning

   PHP" Wiley Publishing, Inc

CS4CRP04 : Assembly Language Programming Lab (Complementary)

(Five programs from each section and 12 hrs per section.)

1. Simple Arithmetic Calculations

2. Conditional Statements

3. Control Statements

4. Loop and Arrays

5. Character Strings

6. Subroutines and Stack Operations

Scheme of Evaluation for lab external is as follows:

Division of Marks (Practical - 3 hours External)

First program - questions from 1 to 3   - 25 marks

(Logic – 12 marks, Successful compilation – 8 marks, Result – 5 marks)

Second program should be based on advanced concepts – questions from 4 to 6
**   - 35 marks**

(Logic – 20 marks, Successful compilation – 10 marks, Result – 5 marks)

Viva Voce   - 10 marks

Lab Record (minimum of 20 Programs)   - 10 marks

Total   80 marks

CS4CRP05 : Software Lab - IV

Section 1 : Module I,II,III

- Creating simple webpages using HTML tags and CSS.
- Simple validation programs using Java Script.
- PHP including Loops, decision statements and arrays

Section 2 : Module IV,V

- PHP programs using session.
- PHP programs using Data base connectivity

Division of Marks (Practical - 3 hours External)

First program - questions from Modules 1 to 3 - 25 marks

Second program should be based on advanced concepts – questions from modules 4 to 6
             - 35 marks

Viva Voce   - 10 marks

Lab Record (minimum of 20 Programs) - 10 marks

Total   80marks

B.Sc. Computer Science - SEMESTER V

CS5CRT14 : System Software and Operating Systems (Core)

Unit I

System software- General concepts,Language processing concepts, Fundamentals of Language processing, Fundamentals of language specification - Programming Language Grammar, Classification of grammar. Assemblers: Elements of assembly language programming – assembly language statements, Design specification of an assembler. Macros: Definition- Call- Expansion.

Unit II

Scanning & Parsing : Finite State Automata. Parsing **-** Parse trees ,topdown parsing,bottom up parsing. Compilers **-** Phases of compiler- Aspects of compilations- code optimization. Linkers and Loaders **-** Relocation and linking concepts- Design of linker-Type of loaders.

Unit III

Operating System: OS Definition, Functions, OS as a resource manager, types of OS Evolution of OS, Operating System Services. Process:Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, CPU Scheduling - Scheduling Criteria, Scheduling Algorithms.

Unit IV

Process Synchronization -The Critical Section problem,Semaphores. Dead Locks : System Model, Dead Lock Characterization, Methods of Handling Dead Locks, Dead Lock Prevention, Dead Lock Avoidance, Dead Lock Detection, Recovery from Dead Lock.

Unit V

Memory Management:Memory Management Strategies -Swapping, Contiguous memory allocation, Paging, Segmentation, Page Replacement.File System :- File Concept, Access Methods, Allocation Methods.

Book of study:

1. D M Dhamdhere - System programming and operating Systems , Tata McGraw Hill
2. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley

Reference :

1. John J Donovan - System Programming, First edition, Tata McGraw Hill 2009.
2. William Stallings - Operating Systems, Sixth edition, Prentice Hall of India 2010.

CS5CRT15 : IT & Environment (Core)

Unit 1 : (18 hrs.)

Multidisciplinary nature of environmental studies : Definition, scope and importance, Need for public awareness.   (**2 hrs**)

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) **Forest resources**: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) **Food resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.   e) **Energy resources**: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. f) **Land resources**: Land as a resource, land degradation, man induced landslides, soil erosion   and desertification. Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles.   (**10hrs**)

Ecosystems : 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 given ecosystem:- Forest ecosystem

                                                                                             (**6 hrs**)

Unit 2: (26 hrs)

Biodiversity and its conservation: Introduction, Biogeograhical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values., India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

                                                                                             (**8 hrs**)

 Environmental Pollution : 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.   (**8 hrs**)

 Social Issues and the Environment : 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, Consumerism and waste products, Environment Protection Act ,   Air (Prevention and Control of Pollution) Act, Water

(Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.   (**10hrs**)

Unit 3: (10 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET . (**10hrs**)

Unit 4: (10 hrs.)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages, Green Computing Concept. (**10hrs**)

Unit 5: (8 hrs.)

Human Rights– An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic,   Social and Cultural Rights).

Human Rights and United Nations – contributions, main human rights related   organs   -UNESCO,UNICEF, WHO, ILO, Declarations for women and children,   Universal   Declaration   of Human Rights. **Human Rights in India** – Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Environment and Human Rights - Right to Clean Environment and Public   Safety: Issues   of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment **Conservation of natural resources and human rights**: Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthurirengan report. Over exploitation of ground water resources, marine fisheries, sand mining etc. (**8 Hrs**)

Internal: Field study

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

References:

1 ."Technology in Action" Alan Evans, Kendall Martin, Mary Anne Poatsy, Pearson

2. Bharucha Erach, Text Book of Environmental Studies for undergraduate Courses. University Press, IInd Edition 2013 (TB)

3 .Clark.R.S., Marine Pollution, Clanderson Press Oxford (Ref)

4. Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)

5. Dc A.K.Enviornmental Chemistry, Wiley Eastern Ltd.(Ref)

6 .Down to Earth, Centre for Science and Environment (Ref)

7. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)

8. Jadhav.H & Bhosale.V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)

9. Mekinney, M.L & Schock.R.M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)

10 .Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

11 .Odum.E.P 1971. Fundamentals of Ecology. W.B. Saunders Co. USA 574p (Ref)

12. Rao.M.N & Datta.A.K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)

13. Rajagopalan. R, Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)

14. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)

15. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)

16. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (Ref)

17. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)

18. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p (Ref)

19.M-Magazine, R-Reference   TB- Text Book

CS5CRT16 : Java Programming using Linux (Core)

Unit I

Concepts of Object oriented programming, Benefits of OOP, Features of Java. Java environment, Java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

Unit II

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT III

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - Java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multi-threading- creation of multi-threaded program-Thread class-Runnable interface, Thread life cycle.

UNIT IV

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT V

Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics - Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.

2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

Reference:

1. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:

2. Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.

3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

CS5CRT17 : Computer Security (Core)

Unit I

Introduction-Principles of Security- Need for Security- Threats- Attacks

Unit II

Cryptography :Cipher Methods: Caesar cipher -One time pad – Mono alphabetic Cipher -Play fair cipher-Poly alphabetic cipher -Vigenère – Cipher, Transposition ciphers – Cryptographic Algorithms: Symmetric & Asymmetric- Cryptographic tools: PKI- Digital Signatures-Stenography

Unit III

System Security :

Intrusion Detection and Prevention Systems, Why IDPS? Types of IDPS,Password Management, Countermeasures

Unit IV

Network Security:Electronic Mail Security, Pretty Good Privacy, S/MIME, IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload.

Unit V

Web Security: Web Security considerations- Secure Socket Layer -Transport layer Security-Secure electronic transaction. Firewalls-Packet filters- Application Level Gateway-Circuit Level Gateway.

Book of Study:

1.Michael E. Whitman, Herbert J. Mattord, "Principles of Information Security" Fourth Edition

2.William Stallings, "Cryptography and Network Security – Principles and Practices",Fourth Edition,2006,Pearson Education.

Reference :

1.Behrouz A. Forouzan, Dedeep Mukhopadhyay "Cryptography & Network Security", Second

  Edition,Tata McGraw Hill, New Delhi, 2010.

2. Atul Kahate, "Cryptography and Network Security", Second Edition, Tata McGraw Hill

OPEN COURSE

CS5OPT01 Informatics and Cyber Ethics

Unit I

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intra-net, WWW, Web Browser and Web Server, Hyper links, URLs, Electronic mail.

Unit II

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET.

Unit III

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes– categories

–person, property, Government–types-stalking, harassment, threats, security & privacy issues.

Unit V

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy -"Technology in Action", Pearson

References:

1. Dinesh Maidasani "Learning Computer Fundamentals, MS Office and Internet & Web Technology",

    Firewall Media, Lakshmi Publications.

2. V Rajaraman - "Introduction to Information Technology", Prentice- Hall of India.

3. Barkhs and U. Rama Mohan - HTML Black Book 3. "Cyber Law Crimes", Asia Law House,

   New Edition

4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

CS5OPT02 – Computer Fundamentals, Internet & MS Office

Unit I

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intra-net, WWW, Web Browser and Web Server, Hyper-links, URLs, Electronic Email

Unit III

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V

MicrosoftPower Point: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. "Learning Computer Fundamentals, MS Office and Internet & Web Technology", Dinesh Maidasani,

   Firewall Media, Lakshmi Publications.

References:

1. Harley Hahn - "Internet Complete Reference", , Second Edition, Tata McGraw Hill Education

2. Gary B. Shelly, Misty E. Vermaat - "Microsoft Office 2010: Advanced" , CENGAGE Learning 2010

CS5CRP06 : Software Development Lab - I

Part I. Java Programs: using class and read inputs from keyboard , Method Overloading- Method Overriding- inheritance- JDBC connection -Exception Handling

Part II Mini Project using Java

Scheme of Evaluation for software Development lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program - part I - 20 marks

(Logic – 10 marks, Successful compilation – 6 marks, Result – 4 marks)

Lab Record (minimum of 10 Programs) - 5 marks

Project demonstration and Presentation - 30 marks

Viva Voce - 15 marks

Project Report - 10 marks

B.Sc.Computer Science - SEMESTER VI

CS6CRT18 : Computer Graphics (Core)

Unit 1 : (12 hrs.)

Introduction: A survey of Computer Graphics, overview of graphics systems-Video display devices-Refresh CRT, Raster-Scan and Random-Scan Displays ,Color CRT Monitors, DVST, Flat-Panel Displays , Raster Scan systems, Random scan systems, Input devices, Hard copy devices, Graphics software.

Unit 2: (14 hrs.)

Output primitives: Line drawing algorithms: DDA algorithm, Bresenham's line algorithm, Circle generating algorithm- Midpoint circle algorithm, Character generation.

Unit 3: (18 hrs.)

2D geometric Transformations: Basic transformations: Translation, Rotation, Scaling; Other transformations-Reflection and shear, Matrix representation and homogenous coordinates, Composite transformation, Interactive picture construction Techniques.

Two-dimensional viewing: viewing pipeline, window and viewport, window to viewport transformation. Clipping operations- Point clipping, Line clipping:- Cohen Sutherland line clipping, Polygon clipping:- Sutherland- Hodgeman polygon clipping, Text Clipping.

Unit 4: (14 hrs.)

Three-dimensional concepts: Three dimensional display methods, Three dimensional object representations- Polygon surfaces, Sweep representations, Constructive solid geometry methods, octrees and quadtrees.

Unit 5 (14 Hrs)

Computer Animation: Design of animation sequences, raster animations, computer animation languages, key-frame systems, morphing, motion specifications.

Book of study **:**

1.Donald D.Hearn & M. Pauline Baker, Computer Graphics C Version, Second Edition,, PHI Pvt. Ltd.

References:

1.Newman W M & R F Sproul, Principles of Interactive Computer Graphics, Second Edition Mc-
        Graw Hill Publishers.
2.Plastock R & Xiang Z, Theory and problems of computer Graphics, Second Edition Schaum Series,
  McGraw Hill Publishers.

CS6CRT19 : Big Data Analytics

Unit I: Introduction to Big Data

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

Unit II: Mining Data Streams

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

Unit III : Hadoop

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop-Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features.

Unit IV : Hadoop Environment

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

Unit V : Frameworks

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

Book of Study:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012

References:

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
3. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007
4. Pete Warden, "Big Data Glossary", O'Reilly, 2011.

Elective Papers

CS6PET01: Python and LateX

Module I - Introduction to Python

The Python Pogramming Language , Variables , Basic expressions and statements , Arithmetic Operators , Data types - Type conversion , Numbers, Floats , String operations

Module II - Control Flow and Data Structures

Logical operators , if , If-Else , While loop , For loop , List value, lenght, operation and deletion , Dictionary operation & methods , Tuples

Module III – Functions

Basic inbuild functions , User defined functions , Function Calls , Parametrized function calls , Function returns , Recursive functions , Scope concepts - local, global

Module IV - Files and user I/O

User input , Reading files , Writing to files , Directories , Interactive programming , Pickling , Exceptions

Module V - Basic LaTeX

What is LaTeX , Structure -Layout - Margin, Header/Footer , Sectioning , Bullets and Numbering , Images

Book of Study:

1. Downey, A. et al., "How to think like a Computer Scientist: Learning with Python", John Wiley, 2015

2. Stefan Kottwitz "LaTeX: Beginner's Guide"Packt Publishing, 2011

References:

1.Swaroop C H, "Byte of Python", CreateSpace Independent Publishing Platform, 2015

2. Zed Shaw, "Learn Python the Hard Way",Addison-Wesley, 2014

3.WikiBooks - https://en.wikibooks.org/wiki/LaTeX/

4. F. Mittelbach and M Goossens with Braams, Carlisle, and Rowley, "The LaTeX Companion", Addison-Wesley Second edition

CS6PET02: Digital Image Processing

Module I: Digital Image Fundamentals

Definition of an image, different types of images, digital image processing-definition, advantages, applications. Basic steps in DIP, elements of visual perception, pixel relationship.

Module II: Image Enhancement In Spatial Domain

Basics, histogram manipulation. Spatial filtering: smoothing linear filters, order- statistics filter- median filter and mean filter; sharpening filters-the Laplacian.

Module III: Image Enhancement In Frequency Domain

Fourier transform and frequency domain, basis of filtering in frequency domain. Smoothing filters-Ideal, Butterworth, Gaussian low pass filter; Sharpening filters- Ideal, Butterworth, Gaussian high pass filters.

Module IV: Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and Closing, Top hat and bottom hat transformation.

Module V: Image Segmentation Point, line, edge detection-detection of isolated points, basic edge detection; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; region based segmentation-region growing, region splitting and merging.

Book of Study :

1. Rafael C. Gonzalez, Richard E. Words, Digital Image Processing, Third Edition

2. S. Jayaraman, S. Esakkirajan, T. Veerakumar , Digital Image Processing

References :

1.Anil K Jain, Fundamentals of Digital Image Processing , Pearson Education 2003

CS6PET03 : Cloud Computing

Unit 1: (14 hrs.)

Introduction: Cloud Computing at a Glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies, Principles of Parallel and Distributed Computing: Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing, Elements of Distributed Computing.

Unit 2: (14 hrs.)

Virtualization: Introduction, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.

Unit 3: (14 hrs.)

Cloud Computing Architecture :Introduction, Cloud Reference Model, Types of Clouds, Economics of the Cloud, Open Challenges.

Unit 4: (16 hrs.)

Aneka: Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud Programming and Management, Data Intensive Computing: Map-Reduce Programming - What is Data-Intensive Computing?, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

Unit 5: (16 hrs.)

Cloud Platforms in Industry: Amazon Web Services, Google AppEngine, Microsoft Azure, Cloud Applications: Scientific Applications, Business and Consumer Applications.

Book of Study:

1. Rajkumar Buyya, Christian Vecchiola, S ThamaraiSelvi- Mastering Cloud Computing, Tata McGraw

   Hill Publications.

References:

   1. Kumar Saurabha, "Cloud Computing " Wiley Publication Krutz ,Vines "Cloud Security".

   Wiley Publication.

   2. A Srinivasan & J. Suresh " Cloud Computing : A Practical Approach for learning and

   Implementation " , First edition ,Pearson

CS6SMP07 : Seminar

Each student can choose a latest topic of current day interest in the areas of Computer Science / Information Technology and present a seminar presentation using appropriate presentation media. A seminar presentation report in bound form in the pattern of a complete technical report (with contents page, well structured presentation, references etc.) should be submitted. There will not be any external

evaluation for the Software lab VI and Seminar Presentation

Scheme of Evaluation of Seminar Presentation (core) (INTERNAL) is as follows:

Division of Marks

Seminar Presentation Internal (100 marks)

Presentation	**- 40 marks**
Questions and Answers	**- 30 marks**
Documentation	**10 marks**
Seminar report with proper Content	
and Binding	**- 20 marks**
Total Marks	**-100 marks**

CA6CRP08 : Software Development Lab II (Main Project) (Core)

Software development lab: 7 hrs. per week

Individual project.

The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.

Scheme of Evaluation for Software Development Lab II external is as follows:

Division of Marks (Software Development Lab II)

Project demonstration and Presentation   **- 40 marks**

Viva related to project   **- 20 marks**

Project report with proper content and binding   **-20 marks**

Total Marks   **- 80marks**

CS6VVT01 –VIVA VOCE (Core)

Credit :1

Scheme of Evaluation of Viva voce (core) for External is as follows:

Each student should attend a course viva voce based on syllabus from semester I to semester IV.

Total Marks – 100 marks

SYLLABUS- B.Sc. Computer Application(Triple Main)

SEMESTER I

CA1CRT01 : Computer fundamentals and digital principles (Core)

Unit-1:

Introduction: Functional units of a computer system, Different types of computers, Computer Software and Hardware, Types of software-System software and Application programme. Characteristic of computers. Input Devices – Keyboard, Mouse, Optical input devices, Output devices – Monitors and Printers.

Unit-2:

Introduction to Operating Systems and Networking: Definition of an Operating System - Different types of PC Operating Systems. Computer Networks- categories of networks - LAN, WAN,MAN. The Internet - Working of Internet - Major Features of Internet.

Unit 3:

Number Systems: Base or radix ,Positional number system, Popular number systems(Decimal, Binary, Octal and Hexadecimal), Conversion-From one number system to another, Concept of binary addition and subtraction, Complements in binary number systems,1^s Complement, 2^s Complement and their applications, Signed magnitude form, BCD numbers- concept and addition.

Unit 4:

Boolean Algebra and Gate Networks: Logic gates- AND, OR, NOT, NAND and NOR Truth tables and graphical representation, Basic laws of Boolean Algebra, Simplification of Expressions, De Morgans theorems, Dual expressions, Canonical expressions, Min terms and Max terms, SOP and POS expressions, Simplification of expression using K-MAP (up to 4 variables), Representation of simplified expressions using NAND/NOR Gates, Dont care conditions, XOR and its applications, parity generator and checker.

Unit 5:-

Sequential and Combinational Logic. Flip flops- Latch, Clocked, RS, JK, T, D and Master slave , Adders-Half adder, Full adder(need and circuit diagram), Encoders, Decodes, Multiplexers and Demultiplexers(working of each with diagram), Analog to digital and digital to analog converters (Diagram and working principle), : Concept of Registers, Shift Registers

Books of study :

1. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

3. M Morris Mano-Digital Logic and Computer design, Fourth Edition, Prentice Hall.

References :

 1. Thomas C Bartee- Digital computer Fundamentals, Sixth Edition, TATA McGraw Hill Edition

2. Thomas L Floyd- Digital Fundamentals, Ninth edition, PEARSON Prentice Hall.

3. Malvino & Leach- Digital Principles and Applications, Sixth Edition, Tata McGraw Hill, 2006

CA1CRT02-**Methodology Of Programming And C Language (Core)**

UNIT 1

Introduction to programming, Classification of computer languages, Language translators (Assembler, Compiler, Interpreter), Linker, Characteristics of a good programming language, Factors for selecting a language, Subprogram, Purpose of program planning, Algorithm, Flowchart, Pseudocode, Control structures (sequence, selection, Iteration), Testing and debugging.

UNIT 2

C Character Set, Delimiters, Types of Tokens, C Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data types, C data types, Declaring and initialization of variables, Type modifiers, Type conversion, Operators and Expressions- Properties of operators, Priority of operators, Comma and conditional operator, Arithmetic operators, Relational operators, Assignment operators and expressions, Logical Operators, Bitwise operators

UNIT 3

Input and Output in C – Formatted functions, unformatted functions, commonly used library functions, Decision Statements If, if-else, nested if-else, if-else-if ladder, break, continue, goto, switch, nested switch, switch case and nested if. Loop control- for loops, nested for loops, while loops, do while loop.

UNIT 4

Array, initialization, array terminology, characteristics of an array, one dimensional array and operations, two dimensional arrays and operations. Strings and standard functions, Pointers, Features of Pointer,

Pointer and address, Pointer declaration, void wild constant pointers, Arithmetic operations with pointers, pointer and arrays, pointers and two dimensional arrays.

UNIT 5

Basics of a function, function definition, return statement, Types of functions, call by value and reference. Recursion -Types of recursion, Rules for recursive function, direct and indirect recursion, recursion vs iterations, Advantages and disadvantages of recursion. Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef, bitfields , enumerated data types, Union, Dynamic memory allocation, memory models, memory allocation functions.

Book Of Study:

1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education

2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

Reference Text

1. E. Balaguruswamy -Programming in ANSI C ,Seventh Edition , McGraw Hill Education
2. Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill

CA1CRP01-Software Lab I (Core)

Software Lab: 4 hrs. per week

Credits:2

Syllabus

1. Programs to familiarize printf() and scanf() functions.

2. Programs Based on Decision statements , break, goto, continue, switch and Loop controls statements.

3. Programs Based on One dimensional and two dimensional arrays.

4. Programs on Strings and string handling functions.

5. Programs based on Pointers, operations on pointers, Arrays & Pointers,

6. Programs based on functions, Call by value, Call by reference, Recursion,

7. Programs based on structure and union, array of structures, Pointer to structure, structure and functions

8. Simple programs using pointers and malloc().

Scheme of Evaluation for software lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program from part 1& 2   **- 25 marks**

      1.Flowchart   - 5 marks

      2.Logic   – 10 marks

      3.Successful compilation   – 5 marks

      4.Result   – 5 marks

Second program should be based on advanced concepts ,part 3 to part 5   **- 35 marks**

      1.Logic   – 20 marks

      2.Successful compilation   – 10 marks

      3. Result   – 5 marks)

Viva Voce   **- 10 marks**

Lab Record (minimum of 25 Programs)   **- 10 marks**

Total Marks   **- 80 marks**

CA2CRT03-Database Management Systems (Core)

Theory:4 Hours per week
Credit:3

Unit 1: Introduction (12 hrs.)

Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three-Schema Architecture and Data Independence.

DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.

Unit 2: Relational Model (16 hrs.)

Entity Relationship Modeling: Introduction –Entity Types , Entity Sets , Attributes and Keys – Relationship Types ,Relationship Sets, Roles , and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams.

Relational Model concepts: Domains ,Attributes , Tuples , and Relations – Characteristics of Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints , Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .

Unit 3: SQL(14 hrs.)

Data Types – Data Definition commands : CREATE , ALTER ,DROP - Adding constraints in SQL –

Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views.

Unit 4: Normalization and Indexing Structures for Files(15 hrs.)

Normalization: Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms –BCNF.

Indexing Structures for files: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.

Unit 5: Transaction Processing and Database Security (15 hrs.)

Transaction Processing: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions.

Database Security and Authorization: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges.

*Books of study***:**

1.Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS , Sixth Edition, Pearson

   Education.

.
References:

1. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003

2. Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems , Third edition,

   Mc Graw Hill International Edition.

3. Dipin Desai , An Introduction to Database Systems , First Edition, Galgoria Publications

CA2CRT04-Object Oriented Programming using C++

Unit I:Principles of Object Oriented Programming, Beginning with C++
Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program-Structure of C++ program- C++ data types- Symbolic constants- Reference by variables-Operatorsin C++- Operator precedence- Control structures- Function in C++ - The main function, Function prototyping- Call byreference- Return by reference- Inline function- Default arguments- Functionoverloading.

Unit II:Classes and Objects
Specifying a class- Defining member functions- Nesting of member functions -Private member functions - Arrays within a class - Memory allocation for objects-Staticdata members -Static member functions - Arrays of objects - objects asfunction arguments -Friendly functions- Returning Objects.

Unit III: **Constructers and Destructors, Overloading**

Constructors- Default constructor-Parameterized constructor-Copy constructor- Multiple constructors-Constructors withdefault arguments- Dynamic constructor-Destructors- Operator overloading- Unary andBinary operator overloading- Overloading using friends- Rules for overloading- Type conversion.

Unit IV:Inheritance

Inheritance- Defining derived classes-Visibility modes-Single,Multilevel,Multiple, Hierarchical andHybrid inheritance- Virtual base classes- Abstractclasses- Constructors in derived classes- Nesting of classes.

UnitV:Pointers, Virtual Functions and Polymorphism, Working with Files

Pointers- Pointers to objects- this pointer-Pointers to derivedclasses- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.

Book of Study:

1. E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

Reference:

1. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
2. Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.
3. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill

CA2CRP02-Software Lab II

I. SQL Commands (2 hrs. per week)

1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary

   key, foreign key, unique key, check, not null.

2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables,

   ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT,

   INTERSECT, Substring   Comparison using LIKE operator, BETWEEN operator.

3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL

   values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

4. Managing views, Simple stored procedures.

5. Data Control commands - Access Control and Privilege commands.

II. Object Oriented Programming using C++ (3 hrs. per week)

1. Programs based on default arguments, function overloading.
2. Programs based on array of objects, friend functions, passing objects as arguments to function.
3. Programs based on operator overloading (binary, unary) using member functions and friend functions.
4. Programs based on constructors, different types of constructors.
5. Programs based on inheritance, different types of inheritance.

Scheme of Evaluation for software lab II external is as follows:

(There will be two questions; the first from DBMS and second from C++)

Division of Marks (Practical - 3 hours External)

First program - questions from DBMS **- 25 marks**

    1. Logic   – 10 marks

    2.Successful compilation   – 8 marks

    3. Result   – 7 marks

Second program – questions from Object Oriented Programming using C++ **- 35 marks**

    1. Logic   – 20 marks

    2.Successful compilation   –10 marks

    3. Result   – 5 marks

Viva Voce **- 10 marks**

Lab Record **- 10 marks**

(DBMS   -Minimum of 10 Programs

 C++   -Minimum: of 15 Programs)

Total Marks **- 80 marks**

B.Sc. Computer Application - SEMESTER III

CA3CRT05-Data Structures using C++ (Core)

Module I
Concept of Structured data - Data structure definition, Different types and classification of data structures, Arrays – Memory allocation and implementation of arrays in memory, array operations, Applications - sparse matrix representation and operations, polynomials representation and addition, Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.

Module II
Stacks – Concepts, organization and operations on stacks using arrays (static), examples, Applications - Conversion of infix to postfix and infix to prefix, postfix evaluation, subprogram calls and execution, Multiple stacks representation. Queues - Concepts, organization and operations on queues, examples.
Circular queue – limitations of linear queue, organization and operations on circular queue. Double ended queue, Priority queue.

Module III
Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular linked list, doubly linked lists, Applications- linked stacks and queues, memory management basic concepts, garbage collection.

Module IV
Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees, strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree, binary search trees, Creation of binary search tree, tree traversing methods – examples, binary tree representation of expressions.

Module V
File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning, hashing – hash tables, hashing functions, collisions, collision resolving methods.

Books of study :

1. G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.

2. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaums Outline Series,2006, McGraw Hill

2. Yedidyah Lanngsam, Moshe Augustein, Aaron M Tenenbaum- Data structures using C and C++ , Second Edition, Prentice Hall

CA3CRT06- Computer Networks

Unit 1:
Introduction to Networks, Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation, distortion and noise.
Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

Unit 2:
Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum. Transmission Media- guided media and unguided media. Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

Unit 3:
Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).
Multiple Access Protocols. Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, wireless LANs-Bluetooth, Cellular Telephony

Unit 4:
Network layer and Transport layer: Repeaters, Bridges, Gateways and routers. Logical addressing – IPV4 and IPV6 addressing, Internet protocol - IPV4 and IPV6. Connectionless and Connection Oriented Services: UDP and TCP. Congestion Control, Quality of Service.

Unit 5:
Application layer: HTTP, FTP, SMTP, DNS. Network security: Common Threats- Firewalls (advantages and disadvantages), Cryptography.

Book of study:

1. B. A. Forouzan - Data communication and Networking, Fourth edition-,TMH
2. Andrew S Tanenbaum - Computer Networks ,Fourth Edition, Prentice Hall of India.

CA3CRT07-SYSTEM ANALYSIS AND SOFTWARE ENGINEERING

Module 1:
Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; the system development life cycle concepts; hardware and software end products. Life cycle activities- life cycle flow chart, task, management review, baseline specifications, role of system analyst.

Module 2:

Introduction to Software Engineering - Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models - Definition, Waterfall model, Increment process models, Evolutionary process models, Selection of a life cycle model.

Module 3:
Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation, Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).

Module 4:
Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software quality model, Capability Maturity Model.

Module 5:
Software Testing What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing path testing, Graph matrices, Data flow testing; Levels of testing Unit testing, integration testing, system testing, validation testing, a brief introduction about debugging and various testing tools.

Book of Study:

1. Marvin Gore & John Stubbe -Elements Of System Analysis, Fourth Edition, Galgotia Book Source.

2. K K Aggarwal, Yogesh Singh - Software Engineering,Third Edition, New Age International Publications.

References :

1. Roger S Pressman - Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw-Hill Higher Education.
2. Ian Sommerville - Software Engineering , Seventh Edition, Pearson Education.
3. Pankaj Jalote - An Integrated approach to Software Engineering, Second Edition, Narosa Publishing Company.

CA3CRP03-Software Lab III (Core)

Software Lab: 6 hrs. per week

Credits:2

Syllabus

Module I

Array – Insertion , Deletion, Polynomial addition using arrays

Sort – Selection, Insertion, Quick

Search – Linear search, Binary search

Sparse matrix – Sparse form representation, transpose and addition using the sparse form

Module II

Stack - Implementation using arrays (linear stack), Infix to postfix conversion, Postfix evaluation

Queue – Implementation using arrays (linear queue), Implementation of circular queue

Module III

Singly linked list – Implementation using dynamic memory allocation techniques, arrange the list based on the ascending or descending order of the information field, concatenate two linked lists, interchange any two nodes in a list, Implementation of circular list, Implementation of linked stacks and queues.

Doubly linked list – Implementation of doubly linked list, Implementation of circular doubly linked list.

Module IV

Creation of binary search trees, Insertion and deletion of nodes, Tree traversals.

Scheme of Evaluation for software lab III external is as follows:

(There will be two questions)

Division of Marks (Practical - 3 hours External)

First program - questions from module 1 & II   **- 25 marks**

      1. Logic   – 10 marks

      2.Successful compilation   – 8 marks

      3. Result   – 7 marks

Second program – questions from module III & IV   **- 35 marks**

      1. Logic   – 20 marks

      2.Successful compilation   –10 marks

      3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(Minimum of 25 Programs)

Total Marks   **- 80 marks**

CA4CRT08-Linux Administration (Core)

Unit-I

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit II

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit III

Shell programming - Basics of shell programming, various types of shell available in Linux,comparisons between various shells, shell programming in bash. Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-IV

 System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-V:

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed Understanding various Servers **:**DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :
1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India

2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.

5. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

CA4CRT09- Web Programming Using PHP

MODULE I

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

MODULE II

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

MODULE III

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, datatypes, branching statements, loops, arrays

MODULE IV

PHP functions, PHP form, Passing information between pages, $_GET, $_POST, $_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

MODULE V

Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query,

mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - "Beginning PHP", Wiley Publishing, Inc
2. Ivan Bayross - "HTML, DHTML, JavaScript, Pearl & CGI ", Fourth Revised Edition, BPB Publication.
3. "Programming PHP",Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd

4. "Beginning PHP", Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc

CA4CRP04 - Software Lab IV (Core)

Software Lab: 6 hrs. per week

Credits:2

I. Linux (2 hrs. per week)

Sl.No	Topic and Details
1	Getting started –Commands
2	The Linux Architecture and command usage – Commands, General-purpose utilities
3	The File system –Commands
4	Process related commands
5	Handling ordinary files, Basic file attributes
6	The vi editor
7	Simple Filters, Filters using regular expressions-use of grep command
8	Introduction to shell concept and writing shell script
9	Introduction to shell concept and writing shell script, Essential Shell Programming
10	User management, monitoring system performance, disk usage etc.

II. Web Programming using PHP (4 hrs. per week)

1. Creating programs based on HTML

2. Creating Java script based programs

3. Creating simple programs based on PHP

4. Programs using PHP functions

5. Programs based on MY SQL

Scheme of Evaluation for software lab IV external is as follows:

(There will be two questions; the first from LINUX and second from PHP)

Division of Marks (Practical - 3 hours External)

First program - questions from LINUX   **- 25 marks**

     1. Logic   – 10 marks

     2. Successful compilation   – 8 marks

     3. Result   – 7 marks

Second program – questions from PHP   **- 35 marks**

     1. Logic   – 15 marks

     2. Successful compilation   –15 marks

     3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

 (LINUX   -Minimum of 10 Programs

  PHP   -Minimum of 15 Programs)

   Total Marks   **- 80 marks**

B.Sc. Computer Application - SEMESTER V

CA5CRT10 – Java Programming using Linux (Core)

Theory:3 hrs. per week

Credits:3

UNIT 1 (10 hrs.)

Concepts of Object oriented programming, Benefits of OOP, Features of java. Java environment, java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

UNIT 2 (10 hrs.)

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT 3 (12 hrs.)

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface, Thread life cycle.

UNIT 4 (10 hrs.)

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT 5 (10 hrs.)

Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics -Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.

2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

Reference:

1. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:

2. Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.

3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

CA5CRP05 : Software Lab V (core)

Software Lab**: 5** hrs. per week

Credits: 2

 Syllabus

Part I. Applet, JDBC connection and swing based Programs

Part II (using class and read inputs from keyboard)

Java Programs: Method Overloading- Method Overriding-inheritance-abstract class

interfaces- packages-Exception Handling-Multithreading

Scheme of Evaluation for software lab V external is as follows:

(There will be two questions; the first from Part I and second from Part II)

Division of Marks (Practical - 3 hours External)

First program - questions from Part I   **- 25 marks**

    1. Logic   – 10 marks

    2.Successful compilation   – 8 marks

    3. Result   – 7 marks

Second program – questions from Part II   **- 35 marks**

    1. Logic   – 20 marks

    2.Successful compilation   –10 marks

    3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(Minimum   of 25 Programs)

Total Marks   **- 80 marks**

OPEN COURSES

CA5OPT01 -Informatics and Cyber Ethics

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic mail.

Unit II (16 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET.

Unit III (16 hrs.)

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV (14 hrs.)

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes– categories –person, property, Government–types-stalking, harassment, threats, security & privacy issues.

Unit V(14 hrs.)

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy - "Technology in Action", Pearson

References:

1. Dinesh Maidasani "Learning Computer Fundamentals, MS Office and Internet & Web Technology",

 Firewall Media, Lakshmi Publications.

2. V Rajaraman - "Introduction to Information Technology", Prentice- Hall of India.

3. Barkhs and U. Rama Mohan - HTML Black Book 3. "Cyber Law Crimes", Asia Law House,

   New Edition

4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

CA5OPT02 - Computer Fundamentals, Internet & MS Office (Open Course)

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic Email

Unit III (14 hrs.)

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV (18 hrs.)

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V (16 hrs.)

Microsoft PowerPoint: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. Dinesh Maidasani, Firewall Media - "Learning Computer Fundamentals, MS Office and Internet &

   WebTechnology", , Lakshmi Publications.

References:

1. Harley Hahn - "Internet Complete Reference", , Second Edition, Tata McGraw Hill Education

2. Gary B. Shelly, Misty E. Vermaat - "Microsoft Office 2010: Advanced" , CENGAGE Learning 2010

CA6CRT11- Operating Systems

Unit 1:
Introduction: OS Definition, Functions, Evolution of OS,OS Structure Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2:
Process: Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3:
Process Coordination: Synchronization - The Critical Section problem, Semaphores, Classic Problems of Synchronization, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit 4:
Memory Management: Memory Management Strategies - Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement.

Unit 5:
Storage Management: File System: - File Concept, Access Methods, Directory structure. Implementing File Systems:-File System Structure, Allocation Methods, Free Space Management, Disk Scheduling.

Book of study:
1. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley

2. William Stallings - Operating Systems, Sixth Edition, Prentice Hall of India, Pearson

Reference:
1. Milan Kovic - Operating Systems, 2ndEdition, (TMH)

CA6PET01- DATA MINING   (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

 Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 2: (12 hrs.)

 Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining

 Unit 3: (18 hrs.)

 Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction

 Unit 4: (18 hrs.)

 Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods

Unit 5: (12 hrs.)

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Book of study:

1. Jiawei Han and Micheline Kamber - Data Mining - Concepts and Techniques,Second Edition, Elsevier, 2006

Reference:

1. Witten and Frank - Data Mining Practical Machine Learning Tools and Techniques, Second Edition, Elsevier, 2005

2. Soman, Divakar and Ajay, Data Mining Theory and Practice, PHI, 2006

3. Margaret H Dunham- Data Mining –Introductory and Advanced Topics, Fourth Edition, Person

2006

CA6PET02 -Digital Image Processing

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Digital Image Fundamentals

Image, Digital Image, Digital image processing-definitions, Examples of fields that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image processing system.

Unit 2 : (14 hrs.)

Elements of visual perception

Elements of visual perception- Image Formation, Brightness adaptation and Discrimination, Image sampling and quantization- basic concepts, spatial and Intensity resolution, Basic relationship among Pixels.

Unit 3: (16 hrs.)

 Image Enhancement in Spatial and Frequency Domain

Intensity Transformation and spatial Filtering Basics, Intensity transformation functions- Image Negatives, Log Transformations, Power Law Transformations, Histogram Processing, Spatial filtering-correlation and convolution; Fourier transform and frequency domain.

Unit 4: (15 hrs.)

Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and Closing, Hit or miss transformation.

Unit 5: (17 hrs.)

Image Segmentation

Point, Line, Edge detection-detection of isolated points, Basic edge detection- Gradient operators; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; Region based segmentation-region growing, region splitting and merging.

Book of Study:

1. Rafael C. Gonzalez, Richard E. Words- Digital Image Processing, Third Edition, Pearson.

References:

1.Anil K Jain- Fundamentals of Digital Image Processing , Pearson Education.
2.Er. Rishabh Anand, Digital Image Processing, MEDTEC Publications.

CA6PET03- Soft Computing Techniques

Theory:4 hrs. per week

Credits:4

Unit 1 (14 hrs.)

Soft Computing, Difference between soft computing and hard computing. **Neural Networks:** Basic concepts of Neural Networks, Human Brain, Artificial Neuron model, Activation functions,Neural network architecture,Single layer and multilayer feedforward networks, Recurrent networks, Neural network characteristics, Learning methods, Rosenblatt's perceptron,Perceptron and linearly separable tasks, XOR problem, Neural network applications.

Unit 2 : (14 hrs.)

Back Propagation Networks: Architecture- perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning- input layer computation, hidden layer computation, output layer computation, calculation of error, Training of neural network, effect of learning rate coefficient, Back propagation algorithm.

Unit 3: (15 hrs.)

Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets, Operations on crisp sets, Properties of crisp sets, Partition and covering, Fuzzy sets, Membership functions, Basic fuzzy set operations, Properties of fuzzy sets, Crisp relations, Operations on crisp relations, Fuzzy relations, Fuzzy cartesian product, Operations on fuzzy relations.

Unit 4 : (15 hrs.)

Fuzzy Systems: Crisp logic, Laws of propositional logic, Inference in propositional logic, Predicate logic, Interpretations of predicate logic formula, Inference in predicate logic, Fuzzy logic, Fuzzy propositions, Fuzzy connectives, Fuzzy quantifiers, Fuzzy inference, Fuzzy rule based system, Defuzzification methods, Applications.

Unit 5: (14 hrs.)

Genetic Algorithm: History, Basic concepts, Biological background, Creation of offsprings, Encoding, Fitness function, Reproduction, **Genetic Modeling**:Crossover, Inversion and deletion,Mutation,Bit-wise operators used in geneticalgorithm, Generational cycle, Convergence of a genetic algorithm, Issues and benefits of GA, Application domains.

Book of study:

1. S. Rajasekaran and G.A VijayalakshmiPai- Neural Networks, Fuzzy Logic, and Genetic AlgorithmsSynthesis and Applications, Prentice-Hall of India Pvt.Ltd ,2004.

References:

1. S. N. Sivanandan and S. N. Deepa, Principles of Soft Computing, Wiley India 2nd Ed, 2011.
2. B K Tripathy, J. Anuradha, Soft computing Advances and Applications, Cengage Learning.
3. B Yegnanarayana, Prentice, Artificial Neural Network, Hall of India Pvt.Ltd ,2012.

CA6CRP08 : Software Development Lab (Main Project) (Core)

Software development lab: 7 hrs. per week

Credits: 3

Individual project.

The project topic shall be chosen from areas of current day interest using latest packages / languages running on appropriate platforms (Except the tools used in software development-I), so that the student can be trained to meet the requirements of the Industry. A project report should be submitted in hard bound complete in all aspects. For internal evaluation, the progress of the student shall be systematically assessed through various stages of evaluation at periodic intervals.

Scheme of Evaluation for Software Development Lab II external is as follows:

Division of Marks (Software Development Lab II)

Project demonstration and Presentation   **- 40 marks**

Viva related to project   **- 20 marks**

Project report with proper content and binding   **-20 marks**

Total Marks   **- 80marks**

CA6VVT01 –VIVA VOCE (Core)

Credit :1

Scheme of Evaluation of Viva voce (core) for External is as follows:

Each student should attend a course viva voce based on syllabus from semester I to semester IV.

Total Marks – 100 marks

SEMESTER I

IT1CRT01-Computer Fundamentals and Basics of PC Hardware (Core)
Theory: 4 hrs. per week
Credits: 4
Unit I:

Introduction to Computers: Generations of Computer (I-V), Classification of Computers: Analog, Digital and Hybrid Computers, Micro, Mini, Mainframe, Super Computers, Servers, Laptop and Block Diagram of a Computer, Functions of the Different Units: Input unit, Output unit, Memory unit, CPU (ALU+CU). Booting Process- POST, BIOS, clock speed, memory speed, memory capacity.

Unit II:

Introduction to Computer Hardware, DC regulated power supply- Block Diagram, Concepts of Switch Mode Power supply, Inverters, UPS and their applications. Basic Components of CPU, Mother Board.

Unit III:

Expansion Slots- ISA, EISA, MCA, VESA, PCI local bus, Processor, Connectors, CMOS memory, SMPS, Serial and Parallel Ports, USB, BIOS chip, Steps for assembling a PC.

Unit IV:

Input Devices: Keyboard, Point and draw devices: mouse, joystick, track ball, light pen, Data Scanning devices: image scanner, OCR, OMR, MICR, Bar code reader, Voice Recognition Device: Microphone, Output Devices: Monitor- CRT displays, Non-CRT displays, TFT: LED, LCD, Plasma. Printer, Impact and non-impact, Character, line and Page Printers.

Unit V:

Memory: Primary Memory, RAM- SRAM, DRAM, ROM, PROM, EPROM, EEPROM, flash memory, Secondary memory: Hard Disk: Structure of a hard disk, how data is stored in a hard disk, concept of tracks, sectors, clusters, cylinders, CD-R, RW, DVD-RW, Blue-ray disk, HVD, PC memory Units: SIMM, DIMM, RIMM.

Book of study:

1. Pradeep Sinha and Priti Sinha - Computer Fundamentals, Fourth Edition- 2007, BPB Publications

2. B. RAM, "Computer Fundamentals: Architecture and Organization", New age International (P) Limited.
.

Reference:

1. Balagurusamy - Fundamentals of Computer, First Edition- 2009, McGraw-Hill
2. Anita Goel - Computer Fundamentals, First Edition-2010, Pearson.
3. Peter Norton, "Introduction to Computers", McGraw Hill

IT1CRT02 : Digital Electronics
Theory: 4 hrs. per week
Credits: 3

Unit I: Number Systems, Operations and Codes (15 hrs.)
Decimal Numbers, Binary Numbers, Decimal to Binary Conversion, Binary Arithmetic, 1's and 2's complement of binary numbers, Signed numbers, Arithmetic operations with signed numbers, Hexadecimal numbers, Binary to hexadecimal conversion, Hexadecimal to binary conversion, hexadecimal to decimal conversion, Decimal to Hexadecimal conversion, Hexadecimal addition and subtraction, Octal numbers, Octal to decimal conversion, Decimal to Octal conversion, Octal to binary conversion, Binary to Octal conversion, Binary coded decimal, 8421 BCD code, BCD addition,
Digital codes- gray code, binary to gray code conversion, Alphanumeric codes, parity codes.

Unit II: Logic Gates, Logic Levels and Waveforms(12 hrs.)
Logic Levels and Digital waveforms, Logic Gates: AND, OR, NOT, XOR, XNOR, NAND (Definition, Symbols, Truth Tables and Operation). Universal Property of NAND and NOR gates. Logic gate operations with pulse waveforms.

Unit III: Boolean Algebra and Logic Simplifications. (15 hrs.)
Boolean operations and expressions, Laws and rules of Boolean algebra, De-morgans theorems, Boolean analysis of logic circuits, simplification using Boolean algebra, standard forms of Boolean expression, Boolean expressions and truth tables. The Karnaugh Map, Karnaugh SOP minimization, Karnaugh POS minimizationFour variable Karnaugh maps.

Unit IV: Combinational Logic and its functions. (15 hrs.)
Basic combinational Logic circuits, Implementing combinational logic, combinational logic using NAND and NOR gates, Basic overview of logic functions, Basic adders, parallel binary adders, comparators, decoders, encoders, code converters, multiplexers, demultiplexers, parity generators/ checkers.

Unit V: Sequential Circuits.(15 hrs.)
Latches, RS flip flop using NAND/ NOR gates, Clocked RS, D, JK and T flip flops, Edge triggered flip flops, Master slave flip flops, Asynchronous counter operation, Synchronous counter operations, Up/ Down Synchronous counter, Design of synchronous counters. Basic shift register functions. Serial in- Parallel out shift registers, Parallel in -Serial out shift registers, Serial in- Serial out shift registers,

Parallel in Parallel out shift registers.

Book of Study:

1. Floyd and Jain- Digital Fundamentals, Eighth Edition, Pearson Education

Reference:

1.A P Malvino and D P Leach - Digital Principles and Applications, Fourth edition, Tata McGraw Hill

   Publishers, co Ltd.

IT1CRT03-Methodology Of Programming And C Language (Core)

Theory:4 hrs. per week

Credits:3

UNIT 1 (12 hrs.)

Introduction to programming, Classification of computer languages, Language translators (Assembler, Compiler, Interpreter), Linker, Characteristics of a good programming language, Factors for selecting a language, Subprogram, Purpose of program planning, Algorithm, Flowchart, Pseudocode, Control structures (sequence, selection, Iteration), Testing and debugging

UNIT 2:(12 hrs.)

C Character Set, Delimiters, Types of Tokens, C Keywords, Identifiers, Constants, Variables, Rules for defining variables, Data types, C data types, Declaring and initialization of variables, Type modifiers, Type conversion, Operators and Expressions- Properties of operators, Priority of operators, Comma and conditional operator, Arithmetic operators, Relational operators, Assignment operators and expressions, Logical Operators, Bitwise operators

UNIT 3: (15 hrs.)

Input and Output in C – Formatted functions, unformatted functions, commonly used library functions, Decision Statements If, if-else, nested if-else, if-else-if ladder, break, continue, goto, switch, nested switch, switch case and nested if. Loop control- for loops, nested for loops, while loops, do while loop.

UNIT 4:(15 hrs.)

Array, initialization, array terminology, characteristics of an array, one dimensional array and operations, two dimensional arrays and operations. Strings and standard functions, Pointers, Features of Pointer,

Pointer and address, Pointer declaration, void wild constant pointers, Arithmetic operations with pointers, pointer and arrays, pointers and two dimensional arrays.

UNIT 5 :(18 hrs.)

Basics of a function, function definition, return statement, Types of functions, call by value and reference. Recursion -Types of recursion, Rules for recursive function, direct and indirect recursion, recursion vs iterations, Advantages and disadvantages of recursion. Storage class, Structure and union, Features of structures, Declaration and initialization of structures, array of structures, Pointer to structure, structure and functions, typedef , bitfields , enumerated data types, Union, Dynamic memory allocation, memory models, memory allocation functions.

Book Of Study:

    1. Ashok Kamthane - Programming in C, Third Edition, Pearson Education

    2. P K Sinha & Priti Sinha - Computer Fundamentals , Fourth Edition, BPB Publications.

Reference :

1. E. Balaguruswamy -Programming in ANSI C ,Seventh Edition , McGraw Hill Education

2. Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill

IT1CRP01-Software Lab I (Core)

Software Lab: 4 hrs. per week

Credits:2

Syllabus

1. Programs to familiarize printf() and scanf() functions.

2. Programs Based on Decision statements , break, goto, continue, switch and Loop controls statements.

3. Programs Based on One dimensional and two dimensional arrays.

4. Programs on Strings and string handling functions.

5. Programs based on Pointers, operations on pointers, Arrays & Pointers,

6. Programs based on functions, Call by value, Call by reference, Recursion,

7. Programs based on structure and union, array of structures, Pointer to structure, structure and functions

8. Simple programs using pointers and malloc().

Scheme of Evaluation for software lab I external is as follows:

Division of Marks (Practical - 3 hours External)

First program from part 1& 2   **- 25 marks**

      1.Flowchart   -   5 marks

      2.Logic   – 10 marks

      3.Successful compilation   – 5 marks

      4.Result   –   5 marks

Second program should be based on advanced concepts ,part 3 to part 8   **- 35 marks**

      1.Logic   – 20 marks

      2.Successful compilation   – 10 marks

      3. Result   – 5 marks)

Viva Voce   **- 10 marks**

Lab Record (minimum of 25 Programs)   **- 10 marks**

Total Marks   **- 80 marks**

B.Sc. IT - SEMESTER II

IT2CRT04-Operating Systems (Core)

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction: OS Definition, Functions, Evolution of OS,OS Structure Operating System Operations, Operating System Services, User Operating System Interface, System Calls, Types of System Calls.

Unit 2: (14 hrs.)

Process: Basic Concepts, Process Scheduling, Operations on Processes, Inter process communication, Process Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple Processor Scheduling.

Unit 3: (18 hrs.)

Process Coordination: Synchronization - The Critical Section problem, Semaphores, Classic Problems of Synchronization, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods of handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Unit 4: (16 hrs.)

Memory Management: Memory Management Strategies - Swapping, Contiguous memory allocation, Paging, Segmentation. Virtual Memory Management- Demand paging, Page Replacement.

Unit 5: (14 hrs.)

Storage Management: File System: - File Concept, Access Methods, Directory structure. Implementing File Systems:-File System Structure, Allocation Methods, Free Space Management, Disk Scheduling.

Book of study:
1. Abraham Silberschatz, Peter Galvin and Greg Gagne - Operating System Principles, Seventh Edition, John Wiley

2. William Stallings - Operating Systems, Sixth Edition, Prentice Hall of India, Pearson

Reference:
1. Milan Kovic - Operating Systems, Second Edition, TMH.

IT2CRT05-Computer Organization and Architecture (Core)

Theory:4 hrs. per week

Credits:3

Unit 1: (12 hrs.)

Basic computer organization and design

Operational concepts, Instruction codes, Computer Registers, Computer Instructions, Memory locations and addresses, Instruction cycle, Timing and control, Bus organization.

Unit 2: (15 hrs.)

Central Processing Unit:

General Register Organization, Stack Organization, Addressing modes, Instruction Classification, Program control.

Unit 3: (16 hrs.)

Memory Organization

Memory Hierarchy, Main Memory, Organization of RAM, SRAM, DRAM, Read Only Memory-ROM-PROM,EROM,EEPROM, Auxiliary memory, Cache memory, Virtual Memory, Memory mapping Techniques.

Unit 4: (15 hrs.)

Parallel Computer Structures:

Introduction to parallel processing, Pipeline computers, Multi processing systems, Architectural classification scheme-SISD, SIMD, MISD, MIMD.

Unit 5: (14 hrs.)

Pipelining and Vector processing: Introduction to pipelining, Instruction and Arithmetic pipelines (design) Vector processing, Array Processors.

Book of study :

1.M.Morris Mano-Computer Systems Architecture, Third Edition, Pearson Education
2.Kai Hwang and F A Briggs-Computer Architecture and parallel processing, McGraw Hills,1990

Reference

    1.Carl Hamacher -Computer Organization, Fifth Edition, Tata McGraw Hill.
    2.John P Hayes -Computer Architecture & Organization–Mc Graw Hill
    3.William Stallings-Computer Organization and Architecture , Seventh Edition, Pearson
      Education

IT2CRT06- Object Oriented Programming using C++ (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Principles of Object Oriented Programming, Beginning with C++

Procedure Oriented Programming-Object Oriented Programming-Basic concepts of object-oriented programming- Benefits of OOP- Applications of OOP-A simple C++program-Structure of C++ program-C++ data types- Symbolic constants- Reference by variables-Operators in C++- Operator precedence-Control structures- Function in C++ - The main function, Function prototyping- Call by reference- Return by reference- Inline function- Default arguments- Function overloading.

Unit 2: (10 hrs.)

Classes and Objects : Specifying a class- Defining member functions- Nesting of member functions - Private member functions - Arrays within a class - Memory allocation for objects-Static data members - Static member functions -Arrays of objects - objects as function arguments -Friendly functions- Returning Objects.

Unit 3: (12 hrs.)

Constructers and Destructors, Overloading

Constructors- Default constructor-Parameterized constructor-Copy constructor- Multiple constructors-Constructors with default arguments- Dynamic constructor-Destructors- Operator overloading- Unary and Binary operator overloading- Overloading using friends- Rules for overloading- Type conversion.

Unit 4: (10 hrs.)

Inheritance: Inheritance - Defining derived classes-Visibility modes-Single, Multilevel, Multiple, Hierarchical and Hybrid inheritance- Virtual base classes- Abstract classes- Constructors in derived classes- Nesting of classes.

Unit 5: (12 hrs.)

Pointers, Virtual Functions and Polymorphism, Working with Files : Pointers- Pointers to objects-this pointer-Pointers to derived classes- Virtual functions- Pure virtual functions- File Stream classes, Opening and closing a file- File opening modes- File pointers and their manipulations- Sequential input and output operations.

Book of Study:

1. E. Balagurusamy - Object Oriented Programming with C++, Fifth edition, Tata McGraw Education Hill , 2011.

Reference:

1. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, First Edition, Pearson India
2. Robert Lafore, Object Oriented Programming in Turbo C++, First Edition, Galgotia Publications.
3. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

IT2CRP02-Software Lab II (Core)

Software Lab: 4 hrs. per week

Credits:2

I.Object Oriented Programming using C++ (3 hrs. per week)

1.Programs based on default arguments, function overloading.

2.Programs based on array of objects, friend functions, passing objects as arguments to function.
3.Programs based on operator overloading (binary, unary) using member functions and friend functions.
4.Programs based on constructors, different types of constructors.
5.Programs based on inheritance, different types of inheritance.

IT3CRT07 : Software Engineering(Core)
Theory: 4 hrs. per week
Credits: 4

Module I: (12)
System Development Life Cycle- Introduction to system development life cycle (SDLC): Various phases-Study, Analysis, Design, tools, Development, Implementation and Maintenance. Introduction-Software Engineering - The Software process - Software Myths - Prescriptive Process Models-Agile Development-What is an Agile Process?-Agility Principles ,The Politics of Agile Development, Human Factors

Module II: (15)
Requirements Engineering-Software Engineering Knowledge-Core Principles- Principles that guide each Framework Activity- Requirements Engineering- Eliciting Requirements-Requirements Analysis-Scenario Based Modeling-UML Model That Supplement the Use Case-Data Modeling Concepts-Class Based Modeling

Module III: (18)
Software Design-The Design process- Design Concept-Design Model-Component Level Design-What is a Component? ,Designing Class Based Components, Designing Traditional Components.

Module IV: (15)
Testing- A Strategic Approach to Software Testing-Test strategies for Conventional Software-Test Strategies for Object Oriented Software-Validation Testing-System Testing

Module V: (12)
Quality Management-Software Configuration Management(SCM),SCM Process- Metrics in the Process and Project Domain-Software Measurement- Metrics for Software Quality.Project Scheduling- Basic Concepts-Project Scheduling-Defining a Task Set for the Software Projects-Defining a Task Network. Risk Management- Software Risks- Risk Identification- Risk Projection-Risk Refinement-Risk Mitigation Monitoring and Management.

Book of Study:
1. Elias M. Awad**,** Systems Analysis And Design, Second Edition, Galgotia Publications Pvt Ltd.
2. Richard Fairley, Software Engineering Concepts , 1997, Tata McGraw Hills.

Reference:

1. K K Aggarwal, Yogesh Singh, Software Engineering, Third Edition, New Age International
   Publications.
    2. Eve Anderson, Philip greenspun & Andrew Grumet, Software Engineering for Internet
         Applications, 2006, MIT press.

3. Ian Sommerville, Software Engineering, Seventh Edition, Pearson Education
4. Software Engineering Project Management – 2nd Edition, Wiley India.
5. Software Quality Engineering – Jeff Tian, Student edition, 2006, Wiley India
6. Pankaj Jalote, An Integrated approach to Software Engineering, Second Edition,Narosa
   PublishingCompany, Pearson Education

IT3CRT08-Computer Graphics (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (12 hrs.)

Introduction: A survey of Computer Graphics, overview of graphics systems-Video display devices-Refresh CRT, Raster-Scan and Random-Scan Displays ,Color CRT Monitors, DVST, Flat-Panel Displays , Raster Scan systems, Random scan systems, Input devices, Hard copy devices, Graphics software.

Unit 2: (14 hrs.)

Output primitives: Line drawing algorithms: DDA algorithm, Bresenham's line algorithm, Circle generating algorithm- Midpoint circle algorithm, Character generation.

Unit 3: (18 hrs.)

2D geometric Transformations: Basic transformations: Translation, Rotation, Scaling; Other transformations-Reflection and shear, Matrix representation and homogenous coordinates, Composite transformation, Interactive picture construction Techniques.

Two-dimensional viewing: viewing pipeline, window and viewport, window to viewport transformation. Clipping operations- Point clipping, Line clipping:- Cohen Sutherland line clipping, Polygon clipping:- Sutherland- Hodgeman polygon clipping, Text Clipping.

Unit 4: (14 hrs.)

Three-dimensional concepts: Three dimensional display methods, Three dimensional object representations- Polygon surfaces, Sweep representations, Constructive solid geometry methods, octrees and quadtrees.

Unit 5: (14 hrs.)

Computer Animation: Design of animation sequences, raster animations, computer animation languages, key-frame systems, morphing, motion specifications.

Book of study :
> 1 .Donald D.Hearn & M. Pauline Baker, Computer Graphics C Version, Second Edition,, PHI Pvt. Ltd.

References:

1.Newman W M & R F Sproul, Principles of Interactive Computer Graphics, Second Edition Mc-Graw Hill Publishers.

2.Plastock R & Xiang Z, Theory and problems of computer Graphics, Second Edition Schaum Series, McGraw Hill Publishers.

IT3CRT09 Database Management Systems (Core)

Theory:4 hrs. per week

Credits:3

Unit 1: Introduction (12 hrs.)

Characteristics of the Database Approach – Database users :DBA , Database Designers ,End users – Advantages of using the DBMS Approach – Data models, Schemas , and Instances – Three-Schema Architecture and Data Independence.

DBMS Languages: DDL, DML – The Database System Environment: DBMS Component Modules.

Unit 2: Relational Model (16 hrs.)

Entity Relationship Modeling: Introduction –Entity Types , Entity Sets , Attributes and Keys – Relationship Types ,Relationship Sets, Roles , and Structural Constraints – Weak Entity Types – Notation for ER diagrams – Sample ER diagrams.

Relational Model concepts: Domains ,Attributes , Tuples , and Relations – Characteristics of Relations – Relational Model Constraints and Relational Database Schemas : Domain Constraints, Key Constraints , Relational Database Schemas , Entity Integrity , Referential Integrity, and Foreign Keys .

Unit 3: SQL(14 hrs.)

Data Types – Data Definition commands : CREATE , ALTER ,DROP - Adding constraints in SQL –

Basic SQL Queries : INSERT ,SELECT ,DELETE ,UPDATE - Substring comparison using LIKE operator ,BETWEEN operator – Ordering of rows – SQL set operations UNION , EXCEPT , INTERSECT – Complex Queries : Comparison involving NULL and Three-valued logic ,Nested queries , EXISTS and UNIQUE functions, Renaming of attributes and Joining of tables, Aggregate functions ,Grouping – Managing Views.

Unit 4: Normalization and Indexing Structures for Files(15 hrs.)

Normalization: Informal Design Guidelines for Relational Schemas –Functional Dependencies – Normal forms : First Normal Form , Second Normal Form , Third Normal Form – General Definitions of Second and Third Normal Forms –BCNF.

Indexing Structures for files: -Types of Single-Level Ordered Indexes: Primary Indexes, Clustering Indexes, and Secondary Indexes.

Unit 5: Transaction Processing and Database Security (15 hrs.)

Transaction Processing: Introduction to Transaction Processing - Transaction and System Concepts – Desirable properties of Transactions.

Database Security and Authorization: Types of Security – Control measures – Database Security and DBA – Access Control , User Accounts, and Database Audits –Access Control based on Granting and Revoking Privileges.

*Books of study***:**

1.Ramez Elmasri and Shamkant B.Bavathe - DATABASE SYSTEMS , Sixth Edition, Pearson

   Education.

References:

1. C.J Date- An Introduction to Database Systems, Eighth edition, Pearson Education,2003

2. Reghu Ramakrishnan and Johannes Gehrke- Database Management Systems , Third edition,

   Mc Graw Hill International Edition.

3. Dipin Desai , An Introduction to Database Systems , First Edition, Galgoria Publications .

IT3CRT10- Data Structures using C++

Theory:4 hrs. per week

Credits:3

Unit 1 (12 hrs. **)**

Concept of Structured data - Data structure definition, Different types and classification of data structures, Arrays – Memory allocation and implementation of arrays in memory, array operations, Applications - sparse matrix representation and operations, polynomials representation and addition, Concept of search and sort – linear search, binary search, selection sort, insertion sort, quick sort.

Unit 2 (12 hrs.**)**

Stacks – Concepts, organization and operations on stacks using arrays (static), examples, Applications - Conversion of infix to postfix and infix to prefix, postfix evaluation, subprogram calls and execution, Multiple stacks representation.

Queues - Concepts, organization and operations on queues, examples.

Circular queue – limitations of linear queue, organization and operations on circular queue. Double ended queue, Priority queue.

Unit 3 (18 hrs.**)**

Linked list: Concept of dynamic data structures, linked list, types of linked list, linked list using pointers, insertion and deletion examples, circular linked list, doubly linked lists

Applications- linked stacks and queues, memory management basic concepts, garbage collection.

Unit 4 (15)

Trees - Concept of recursion, trees, tree terminology, binary trees, representation of binary trees, strictly binary trees, complete binary tree, extended binary trees, creation and operations on binary tree, binary search trees, Creation of binary search tree, tree traversing methods – examples, binary tree representation of expressions.

Unit 5 (15)

File - Definition, Operations on file (sequential), File organizations - sequential, Indexed sequential, random files, linked organization, inverted files, cellular partitioning, hashing – hash tables, hashing functions, collisions, collision resolving methods.

Books of study :

1. G.S Baluja - Data Structures Through C++ (A Practical Approach), Second Edition-2004, Danapat Rai & Co.

2. Ellis Horowitz and Sartaj Sahni - Fundamentals of Data Structures in C++ , Second Edition, Galgotia Publications.

References:

1. Seymour Lipschutz, Theory and Problems of Data Structures, Schaums Outline Series,2006, McGraw Hill

2. Yedidyah Lanngsam, Moshe Augustein, Aaron M Tenenbaum- Data structures using C and C++ Second Edition,   Prentice Hall

IT3CRP03- Software Lab III

I. SQL Commands (2 hours)
1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary key,
foreign key, unique key, check, not null.
2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of
rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring
Comparison using LIKE operator, BETWEEN operator.
3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL
values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.
4. Managing views, Simple stored procedures.

II. Data Structures using C++. (3 hours per week)
1. Array sort Bubble sort, selection sort, insertion sort, Quick sort, merge sort, linear search, binary
search, operations on - sparse matrix, polynomial addition etc.(with and without user defined functions)

2. Stack- push and pop operations, implementation, Application of stacks Conversion of infix expression to postfix, infix expression to prefix, postfix expression evaluation (with and without user defined functions)

3. Queue- insertion and deletion operations, implementation, Implementation of circular queue (with and without user defined functions)

4. Linked list- implementation, concatenation, interchange nodes etc., circular list and doubly linked list implementation, implementation of stacks and queue using linked lists. Polynomial addition using linked list etc.

5. Creation and traversal of binary tree and binary search trees etc.

6. File operations using sequential files.

Scheme of Evaluation for software lab III external is as follows:

Division of Marks (Practical - 3 hours External)

First program - questions from DBMS **- 20 marks**

(Logic – 10 marks, Successful compilation – 6 marks, Result – 4 marks)

Second program should be based on advanced concepts in Data Structure(2 to 5) **- 35 marks**

(Logic – 20 marks, Successful compilation – 10 marks, Result – 5 marks)

Viva Voce **- 15 marks**

Lab Record

(Minimum of 15 Programs from section I and 20 programs from section II) **- 10 marks**

Total Marks - 80 marks

B.Sc. IT- SEMESTER IV

IT4CRT12-Design and Analysis of Algorithms (Core)

Theory:4 hrs. per week

 Credits:4

Unit 1: (12 hrs.)

Introduction, Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, performance analysis - space complexity, time complexity, Best, Worst, And average case complexity.

 Unit 2 (14 hrs.)

Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Strassen's matrix multiplication.

Unit 3 (18 hrs.)

Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Knapsack problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm).

Unit 4: (16 hrs.)

Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source shortest path, 0/1 Knapsack problem, Traveling Sales person problem.

Unit 5: (12 hrs)

Basic traversal and search techniques - BFS and traversal, DFS and traversal, Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Book of study:

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekharan, Computer algorithms/C++,Second Edition, Universities Press.

References:

1. Anany Levitin- Introduction to design and analysis of algorithms, Third Edition, Addison Wesley Low price edition.
2. Richard Neapolitan & Kumarss Naimipour, Foundation of Algorithms using C++ Pseudocode, Third edition, Jones And Bartlett Publishers.

IT4CRT12-Linux Administration

Theory:4 hrs. per week

 Credits:4

Unit-1 (12 hrs.)

Overview of Linux : What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.

Unit 2 (15 hrs.)

Essential Linux commands: Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor.

Unit 3 (15 hrs.)

Shell programming - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash.Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks

Unit-4 (18 hrs.)

 System administration - Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.

Unit-5: (12 hrs.)

Simple filter commands: pr, head, tail, cut, sort, uniq, tr - Filter using regular expression grep, egrep, sed **Understanding various Servers :**DHCP, DNS, Squid, Apache, Telnet, FTP,Samba.

Book of study :
1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India

2. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.

3.Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech

India.

IT4CRT13-Parallel Processing(core)

Theory: 4 hrs. per week
Credits: 4

Unit I:(12)
Introduction to parallel processing: Parallelism in uniprocessor systems, parallel computer structures, Architectural classification schemes (Flynn's, Feng's and handler's), parallel processing applications.

Unit II:(16)
Pipelining and vector processing: Linear pipelining, classification of pipeline processors, Instruction and arithmetic pipelines, principles of designing pipelined processors, characteristics of vector processing

Unit III: (14)
Structures and algorithms for Array processors: SIMD array processors, SIMD interconnection networks, parallel algorithms for array processors

Unit IV:(16)

Multiprocessor architecture and programming: functional structures of multiprocessor systems, interconnection networks, multiprocessor operating systems, interprocessor communication mechanisms

Unit V:(14)

Dataflow computers: Distinction between control flow and data flow computers, data flow graphs and languages, advantages and disadvantages of dataflow computers, dataflow computer architectures

Book of study:
1. Kai Hwang and F A Briggs - Computer Architecture and parallel processing, McGraw Hill Education

References:
1. Stone H S -Introduction to Computer Architecture-Stone H S,Galgotia publishers.
2. Peter M. Kogge - The Architecture of pipelined computers, First Edition, Mc Graw Hill

IT4CRT14 -WEB PROGRAMMING USING PHP

Theory:3 hrs. per week

 Credits:3

Unit 1 (8 hrs.)

Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.

Unit 2 (10 hrs.)

CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists

Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation

Unit 3 (10 hrs.)

Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays

Unit 4 (12 hrs.)

PHP functions, PHP form, Passing information between pages, $_GET, $_POST, $_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP

Unit 5 (14 hrs.)

Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db, mysql_query, mysql_fetch_row, mysql_fetch_array, mysql_result, mysql_list_fields, mysql_num_fields, insertion, updation and deletion of data using PHP, displaying data from MySQL in webpage.

Book of Study:

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - "Beginning PHP", Wiley Publishing, Inc
2. Ivan Bayross - "HTML, DHTML, JavaScript, Pearl & CGI ", Fourth Revised Edition, BPB Publication.
3. "Programming PHP",Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd

4. "Beginning PHP", Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc

IT4CRP04 - Software Lab IV (Core)

Software Lab: 6 hrs. per week

Credits:2

   II. Linux (2 hrs. per week)

Sl.No	Topic and Details
1	Getting started –Commands

2	The Linux Architecture and command usage – Commands, General-purpose utilities
3	The File system –Commands
4	Process related commands
5	Handling ordinary files, Basic file attributes
6	The vi editor
7	Simple Filters, Filters using regular expressions-use of grep command
8	Introduction to shell concept and writing shell script
9	Introduction to shell concept and writing shell script, Essential Shell Programming
10	User management, monitoring system performance, disk usage etc.

II. Web Programming using PHP (2 hrs. per week)

 1. Creating programs based on HTML

2.Creating Java script based programs

3.Creating simple programs based on PHP

4.Programs using PHP functions

5.Programs based on MY SQL

B.Sc. IT - SEMESTER V

IT5CRT15-Computer Networks (Core)

Theory:3 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Introduction to Networks, Data and signals-analog and digital, periodic analog signals, digital signals, bit rate, baud rate, bandwidth. Transmission impairments- attenuation, distortion and noise.

Data communication protocols and standards, Network models - OSI model-layers and their functions. TCP/IP protocol suite.

Unit 2: (10 hrs.)

Bandwidth utilization Multiplexing: FDM, TDM, spread spectrum. Transmission Media- guided media and unguided media. Switching: message, Circuit and packet switched networks, datagram networks, virtual- circuit networks.

Unit 3: (12 hrs.)

Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols - Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing).

Multiple Access Protocols. Random Access-ALOHA, CSMA. Wired LANs-IEEE standards, wireless LANs-Bluetooth, Cellular Telephony

Unit 4: (12 hrs.)

Network layer and Transport layer: Repeaters, Bridges, Gateways and routers. Logical addressing – IPV4 and IPV6 addressing, Internet protocol - IPV4 and IPV6. Connectionless and Connection Oriented Services: UDP and TCP. Congestion Control, Quality of Service.

Unit 5: (10 hrs.)

Application layer: HTTP, FTP, SMTP, DNS. Network security: Common Threats- Firewalls (advantages and disadvantages), Cryptography.

Book of study:

1. B. A. Forouzan - Data communication and Networking, Fourth edition-,TMH
2. Andrew S Tanenbaum - Computer Networks ,Fourth Edition, Prentice Hall of India.

IT5CRT16 – Java Programming using Linux (Core)

Theory:3 hrs. per week

Credits:3

UNIT 1 (10 hrs.)

Concepts of Object oriented programming, Benefits of OOP, Features of java. Java environment, java tokens, Constant, variables, data types, operators, Control Statements-branching statements, looping statements, jump statements, labeled loops.

UNIT 2 (10 hrs.)

Defining a Class, Fields declaration, Method declaration, Creating object, Accessing class members, method overloading, Constructors, constructor overloading, super keyword, static Members, Inheritance, overriding methods, dynamic method dispatch, final(variables, methods and classes), abstract methods and classes, interfaces, visibility control.

UNIT 3 (12 hrs.)

Arrays- One dimensional arrays, declaration, creation, initialization of arrays, two dimensional arrays, String class. Packages: - java API packages overview (lang, util, io, awt, swing, applet), user defined packages-creating packages, using packages

Exception Handling Techniques-try-catch-throw-throws-finally -Multithreading- creation of multithreaded program-Thread class-Runnable interface, Thread life cycle.

UNIT 4 (10 hrs.)

Event Handling-Delegation Event Model-Event Classes-Sources of Events-Event Listeners- Event classes- Swing- architecture, components of swing- JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextField, JText Area, JPanel, JFrame, Layout Managers(Flow Layout, Grid Layout, Card Layout, Border Layout, Box Layout, Null Layout).

UNIT 5 (10 hrs.)

Applet Fundamentals -applet tag, applet life cycle, passing parameters to applets. Working with graphics -Line, Rectangle, Oval, Arc, color setting. JDBC architecture- JDBC connection, JDBC statement object, JDBC drivers.

Book of study :

1. E. Balagurusamy- Programming with Java , Third Edition, McGraw Hill Companies.

2. K. Somasundaram - PROGRAMMING IN JAVA2, First Edition, Jaico Publishing House.

Reference:

1. Patrick Naughton - Java2 The Complete Reference, Seventh Edition:

2. Cay S Horstmann & Gary Cornell - Core Java Volume 1- Fundamentals, Eighth edition.

3. Java 6 Programming Black Book 2007 Edition, Dreamtech press.

IT5CRT17 - IT & Environment (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 : (18 hrs.)

Multidisciplinary nature of environmental studies : Definition, scope and importance, Need for public awareness.   (**2 hrs**)

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) **Forest resources**: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) **Food resources**: World food problems, changes caused by agriculture and

overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.   e) **Energy resources**: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. f) **Land resources**: Land as a resource, land degradation, man induced landslides, soil erosion   and   desertification. **Role of individual in conservation of natural resources. Equitable use of resources for sustainable life styles.**

(**10hrs**)

Ecosystems : 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 given ecosystem:- Forest ecosystem

(**6 hrs**)

Unit 2: (26 hrs)
Biodiversity and its conservation: Introduction, Biogeograhical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values., India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

(**8 hrs**)
 Environmental Pollution : 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.   (**8 hrs**)
 Social Issues and the Environment : 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, Consumerism and waste products, Environment Protection Act ,   Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

(**10hrs**)

Unit 3: (10 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET

(**10hrs**)

Unit 4: (10 hrs.)

IT & Society- issues and concerns- digital divide, IT & development, the free software movement , IT industry: new opportunities and new threats, software piracy, cyber ethics, cyber crime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, information overload, health issues- guide lines for proper usage of computers, internet and mobile phones. e-wastes and green computing, impact of IT on language & culture-localization issues- Unicode- IT and regional languages, Green Computing Concept

(**10hrs**)

Unit 5: (8 hrs.)

 Human Rights– An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic,   Social and Cultural Rights).

Human Rights and United Nations – contributions, main human rights related   organs   -UNESCO,UNICEF, WHO, ILO, Declarations for women and children,   Universal   Declaration   of Human Rights. **Human Rights in India** – Fundamental rights and Indian Constitution, Rights for children and women, Scheduled Castes, Scheduled Tribes, Other Backward Castes and Minorities

Environment and Human Rights - Right to Clean Environment and Public   Safety: Issues   of Industrial Pollution, Prevention, Rehabilitation and Safety Aspect of New Technologies such as Chemical and Nuclear Technologies, Issues of Waste Disposal, Protection of Environment **Conservation of natural resources and human rights**: Reports, Case studies and policy formulation. Conservation issues of western ghats- mention Gadgil committee report, Kasthurirengan report. Over exploitation of ground water resources, marine fisheries, sand mining etc.

(8 Hrs)

Internal: Field study

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

 (Field work Equal to 5 lecture hours)

References:

1. Technology in Action" Alan Evans, Kendall Martin, Mary Anne Poatsy, Pearson

2. Bharucha Erach, Text Book of Environmental Studies for undergraduate Courses. University Press, IInd Edition 2013 (TB)

3. Clark.R.S., Marine Pollution, Clanderson Press Oxford (Ref)

4. Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)

5. Dc A.K.Enviornmental Chemistry, Wiley Eastern Ltd.(Ref)

6. Down to Earth, Centre for Science and Environment (Ref)

7. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)

8. Jadhav.H & Bhosale.V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)

9. Mekinney, M.L & Schock.R.M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)

10. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

11. Odum.E.P 1971. Fundamentals of Ecology. W.B. Saunders Co. USA 574p (Ref)

12. Rao.M.N & Datta.A.K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)

13. Rajagopalan. R, Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)

14. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)

15. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)

16. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (Ref)

17. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)

18. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p (Ref)

19. M-Magazine, R-Reference   TB- Text Book

IT5OPT01 -Informatics and Cyber Ethics (Open Course)

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic mail.

Unit II (16 hrs.)

Internet as a knowledge repository, academic search techniques, creating cyber presence. Academic websites, open access initiatives, opens access publishing models, Introduction to use of IT in teaching and learning -Educational software, Academic services–INFLIBNET, NPTEL, NICNET, BRNET.

Unit III (16 hrs.)

Introduction to purchase of technology, License, Guarantee, Warranty, Basic concepts of IPR, copyrights and patents, plagiarism. IT & development, the free software movement

Unit IV (14 hrs.)

Cyber space, information overload, cyber ethics, cyber addictions, cybercrimes– categories –person, property, Government–types-stalking, harassment, threats, security & privacy issues.

Unit V(14 hrs.)

Cyber Addiction, Information Overload, Health Issues, e-Waste and Green computing impact of IT on language & culture-localization issues- Unicode- IT and regional languages e-Governance in India, IT for National Integration, Role of IT.

Book of Study:

1. Alan Evans, Kendall Martin, Mary Anne Poatsy - "Technology in Action", Pearson

References:

1. Dinesh Maidasani "Learning Computer Fundamentals, MS Office and Internet & Web Technology",

 Firewall Media, Lakshmi Publications.

2. V Rajaraman - "Introduction to Information Technology", Prentice- Hall of India.

3. Barkhs and U. Rama Mohan - HTML Black Book 3. "Cyber Law Crimes", Asia Law House,

New Edition

4. Peter Nortons- Introduction to Computers, Sixth Edition, Published by Tata McGraw Hill

IT5OPT02 - Computer Fundamentals, Internet & MS Office (Open Course)

Theory:4 hrs. per week

Credits:4

Unit I (12 hrs.)

Computer Fundamentals: History, Generations, Classifications, Operating Systems, Types of Networks

Unit II (12 hrs.)

The Internet, TCP/IP, IP Addressing, Client Server Communication, Intranet, WWW, Web Browser and Web Server, Hyperlinks, URLs, Electronic Email

Unit III (14 hrs.)

Word processing: Introduction, Microsoft Word, Basic Menus, Formatting the text & paragraph, Working with Index

Unit IV (18 hrs.)

Spread Sheet: Introduction, Microsoft Excel, Basic Menus, Formulas, Basic functions, Charts and Graphs.

Unit V (16 hrs.)

Microsoft PowerPoint: Introduction, Basic Menus, Template, Slide Basics, Charts, Adding Multimedia & Animation.

Book of Study:

1. Dinesh Maidasani, Firewall Media - "Learning Computer Fundamentals, MS Office and Internet &

WebTechnology", , Lakshmi Publications.

References:

1. Harley Hahn - "Internet Complete Reference", , Second Edition, Tata McGraw Hill Education

2. Gary B. Shelly, Misty E. Vermaat - "Microsoft Office 2010: Advanced" , CENGAGE Learning 2010

IT5CRP05 : Software Lab V (core)

Software Lab**: 5** hrs. per week

Credits: 2

 Syllabus

Part I. Applet, JDBC connection and swing based Programs

Part II (using class and read inputs from keyboard)

Java Programs: Method Overloading- Method Overriding-inheritance-abstract class

interfaces- packages-Exception Handling-Multithreading

Scheme of Evaluation for software lab V external is as follows:

(There will be two questions; the first from Part I and second from Part II)

Division of Marks (Practical - 3 hours External)

First program - questions from Part I   **- 25 marks**

    1. Logic   – 10 marks

    2.Successful compilation   – 8 marks

    3. Result   – 7 marks

Second program – questions from Part II   **- 35 marks**

    1. Logic   – 20 marks

    2.Successful compilation   –10 marks

    3. Result   – 5 marks

Viva Voce   **- 10 marks**

Lab Record   **- 10 marks**

(Minimum   of 25 Programs)

Total Marks   **- 80 marks**

IT5CRP06 : Software Development Lab I (core)

Software Development Lab: 6 hrs. per week

Credits: 2

Mini project can be a small complete application project, to make the student confident in designing a system based on Software engineering course. The internal and external evaluation is to be done with the project demonstration and presentation, viva and modification. It must be done in the college lab under the guidance of a faculty.

Scheme of Evaluation for Software Development Lab I external is as follows:

Division of Marks (Software Development Lab I)

Project demonstration and Presentation   **- 25 marks**

Modification   **- 15 marks**

Viva Voce   **- 15 marks**

Project report with proper content and binding **- 25 marks**

Total Marks   **- 80 marks**

B.Sc. IT - SEMESTER VI

IT6CRT18-**Mobile Application Development – Android** (Core)

Theory:4 hrs. per week

Credits:4

Unit 1 (10 hrs.)

Introduction to Android, Android Versions, Android Activity, Android Features and Architecture, Java JDK, Android SDK, Android Development Tools, Android Virtual Devices, Emulators, Dalvik Virtual Machine, Layouts – Linear, Absolute, Frame, Relative and Table.

Unit 2 (16 hrs.)

Android User Interface- Fundamental UI design , User interface with View- Text View, Buttons, Image Button, Edit Text, Check Box, Toggle Button, Radio Button and Radio Group, Progress Bar, Autocomplete Text View, Spinner, List View, Grid View, Image View, Scroll View, Custom Toast Alert and Time and Date Picker.

Unit 3 (14 hrs.)

Activity - Introduction, Intent, Intent_filter, Activity Life Cycle, Broadcast Life Cycle, Services,

multimedia-Android System Architecture, Play Audio and Video, Text to Speech.

Unit 4 (16 hrs.)

SQLite Database in Android- Introduction to SQLite Database, Creation and Connection of the

Database, Extracting values from Cursors, Transactions, Telephoning and Messaging-SMS Telephony, Sending SMS, Receiving SMS, Wi-Fi Activity.

Unit 5 (16 hrs.)

Introduction to JSON and XML, Use of JSON, Syntax and Rule of JSON, JSON Name, JSON Values, JSON Objects, JSON Arrays, Parsing JSON and XML.

Google Play services, Location services, Maps

Book of Study:

1. Prasanna Kumar Dixit - ANDROID, Vikas Publishing House.

2. Anubhav Pradhan, Anil Deshpande, Composing Mobile Apps using Android, Wiley India Pvt.Ltd,2014

References:

1. Kevin Grant and Chris Haseman, Beginning Android Programming – Develop and Design, Pearson.

IT6CRT19- System Software (core)
Theory: 4 hrs. per week
Credits: 4

Unit 1 (12)
Language processing concepts: Introduction, Language processing activities, Fundamentals of Language processing, Fundamentals of language specification. Programming Language Grammar, Classification of grammar, Regular Expression.

Unit 2 (12)
Assemblers: Elements of assembly language programming – two pass and one pass assembler- forward reference problem- cross assemblers.

Unit 3 (15)
Compilers Phases of compiler- Aspects of compilations- memory allocation – Compilation of expression, Compilation of control structures.

Unit 4 (15)
Scanning: finite state alternate, Building DFA's, Parsing, Parse trees, Abstract syntax trees, topdown parsing, predications and back tracking, top down parsing without backtracking, practical topdown parsing, bottom up parsing, operator precedence ,grammars, operator precedence parsing.

Unit 5 (18)
Macros: Macro definition- macro call- Macro expansion- nested macro calls – macro processors.
Linkers and Loaders, Relocation and linking concepts- Design of linker- Functions of loaders- Type of loaders.

Book of study:
1.D M Dhamdhere System programming and operating Systems B y, Tata McGraw Hill

References :
1. John J Donovan - System Programming , First edition, Tata McGraw Hill
2. A V Aho & J D Ullman - Principles of compiler Design, Second edition,Pearson education

B.Sc. IT - Elective Papers

IT6PET01- DATA MINING

Theory:4 hrs. per week

Credits:4

Unit 1: (12 hrs.)

Introduction Data Mining, Data Ware House, Transactional Databases, Data Mining Functionalities Characterization and Discrimination, Mining frequent patterns, Association and correlation, Classification and Prediction, Cluster Analysis, Classification of Data Mining Systems, Data Mining Task Primitive, Integration of Data Mining systems, Major issues in Data Mining, Data integration and transformation, Data reduction, Data discretization.

Unit 2: (12 hrs.)

Data Warehouse and OLAP technology Data Warehouse, Multidimensional data Model, Data warehouse architecture, Data Warehouse implementation, OLAP, Data Warehouse and data mining

Unit 3: (18 hrs.)

Association Rules and Classification Concepts Efficient and Scalable Frequent item set Mining methods, Mining various kind of association rules, from association mining to Co-relation analysis, Classification and prediction, Issues, Classification by Decision tree induction, Bayesian Classification, Rule-based classification, Support Vector Machines, Learning from your neighbors, Prediction

Unit 4: (18 hrs.)

Cluster Analysis Definition, Types of data in cluster analysis, A categorization major Clustering methods- Partitioning methods, K-means and k-medoids, from k-medoids to CLARANS, Hierarchical methods, Density based methods

Unit 5: (12 hrs.)

Mining Complex Data Spatial Data Mining, Multimedia Data Mining, Text Mining and Mining WWW.

Book of study:

1. Jiawei Han and Micheline Kamber - Data Mining - Concepts and Techniques,Second Edition, Elsevier, 2006

Reference:

1. Witten and Frank - Data Mining Practical Machine Learning Tools and Techniques, Second Edition,   Elsevier, 2005

2. Soman, Divakar and Ajay, Data Mining Theory and Practice, PHI, 2006

3. Margaret H Dunham- Data Mining –Introductory and Advanced Topics, Fourth Edition, Person 2006

IT6PET02 -Digital Image Processing

Theory:4 hrs. per week

Credits:4

Unit 1: (10 hrs.)

Digital Image Fundamentals

Image, Digital Image, Digital image processing-definitions, Examples of fields that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image processing system.

Unit 2 : (14 hrs.)

Elements of visual perception

Elements of visual perception- Image Formation, Brightness adaptation and Discrimination, Image sampling and quantization- basic concepts, spatial and Intensity resolution, Basic relationship among Pixels.

Unit 3: (16 hrs.)

 Image Enhancement in Spatial and Frequency Domain

Intensity Transformation and spatial Filtering Basics, Intensity transformation functions- Image Negatives, Log Transformations, Power Law Transformations, Histogram Processing, Spatial filtering-correlation and convolution; Fourier transform and frequency domain.

Unit 4: (15 hrs.)

Morphological Image Processing

Introduction, basis of set theory, Dilation, Erosion, Structuring elements, Opening and

Closing, Hit or miss transformation.

Unit 5: (17 hrs.)

Image Segmentation

Point, Line, Edge detection-detection of isolated points, Basic edge detection- Gradient operators; Pixel based approach-Basics of intensity thresholding, Basic global thresholding; Region based segmentation-region growing, region splitting and merging.

Book of Study:

1. Rafael C. Gonzalez, Richard E. Words, Digital Image Processing, Third Edition, Pearson

References:

1.Anil K Jain, Fundamentals of Digital Image Processing , Pearson Education.
2.Er. Rishabh Anand, Digital Image Processing, MEDTEC Publications.

IT6PET03- Soft Computing Techniques

Theory:4 hrs. per week

Credits:4

Unit 1 (14 hrs.)

Soft Computing, Difference between soft computing and hard computing. **Neural Networks:** Basic concepts of Neural Networks, Human Brain, Artificial Neuron model, Activation functions,Neural network architecture,Single layer and multilayer feedforward networks, Recurrent networks, Neural network characteristics, Learning methods, Rosenblatt's perceptron,Perceptron and linearly separable tasks, XOR problem, Neural network applications.

Unit 2 : (14 hrs.)

Back Propagation Networks: Architecture- perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning- input layer computation, hidden layer computation, output layer computation, calculation of error, Training of neural network, effect of learning rate coefficient, Back propagation algorithm.

Unit 3: (15 hrs.)

Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets, Operations on crisp sets, Properties of crisp sets, Partition and covering, Fuzzy sets, Membership functions, Basic fuzzy set operations, Properties of fuzzy sets, Crisp relations, Operations on crisp relations, Fuzzy relations, Fuzzy cartesian product, Operations on fuzzy relations.

Unit 4 : (15 hrs.)

Fuzzy Systems: Crisp logic, Laws of propositional logic, Inference in propositional logic, Predicate logic, Interpretations of predicate logic formula, Inference in predicate logic, Fuzzy logic, Fuzzy propositions, Fuzzy connectives, Fuzzy quantifiers, Fuzzy inference, Fuzzy rule based system, Defuzzification methods, Applications.

Unit 5: (14 hrs.)

Genetic Algorithm: History, Basic concepts, Biological background, Creation of offsprings, Encoding, Fitness function, Reproduction, **Genetic Modeling**:Crossover, Inversion and deletion,Mutation,Bit-wise operators used in geneticalgorithm, Generational cycle, Convergence of a genetic algorithm, Issues and benefits of GA, Application domains.

Book of study:

    1.S. Rajasekaran and G.A VijayalakshmiPai- Neural Networks, Fuzzy Logic, and Genetic AlgorithmsSynthesis and Applications, Prentice-Hall of India Pvt.Ltd ,2004.

References

    1.S. N. Sivanandan and S. N. Deepa, Principles of Soft Computing, Wiley India 2nd Ed, 2011.
    2.B K Tripathy, J. Anuradha, Soft computing Advances and Applications, Cengage Learning.
    3.B Yegnanarayana, Prentice, Artificial Neural Network, Hall of India Pvt.Ltd ,2012.

COMPLEMENTARY/VOCATIONAL COURSES

I. B.Com COMPUTER APPLICATION VOCATIONAL MODEL II

Complementary Course 3: -Semester V

Programming in C

(Computer Application Stream)

Instructional hours- (54 theory and 36 practical)   Credit -4

Unit 1:
Basic concepts of programming. Algorithm and flowchart. Importance of C, Basic structure of C programs, C character set, Identifiers and keywords, Constants, variables, Data types- primary, derived and user defined datatypes. Defining symbolic constants, Declaration of variables, Operators and expressions- Arithmetic, Relational, Logical, Assignment, Increment & decrement and conditional operators, Evaluation of expressions, operator precedence. Input and output operations- Formatted input and formatted output.
(10 Hours)

Unit 2: Decision making and Branching : Simple If statement, if else , nesting of   if .. else statement, Else if ladder, switch statements. Looping- while, do while, for statements,nested loop, break, continue and go to statements.
(24 Hours)

Unit 3:
Arrays- one dimensional and two dimensional arrays, Character arrays and strings, declaring string variables, Reading strings from terminal and writing strings to screen String handling functions.
(24 Hours)

Unit 4:
User defined functions – Need for user defined functions, Elements of function, Definition of functions, function call, Function declaration, Category of functions, Recursion, Scope, visibility and lifetime of variables. library functions: - Math.h, String.h, Conio.h and Stdio.h.
(12 Hours)

Unit 5:
Structures and Unions : Defining structure, Declaring structure variables, Accessing structure members, Unions- Definition, Difference between structure and Union, Pointer: Fundamentals - Understanding pointers, Declaration of pointer , Pointer expressions, **(20 Hours)**

Practical Session
1. Programs using branching statements
2. Programs using loops
3. Programs using one dimensional array and two dimensional array
4. Programs using User defined functions
5. Simple programs using pointers

Book of Study:
        1.E Balaguruswamy Programming in ANSI C , Seventh Edition,Mc GrawHill Education
References:
1.   Let Us C – Yashavant Kanetker – BpB Publications

2. Ashok Kamthane - Programming in C, Third Edition, Pearson Education

3.Byron Gotfried - Programming with C, Second Edition, Schaums Outline series. McGraw Hill

Complementary course 4: Semester VI

(For Computer Application Stream)

Data Base Management System
Instructional Hours 90 (Theory 54 and Practical 36)   **Credit 4**

Module I

Database Concepts: Meaning – Character- Field-Record-File-Database- Types of Databases- Entities, Attributes, Keys – DBMS - Advantages of Database Systems – Entity Relationship Concepts -Data Independence - Components of DBMS.

(10Hours)

Module II
RDBMS & Relationships in Database : Data Models - Relational Data Model - RDBMS - Relationships - Types of Relationships - One to One - One to Many - Many to Many – Functional Dependency - Normalization : Meaning , Schemas (1NF, 2NF, 3NF)- Defining Relationships -Referential Integrity-Key: Candidate key , Primary key Foreign Key.

(14 Hours)

Module III
Basic Elements of Ms- Access 2013 : Introduction - Objects in Ms- Access - Create, Open, and Close a Database - Creating a Data Table - Different ways of Creating Tables - Data Types - The Primary Key - Properties of the Fields - Saving a Table - Closing a Table - Modifying Data Tables - Creating Table Relationships -Editing Relationships.

(24 Hours)

Module IV

Queries & Forms in Access: Types of Queries - Creating a Query - Saving Queries -Summary Queries - Cross Tab Queries - Action Queries - Forms - The Form Wizard - Editing the Data in a Form - The Form Design View - The Form Design Bar - The Toolbox - Working with Controls.

(24 Hours)

Module -V

Reports in Access: The Report Wizard - The Report Design View - The Report Design Bar - The Toolbox - The Preview Window - Grouping and Sorting - Printing a Report

(18 Hours)

Practical Training: Creating and Modifying Data base - Creating Relationship between Tables - Using Queries for Viewing and Modifying Data from Tables -Working with Forms - Managing Controls in Forms -Generating Reports.

Book of Study:

1. Ritchie, Collin, Data base Principles and Design, Third edition, Thomson Learning.
2. C.J. Date, A.Kannan & S.Swamynathan -An Introduction to Database Systems: Pearson Education.
3. Elmasri,Ramez and Navathe ,Shamkant B, Fundamentals of Database Systems, Sixth Edition, Addison-Wesley
4. Viescas, John L and Conrad Jeff , Microsoft Office Access 2013 Inside Out.
5. Connolly, Thomas and Begg, Carolynn , Learning SQL A step-by-step guide.
6. Michael Alexander, Richard Kusleika, Access 2013 Bible, Wiley Books.
7. Joan Lambert & Joyce Cox, Microsoft Access 2013 Step by step, Microsoft

Optional Courses- B.Com Computer Applications

SEMESTER III

Optional Core I-INFORMATION TECHNOLOGY FOR BUSINESS

Instructional Hours: 90 (54 theory and 36 practical)   **Credit: 4**

Unit I

Introduction to Information Technology -Informatics - Information Technology -E-World -Information Systems–Hardware and Software: Input, Processing, Storage, Output and Communication Hardware–Software: System Software and Application Software – Operating System: WINDOWS, UNIX and LINUX – Versions. Free Software Movement – Futuristic IT – Artificial Intelligence – Virtual Reality.

(16 Hours)

Unit II

Social Informatics - IT and Society –IT Applications in Commerce, Business and Industry – IT Applications in Education, Teaching and Learning – Computer and Health Issues – Proper Usage of Computers and Internet – Cyber Ethics - Cyber Addiction –Cyber Crime -E-waste and Green Computing.

(12 Hours)

Unit III

Network and Communications - Computer Networks – Types of Networks: WAN, MAN, LAN, PAN, CAN-Benefits of Networks, Network Topology –Work Group Computing & Groupware - Telecommuting & Virtual Offices - Network Security –Firewalls. Communication Medium: Wired and Wireless – Generations in Communication. **(15 Hours)**

Unit IV

HTML and Webpage - Introduction to HTML – Essentials- Static & Dynamic Web Pages - Structure of a Web Page - Designing Web Pages- HTML Tags -Text Formats- Working with Text- Presenting and Arranging Text-Paragraphs- Animated Effects: Marquee – using White Space - Tables in HTML-Working with Links, E-mail Links, Lists, Images, Thumbnails, Rollover Images, Audio & Video-Forms & Frames - Website Management. **(34 Hours)**

Unit V

Internet -Working Concepts -Devices, History, Benefits and Drawbacks - Internet Structure, Internet Protocols: TCP/IP, FTP, HTTP, etc., IP Address, Domain Name System (DNS), URL, Web Browsers, WWW Consortium, Search Engines – Types, Academic Search Techniques - Business Applications of Internet, Internet Access Methods - Intranet and Extranet. **(13 Hours)**

Practical Training:
1. Designing a web page for your Department
2. Designing a web page for a Retail Marketing Firm.
3. Design a web page for a Hotel

Suggested Readings
1. Alexis Leon & Mathews Leon, Fundamentals of Information Technology, *Vikas Publishing House, New Delhi.*
2. Williams &Sawyer, Using Information Technology (6th Edition*), Tata McGraw Hill Company.*
3. Avi Silberschatz Peter Galvin & Greg Gagne*,* Operating System Concepts (Windows XP update) .Wille*y India.*
4. *Uyless Black,*Computer Networks, Protocols, Standards and Interface*, Prentice Hall India Pvt. Ltd.*
5. Nagpal, D.P., Web Design Technology Theory and Techniques on the Cutting Edge, *S.Chand& Company Ltd*

SEMESTER IV

Optional Core II:INFORMATION TECHNOLOGY FOR OFFICE

Instructional Hours: 90   (54 theory and 36 practical)

Credit: 4

Module-I

Word Processing Package: MS-Word 2013- Introduction-Features- Word User Interface Elements-Creating New Documents- Basic Editing- Saving a Document- Printing a Document- Print Preview-Page Orientation- Viewing Documents- Setting Tabs-Page Margins- Indents- Ruler- Formatting Techniques-Font Formatting- Paragraph Formatting- Page Setup- Headers &Footers-Bullets and Numbered List-Borders and Shading- Find and Replace-Page Break Page Numbers-Mail Merging-Spelling and Grammar Checking- Thesaurus- Macros- Tables- Side-By-Side and Nested Tables- Formatting Tables- Drawing-Word art- Paint Brush Document Templates – Email Editor.   **(18 Hours)**

Module-II

Desktop Publishing- PageMaker 7.0 - Introduction to Desktop Publishing as a Process- PageMaker Tools and Palettes- Working With Objects -Type Styling Options - Working With Text - Formatting Options-Leading, Margins and Indents - Scaling Text-Paragraph Formatting Options -Working With Grids - Creating Frames - Layers**.   (18 Hours)**

Module-III

Spreadsheet Package: MS -Excel 2013-Introduction-Excel User Interface- Working With Cell and Cell Addresses- Selecting a Range, Moving, Cutting, Copying With Paste-Inserting and Deleting Cells-Freezing Cells- Adding, Deleting and Copying Worksheet Within a Workbook- Renaming a Worksheet-Cell Formatting Options- Formatting Fonts- Aligning-Wrapping and Rotating Text- Using Borders-Boxes and Colors- Centering a Heading, Changing Row/Column Height / Width-Formatting a Worksheet Automatically- Insert Comments- Clear Contents in a Cell- Using Print Preview- Preparing Worksheet for the Printer- Selecting Print Area-Margin and Orientation- Centering a Worksheet- Using Header and Footer- Inserting Page Breaks- Sorting Data.   **(22 Hours)**

Module-IV

Advanced Features of Excel: All Functions in Excel- Using Logical Functions-Statistical Functions-Mathematical Functions - Linking Data between Worksheet- Elements of Excel Charts-Categories- Create a Chart- Choosing Chart Type- Edit Chart Axis - Titles, Labels, Data Series and Legend- Adding a Text Box- Rotate Text in a Chart- Converting a Chart on a Web Page- Saving a Chart- Designing of Templates in Excel.   **(20 Hours)**

Module-V

Presentation Package: Ms-Power Point 2013-Advantages of Presentation- Screen Layout- Creating Presentation- Inserting Slides-Adding Sounds and Videos-Formatting Slides -Slide Layout Views in

Presentation - Colour Scheme- Background Action Buttons- Slide Transition- Custom Animation-Creating Master Slides- Managing Slide Shows - Using Pen Setting Slide Intervals.
(12 Hours)

Practical Training:
1. Create a small poster using PageMaker
2. Create a Brochure using PageMaker
3. Prepare Pay rolls in Excel
4. Conditional Cell Formatting
5. Analysis and presentation of data using charts in Excel
6. Usage of Functions in Excel
7. Mail merging feature of Word.

Book of Study:
1. Gini, Courter & Annette Marquis, Ms-Office *2013, BPB Publications*
2. Patrick Blattner, Louie Utrich. Ken Cook & Timothy Dyck, *Special Edition Ms Excel 2013*, *Prentice Hall India Pvt. Ltd.*
3. Atman Rebecca & Atman Rich, Mastering PageMaker*, BPB Publications*
4. *Building a Foundation with Microsoft Office 2013*
5. *Welcome to Microsoft Office*

SEMESTER V

Optional Core III: COMPUTERIZED ACCOUNTING

Instructional Hours: 90   (54 theory and 36 practical)
Credit :4

Module I
Introduction to Computerized Accounting- Computerized Accounting Vs. Manual Accounting- Merits of Computerized Accounting –Tally ERP 9-Features of Tally ERP 9– Screen Components-Creation of Company- Selecting a Company – Altering/ Modifying Company Creation Details – Deleting a Company – F 11 Features – F 12 Configuration.
(6 Hours)

Module II

Accounts and Vouchers– Account Groups – Pre-Defined Groups – Creating Single& Multiple Groups – Creation of Primary Account Groups – Creating Ledger Accounts in Single & Multiple – Displaying- Altering and Deleting Account Groups and Ledgers –Accounting Vouchers- Entering Transactions in Accounting Vouchers – Bill Wise Details -Altering and Deleting a Voucher Entry – Creating New Voucher Types – Modifying an Existing Voucher – Duplicating a Voucher – Optional Vouchers – Post-Dated Vouchers – Reverse Journal – Bank Reconciliation Statement - Creating Budget - Generating Reports - Configuring Reports Balance Sheet – Profit and Loss Account – Trial Balance – Day Books – Account Books –Statement of Accounts – Ratio Analysis - Cash Flow - Fund Flow – List of Accounts – Exception Reports.   (**20 Hours)**

Module III

Accounts With Inventory– Enabling F 11 and F 12 - Stock Category – Stock Group Single/Multiple Creation of Stock Category and Stock Group – Creation of Units of Measurement – Creating Single/Multiple Stock Items – Creating Godowns - Displaying, Altering and Deleting Stock Groups, Units, Items and Godowns – Cost Categories- Cost Centres – Creating Cost Categories and Cost Centres - Displaying, Altering and Deleting Cost Categories and Cost Centres – Purchase / Sales Orders - Inventory Vouchers - Using Inventory Vouchers – Using Accounting Vouchers With Inventory Details (Invoice Mode) - Tally Security - Tally Vault –Tally Audit – Advanced Security Control – Back-Up and Restore – Inventory Reports – Stock Summary - Inventory Books – Statement Of Inventory.

(22 Hours)

Module IV

Accounting With Tax– F 11 &F 12 Settings For Taxation – TDS – Ledgers Related to TDS – Creating TDS Voucher Types - TDS Reports – TCS – Service Tax - VAT –VAT Terminologies – Computing VAT – Ledgers and Vouchers Pertaining to VAT – VAT Reports – VAT Forms – Interstate Trade and CST.

(20 Hours)

Module V

Payroll: Enabling Payroll – Creating Pay Heads – Single/Multiple Creation of Employee Groups - Single/Multiple Creation of Employee Head – Salary Details – Configuration of Salary Details - Creating Units of Work – Managing and Creating Attendance / Production Types – F 12 Payroll Configuration – Payroll Vouchers – Creating Payroll Voucher Types -Displaying, Altering and Deleting Payroll Documents – Payroll Reports (Full) – Configuring All Payroll Reports – Statutory Deductions – PF – Employers Contribution to PF – PF Ledger Heads– PF Related Heads in Pay Structure –Gratuity Calculation, Creation and Accounting - Generating a Sample Pay Slip – Employee Loan & Salary Advance Management.   (**22 Hours)**

Practical Training
- Prepare final accounts of a Company in Tally ERP 9 with Inventory
- Prepare final accounts of a company in Tally ERP 9 incorporating VAT and TDS
- Preparation of payroll

Book of Study:
1. Roopa, Tally for Every one - *ATC Publishing Chennai*.
2. Nadhani, A.K. Implementing Tally ERP 9
3. A Comprehensive Guide to Tally ERP 9, Tally Manual

SEMESTER VI

Optional Core IV: SOFTWARE FOR BUSINESS AND RESEARCH
Instructional Hours 90   (54 theory and 36 practical)
Credit 4

Module I
Data Analysis: Data – Meaning and Definition – Sources of Data – Data Life Cycle – Processing – Methods and Types- EDP – Information – Value of Information in Decision Making - Information and Analysis of Business Research – Data Processing Software.(**6 Hours**)

Module II
Introduction to SPSS: Menus, tool bar – SPSS layout- Variable View – Data View – Output View – Terminology - Basic Steps for Performing any Statistical Procedure – Creating a Data file- Defining Variables- Variable Characteristics- Default Values - Entering the Data – Inserting Variable and Cases – Selecting Cases - Listing Cases – Identifying Duplicate Cases and Unusual Cases- Sorting Cases.
(24 Hours)

Module – III
Data Transformation: Computing New Variables – Recoding Variables – Automatic Recode – Visual Binning – Rank cases – Types of Measurement Scales – Summary Measures - Frequency, Explore and Cross Tabs – Describing Data Graphically - Descriptive Data Analysis- Number of cases, Minimum, Maximum, Sum, Mean, Standard Deviation, Variance, Kurtosis, Skewness - Bivariate Correlation.
(20 Hours)

Module – IV
Libre Office Writer: Free Software – Libre Office - Writer – User Interface – Creating new Document – Page setup - Saving Documents – Basic Editing – Find and Replace - Formatting Text – Copying and Moving Text – Indenting and Spacing – Headers and Footers – Bulleted and Numbered lists – Tables - Previewing and Printing.

(20 Hours)

Module – V
Libre Office Calc: Spread Sheet – Features – User Interface – Cells – Selecting – Moving and Copying – Text Alignment – Formatting Text – Inserting and Deleting Columns and Rows – Adding and Renaming Worksheets – Borders, Boxes and Colors – Formatting Worksheet – Entering Formulae – Functions – Charts – Previewing and Printing.
(20 Hours)

Practical Training
- List out frequency table, cross tab and graphs related with the marks and details of students in a class.
- Prepare a report on descriptive analysis of any relevant Socio demographic details related with social issue.
- Prepare a letter using Writer
- Prepare a mark sheet using Calc

Suggested Readings
  1. Tutorial of IBM SPSS Statistics.
  2. Kiran Panya, Smruti Bulsari & Sanjay Sinha., *SPSS in Simple Steps,* First edition, Durga Enterprises, Delhi.
  3. Field A., *Discovering Statistics Using SPSS,* Fourth Edition, SAGE Publishers, 2013
  4. Libre Office Handbook
  5. Keith Gordon, Principles of Data Management, BCS Publications, UK

II. BSc Mathematics Model II Computer Application

SEMESTER – I

CA1VOT01 :: Computer Fundamentals

Theory: 4 hrs. per week   Credits: 4

Total Marks - 80 marks

Module I (15hours)

Fundamentals of Computers:

Definition of computer and Characteristics, Generations of computers, Types of Computer- Desktop, Laptop, Mainframe, Super Computer, work stations.

Module II (15hours)

Number systems:

Binary, Octal and Hexadecimal, Converting from one number system to another,decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method for converting from binary to octal, octal to binary, binary to hexadecimal and hexadecimal to binary, Computer Codes (BCD, EBCDIC, ASCII)

Module III (15hours)

Hardware Components:

Logical Organization of a Digital Computer, Bit/Byte/Word, input unit ,Output unit ,Storage unit ,Arithmetic logic unit,Control unit ,CPU. Input devices – keyboard,point and draw devices, data scanning devices ,output devices-monitors ,printers,plotters.

Module IV (15hours)

Software Components:

Definition of software ,Types of software-system software -Application software,Logical system architecture,Software   development   steps.   Machine   language ,Assemblylanguage,Highlevellanguage.DefineProgram,purpose   of program,algorithms,flowcharts,flowchartsymbols,flowchartingrules,advantagesang   limitations   of flowcharts.

Module V (12hours)

Introduction to Computer Networks:

Uses – Physical Communication Media – Network Types – Network Topologies – Communication Protocols.   Basic internet services- email, FTP,TELNET ,WWW

Book of Study :

1. P.K Sinha and Priti Sinha , Computer Fundamentals, Sixth Edition, BPB Publications.

Reference

1.Rohit Khorana, Introduction to Computer Science, 2nd Edition, Pearson Publishers.

2. V. Rajaraman and T. Radhakrishnan , An introduction to Digital Computer design, Fifth
   Edition, Prentice Hall India Learning Private Limited.

3. B. Ram , Computer fundamentals: Architecture and Organization, Fifth Edition, New Age
   International.

4. Sanjay Saxena , A First Course in Computers, Second Edition, VIKAS Publishers.

CA01VOP01 : Software Lab –I- Introduction to WEB Technologies

Practical: 4 hrs. per week Credits: 3

Total Marks - 80 marks

Getting Started With HTML:-

1. Basics of HTML- Document Body Text, Hyperlink, Adding more formatting, LISTS, Tables,, Frames, forms- MARQUEE. Cascading style sheets, Attributes specified to

    the style tag, CLASS, <SPAN> tag, <DIV> tag, LAYERS.

    Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking Text as well as marquee Text.
2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
3. Create HTML document with Table: Some image here
4. Create Form with Input Type, Select and Text Area in HTML.
5. Create an HTML containing Roll No., student's name and Grades in a tabular form.
6. Create an HTML document (having two frames) which will appear as follows:
   About
   Department 1
   Department 2
   Department 3
   This frame would show the
   contents according to the link
   clicked by the user on the left
   frame.
7. Create an HTML document containing horizontal frames as follows:
   Department Names (could be along with Logos)
   Contents according to the Link clicked
8. Create a website of 6 – 7 pages with different effects as mentioned in above problems.
9. Create HTML documents (having multiple frames) in the following three formats:
   Frame1
   Frame2
   Frame1
   Frame2 Frame3
10. Create a form using HTML which has the following types of controls:
    I. Text Box
    II. Option/radio buttons
    III. Check boxes
    IV. Reset and Submit buttons

How PHP scripts work:-

The building blocks of PHP: variables, data types, arrays-basic array, associative array

, multidimensional array; array functions, program control, type casting, regular

expression. User-defined functions, built-in functions, Using files. Forms in PHP:

Creating a simple input form, combining HTML & PHP code on a single page.

References:

1. Luke welling & Laura Thomson,"PHP and MySQL web Development", fourth edition,

Pearson.

2. Chris Bates, Web Programming, 3 rd Edition; Pub: John Wiley & Sons

3. HTML Black Book, Steven Holzner, Dreamtech Publishers

4. PHP and MySQL for Dynamic Web Sites, Fourth Edition: Visual QuickPro Guide Kindle Edition by Larry Ullman.

 5. PHP & MySQL in easy steps, Kindle Edition by Mike McGrath.

Minimum 25 Experiments using HTML and PHP .

Scheme of Evaluation for Software Lab Iexternal is as follows:

Division of Marks (Practical - 3 hours External)

First program based on HTML	**- 30 marks**
Second program based on PHP	**-30 marks**
Viva Voce	**- 05 marks**
Lab Record (minimum of 12 Programs from each section)	**- 15 marks**
Total Marks	**- 80 marks**

CA2VOT02 : Object Oriented Programming with C++

Theory: 4 hrs. per week Credits: 4

Total Marks - 80 marks

Module I (10 hours)

The object oriented technology, Key concept of object oriented programming, Advantages of OOP, structure of C++ program, Tokens, variables, data types, operators in C++, memory management operators, comments ,simple C++ programme, header files and libraries, unformatted console I/O operations, setw() manipulator.

Module II (18 hours)

Decision statements, control loop structure, arrays

Functions : introduction, parts of a function, passing arguments, return by reference, returning more values, default arguments, const arguments, inline functions, function overloading, recursion

Module III (18 hours)

Classes and Objects

Constructers and Destructors , Constructors- parameterized constructors-multiple constructors-constructors with default argument- copy constructor-dynamic constructorDestructors- calling Constructers and Destructors, Constructers and Destructors with static members.

Module IV (14 hours)

Operator overloading:

introduction, the keyword operator, overloading unary operator, operator return type, overloading binary operator, overloading with friend function, overloading assignment operator

Module V (12 hours)

Inheritance, Pointers-Virtual Functions a and Polymorphism

Files and Exception handling

Book of Study:

1. E. Balagurusamy, Object Oriented Programming with C++ , Sixth Edition, McGraw Hill Education.

Reference :

1. D Ravichandran, Programming with C++, Second edition, Tata McGraw- Hill.

2. Mahesh Bhave and Sunil Pateker , Object Oriented Programming with C++, Second edition, Pearson

3. Ashok N Kamthane and Amit Ashok Kamthane, Programming in C++, Second Edition, Pearson.

CA2VOP02 :Software Lab-II using C++

Practical : 4 hrs. per week Credits: 3

Total Marks - 80 marks

1. Programs based on class, objects and manipulation of objects using member functions

2. Programs based on friend functions, passing objects as arguments to function.

3. Programs based on array of objects.

4. Programs based on function overloading, Default arguments.

5. Programs based on operator overloading (binary, unary) using member functions and friend functions.

6. Programs based on constructors, different types of constructors.

7. Programs based on Inheritance, different types of inheritance.

Scheme of Evaluation for Software Lab IIexternal is as follows:

Division of Marks (Practical - 3 hours External)

First program based 1 to 5		**- 30 marks**
Second program based 6 & 7		**-30 marks**
Viva Voce		**- 05 marks**
Lab Record (minimum of 25 Program)		**- 15 marks**
	Total Marks	**- 80 marks**

BSc Mathematics Model II Computer Application - SEMESTER – III

CA3VOT03 : Database Management Systems

Theory: 6 hrs. per week Credits: 4

Total Marks - 80 marks

Module I (15 hours)

Basic concepts :

Database, need for DBMS, users, architecture of DBMS, data models, views of data, data Independence, , attributes, relationship attributes, relationship set, generalization, aggregation, structure of relations

Module II (15 hours)

 Data model :

conventional data models & systems, ER model, structure of relational Database and different types of keys;Data base languages.

Module III(20 hours)

The relational algebra modification of database – Views. SQL – Basic structures , Data definition in SQL, Views and Queries in SQL, – Programming using SQL

Module IV (25 hours)

Object – Oriented data base, Object – Oriented data model, Object – oriented languages.

File structures – File organization – Organization of records in files – Data dictionary.

Module V (15 hours)

Query processing – Overview – Section of operation – Sorting, Database architecture – Different type of systems – Network types.

Book of study:

1.Abraham Silberschatz, Henry K. Korth, S, Sudarshan , Data Base System Concepts , Sixth

Edition, McGraw Hill.

Reference:

1. R. Elmarsi, S. B. Navathe , Fundamentals of Database System , Fourth Edition, Addison Wesley

2. Jeffrey D Ullman, Principles of Database Systems, Second Edition, Computer Science Press.

CA3VPOP03 : Software Lab -III using SQL

Practical : 6 hrs. per week Credits: 3

Total Marks - 80 marks

1. Data definition commands - CREATE, ALTER, DROP, Adding Constraints Primary key, foreign key, unique key, check, not null.

2. Basic SQL queries INSERT, SELECT, DELETE, UPDATE, Using multiple tables, ordering of rows using ORDER BY option, Set operations using UNION, EXCEPT, INTERSECT, Substring Comparison using LIKE operator, BETWEEN operator.

3. Complex Queries Nested Queries, EXISTS and UNIQUE/DISTINCT functions, NULL values, Renaming of attributes and Joining of tables, Aggregate functions and grouping.

Scheme of Evaluation for Software Lab III external is as follows:

Division of Marks (Practical - 3 hours External)

First program based on 1&2	**- 30 marks**
Second program based on 3	**-30 marks**
Viva Voce	**- 05 marks**
Lab Record (minimum of 30 Programs)	**- 15 marks**
Total Marks	**- 80 marks**

BSc Mathematics Model II Computer Application -SEMESTER – IV

CA4VOT04 : Operating System

Theory: 6 hrs. per week Credits: 4

Total Marks - 80 marks

Module I: (15 hrs.)

INTRODUCTIONTO OPERATING SYSTEM:

Operating System: Objectives and functions; Different views of an operating system; Types of operating systems-batch os, mainframe os, server os, multiprocessor os, personal computer os, handheld computer os, embedded os, sensor node os, real-time os, smart card os; Operating system services .

Module II (25 hours)

PROCESSES MANAGEMENT & CPU SCHEDULING:

Process Management: Process concept- The process, Process states, Process Control Block; Process Scheduling- Scheduling Queues, Schedulers;

 CPU scheduling: Schedulingconcepts- Process behaviour, When to schedule, Dispatcher; Scheduling Criteria; Scheduling algorithms-FCFS, SJFS, Priority scheduling, Round-robin scheduling, Multilevel Queue Scheduling, Multilevel feedback queue scheduling.

Dealing with deadlocks: introduction; deadlock characterization-deadlock conditions, resource allocation graph; deadlock prevention.

Module III (15 hours)

MEMORY MANAGEMENT BASICS:

 Introduction- Address binding, Logical and physical address space, Program relocation; Storage allocation and management techniques-Contiguous storage allocation-fixed partition, variable partition; Non-contiguous storage allocation-paging, segmentation.

Module IV(15 hours)

FILE SYSTEMS:

Files: Basic concept- file attributes, file operations, file types, file structures, file access; directories- single-level directory system, two-level directory system, hierarchical directory system, directory operations.

Module V (20 hours)

PROTECTION AND SECURITY:

Why protection; goals of protection; security and its goals; authentication- passwords, artifact-based authentication, biometrics techniques; encryption; virus, worms and Trojans- dealing with viruses, dealing with worms; threat monitoring.

Book of study:

1. RohitKhurana, Operating System, Second Edition,Vikas Publishing house Pvt Ltd.

2. EktaWalia, Operating Systems Concepts, Second Edition, Khanna Book Publishing.

References:

1. Silberschatz, Galvin, Gagne, Operating System Concepts, 6th edition, Wiley Publishers.

2. Gary Nutt, NabenduChaki, SarmishthaNeogy, Operating Systems, Third edition, Pearson

CA4VOP04 : Software Lab – IV Project Practical

6 hrs. per week Credits: 3

Total Marks - 80 marks

Scheme of Evaluation for Software Lab – IV Project Practical external is as follows:
Division of Marks (external)

Project demonstration and Presentation   **- 40 marks**

Viva related to project   **-20 marks**

Project report with proper content and binding   **- 20 marks**

Total Marks   - 80marks

III. B.Sc Physics Model II Computer Application

VOCATIONAL COURSES - MODEL II - COMPUTER APPLICATIONS

Vocational Paper I: CA1VOT01 - COMPUTER FUNDAMENTALS

Credits – 2   **No. of contact Hours. –36**

Scope: This course provides the basic knowledge about computers.

Prerequisites: Basic Mathematics, Fundamentals of Electronics.

Module I – (10 Hours.)

Fundamentals of Computers:

Evolution of Computers: Abacus, Napier's Logs and Bones, Mechanical Calculators, Babbage's Engines, Hollerith's Machine, Generation of Computers, Purpose of using computers. Data & Information, Characteristics of a Computer, Capabilities & Limitations of Computers. Type of Computers: Analog-Digital-Hybrid. Classification based on memory size: Micro, Mini and Mainframes, Supercomputers.

Module II – (6 Hours.)

Basic Computer Organization and Number System

Basic Organization & Working of a Computer: Arithmetic Logic unit-Control unit-Central Processing unit.

Number system arithmetic – octal addition, octal Subtraction, hexadecimal addition, hexadecimal subtraction

Computer Codes (BCD, EBCDIC, ASCII), BCD Addition

Module III - (10 Hours.)

Components of a Computer

Input unit: Different types of Keyboards, Mouse and its working, Joystick, Trackball,

Scanner: Flat bed, Sheet-fed and Hand-held scanners, Graphic Tablets, Light Pen Output unit: Working of monochromatic and color CRT, LCD Panel, Plotters, Audio output devices, Printers – Working of Dot Matrix, Laser, Inkjet, Color Thermal printer Motherboard, Expansion Buses, BIOS

Storage unit: Primary Memory-RAM, ROM, PROM, EPROM and EEPROM, Cache Memory Secondary Memory-Magnetic storage devices, Optical storage devices, Semiconductor memory.

Module IV – (10 Hours.)

Software Components and Computer Languages:

What is software, Relation between Hardware and Software?

Types of Software: System software: Operating System, Language Translators- Assembler, Compiler & Interpreter

Application software: General Purpose Application Software, Customized Application software.

Utility Software: Antivirus, Disk Defragmenter, Backup Software, Compression Software

Classification of software based on license: Proprietary, Shareware, Freeware, Open source, Free Software

Computer Languages-Machine Language, Assembly Language, High-Level Language, Define program, purpose of program, flowcharts, flowchart symbols, flowcharting rules, advantages and limitations of flowcharts

Book of Study

1. *Computer Fundamentals sixth edition by P.K Sinha,BPB Publications*

2. *Fundamentals of Computers, V Rajaraman, Prentice-Hall of India, New Delhi.*

Reference Books

1. *Introduction to Computer Science 2nd Edition, Rohit Khorana, Pearson Publishers*

2. An introduction to Digital Computer design by V. Rajaraman and T. Radhakrishnan

3. Computer fundamentals by B. Ram

4. A First Course in Computers 2003, Saxena, VIKAS

Vocational Paper II: CA1VOT02 - COMPUTER NETWORKS & INTERNET TECHNOLOGIES

Credits – 2   **No. of contact Hours. –36**

Scope: This course is expected to provide knowledge of various networking technologies and its applications.

Prerequisites: Basic mathematics, Fundamentals of Computers.

Module I: (8 Hours.)

Computer Networks: Introduction to computer network, data communication, Components of data communication, data transmission mode, Network topologies, LAN, MAN, WAN, Client Server Model- Peer-to-Peer, Uses of networks

Module II: (10 Hours.)

Transmission Media: Introduction, Guided Media: Twisted pair, Coaxial cable, Optical

fiber. Unguided media: Microwave, Radio frequency propagation. LAN Topologies: Ring, bus, star, mesh and tree topologies. Network Devices: NIC, repeaters, hub, bridge, switch, gateway and router, Multiplexing – FDM, TDM, WDM

Module III: (11 Hours.)

Network Models: The OSI Model- Layers -Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer. TCP/IP Protocol suite-Physical and Data Link Layer, Network Layer, Transport Layer, Application Layer.

Module IV: (7 Hours.)

INTERNET- Basics of internet, features of internet, E-mail, Email Architecture, SMTP, POP,IMAP, WWW Architecture, URL, File transfer, The TELNET, Gopher, Web server, Web Browser.

Book of study

1. *Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition),PHI, 2010*

2. *Forouzan, Data Communication and Networking, TMH,2003.*

Reference Books:

1. *Computer Networking: A Top-Down Approach 5th Edition, by James F Kurose*

2. *Computer Networks- A system approach, by Peterson*

Semester II

Vocational Paper III: CA2VOT03 - WORD AND DATA PROCESSING PACKAGES

Credits – 2   **No. of contact Hours. –36**

Scope: This course provides the detailed knowledge of Word and data processing software's

Prerequisites: Basic Computer Knowledge.

Module I

MS Word: (12 Hours.)

Word Processing Package: MS-Word: Introduction; Features- Word User Interface Elements; Creating new Documents; Basic editing, Saving a Document; Printing a Document; Print Preview, Page orientation – Viewing Documents; Setting tabs- Page Margins; Indents; Ruler, Formatting Techniques; Font Formatting, Paragraph Formatting; Page Setup; Headers & Footers; Bullets & Numbered List; Borders & shadings; Find & Replace; Page Break & Page Numbers; Mail Merging ; Spelling & Grammar Checking; Thesaurus; Automating Documents; Macros; Tables- Side by Side & Nested Tables; Formatting Tables; Word Art, E-mail editor

Module II

PageMaker (12 Hours.)

Desktop Publishing: PageMaker: Introduction to Desktop Publishing as a Process-Advantages of PageMaker- PageMaker User Interface Elements; Creating new Documents - PageMaker Tools &

Palettes-Master Pages- Page Setup, Page Orientation, Inserting Pages, Removing Pages; Headers & Footers, Page Number - Working with objects- Type Styling Options- Working with text-Formatting Options: Leading, Margins & indents- Scaling Text- Changing Line Specifications, Changing Fill Specifications, Fill & Stroke-Paragraph Formatting Options- Working with Grids-Creating Frames- Adding Graphics to a Frame- Layers- Creating a new layer, moving an object to another layer, hiding layers, locking layers, deleting layers

Module III

MS Excel: (12 Hours.)

Spreadsheet package: MS-Excel Introduction, Excel User interface, working with cell and cell addresses, Selecting a range, Moving, Cutting, Copying & Paste, inserting &

deleting cells, freezing cells, adding deleting & copying worksheet within a workbook, Renaming a worksheet. Cell formatting options-Formatting Fonts, Aligning, Wrapping and Rotating Text, Using Borders, Boxes and Colors, Centering a heading, Changing row/column and height/width, Formatting a work sheet automatically, Insert Comments, Clear contents in a cell, using Print preview, Preparing worksheet for the printer, Selecting Print area, Margin and Orientation, Centering a worksheet, Using header & Footer, inserting page breaks, creating list, sorting data, Logical & Mathematical functions in excel, Linking data between work sheets, pie chart, converting a pie chart on a webpage, Use of Pivot Tables

References

1. *An Introduction to Business Data Processing, Sardino, Prentice Hall.Microsoft Office 97, Ned Snell, PustakMahal, New Delhi.*

2. *Windows and MS Office 2000 with Database Concepts, N Krishnan, Scitech Publications Pvt. Ltd, Chennai.*

3. *Adobe PageMaker 7.0 (Illustrated Series: Complete) by Kevin Proot.*

4. *Discovering Computers and Microsoft Office 2010: A Fundamental Combined Approach (Shelly Cashman Series) by Gary B Shelly and Misty Vermaat*

5. *PageMaker(r) 7: The Complete Reference(Paperback) Carolyn Connally*

6. *PageMaker for Macintosh and windows David D Busch BPB Publications.*

Vocational Paper IV: CA2VOT04 - PROGRAMMING IN ANSI C

Credits – 2   **No. of contact Hours. –36**

Scope: To gain the skills of Programming and to learn the programming concepts in C Language.

Prerequisites: Basic mathematics, basic computer knowledge.

Module-I: (8 Hours.)

Basic concepts of programming. Language classification. Steps in developing a program, Algorithm and flowchart. C language basics: C character set, tokens, Identifiers and keywords, Data types, constants, variables, declarations, qualifiers-long, short and unsigned declarations, expressions, symbolic constants, Input and output operators/functions , compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, increment and decrement operators, conditional operators.

Module -II: (10 Hours.)

Decision making and Branching: If statement, if else statement, nested if...else statement, Else if ladder, switch statements, looping - for loop, while loop, do..while statements, nested loop structure, break, continue and go to statements, scope of variables.

Module -III: (8 Hours.)

Arrays one dimensional and two dimensional arrays, initializing, reading, writing, strings, string functions, Library functions: Math.h, Conio.h and Stdio.h.

Module -IV: (10 Hours.)

User defined functions - Elements of functions, different arguments, Return values and their types, Function declaration, Function calls, different types /category of functions. Recursive functions, Call by value and reference methods.

Book of study:

1. *Programming in ANSI C – E Balaguruswamy - Mc GrawHill Education*

References:

1. *Mastering C – K R Venugopal& S R Prasad – Mc GrawHill Education*

2. *Programming in C – Ashutosh Pandey – Cyber Tech Publications*

3. *Let Us C – YashavantKanetker – BPB Publications*

Semester III

Vocational Paper V: CA3VOT05 - CONCEPTS OF OBJECT ORIENTED PROGRAMMING

Credits – 4   **No. of contact Hours. – 54**

Scope: This course is expected to provide sound knowledge in object oriented **p**rogramming.

Module I: (9 Hours.)

Basic concepts of Object Oriented Language

Basic concept of object oriented programming- benefits of OOPs- A simple C++ programme, structure of C++ program. Basic data types and declarations, symbolic constants- Reference by variables, operators in C++, Special Assignment Expressions, operator precedence and associatively, control structures- function in C++ - the main function, function prototyping- call by reference- return by reference- inline function Default argument,- function overloading – friend and virtual function.

Module II: **(12 Hours.)**

Classes and Objects

Specifying a class- Defining member functions- nesting of member functions – private member functions – arrays within a class – Memory allocation for object- static data members – static member functions – arrays of objects – friendly functions.

Module III: (10 Hours.)

Constructors and Destructors

Constructors- parameterized constructors-multiple constructors- copy constructor-dynamic constructor, Destructors.

Module IV:

Inheritance and operator overloading   (12 Hours.)

Operator overloading- Defining operator overloading-Overloading unary and binary operators-Inheritance-Defining derived classes- single, multiple, multilevel, hierarchical and hybrid inheritance - virtual base classes.

Pointers, Virtual Functions and Polymorphism (11 Hours.)

Pointers- Declaring and initializing pointers, Manipulation of pointers, Arrays of pointers, Dynamic memory allocation, Pointers and strings, Pointers to functions, Virtual functions, pure virtual function

Book of Study:

1. *E. Balagurusamy , Object Oriented Programming with C++, Fifth edition, McGraw Hill publications*
2. *Object-Oriented Programming in Turbo C++, Robert Lafore, Galgotia.*

Reference:

1. *Mahesh Bhave and Sunil Pateker Object Oriented Programming with C++, Second edition, Pearson*

2. *Ashok N Kamthane and Amit Ashok Kamthane, Programming in C++, Second Edition, Pearson.*

Vocational Paper VI: CA3VOT06 - OPERATING SYSTEM

Credits – 3   **No. of contact hours – 54**

Scope: This course provides a basic knowledge about the role of Operating System in the functioning of computers

Prerequisites: Basic knowledge of computer fundamentals and computer networks

Module I (10 Hours.)

Introduction to operating system:

Operating System: Objectives and functions; Different views of an operating system; Types of operating systems-batch OS, mainframe OS, time sharing OS, multiprocessor OS, personal computer OS, handheld computer OS, embedded OS, real-time OS, Operating system services

Module II (8 Hours.)

Processes management:

Process concept- The process, Process states, Process Control Block; Process Scheduling- Scheduling Queues, Schedulers;

Module III (18Hours.)

CPU Scheduling:

Scheduling concepts- Process behavior, When to schedule, Dispatcher; Scheduling Criteria; Scheduling algorithms-

 CPU Scheduling Problems

First Come First Serve (FCFS)-Shortest Job First (SJF) - Priority Non Preemptive (P-NP)-Shortest Remaining Time First (SRTF)-Priority Preemptive - Round Robin (RR)

Module IV (18 Hours.)

Memory Management Basics:

Basic ideas-Memory Management requirements, Address binding, Dynamic address space binding, Fixed partition memory strategies, Variable partition memory strategies, Dynamic Storage allocation problems: First Fit, Best Fit, Worst Fit, Next Fit, Fragmentation, Swapping, Virtual memory, Page Replacement problems- FIFO, LRU and Optimal replacement

Deadlock:

 Introduction, deadlock characterization-deadlock conditions, resource allocation graph; deadlock prevention.

File systems: Files- Basic concept- file attributes, file operations, file types, file structures, file access

Book of Study:

1. *RohitKhurana, Operating System, 2ndedition,Vikas Publishing house pvt ltd.*
2. *EktaWalia, Operating Systems Concepts, Khanna Book Publishing.*

References:

1. *Silberschatz, galvin, gagne, Operating System Concepts, 6th edition.*
2. *Gary Nutt, NabenduChaki, SarmishthaNeogy, Operating Systems, 3rd edition, Pearson.*

Semester IV

Vocational Paper VII: CA4VOT07 - VISUAL BASIC PROGRAMMING

Credits – 4   **No. of contact hours – 54**

Scope: This course is designed to provide basic ideas of VB programming

Prerequisites: Basic knowledge of computer fundamentals and computer programming.

Module I

Introduction (12 hours)

VB Introduction-VB Developing Environment – VB Menu Bar –Toolbars –Project Explorer- Tool Box-Form Designer-Form Layout.

Visual Basic Program Elements: Variables, Data Types, Scope and Lifetime of Variables, Declaring and using Constants; Operators – Arithmetic Operators, Relational or Comparison Operators, Logical operators; User Defined Data Type, Arrays, Multi-dimensional Arrays, Dynamic Arrays, Comments in VB.

Control Flow Statements- if ....then, if...then...else, select case; Loop Statements- do loop, for next, for each next; Input Box and Message Box functions

Using intrinsic controls (10 hours)

Pointer – Label – Frame – Check box – Combo box – Scroll Bar – Timer – Dir list box – Shapes – Image – OLE – Picture box – Text box – Command button – Option button – List box – Drive List Box-Directory List Box-File List Box-Shape Control & Line Control-Horizontal Scroll bar – Vertical Scroll Bar-Adding check box controls – Adding combo box– Standard MDI form features – Building the MDI form.

Module II

Methods, Properties, and Events (14 hours)

Learn about properties and how to manage them – Discover how to call methods –Learn how Visual Basic enables program to respond to events, System Events and User Events.

Debugging Window- Immediate Window, Locals Window, Watch Window, Quick Watch Window, Call Stack Window, creating a toolbar in VB

Module III

Functions and File Handling (8 hours)

Control Arrays, Procedures, Event Procedure, General Procedures-Sub Procedures, Functions; Arguments to functions or sub procedures, Passing arguments by reference and value, Optional arguments , Using named Arguments, Exiting Procedures, Event-Driven Programming, String Functions

Module IV (10 Hours.)

File Handling

File Handling-File, Field, Records, Sequential Access Files, Opening and closing of Sequential Access Files, Editing (Reading & Writing) Files opened for Sequential Access, Random Access Files, Opening and closing of Random Access Files, Editing (Reading & Writing) Files opened for Random Access, Deleting records in Random Access- Binary Access Files, Opening and closing of Binary Access Files, Editing (Reading & Writing) Files opened for Binary Access, Deleting records in Binary Access

Reference Books:

1. *Visual Basic 6 - Clayton Walnum, Prentice- Hall of India, New Delhi.*

2. *Microsoft Visual Basic 6.0 Professional: Step by Step by by Halvorson*

3. *Visual Basic 6.0, N Krishnan and N Saravanan, Scitech Publications, Pvt Ltd, Chennai.*

4. *Programming With Visual Basic 6.0 by M. Azam*

Vocational Paper VIII: CA4VOT08 - WEB DEVELOPMENT AND PHP

PROGRAMMING

Credits – 3   **No. of contact hours – 54**

Scope: This course is designed to provide basic ideas of HTML, JavaScript and MYSQL

Prerequisites: Basic knowledge of computer fundamentals and computer programming.

Module I

HTML & CSS (18 hours)

Basics of HTML:- Html tags, HTML Editors, HTML Documents, Heading Tags, Paragraph Tags, Centering Contents, HTML Elements, frames element, marquee text,

HTML Attributes:- lang, href, size, align, valign, bgcolor, background, width, height, title

HTML styles, HTML symbols, HTML layout, HTML Text formatting elements, HTML comments, HTML Links, Anchor, HTML elements, HTML Tables, HTML List, HTML Block elements, HTML head, HTML forms, GET & POST Methods, Form Attributes,

Organization of HTML Document, Creating a webpage using html, HTML editors (Microsoft Front page, dream weaver), Introduction to HTML Web server (IIS - Internet Information Server, PWS - Personal Web Server).

CSS:- Basics, Syntax, CSS Comments, CSS Selectors, External style sheet, Internal style sheet, Inline style, CSS Text

Module II

JavaScript (12 hours)

Basics, Static webpage, Dynamic webpage, Advantages & Limitations of JavaScript, JavaScript Development Tools, External JavaScript, JavaScript Output, JavaScript Data Types, Variables and its scope, JavaScript Reserved Words. JavaScript Operators, Conditional Statements-if statement, if...else statement, if...else if ... statement, Switch statement, JavaScript Loops:- while loop, for loop, do-while loop, for-in loop, break & continue statements, various mouse and keyboard events

Module III

PHP& MYSQL (15 hours)

  The Structure of PHP- Using Comments, Basic Syntax, Variables, Operators, Variable Assignment, Multiple-Line Commands, Constants, Predefined Constants, The Difference Between the echo and print Commands, Functions, Variable Scope. Conditional Statements-if statement, if...else statement, if...else if...else statement, Switch statement, PHP Loops:- while loop, for loop, do-while loop, for each loop, break statement, functions, arrays, super globals, PHP sessions and cookies, PHP file handling.

Module IV

Implementing MYSQL using PHP (9 Hours.)

 Introduction, Database, opening a connection, closing a connection, Create Database, drop database, select database, MYSQL Data types, tables, Drop tables, insert, select tables, Where clause, update, delete records, Like clause, Order By, Joins, alter, dropping adding or repositioning a column,

References

1. *Learning Web Design 2nd Edition by Jennifer Niederst*

2. *DHTML and JavaScript by Gilorien*

3. *PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide by Larry Ullman*

4. *HTML & CSS: The Complete Reference, Fifth Edition by Thomas Powell*

5. *HTML and CSS: Design and Build Websites by Jon Duckett*

6. *PHP: The Complete Reference by Steven Holzner*

7. *Learning PHP, MySQL & JavaScript with j Query, CSS & HTML by Robin Nixon*

VOCATIONAL SUBJECT COMPUTER APPLICATIONS PRACTICAL SYLLABUS

SEMESTER I& II

Vocational Practical 1

CA2VOP01: INTRODUCTION TO COMPUTERS & ANSI C PROGRAMMING

1. Introduction to various hardware components of a computer.

2. Preparation and printing of a simple document using DOS TEXT Editor.

3. Development of a batch file to copy the contents of a text file into another text file.

4. Development of a batch file to create a directory named "Computer" and any two subdirectories inside "Computer

5. Development of a batch file to copy all files from a source drive to a target drive.

6. Development of a batch file to copy all the files, directories and all hidden files (if any) from one disk to another identical disk.

7. Development of a batch files to rename any existing directory by giving a new name with all possible error messages.

8. Composing and sending an E-Mail message.

9. Program to find the sum and average of n numbers.

10. Obtain roots of a quadratic equation in all possible cases.

11. Program that read a four digit number from keyboard and then prints it in reverse case.

12. Program to compute x to the power n using for loop.

13. Program to calculate the standard deviation of an array of values. The array elements are read from terminal. Use function to calculate standard deviation and mean.

14. Program to read the elements of the given two matrices of order n x n and to perform the matrix multiplication.

15. Program to print the first n Fibonacci numbers using function.

16. Program to find the sum of the following series using a function declaration. Sum = x $- x^3/3! + x^5/5! - x^7/7! + \ldots x^n/n!$. Where n and x are entered from the keyboard.

17. Program that uses a function to sort an array of integers.

18. Program to reverse a string without using string function

19. Program to find the length of the given string without using string function

20. Program to print prime numbers within a range.

21. Program to print the following pattern by using any loop. Range of star (*) must be entered from keyboard.

    *

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References

1. *Operating systems Gary Nutt 3rd Edn. Pearson.*

2. *Microsoft MS-DOS User's Guide & Reference.*

3. *Programming in ANSI C – E Balaguruswamy - Mc GrawHill Education*

4. *Visual Basic 6 - Clayton Walnum, Prentice- Hall of India, New Delhi.*

SEMESTER III & IV

Vocational Practical II

CA4VOT01 - DATA PROCESSING PACKAGES, OPERATING SYSTEM & VISUAL BASIC PROGRAMMING

(Minimum 14 experiments)

1. Implement the concept of First Come First Serve (FCFS) using C or C++

2. Implement the concept of Shortest Job First (SJF) using C or C++

3. Implement the concept of First Fit algorithm.

4. Create a worksheet which contain Employee no, Emp. name, Salary, department, Designation. Calculate the gross salary. Gross Salary = (Salary+HRA+DA) - PF. HRA = 50% of salary, DA = 30% of salary, PF = 10% of salary. Extract all employees who are managers. Extract all the employees whose salary is between 20000 and 40000. List the total salary and gross salary in each department.

5. Create the following work sheet. Marks of 4 subjects of 15 students and calculate the total mark, Average mark, Result and Grade. Sort the total marks in the descending order. All the numeric fields in the left alignment. Centralize the name of the Institute that you are studying.

6. Create a work sheet for preparing merit list for BSc admission in your college.

7. Create two documents using MS WORD exactly the way they are seen.

8. Create a document and type 30 lines in it. Spell-check the document and create five AutoCorrect entries on your own. Then create five Auto text entries. Print only the current page of the document.

9. Create a file, inviting your friends to a dinner. Use the Mail Merge facility so that you do not have to re-type the letter with their names and addresses.

10. Create two documents using PageMaker exactly the way they are seen.

11. Create two documents using PageMaker. Change its character width, indents, space around paragraphs; add special characters, figures, tables etc.

12. Design a text book cover page with title and pictures using page maker.

13. Create a VB project that will display pictures in a PictureBox and ImageBox controls, when the user click display button

14. Using a text box and a command button in the form, enter a number in the text box and on clicking on command button display whether the number a single, two or three-digit number in a message box.

15. Create a project to change the shape of a shape control at the interval of one second using Timer control.

16. Create an event procedure to convert a text from lowercase to uppercase.

17. Create a function procedure to calculate the sum of "n" Fibonacci numbers

18. Create a function procedure to find simple interest.

19. Create a program to accept a number and print it in the reverse order.

20. Create a program to accept a set of numbers and find the largest and smallest number.

21. Create a program to count the number of vowels in a string and replace with '*' symbol.

22. Create a program to check whether a given string is palindrome or not.

23. Create a function procedure to find prime numbers within a range

24. Implement traffic system demonstration

References

1. *E. Balagurusamy , Object Oriented Programming with C++, Fifth edition, McGraw Hill publications.*
2. *Visual Basic 6 - Clayton Walnum, Prentice- Hall of India, New Delhi.*

3. *Operating systems Gary Nutt 3rd Edn. Pearson.*

4. *Discovering Computers and Microsoft Office 2010: A Fundamental Combined Approach (Shelly Cashman Series) by Gary B Shelly and Misty Vermaat*

Vocational Practical III

CA4VOP03: C++ PROGRAMMING & WEB DEVELOPMENT

(Minimum 14 experiments)

1. Write a function called reversit() that reverses a string (an array of char). Use a for loop that swaps the first and last characters, then the second and next –to-last characters, and so on .The string should be passed to reversit() as an argument. Write a program to exercise reversit().The program should get a string from the user, call reversit(), and print out the result.

2. A program to perform simple arithmetic operations of two complex numbers using operator overloading.

3. Create a class called employee that contains a name and an employee no: Create another class called scientist that inherits the properties of employee and it contains the function for entering the name of the award he gets and display it. Create objects for class scientist that contain their name, no and the award they get. Implement single inheritance.

4. Imagine a publishing company that markets both book and audio-cassette versions of its works. Create a class "publication" that stores a title (a string) and price (type float) of a publication. From this class derive two classes; "book", which adds a page count (type int); and "tape", which adds a playing time in minutes (type float). Each of these three classes should have a getdata() function to get its data from the user at the keyboard, and a putdata() function to display its data. Write a main() program to test the "book" and "tape" classes by creating instances of them, asking the user to fill in their data with getdata(), and then displaying the data with putdata().

5. Declare a class to represent bank account of 10 customers and the following data

   members: Name of the depositor, Account Number, Type of Account (S for saving

   and C for current Account), Balance Amount. The class also contains the following member functions. a). To initialize data members, b) To deposit money. c) For withdrawal of money after checking the minimum balance (minimum balance is Rs1000) d) To display the data members.

6. A program to concatenate using two strings into one string using a pointer method.

7. Write a program that read a group of numbers from the user and places them in an array of type float. Once the numbers are stored in the array, the program should average them and print the result. Use pointer notation wherever possible

8. Program to find Armstrong numbers within a range.

9. Write any program to implement the concept of friend function.

10. Write an HTML code for a webpage for your college with the following details and features

    ☐ A heading followed by a paragraph of 5 sentences about your college using text formatting tags and attributes.
    ☐ Provide yellow color to the background of the page.

    ☐ Include an image of the college.

    ☐ Include a marquee that "Admission for the new academic year commences on 1st June"

11. Write an HTML code to display an online application form for BSc admission. The application form must contains columns for name, address, parent's name, age, sex, caste, marks, photo etc.

12. Write an HTML code to create a list of 3 bikes of your choice in a frame. Link each one to display the description with a picture in another frame.

13. Create an HTML document with following formatting – Bold, Italics, Underline, Color, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking Text as well as marquee Text.

14. Develop a website to display an email login page. The page must contain one text box for entering the username and one password box for entering the password. The username must contain at least 4 characters and the password must contain at least 6 characters. The first two characters in the password must be numbers. On clicking show login button, if the valid data are given in the boxes, a message
"Correct Data" should be displayed. Otherwise "Wrong Data" message should be displayed.

15. Develop a webpage to implement a simple calculator. The page should have two textboxes to enter two numbers. It should also have 4 buttons to add, subtract, multiply and divide the two numbers. The answer should be displayed in a third text box on clicking the button.

16. Design an HTML page that contains five text boxes, three textboxes for marks of three subjects, and remaining for total marks and average marks. Provide validations for this textbox in a separate JavaScript file and link it with the HTML file. The validations are (i) Textboxes should not be empty (ii) It should be a number (iii) It should be between 0 and 99.

17. A webpage contains a button. Write HTML code for the button which executes a function Message() on the occurrence of the following events. (a) When user clicks the mouse on the button. (b) When user moves the mouse over the button.

18. Write HTML codes to create two web pages to show some information about the science and the commerce department of your college. Create another webpage to divide the browser window horizontally into two. In the first frame, a brief introduction of the college and two links are to be provided- one for science and other for commerce. On clicking these links the respective webpage is to be opened in the second frame.

19. Create a form using HTML which has the following types of controls:

   I. Text Box

   II. Option/radio buttons III. Check boxes

   IV. Reset and Submit buttons

References

1. *E. Balagurusamy , Object Oriented Programming with C++, Fifth edition, McGraw Hill publications*

2. *Object-Oriented Programming in Turbo C++, Robert Lafore, Galgotia.*

3. *Learning Web Design 2nd Edition by Jennifer Niederst*

4. *HTML & CSS: The Complete Reference, Fifth Edition by Thomas Powell*

SYLLABUS OF MODEL- I COMPLEMENTARY PAPER FOR B.SC.STATISTICS, BSc.MATHEMATICS

Semester I

CA1CMT01 : Computer Fundamentals

Theory: 2 hrs. per week

Credits: 2

Module I – (10 Hrs)

Fundamentals of Computers: Define computer, introduction to bit, byte, data,information, program, hardware and software. Generations of computers , Types of Computers, Logical Organization of a Digital Computer - Input unit ,Output unit ,Storage unit ,Arithmetic logic unit, Control unit ,CPU.Input devices – keyboard, point and draw devices, data scanning devices.Output devices-monitors ,printers, plotters.Primary and Secondary storage devices.

Module II -(6 Hrs)

Number systems- Binary, Octal and Hexadecimal, Converting from one number systemto another-decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method forconverting from binary to octal, octal to binary, binary to hexadecimal and hexadecimalto binary, Computer Codes (BCD, EBCDIC, ASCII)

Module III – (8 Hrs)

Boolean Algebra and Logic circuits- Fundamental concepts of BooleanAlgebra,Postulates of Boolean algebra,Theorems of boolean algebra, Logic Gates- AND,OR, NOT, NAND, NOR, XOR and XNOR, logic circuits, converting expression to logiccircuit.

Module IV - (6Hrs)

Computer Software and Languages : Define software, Relationship between hardwareand software, Types of software-System software and Application software,Machine language, Assembly language, High-level language, Language Translators - Assembler, Compiler, Interpreter

Module V – (6 Hrs)

Operating system: Definition, functions of an operating system, types of Operatingsystem: (batch, multiprogramming, time sharing etc.), features of UNIX,LINUX,MS DOS,WINDOWS operating systems.

Book of Study:

1. P.K Sinha and Priti Sinha , Computer Fundamentals, Sixth Edition, BPB Publications.

2. Rohit Khorana, Introduction to Computer Science, 2nd Edition, Pearson Publishers.

Reference:

1. V. Rajaraman and T. Radhakrishnan , An introduction to Digital Computer design, Fifth Edition, Prentice Hall India Learning Private Limited.

2. B. Ram , Computer fundamentals: Architecture and Organization, Fifth Edition, New Age International.

3. Sanjay Saxena , A First Course in Computers, Second Edition, VIKAS Publishers.

Practical LAB –I

Practical : 2 hrs. per week

MS WORD

1. Page formatting

2. Paragraph formatting, header and footer, page number etc.

3. Table creation, chart, shapes, hyperlinks, cross-reference etc.

4. Mail merge

MS EXCEL

1. Working with excel formula , different type of cell references and linking data betweenworksheet Logical functions – IF, AND, OR and Nested IF function.

2. Math functions – ROUND, RAND, CELING, FLOOR, INT, LCM, MOD, EVEN, SUNIF, SQRTand Trigonometric functions

3. Statistical functions- AVERAGE, AVERAGEA, AVERAGEIF, COUNT, COUNTA,COUNTBLANK, COUNTIF, SUM , SUMA, MIN, MINA, MAX and MAXA

4. Formatting cells

5. Create a chart, choosing chart type, edit chart axis-titles, labels, data series and legend

MS POWERPOINT

1. Creating presentation

2. Animations & Transition

3. Different type of design, Sound

4. Inserting picture, table, shapes, charts etc.

MODEL- I B.SC.STATISTICS, BSc.MATHEMATICS - SEMESTER II

CA2CMT02 : Programming in C language

Theory: 2 hrs. per week   Credits: 3

Module-1:

Basic concepts of programming.Language classification.Steps in developing a program, Algorithm and flowchart.

C language basics: C character set, tokens, Identifiersand keywords, Data types, constants, variables, declarations, qualifiers- long, short andunsigned declarations, expressions, symbolic constants, Input and outputoperators/functions ,compound statements, arithmetic operators, unary operators,relational and logical operators, assignment operators, increment and decrementoperators, conditional operators.

(Theory 6 hrs)

Module -2:

Decision making and Branching : If statement, if else statement, nested if...elsestatement, Else if ladder, switch statements, looping - for loop , while loop, do..whilestatements, nested loop structure, break, continue and go to statements, scope ofvariables.

(Theory 10 hrs)

Module -3:

Arrays one dimensional and two dimensional arrays, initializing, reading, writing. Strings, standard library string functions Library functions: Math.h, Conio.h and Stdio.h.

(Theory 8 hrs)

Module -4:

User defined functions - Elements of functions, different arguments, Return values andtheir types, Function declaration, Function calls, different types /category of functions.Recursive functions, Call by value and reference methods.Storage classes: automatic, external(global),static and registers.

(Theory 8 hrs)

Module -5:

Structure: definition, Declaring structure variables, Accessing structure membersConcept of Union. Pointers: Fundamentals - Understanding pointers, Addressoperators, Pointer declaration.

(Theory 4 hrs)

Book of study:

1.E Balaguruswamy , Programming in ANSI C , Sixth Edition, Mc GrawHill Education.

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References:

1. K R Venugopal & S R Prasad , Mastering C , First Edition, Mc GrawHill Education
2. Ashutosh Pandey , Programming in C, First Edition, Cyber Tech Publications
3. YashavantKanetker , Let Us C , Fourteenth Edition, BpB Publications

**Practical LAB –II -- ** Practical : 2 hrs. per week

SYLLABUS

1. Fundamental data types, input/output functions scanf(), printf(), Arithmetic expressions,Evaluation of integer, real and mixed mode arithmetic expressions, truncation effect, typecasting.

2. Programs using control structures: If statement, if else statement, nested if...else statement,Else if ladder, switch, for, while, do…while, break and continue. Using nested loops.

3. Programs using one dimensional array: Creation of array, linear array operations,search, sort, Static initialization of arrays etc.Two dimensional array, matrix addition, matrix multiplication, transpose of a matrix.

4. User Defined Functions: Programs using different categories of functions return typefunctions, void type functions, program using recursive functions (factorial) etc.

Semester II

CA2CMP01 : Software Lab I

Scheme of Evaluation for software lab I external (Practical Lab – I and PracticalLab-II) is as follows: (in Second Semester)

Division of Marks (Practical - 3 hours External)

First program based on Lab I word/excel **- 15 marks**

Second program should be based on Lab II c program **- 15 marks**

Viva Voce **– 03 marks ,** Lab Record (minimum of 15 Programs from each section) **- 7 marks**

Total Marks - 40 marks

CA3CMT03 : Web Technology and Programming

Theory: 2 hrs. per week Credits: 2

Module I - 6 Hrs.

Computer networks- Advantages of networking, Network topologies (Bus, Ring, Star,Tree, Mesh, Hybrid), types of networks - LAN, MAN, WAN, intranet and Internet ,Communication Media – Guided: Twisted Pair, Coaxial Cable and Optic Fiber, Unguided:infrared, microwave & satellite, Concept of the point to point and Broadcast Network,Networking Tools-MODEM, Repeater, Hub, Switches, Routers, Bridge, Gateway, Firewall

Module II - 6 Hrs.

Concept of ISP (Internet Service Provider), Internet Backbone, Concept of URL Address,Domain Names, Hypertext Concepts and World Wide Web, Protocols- FTP, NNTP, SMTP,HTTP, POP, PPP, Email- Electronic Post Service, ISO OSI Reference Model

Module III - 8 Hrs.

Web server and proxy server, Internet Viruses (Trojan, WORM), Internet security issues(Malware, Spyware, Hacking etc.), types of firewall, Basics of Data compression anddata encryption, Digital Signatures, Digital Certificates

Module IV - 10 Hrs.

The art of creating the website, WWW, website, webpage, and home page, The HTMLprogramming basics, General structure of HTML document, HTML tags and attributes,Formatting Tags, Choice of page color, including banners, Tables, Lists, Example ofHTML page. Tags - <HTML>, <BODY>, <HEAD>, <TITLE>, <H1>, <H2>, ……<H6>, <BR>,<B>, <I>, <U>, Adding hyperlinks

Module V - 6 Hrs.

Introduction web browsers (like Internet Explorer, Mozilla Firefox, Google Chrome),Basic tools in the browser(back, forward, homepage, stop, refresh), search engine forinternet, meta search engine

Books of study:

1. P.K Sinha and Priti Sinha , Computer Fundamentals, Sixth Edition, BPB Publications.

2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks , Fifth Edition, Pearson

Reference:

1. Raj Kamal ,Internet & Web Technologies,2002 Edition , Tata McGraw Hill

2. HTML Black Book, Steven Holzner, 2000 edition, Dreamtech Publishers

3. Joel Sklar , Principles of web page design, Sixth Edition, Vikas publications

4. Behrouz A Forouzan , Data Communication & Networking, Fourth Edn. McGraw Hill

Semester III

Practical LAB –III

Practical : 2 hrs. per week

☐ Internet browsing

☐ email - creation of account, reception, compilation, sending etc

☐ Web page designing using HTML tags and linking with other pages.

1. Create HTML document with following formatting – Bold, Italics, Underline, Colors,Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes,Horizontal, Line, Blinking Text as well as marquee Text.

2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internaland External linking

3. Create HTML document with Table:

Some image here

4. Create Form with Input Type, Select and Text Area in HTML.

5. Create an HTML containing Roll No., student's name and Grades in a tabular form.

6. Create an HTML document (having two frames) which will appear as follows:

About

Department 1

Department 2

Department 3

This frame would show thecontents according to the linkclicked by the user on the leftframe.

7. Create an HTML document containing horizontal frames as follows:

Department Names (could be along with Logos)

Contents according to the Link clicked

8. Create a website of 6 – 7 pages with different effects as mentioned in aboveproblems.

9. Create HTML documents (having multiple frames) in the following three formats:

Frame1

Frame2

Frame1

Frame2 Frame3

10. Create a form using HTML which has the following types of controls:

I. Text Box

II. Option/radio buttons

III. Check boxes

IV. Reset and Submit buttons

11. A. Create a web site for ICC world cup tournament which contain

1. A home page

2. Tournament schedule should be present in a table.

3. Details of previous world cups

4. Details of all teams.

Include form, Image, tables, list, according to their needs

12.Create a web site for your college which contain

a. A home page

b. About your management

c. About your Staffs

d. About your course

e. About your Facilities

All this pages contain appropriate pictures and links between them.

MODEL- I B.SC.STATISTICS, BSc.MATHEMATICS - SEMESTER IV

CA4CMT04 : Visual Programming Techniques

Theory: 2 hrs. per week

Credits: 2

Unit 1: 4 Hrs.

Data Base Management System: basic concepts & structure, Data definition and data manipulation using MS ACCESS

Unit 2 : 10 hrs.

Visual Basic - Basic Concepts: Getting Started with Visual Basic advantages of VB, VB Development Overview, Designing and building the User Interface, creation of forms and adding controls to the form, Setting control properties, Writing Event Driven Code

Visual Basic Projects : Using different types of Projects, Project Explorer Window, VB procedures, subroutines & functions, Comments, Controlling Program Flow IF.. THEN…ELSEIF, SELECT…CASE, Loops-FOR…NEXT, DO, WHILE…WEND. Visual Basic Variables-Data Types Byte, Integer, Long, Single, Double, Currency, Boolean, Date, Object, String & Variant. Variable Declaration-Implicit & Explicit

Unit 3 : 8 Hrs.

Designing the User Interface : VB Form, Adding Forms, Form Properties, Setting Properties with Code, Using Form Drawing Methods, Loading & Unloading Forms, Form Events, Dialog Boxes-Message Box & Input Box, MDI Applications-MDI Parent Form/ChildForms.

Unit 4 : 8 Hrs.

Controls: Tool Box-Label, Text Box, Frame, Command Button, Check Box, Option Button, List Box, Combo Box, Horizontal Scrollbar, Vertical Scrollbar, Timer, Drive List Box, Directory List Box, File List Box, Line, Shape, Image Box, Picture Box, Data Control, OLE Control, Customizing Tool Box, Adding Controls to Forms, Naming Controls, Copying Controls, Control Arrays

Unit 5: 6 Hrs.

Mastering Menus and Toolbars : Menus, Menu Editor, Pop-up Menus, Customising Toolbar, Jet, DAO, Advanced Data Access Methods, ADO, OLEDB Working with other Applications & Database Access: Visual Basic Data Control, Creating Queries in Visual Basic

Books of study:

Peter Norton's Guide to Visual Basic 6 by Peter Norton and Michael Groh, Techmedia publications Chapters: 1-7, 18, 19, (2007)

References:

1. Visual Basic 6 from the Ground Up by Gary Cornell, TataksMcGraw-Hill (2008)

2. Programming in Visual Basic 6.0 by Julia Case Bradley and Anita C Millspaugh, Tata

McGraw-Hill (2005)

3. Using Visual Basic 6 by Bob Roselman, Richard Peasley and Wayne Prunchiah, PHI

Practical LAB –IV

Practical : 2 hrs. per week

1. Designing User Interface using- List Box, Combo Box, Image and Picture Box,

Directory-File-Drive list boxes, Rich text box, etc

2. Creating Menus- Creating Menus and writing Codes, Linking Menus with MDI forms.

3. Database Connectivity using Controls - Designing user interface with forms and

controls and create database connectivity by DAO and ADO Control.

4. Creating Reports - Create reports using Data Report in VB

Semester IV

CA4CMP02 : Software Lab II

Scheme of Evaluation for software lab II external (Practical Lab – III and Practical Lab-IV) is as follows:

Division of Marks (Practical - 3 hours External)

First program based on Lab III HTML **- 15 marks**

Second program should be based on Lab IV VB **- 15 marks**

Viva Voce **– 03 marks**

Lab Record (minimum of 15 Programs from each section) **- 7 marks**

Total Marks - 40 marks

V. B.Sc Petrochemicals Complementary papers

Semester I

CA1CMT01 : Computer Fundamentals

Theory: 2 hrs. per week

Credits: 2

Module I – (10 Hrs)

Fundamentals of Computers: Define computer, introduction to bit, byte, data,information, program, hardware and software. Generations of computers , Types of Computers, Logical Organization of a Digital Computer - Input unit ,Output unit ,Storage unit ,Arithmetic logic unit, Control unit ,CPU.Input devices – keyboard, point and draw devices, data scanning devices.Output devices-monitors ,printers, plotters.Primary and Secondary storage devices.

Module II -(6 Hrs)

Number systems- Binary, Octal and Hexadecimal, Converting from one number systemto another-decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method forconverting from binary to octal, octal to binary, binary to hexadecimal and hexadecimalto binary, Computer Codes (BCD, EBCDIC, ASCII)

Module III – (8 Hrs)

Boolean Algebra and Logic circuits- Fundamental concepts of BooleanAlgebra,Postulates of Boolean algebra,Theorems of boolean algebra, Logic Gates- AND,OR, NOT, NAND, NOR, XOR and XNOR, logic circuits, converting expression to logiccircuit.

Module IV - (6Hrs)

Computer Software and Languages : Define software, Relationship between hardwareand software, Types of software-System software and Application software,Machine language, Assembly language, High-level language, Language Translators - Assembler, Compiler, Interpreter

Module V – (6 Hrs)

Operating system: Definition, functions of an operating system, types of Operatingsystem: (batch, multiprogramming, time sharing etc.), features of UNIX,LINUX,MS DOS,WINDOWS operating systems.

Book of Study:

1. P.K Sinha and Priti Sinha , Computer Fundamentals, Sixth Edition, BPB Publications.

2. Rohit Khorana, Introduction to Computer Science, 2nd Edition, Pearson Publishers.

Reference:

1 V. Rajaraman and T. Radhakrishnan , An introduction to Digital Computer design, Fifth Edition, Prentice Hall India Learning Private Limited.

2. B. Ram , Computer fundamentals: Architecture and Organization, Fifth Edition, New Age International.

3. Sanjay Saxena , A First Course in Computers, Second Edition, VIKAS Publishers.

Practical LAB –I Practical : 2 hrs. per week

MS WORD

1. Page formatting

2. Paragraph formatting, header and footer, page number etc.

3. Table creation, chart, shapes, hyperlinks, cross-reference etc.

4. Mail merge

MS EXCEL

1. Working with excel formula , different type of cell references and linking data betweenworksheet Logical functions – IF, AND, OR and Nested IF function.

2. Math functions – ROUND, RAND, CELING, FLOOR, INT, LCM, MOD, EVEN, SUNIF, SQRTand Trigonometric functions

3. Statistical functions- AVERAGE, AVERAGEA, AVERAGEIF, COUNT, COUNTA,COUNTBLANK, COUNTIF, SUM , SUMA, MIN, MINA, MAX and MAXA

4. Formatting cells

5. Create a chart, choosing chart type, edit chart axis-titles, labels, data series and legend

MS POWERPOINT

1. Creating presentation

2. Animations & Transition

3. Different type of design, Sound

4. Inserting picture, table, shapes, charts etc.

BSc Petrochemicals Complementary papers - Semester II

CA2CMT02 : Programming in C language

Theory: 2 hrs. per week   Credits: 3

Module-1:

Basic concepts of programming.Language classification.Steps in developing aprogram, Algorithm and flowchart.

C language basics: C character set, tokens, Identifiersand keywords, Data types, constants, variables, declarations, qualifiers- long, short andunsigned declarations, expressions, symbolic constants, Input and outputoperators/functions ,compound statements, arithmetic operators, unary operators,relational and logical operators, assignment operators, increment and decrementoperators, conditional operators.

(Theory 6 hrs)

Module -2:

Decision making and Branching : If statement, if else statement, nested if...elsestatement, Else if ladder, switch statements, looping - for loop , while loop, do..whilestatements, nested loop structure, break, continue and go to statements, scope ofvariables.

(Theory 10 hrs)

Module -3:

Arrays one dimensional and two dimensional arrays, initializing, reading, writing.
Strings, standard library string functions
Library functions: Math.h, Conio.h and Stdio.h.

(Theory 8 hrs)

Module -4:

User defined functions - Elements of functions, different arguments, Return values andtheir types, Function declaration, Function calls, different types /category of functions.Recursive functions, Call by value and reference methods.Storage classes: automatic, external(global),static and registers.

(Theory 8 hrs)

Module -5:

Structure: definition, Declaring structure variables, Accessing structure membersConcept of Union.
Pointers: Fundamentals - Understanding pointers, Addressoperators, Pointer declaration.

(Theory 4 hrs)

Book of study:

1.E Balaguruswamy , Programming in ANSI C , Sixth Edition, Mc GrawHill Education.

References:

1. K R Venugopal & S R Prasad , Mastering C , First Edition, Mc GrawHill Education
2. Ashutosh Pandey , Programming in C, First Edition, Cyber Tech Publications
3. YashavantKanetker , Let Us C , Fourteenth Edition, BpB Publications

Practical LAB -II

Practical : 2 hrs. per week

SYLLABUS

1. Fundamental data types, input/output functions scanf(), printf(), Arithmetic expressions,Evaluation of integer, real and mixed mode arithmetic expressions, truncation effect, typecasting.

2. Programs using control structures: If statement, if else statement, nested if...else statement,Else if ladder, switch, for, while, do…while, break and continue. Using nested loops.

3. Programs using one dimensional array: Creation of array, linear array operations,search, sort, Static initialization of arrays etc.Two dimensional array, matrix addition, matrix multiplication, transpose of a matrix.

4. User Defined Functions: Programs using different categories of functions return typefunctions, void type functions, program using recursive functions (factorial) etc.

Semester II

CA2CMP01 : Software Lab I

Scheme of Evaluation for software lab I external (Practical Lab – I and PracticalLab-II) is as follows: (in Second Semester)

Division of Marks (Practical - 3 hours External)

First program based on Lab I word/excel **- 15 marks**

Second program should be based on Lab II c program **- 15 marks**

Viva Voce **– 03 marks ,** Lab Record (minimum of 15 Programs from each section) **- 7 marks**

Total Marks - 40 marks

BSc Petrochemicals Complementary papers - Semester III

CA3CMT03 : Web Technology and Programming

Theory: 2 hrs. per week Credits: 2

Module I - 6 Hrs.

Computer networks- Advantages of networking, Network topologies (Bus, Ring, Star,Tree, Mesh, Hybrid), types of networks - LAN, MAN, WAN, intranet and Internet ,Communication Media – Guided: Twisted Pair, Coaxial Cable and Optic Fiber, Unguided:infrared, microwave & satellite, Concept of the point to point and Broadcast Network,Networking Tools-MODEM, Repeater, Hub, Switches, Routers, Bridge, Gateway, Firewall

Module II - 6 Hrs.

Concept of ISP (Internet Service Provider), Internet Backbone, Concept of URL Address,Domain Names, Hypertext Concepts and World Wide Web, Protocols- FTP, NNTP, SMTP,HTTP, POP, PPP, Email-Electronic Post Service, ISO OSI Reference Model

Module III - 8 Hrs.

Web server and proxy server, Internet Viruses (Trojan, WORM), Internet security issues(Malware, Spyware, Hacking etc.), types of firewall, Basics of Data compression anddata encryption, Digital Signatures, Digital Certificates

Module IV - 10 Hrs.

The art of creating the website, WWW, website, webpage, and home page, The HTMLprogramming basics, General structure of HTML document, HTML tags and attributes,Formatting Tags, Choice of page color, including banners, Tables, Lists, Example ofHTML page. Tags - <HTML>, <BODY>, <HEAD>, <TITLE>, <H1>, <H2>, ……<H6>, <BR>,<B>, <I>, <U>, Adding hyperlinks

Module V - 6 Hrs.

Introduction web browsers (like Internet Explorer, Mozilla Firefox, Google Chrome),Basic tools in the browser(back, forward, homepage, stop, refresh), search engine forinternet, meta search engine

Books of study:

1. Fundamentals of Computers by P. K Sinha

2. Computer Networks by Andrew S. Tanenbaum, David J. Wetherall

Reference:

1. Internet & Web Technologies, Raj Kamal, Tata McGraw Hill

2. HTML Black Book, Steven Holzner, Dreamtech Publishers

3. Principles of web page design by Joel Sklar, Vikas publications

4. Data Communication & Networking by Behrouz A Forouzan Fourth Edn. McGraw Hill

<center>**Semester III**</center>

Practical LAB –III

<div align="right">Practical : 2 hrs. per week</div>

☐ Internet browsing

☐ email - creation of account, reception, compilation, sending etc

☐ Web page designing using HTML tags and linking with other pages.

1. Create HTML document with following formatting – Bold, Italics, Underline, Colors,Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes,Horizontal, Line, Blinking Text as well as marquee Text.

2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internaland External linking

3. Create HTML document with Table:

Some image here

4. Create Form with Input Type, Select and Text Area in HTML.

5. Create an HTML containing Roll No., student's name and Grades in a tabular form.

6. Create an HTML document (having two frames) which will appear as follows:

About

Department 1

Department 2

Department 3

This frame would show thecontents according to the linkclicked by the user on the leftframe.

7. Create an HTML document containing horizontal frames as follows:

Department Names (could be along with Logos)

<center>226</center>

Contents according to the Link clicked

8. Create a website of 6 – 7 pages with different effects as mentioned in aboveproblems.

9. Create HTML documents (having multiple frames) in the following three formats:

Frame1

Frame2

Frame1

Frame2 Frame3

10. Create a form using HTML which has the following types of controls:

I. Text Box

II. Option/radio buttons

III. Check boxes

IV. Reset and Submit buttons

11. A. Create a web site for ICC world cup tournament which contain

1. A home page

2. Tournament schedule should be present in a table.

3. Details of previous world cups

4. Details of all teams.

Include form, Image, tables, list, according to their needs

12.Create a web site for your college which contain

a. A home page

b. About your management

c. About your Staffs

d. About your course

e. About your Facilities

All this pages contain appropriate pictures and links between them.

B.Sc Petrochemicals Complementary papers - Semester IV

CA4CMT04 : Visual Programming Techniques

Theory: 2 hrs. per week

Credits: 2

Unit 1: 4 Hrs.

Data Base Management System: basic concepts & structure, Data definition and data manipulation using MS ACCESS

Unit 2 : 10 hrs.

Visual Basic - Basic Concepts: Getting Started with Visual Basic advantages of VB, VB Development Overview, Designing and building the User Interface, creation of forms and adding controls to the form, Setting control properties, Writing Event Driven Code

Visual Basic Projects : Using different types of Projects, Project Explorer Window, VB procedures, subroutines & functions, Comments, Controlling Program Flow IF.. THEN…ELSEIF, SELECT…CASE, Loops-FOR…NEXT, DO, WHILE…WEND. Visual Basic Variables-Data Types Byte, Integer, Long, Single, Double, Currency, Boolean, Date, Object, String & Variant. Variable Declaration-Implicit & Explicit

Unit 3 : 8 Hrs.

Designing the User Interface : VB Form, Adding Forms, Form Properties, Setting Properties with Code, Using Form Drawing Methods, Loading & Unloading Forms, Form Events, Dialog Boxes-Message Box & Input Box, MDI Applications-MDI Parent Form/ChildForms.

Unit 4 : 8 Hrs.

Controls: Tool Box-Label, Text Box, Frame, Command Button, Check Box, Option Button, List Box, Combo Box, Horizontal Scrollbar, Vertical Scrollbar, Timer, Drive List Box, Directory List Box, File List Box, Line, Shape, Image Box, Picture Box, Data Control, OLE Control, Customizing Tool Box, Adding Controls to Forms, Naming Controls, Copying Controls, Control Arrays

Unit 5: 6 Hrs.

Mastering Menus and Toolbars : Menus, Menu Editor, Pop-up Menus, Customising Toolbar, Jet, DAO, Advanced Data Access Methods, ADO, OLEDB Working with other Applications & Database Access: Visual Basic Data Control, Creating Queries in Visual Basic

Books of study:

Peter Norton's Guide to Visual Basic 6 by Peter Norton and Michael Groh, Techmedia publications
Chapters: 1-7, 18, 19, (2007)

References:

1. Visual Basic 6 from the Ground Up by Gary Cornell, TataksMcGraw-Hill (2008)

2. Programming in Visual Basic 6.0 by Julia Case Bradley and Anita C Millspaugh, Tata

McGraw-Hill (2005)

3. Using Visual Basic 6 by Bob Roselman, Richard Peasley and Wayne Prunchiah, PHI

Practical LAB –IV

Practical : 2 hrs. per week

1. Designing User Interface using- List Box, Combo Box, Image and Picture Box,

Directory-File-Drive list boxes, Rich text box, etc

2. Creating Menus- Creating Menus and writing Codes, Linking Menus with MDI forms.

3. Database Connectivity using Controls - Designing user interface with forms and

controls and create database connectivity by DAO and ADO Control.

4. Creating Reports - Create reports using Data Report in VB

Semester IV

CA4CMP02 : Software Lab II

Scheme of Evaluation for software lab II external (Practical Lab – III and Practical Lab-IV) is as follows:

Division of Marks (Practical - 3 hours External)

First program based on Lab III HTML **- 15 marks**

Second program should be based on Lab IV VB **- 15 marks**

Viva Voce **– 03 marks**

Lab Record (minimum of 15 Programs from each section) **- 7 marks**

Total Marks - 40 marks

VI. Bachelor of Business Administration

INFORMATION TECHNOLOGY FOR BUSINESS

UNIT I

Excel window components, Set Up a Workbook- Creating Workbooks, Modifying Workbooks, Modifying Worksheets, Customizing the Excel 2010 Program Window, Zooming In on a Worksheet, Arranging Multiple Workbook Windows,Adding Buttons to the Quick Access Toolbar, Customizing the Ribbon, Maximizing Usable Space in the Program Window,Work with Data and Excel Tables- Entering and Revising Data, Moving Data within a Workbook, Finding and Replacing Data, Correcting and Expanding Upon Worksheet Data.

UNIT II

Perform Calculations on Data- Naming Groups of Data, Creating Formulas to Calculate Values, Summarizing Data That Meets Specific Conditions, Finding and Correcting Errors in Calculations, Excel Functions-Financial functions(PMT,RATE, NPER, PV, FV),Logical functions(IF,AND,FALSE,TRUE), Mathematical functions(SUM, PRODUCT, POWER, QUOTIENT, SQRT, SUBTOTAL,ABS, ROUND, GCD, LCM),Statistical functions(AVERAGE, AVERAGEIF, MEDIAN, MODE, STEDV, MIN, MAX , LARGE, SMALL),Excel Charts(Column Chart, Line Chart, Pie Chart, Doughnut Chart, Bar Chart, Area Chart, XY (Scatter) Chart, Bubble Chart.), Chart layout.

UNIT III

Change Workbook Appearance - Formatting Cells, Defining Styles, Applying Workbook Themes and Excel Table Styles, Making Numbers Easier to Read , Changing the Appearance of Data Based on Its Value, Adding Images to Worksheets. Focus on Specific Data by Using Filters- Limiting Data That Appears on Your Screen , Manipulating Worksheet Data , Selecting List Rows at Random, Summarizing Worksheets with Hidden and Filtered Rows , Finding Unique Values Within a Data Set, Defining Valid Sets of Values for Ranges of Cells

UNIT IV

Introduction to Electronic Commerce: Defining Electronic Commerce.-Brief History of Electronic Commerce-Forces Fueling Electronic Commerce.-Electronic Commerce Industry Framework.Types of Electronic Commerce.-Inter-organizational Electronic Commerce.Intra-organizational Electronic Commerce-Consumer-to-Business Electronic Commerce.-Intermediaries and Electronic Commerce.

UNIT V

Firewalls and Transaction Security: Firewalls and Network Security-Transaction Security-Encryption and Transaction World Wide Web and Security. **Electronic Payment Systems:** Overview of the Electronic Payment Technology-Electronic or Digital Cash-Electronic Checks-Online Credit Card-Based Systems-Types of Credit Card Payments-Other Emerging Financial Instruments. Consumer, Legal, and Business Issues.

Reference book
1. Step by Step- Microsoft office professional 2010 , Joyce Cox, Joan Lambert and Curtis Frye, Microsoft
2. Electronic Commerce-A Manager's guide,RaviKalakota, Andrew B. Whinston, Addison-Wesley.

VII. Syllabus- BA Economics Vocational Model II Computer Application

CA1CMT01 : Computer Fundamentals
Theory: 5 hrs. per week
Credit: 4

Module I – (12 Hrs)
Fundamentals of Computers: Define computer, introduction to bit, byte, data, information, program, hardware and software, Generations of computers, categories and Types of Computer based on performance - Super Computer, Mainframe, Mini Computer & Micro Computers, Data & Process based – Analog, Digital & Hybrid Computers, Network service based – Server computer, workstation / client computer, Size & usage based - Desktop, Laptop, palmtop, Logical Organization of a Digital Computer, input unit ,Output unit ,Storage unit ,Arithmetic logic unit, Control unit ,CPU. Input devices – keyboard, point and draw devices, data scanning devices, output devices-monitors ,printers, plotters.

Module II -(10 Hrs)
Number systems- Binary, Octal and Hexadecimal, Converting from one number system to another-decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method for converting from binary to octal, octal to binary, binary to hexadecimal and hexadecimal to binary, Computer Codes (BCD, EBCDIC, ASCII).

Module III – (12 Hrs)
Boolean Algebra and Logic circuits- fundamental concepts of Boolean Algebra, Postulates of Boolean algebra,Theorems of boolean algebra, Logic Gates- AND, OR, NOT, NAND, NOR, XOR and XNOR, logic circuits, converting expression to logic circuit, The universal NAND gate, universal NOR gate. Exclusive OR and equivalence functions.

Module IV - (10 Hrs)
Computer Software and Languages :define software, relationship between hardware and software, Types of software-system software -Application software, Logical system architecture, Software development steps. Machine language, Assembly language, High-level language. Define Program, purpose of program, algorithms, flowcharts, flowchart symbols, flowcharting rules, advantages and limitations of flowcharts.

Module V – (10 Hrs)
Operating system: Definition, functions of an operating system, types of Operating system: (batch, multiprogramming, time sharing etc.), features of UNIX,LINUX,MS DOS,WINDOWS operating systems.Basic internet services- email, FTP, TELNET, WWW.

Book of Study:
1. Rohit Khorana - Introduction to Computer Science 2nd Edition, Pearson Publishers

2. P.K Sinha, Priti Sinha - Computer Fundamentals , Fourth Edition by, BPB Publications.
3. Comdex Computer Course Kit: Windows 7 with Office 2010

Reference:
1. V. Rajaraman and T. Radhakrishnan An introduction to Digital Computer design
2. B. Ram - Computer fundamentals- Organization and Architecture, First edition
3. A First Course in Computers 2003, Saxena, VIKAS Publications

Semester I

Practical – I Office Automation
Practical: 2 hrs. per week

I. Familiarization of Computer System: Demonstration of various units of Computer system, handling of devices, demo on hardware units, Login process, Booting Process. **MS WORD:** Page formatting, Paragraph formatting , Table creation, Familiarize with Spell check and mail merge facility(10 hrs)

II. MS POWERPOINT: Creating presentation, Animations & Transition, different type of design, Sound , Inserting picture, table, shapes, charts etc.

III. Practicing Operating System Commands: Linux- dir, copy, del, ren, copy con, date, time, chkdsk, mkdir, cd, rmdir, EDIT etc. MS-WINDOWS – using start menu, desk top, task bar, word pad, note pad, file management - creation, copy, delete, moving of files in directories, selecting and executing a program - demonstration of editing. (16 hrs)

BA Economics- Semester II

CA2CMT02 : Computerized Techniques for Office
Theory: 3 hrs. per week
Credit: 3

Module 1: Word processing package- MS Word 2013

Introduction: word user interface elements, creating new documents, basic editing, saving a document, printing a document, print preview, page orientation, viewing documents, setting tabs, page margins, indents, Ruler, Formatting techniques - Font formatting, paragraph formatting, page setup, headers and footers, Bullets and numbered list, borders and shadings, table: placing tables, side-by-side and nested tables, formatting tables, drawings, word art, document templates, find and replace, page break and page numbers, mail merge, spelling and grammar checking, thesaurus, automating documents- macros, E-mail editor. **(14 Hrs.)**

Module 2: Spreadsheet package- MS Excel 2013

Introduction: Excel user interface, Working with cell & cell addresses, Selecting range, Moving, Cutting, Copying with paste, Inserting & deleting cells, Freezing cells, Adding, Deleting & copying worksheet within a work book, Renaming a worksheet. cell formatting options, Formatting fonts, Aligning, wrapping & rotating text, Using borders, Boxes & colors, changing row/column height/width, formatting a worksheet automatically, Insert comments. Using print preview, preparing worksheet for the printer, selecting print area, margin & orientation, using header & footer ,Inserting page breaks.
Conditional formatting – Applying conditional formatting to cells, using multiple cell rules, using color scale and icon set, creating new rule and managing existing rules. Creating list, using custom list, sorting and filtering of data and advanced filters. **(10Hrs.)**

Module 3: Formula, functions and charts

Working with excel formula, different type of cell references and linking data between worksheet
Logical functions – IF, AND, OR and Nested IF function.

Math functions – ROUND, RAND, CELING, FLOOR, INT, LCM, MOD, EVEN, SUNIF, SQRT and Trigonometric functions
Date Time functions – DATE, TIME, NOW, DATEVLAUE, WEEKDAY, DAY, MONTH AND YEAR
Statistical functions- AVERAGE, AVERAGEA, AVERAGEIF, COUNT, COUNTA, COUNTBLANK, COUNTIF, SUM , SUMA, MIN, MINA, MAX and MAXA
String functions – LEFT, RIGHT, MID, TRIM, LTRIM, RTRIM, UPPER, LOWER, PROPER, SEARCH, REPLACE and CONCATENATE. Database functions – DSUM, DAVERAGE, DMIN, DMAX, and DPRODUCT
Information functions – CELL, ERROR, ISERROR, ISBLANK, ISNONTEXT, ISTEXT, ISNUMBER and TYPE

Create a chart, choosing chart type, edit chart axis-titles, labels, data series and legend, adding a text box, rotate text in a chart, saving a chart. use of pivot tables-designing of templates in excel and sharing data with other applications. **(16 Hrs.)**

Module 4: Advanced Excel Features
Introduction to VBA macro, recording macro and understanding code behind the macro What if Analysis - Creating Scenarios, Creating a Scenario Report. Working with Data Tables, Using Goal Seek, Data Forms - Adding Data using the Data Form, Totals and Subtotals. **(8 Hrs.)**

Module 5: Presentation Package -MS PowerPoint 2013
Advantages of presentation packages, screen layout, creating presentations, inserting – deleting - moving slides, adding sound and video, formatting slides, slide layout, presentation views, color, scheme, background, action buttons, slide transition, custom animation, creating master slide, -managing slide shows, rehearsing slide show, setting intervals, using pen. **(6 Hrs.)**

Book of Study:
1. John Walkenbach, Herb Tyson – Office 2013 Bible– Wiley India Pvt Ltd

Semester II

Practical –II Computerised Techniques for Office
Practical: 2 hrs. per week
1 Preparing Word Documents with all the formatting and the mail merge feature
2 Use of formulae, built in functions and Charts in spreadsheet
3 Preparing attractive presentations in PowerPoint

Semester II

CA2CMP01 : Practical-I & II external
Credit: 2

Scheme of Evaluation for Practical-I & II external is as follows: (in Even Semesters)

Division of Marks (Practical - 3 hours External)
First program from practical -I **- 15 marks**
Second program from practical – II excel **- 15 marks**

Viva Voce **-03 marks**
Lab Record (minimum of 15 Programs from each section) **- 07 marks**

Total Marks - 40 marks

BA Economics –Computer Application -Semester III

CA3CMT03 : DATABASE MANAGEMENT SYSTEM
Theory: 2 hrs. per week
Credit: 3

Module 1: Database Concepts
Introduction to DBMS concepts. Advantages of DBMS over file based system, Operation on files, Structure of DBMS, Data Model Classifications, Entity-Relationship Concept. Data independence. Components of DBMS, Database users, User classification and responsibilities, Role of DBA. **(8 Hrs)**

Module 2: Relational Database Management System
RDBMS & Relationships. Concept of Relational data model. Relations and Properties, Components of – RDBMS. Advantages of RDBMS. Concept of table, filed & record. Keys – Primary, candidate, alternate and foreign keys. Relationships, Type of relationships one to one, one to many and many to many, defining relationships, Referential integrity. Normalisation- 1st , 2nd and 3rd normal forms. **(8 Hrs)**

Module 3: Introduction to MS Access 2013
Basic elements of MS-Access 2013: Introduction-objects in Ms Access-create, open, and close Database, creating a database table-different ways of creating tables, data types, setting the primary key, Properties of the fields-saving, closing and modifying tables, creating table Relationships-editing relationships. **(14 Hrs)**

Module 4: Queries and Forms
Queries & forms in Access: types of queries-creating a query-saving queries –Select query, summary queries, cross tab queries, action queries. Forms –The forms wizard editing the data in a form- The form design view-The form design bar-The tool box- Working with controls. **(14 Hrs)**

Module 5: Reports and Other Features
Reports in Access: The report wizard-The Report design view-The report design bar-The tool box-The preview window-grouping and sorting-Printing a report. Saving as ACCDE Format, Importing and Exporting data with MS Excel Worksheet, Setting Database password, Backup Database, Analyse Table Tool. **(10 Hrs)**

Book of study:

1. C J Date- Introduction to Database Management Systems, Pearson Education
2.Michael R Groh- MS Access 2013 Bible, Wiley Publications

Practical – III DATABASE CONCEPTS and MS-ACCESS

Practical :2 hrs. per week

1. Creation of database and setting of properties and other attributes such as primary key, foreign key and relationships

2. Creation of all type of queries through design view and wizard

3. Creation of forms and reports

Note:

A record with minimum fifteen exercises covering the main types of queries, forms and reports is essential

BA Economics –Computer Application -Semester IV

Unit 1: 4 Hrs.

Data Base Management System: basic concepts & structure, Data definition and data manipulation using MS ACCESS

Unit 2 : 10 hrs.

Visual Basic - Basic Concepts: Getting Started with Visual Basic advantages of VB, VB Development Overview, Designing and building the User Interface, creation of forms and adding controls to the form, Setting control properties, Writing Event Driven Code

Visual Basic Projects : Using different types of Projects, Project Explorer Window, VB procedures, subroutines & functions, Comments, Controlling Program Flow IF.. THEN…ELSEIF, SELECT…CASE, Loops-FOR…NEXT, DO, WHILE…WEND. Visual Basic Variables-Data Types Byte, Integer, Long, Single, Double, Currency, Boolean, Date, Object, String & Variant. Variable Declaration-Implicit & Explicit

Unit 3 : 8 Hrs.

Designing the User Interface : VB Form, Adding Forms, Form Properties, Setting Properties with Code, Using Form Drawing Methods, Loading & Unloading Forms, Form Events, Dialog Boxes-Message Box & Input Box, MDI Applications-MDI Parent Form/ChildForms.

Unit 4 : 8 Hrs.

Controls: Tool Box-Label, Text Box, Frame, Command Button, Check Box, Option Button, List Box, Combo Box, Horizontal Scrollbar, Vertical Scrollbar, Timer, Drive List Box, Directory List Box, File List Box, Line, Shape, Image Box, Picture Box, Data Control, OLE Control, Customizing Tool Box, Adding Controls to Forms, Naming Controls, Copying Controls, Control Arrays

Unit 5: 6 Hrs.

Mastering Menus and Toolbars : Menus, Menu Editor, Pop-up Menus, Customising Toolbar, Jet, DAO, Advanced Data Access Methods, ADO, OLEDB Working with other Applications & Database Access: Visual Basic Data Control, Creating Queries in Visual Basic

Books of study:

Peter Norton's Guide to Visual Basic 6 by Peter Norton and Michael Groh, Techmedia publications Chapters: 1-7, 18, 19, (2007)

References:

1. Visual Basic 6 from the Ground Up by Gary Cornell, TataksMcGraw-Hill (2008)

2. Programming in Visual Basic 6.0 by Julia Case Bradley and Anita C Millspaugh, Tata McGraw-Hill (2005)

3. Using Visual Basic 6 by Bob Roselman, Richard Peasley and Wayne Prunchiah, PHI

Practical LAB –IV

Practical : 2 hrs. per week

1. Designing User Interface using- List Box, Combo Box, Image and Picture Box, Directory-File-Drive list boxes, Rich text box, etc

2. Creating Menus- Creating Menus and writing Codes, Linking Menus with MDI forms.

3. Database Connectivity using Controls - Designing user interface with forms and controls and create database connectivity by DAO and ADO Control.

4. Creating Reports - Create reports using Data Report in VB

Semester IV

CA4CMP02 : Practical-III & IV external

Credit: 2

Scheme of Evaluation for Practical-III & IV external is as follows: (in Even Semesters)
Division of Marks (Practical - 3 hours External)
First program from practical –III **- 15 marks**
Second program from practical – IV **- 15 marks**
Viva Voce **-03 marks**
Lab Record (minimum of 15 Programs from each section) **- 07 marks**
Total Marks - 40 marks

VIII. Syllabus – B.Sc. BIOINFORMATICS (Complementary paper)

SEMESTER I

CA1CMT01 : Computer Fundamentals

Module I
Fundamentals of Computers: Define computer, introduction to bit, byte, data, information, program, hardware and software, Generations of computers, categories and Types of Computer based on performance - Super Computer, Mainframe, Mini Computer & Micro Computers, Data & Process based – Analog, Digital & Hybrid Computers, Network service based – Server computer, workstation / client computer, Size & usage based - Desktop, Laptop, palmtop, Logical Organization of a Digital Computer, input unit ,Output unit ,Storage unit ,Arithmetic logic unit, Control unit ,CPU. Input devices – keyboard, point and draw devices, data scanning devices, output devices-monitors ,printers, plotters.

Module II -
Number systems- Binary, Octal and Hexadecimal, Converting from one number system to another- decimal to a new base, converting to decimal from another bases, converting from base other than ten to base other than ten, short cut method for converting from binary to octal, octal to binary, binary to hexadecimal and hexadecimal to binary, Computer Codes (BCD, EBCDIC, ASCII)

Module III
Boolean Algebra and Logic circuits- fundamental concepts of Boolean Algebra, Postulates of Boolean algebra,Theorems of boolean algebra, Logic Gates- AND, OR, NOT, NAND, NOR, XOR and XNOR, logic circuits, converting expression to logic circuit, The universal NAND gate, universal NOR gate. Exclusive OR and equivalence functions.

Module IV
Computer Software and Languages :define software, relationship between hardware and software, Types of software-system software -Application software, Logical system architecture, Software development steps. Machine language, Assembly language, High-level language. Define Program, purpose of program, algorithms, flowcharts, flowchart symbols, flowcharting rules, advantages and limitations of flowcharts.

Module V
Operating system: Definition, functions of an operating system, types of Operating system: (batch, multiprogramming, time sharing etc.), features of UNIX,LINUX,MS DOS,WINDOWS operating systems. Basic internet services- email, FTP, TELNET, WWW.

Book of Study:
1. Rohit Khoana-Introduction to Computer Science 2nd Edition, Pearson
2. P.K Sinha, Priti Sinha -Computer Fundamentals, Fourth edition , BPB Publication.

Reference:
1. V. Rajaraman and T. Radhakrishnan An introduction to Digital Computer design
2. Computer fundamentals by B. Ram
3. A First Course in Computers 2003, Saxena, VIKAS

BSc. BIOINFORMATICS - Semester V

CA5CMT02: WEB PROGRAMMING AND PERL

Module I
Introduction to internet, www, servers and browsers. Introduction to web programming languages-HTML, DHTML, XML,JAVASCRIPT etc..

Module II
Introduction to HTML-structures of HTML.Text formatting, Lists-ordered and unordered lists. Adding graphics to HTML documents, Tables, Linking documents, Frames, Forms.

Module III
Introduction to Javascript-Dta types, literals, operators and expressions, Placing text in browser

Module IV
Javascript programming constructs-conditional checking using if,switch,Loops-for, while, do while loops, Dialogue boxes, Functions in javascript.

Module V
PERL-Introduction , perl strings, scalar variables, arrays, hashes. Operators and decision making in PERL-if, while, until, for loop, foreach loop, string handling functions, regular expressions.

Book of Study:
1. HTML,DHTML,JAVASCRIPT<PERL CGI(REVISED EDITION) by IVAN BAYROOS
2. Perl-5 Hermann
3. Perl programming for Bio Informatics and Biologists. D. Curtis Jamison, Wiley India

BSc. BIOINFORMATICS - SEMESTER VI

CA6CMT03 : ALGORITHMS, DATASTRUCTURE AND COMPILER

Module I.
Different types of data structures, complexity of algorithms, big O notations. Arrays-bubble sort, linear search, binary search.

Module II.
Stacks and queues-organization and operation on stacks-conversion between infix, suffix and prefix representation, quick sort, heap sort, merge sort.

Module III:
Queues: Organization and operations on queues, lamination of simple queue – variations in a queue, circular queue double ended queue, Priority queue – Applications of queues.

Module IV:
Design and analysis technique-divide and conquer,dynamic programming,greedy algorithms,tree graph algorithms-breadth first search,depth first search, minimal spanning tree algorithms,shortest path.

Module V.
Concept of compiler and interpreter, different phases of compilation, lexical analyzer concept, finite state automata, regular expressions.

Reference:
1.Fundamental of Computer Algoritms By Horowitz Ellis, Sartaj Sahni, Computer Science press.
2.Introduction of Algorithms By Coremen,Charker E Leiserson.
3. Data Structures Through C (A Practical Approach), G.S Baluja, Danapat Rai & Co
4. Fundamentals of Data Structures By Horowitz Ellis And Sartaj Sajni.
5.Principles of Compiler Design By Aho & Ulman.
6.Computer Algorithms Introduction To Design & Analysis By Saara Baase,Allen Van Gelder.
7.Data Structures And Algorithms By Alfred V Aho,John E Hopcroft,Jeffrey D Ullman.