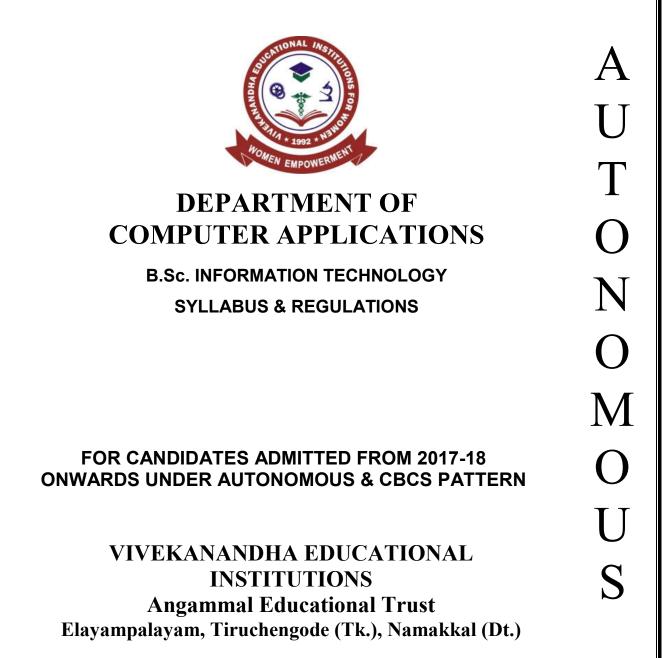# VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).
(Affiliated to Periyar University, Approved by AICTE & Re-Accredited with A Grade by NAAC)
Recognized under section 2(f) and 12(B) Under UGC Act, 1956

DEPARTMENT OF COMPUTER APPLICATIONS

B.Sc. INFORMATION TECHNOLOGY

SYLLABUS & REGULATIONS

FOR CANDIDATES ADMITTED FROM 2017-18 ONWARDS UNDER AUTONOMOUS & CBCS PATTERN

VIVEKANANDHA EDUCATIONAL INSTITUTIONS
Angammal Educational Trust
Elayampalayam, Tiruchengode (Tk.), Namakkal (Dt.)

A
U
T
O
N
O
M
O
U
S

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

[AUTONOMOUS]

B.Sc., (INFORMATION TECHNOLOGY)

(Candidates admitted from 2017-2018 onwards)

REGULATIONS

I. SCOPE OF THE PROGRAMME

Bachelor of Information Technology can be considered to be one of the most prominent UG level programs in our country. This programme mainly deals with the development of computer applications for the purpose of updating computer programming languages. B.Sc.[IT] also aims at creating strong knowledge of theoretical Information Technology subjects who can be employed in software development and testing units of industries. The course has a time period of 3 years with 6 semesters.

II. SALIENT FEATURES

- Regular conduct of guest lectures and seminars
- Campus recruitment
- Provides facilities such as Internet Access and In-House Library
- Provides Career Guidance for Post Graduate Courses like M.Sc, and the Certifications in programming languages
- Conduct of Personality Development Program
- Visiting Exports from Industries

III. OBJECTIVES OF THE COURSE

The Course Objective of the B.Sc. Information Technology program is to provide advanced and in-depth knowledge of Information Technology and its applications to enable students pursue a professional career in Information and Communication Technology in related industry, business and research. The course designed to impact professional knowledge and practical skills to the students.

IV. ELIGIBILITY FOR ADMISSION

A Candidates seeking admission to the first year Degree course (**B.Sc. Information Technology)** shall be required to have passed Higher Secondary Examination with Mathematics or Business Mathematics or Computer Technology or Statistics (Academic

Stream or Vocational Stream) as one of the subject under Higher Secondary Board of Examination, conducted by the Government of Tamilnadu or an examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **B.Sc. Information Technology** Degree Examination of Periyar University after a course of study of three academic years.

V. DURATION OF THE PROGRAMME

➢ The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The First semester will consist of the period from July to November and the Second semester from December to April.

➢ The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women with the approval of Periyar University.

VI. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously and the

Internal Assessment Marks for Theory papers

1. Average of two Tests - 10 Marks
2. Seminar   -   5 Marks
3. Assignment   -   5 Marks
4. Attendance   -   5 Marks

_____
   Total   = 25 Marks
_____

Internal Assessment Marks for Practical

1. Attendance   - 10 Marks
2. Observation   - 10 Marks
3. Test   - 20 Marks

_____
   Total   =40 Marks
_____

PASSING MINIMUM (Theory)

EXTERNAL

In the University Examinations, the passing minimum shall be 40 % out of 75 Marks. (30 Marks)

PASSING MINIMUM (Practical / Mini project)

EXTERNAL

In the University Examinations, the passing minimum shall be 40 % out of 60 Marks. (24 Marks)

Distribution of Marks

Problem Understanding	: 05 Marks
Program writing	: 10 Marks
Debugging	: 10 Marks
For Correct Results	: 05 Marks

The Passing minimum shall be 40% out of 60 marks (24 Marks)

VII. ELIGIBILITY FOR EXAMINATION

Distribution of marks for attendance

PERCENTAGE	MARKS	
	THEORY	PRACTICAL
75-80	1	2
81-85	2	4
86-90	3	6
91-95	4	8
96-100	5	10

A candidate will be permitted to appear for the University Examination only on earning 75 % of attendance and only when her conduct has been satisfactory. It shall be opened to grant exemption to a candidate for valid reasons subject to conditions prescribed.

VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Successful candidates passing the examination of Core Courses (main and allied subjects) and securing marks

a) 75 % and above shall be declared to have passed the examination in first class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.

b) 60% and above but below 75 % shall be declared to have passed the examinations in first class without Distinction.

c) 50%and above but below 60% shall be declared to have passed the examinations in second class.

d) All the remaining successful candidates shall be declared to have passed the examinations in third class.

e) Candidates who pass all the examinations prescribed for the course at the first appearance itself and within a period of three consecutive academic years from the year of admission only will be eligible for University rank.

IX. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the degree only if she has undergone the above degree for a period of not less than three academic years comprising of six semesters and passed the examinations prescribed and fulfilled such conditions have been prescribed therefore.

X. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the semester examination in the concerned subject in subsequent semesters and shall pass the examination.

XI. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2017-18 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2017-18 and thereafter.

EVALUATION OF EXTERNAL EXAMINATIONS (EE)
QUESTION PAPER PATTERN – Theory

Time Duration: 3 Hours   Max. Marks: 75

PART- A: 20x1= 20

Answer all the Questions (Objective types)

Two Questions from each unit

PART- B: 5x5 = 25

Answer all the Questions

One Question from each unit (either or type)

PART- C: 3x10 = 30

Answer Any Three Questions

One Question from each unit (3 Out of 5)

The Passing minimum shall be 40% out of 75 marks (30 marks)

QUESTION PAPER PATTERN – Practical

Time duration: 3 Hours   Max. Marks : 60

1. One compulsory question from the given list of objectives   : 30 Marks
2. One Either/OR type question from the given list of objectives : 30 Marks

The Passing minimum shall be 40% out of 60 marks (24 marks)

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]
ELAYAMPALAYAM, TIRUCHENGODE - 637 205.
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc. INFORMATION TECHNOLOGY
COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS
for the Candidates admitted from the year 2017-2018

Sem	Course Code	Part	Courses	Hour	Credit	Int. Marks	Ext. Marks	Total Marks
I	17U1LT01	I	Tamil-I	4	3	25	75	100
	17U1LE01	II	English I	4	3	25	75	100
	17U1ITC01	IV	Core – I Information Technology in Business	5	5	25	75	100
	17U1ITP01	IV	Core Lab - I Computer Practices Lab	5	3	40	60	100
	17U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	17U1ITC02	IV	Core-II Office Automation	4	3	25	75	100
	17U1VE01		Value Education	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
			TOTAL	**30**	**23**	**190**	**510**	**700**
II	17U2LT02	I	Tamil-II	4	3	25	75	100
	17U2LE02	II	English-II	4	3	25	75	100
	17U2ITC03	IV	Core III – Programming in C	4	4	25	75	100
	17U2ITP02	IV	Core Lab -II Programming in C Lab	4	3	40	60	100
	17U2MAA06	III	Allied II Discrete Mathematics	4	4	25	75	100
	17U2ITC04	IV	Core IV DTP Package	4	2	25	75	100
	17U2ES01		Environmental Studies	4	4	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
			TOTAL	**30**	**23**	**190**	**510**	**700**
III	17U3ITC05	IV	Core V-Data Structures and Algorithms	4	3	25	75	100
	17U3ITC06	IV	Core VI-Operating Systems	4	3	25	75	100
	17U3ITC07	IV	Core VII- Object Oriented Programming in C++	5	5	25	75	100
	17U3ITP03	IV	Core Lab - III Programming in C++ Lab	5	3	40	60	100
	17U3MAA14	III	Allied III - Resource Management Techniques-1	4	4	25	75	100
	17U3ITC08	IV	Core VIII E-Commerce	4	3	25	75	100
	17U3ITS01	VII	SBEC-I – Basics of Unix and Linux	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
			TOTAL	**30**	**23**	**190**	**510**	**700**
IV	17U4ITC09	IV	Core IX-Information security	4	3	25	75	100
	17U4ITC10	IV	Core X- Computer Networks	4	3	25	75	100
	17U4ITC11	IV	Core-XI- Relational Database Management Systems	5	5	25	75	100
	17U4ITP04	IV	Core Lab - IV RDBMS Lab	5	3	40	60	100
	17U4CMA04	III	Allied-III Cost and Management Accounting	4	4	25	75	100
	17U4 ITC12	IV	Core XII Multimedia Design (Corel DRAW)	4	3	25	75	100
	17U4ITS02	VII	SBEC-II Computer installation and Servicing	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
			TOTAL	**30**	**23**	**190**	**510**	**700**

V	17U5ITC13	IV	Core-XIII Java Programming	5	5	25	75	100
	17U5ITC14	IV	Core-XIV Web Services	5	5	25	75	100
	17U5ITC15	IV	Core-XV Software Engineering	5	3	25	75	100
	17U5ITP05	IV	Core Lab - V Java Programming Lab	4	3	40	60	100
	17U5ITE__	V	Elective – I	4	3	25	75	100
	17U5MAN01	VI	NMEC I	2	2	25	75	100
	17U5ITS03	VII	SBEC-III Mobile Application Development	2	2	25	75	100
			Library/ Sports	1	-	-	-	-
			Mini Project	2	1	40	60	100
			TOTAL	**30**	**24**	**230**	**570**	**800**
VI	17U6ITC16	IV	Core-XVI C#.NET	5	5	25	75	100
	17U6ITP06	V	Core Lab -XVI C#.NET Lab	5	3	40	60	100
	17U6ITC17	V	Web Technology	5	5	25	75	100
	17U6ITP07	IV	Core Lab –VII Web Technology Lab	5	3	40	60	100
	17U6ITE__	V	Elective –II	4	3	40	60	100
	17U6MAN02	VI	NMEC II	2	2	25	75	100
	17U6ITS04	VII	SBEC-IV Internet of Things	2	2	25	75	100
			Library/Sports	1	-	-	-	-
	17U6EX01		Extension Activities	1	1	-	-	-
			TOTAL	**30**	**24**	**220**	**480**	**700**
	GRAND TOTAL			**180**	**140**	**1210**	**3090**	**4300**

ELECTIVE COURSES

ELECTIVE – I

Semester	Course Code	Course Name
V	17U5ITE01	Data Mining and Data Warehousing
V	17U5ITE02	Mobile Computing
V	17U5ITE03	Distributed Computing

ELECTIVE – II

Semester	Course Code	Course Name
VI	17U6ITE04	Big Data Analytics
VI	17U6ITE05	Computer Graphics
VI	17U6ITE06	Cloud Computing

Subject Title	Information Technology in Business	Semester	I	Hours:75
Subject Code	17U1ITC01	Specialization	NA	
Type	Core – I	L:T:P:C	5 : 0 : 0 : 5	

Objectives:
  1. To learn about the I/O devices, Memory, Various components in system and the principles of computer system.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to computers: Introduction – Characteristics of computers – Generation of computers - Classification of Digital computer systems: Introduction – Microcomputers- Minicomputers – Mainframes – Supercomputers – Network computers – Components of computer: Introduction – Parts of computer – Input devices – Output devices – Storage devices.	15
II	Input devices: Keyboard – Mouse – Trackball – Touchscreen – Scanners. Outputdevices: Monitor – Printer – Plotter – Multimedia Projector. Secondary storage devices: Magnetic Tape – Magnetic disk – Optical disk. Programming Languages, Compilers, and Interpreters.	15
III	Computers in Business and Industry: Business Pressures – Organizational response – Office Automation systems – Transaction Processing – Tools for Management control – computers in Engineering – Mobile computing – Business on the Internet.	15
IV	Computer Software: Computer software – Hardware, software interaction – classification of software – System software – Application Software – Operating Systems: Functions of an operating System, Classification of operating Systems.	15
V	Computer Networks: Types of Networks – Network Topology – Network Protocols – Network Architecture – Internet and world wide web: Internet Protocols – Internet addressing – WWW- Searching the web – Electronic Mail.	15

Learning Resources	
Text Books	1. "Computer Applications in Business", "Alexis Leon, Mathew's Leon, Vijay Nicole Imprints Pvt Ltd, 2013.
Reference Books	1. Fundamentals of Information Technology, A and Leon M,Leon,Vikas 2002 2. A first Course in Computers, Saxena, Sanjay, Vikas Publishing 1998 3. Fundamentals of Information Technology, Bharioke, Deepak Excel Book, 2000
Web Sites / Links	1. www.allonlinefree.com/computer-applications-in-business-notes/ 2. https://www.slideshare.net/adnanabdullah92/computer-application-to-business

Content beyond the Syllabus
  1. Case study on applications of computer in business.
  2. Case study on online business.

Subject Title	Computer Practices Lab	Semester	I	Hours:75
Subject Code	17U1ITP01	Specialization	NA	
Type	Core Lab - I	L:T:P:C	0 : 0 : 5 : 3	

Objectives:

1. To provide the Knowledge in MS Office software.

List of Programs

1   Type a Bio – Data and do the following

   a)   Heading should be in heading 1 style.

   b)   The content in the page should be 12 in size and book man as font style.

   c)   Set the position of the tab as 0.5 for each paragraph.

   d)   Insert a header and type your Name and insert Date and Time.

   e)   Insert footer with page number.

   f)   Education qualification should be given in table format.

2   Prepare an advertisement to a company requiring software professionals with the following specifications.

   a)   Give Attractive page border.

   b)   Divide the page into two column.

   c)   One side of the column side contain company details in brief (use bullets if necessary).and other side vacancy position.

   d)   Insert the name of the company in the header using different font style.

   e)   Use at least one gallery.

   f)Mention number of vacancies in each category (Software Engineers, Data Operators, System Administrators, Managers etc., arranging the order appropriately), qualifications required etc.

3   Prepare a Time table of your class and do the following

   a)   Heading should be provided and it should be 14 in size, bold and underlined.

   b)   Insert a table which contains 9 rows and 6 columns.

   c)   Within the table, cell should contain merging of cells and splitting of cells be done.

   d)   Each subject should be differentiated using the background color or font color.

   e)   Border should contain 1.00pt.

   f)   Content with in the table should be centered.

4   Create an **Interview call letter** as the main document and create 5 records for 5 persons using MS-Word. Use Mail merge to create letters for 3 selected persons among 5.

5   Create a **visiting card** for a system Administrator of a software company as per the following specifications using Ms-Word. Size of the visiting card is "3 1/2 *2" office and residence address separated by a line and insert logo.

6   **Presentation and Visualization – graphs, charts, 2D, 3D**

    a)   Graphs and Charts in 2D, 3D using open source tools.

    b)   Students mark list analysis using formula in Ms-Excel

    c)   Calculation of salary in Ms-Excel

7   **Problem formulation, Problem solving and flowcharts**

    a)   Drawing Flowcharts – Biggest among three numbers using open source tools.

8   **Create text and images with effects**

9   **Create animation and sound effects**

10 **Create database which consists of at least three tables**

Subject Title	Office Automation	Semester	I	Hours:60
Subject Code	17U1ITC02	Specialization	NA	
Type	Core – II	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

      1. To Provide awareness in automation and to ketch out the hidden talent of student's community recruitment.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to MS-Office: About MS Office – Why MS-Office.MS-word: Word basics-Formatting Features-Menus-Toolbars and their Icons-Word Formatting Toolbar-Working with text and formatting-Creating Tables-Mail Merge.	12
II	MS-EXCEL: Excel Basics-Introduction-Menus-Toolbars-Icons-Opening Excel-Cells-Entering and Editing Data-Creation of Chart-Entering Formulas-Functions-Sorting-Filtering-Conditional formatting.	12
III	Data Analysis: Process-Subtotals with Ranges-Lookup functions-pivot tables-Data Visualization-Data Validation-Working with Multiple sheets.	12
IV	MS-POWERPOINT: Introduction-Menus-Toolbars-Navigating in PowerPoint-Working with PowerPoint.	12
V	MS-ACCESS: Introduction-Starting Microsoft Access-Creating New Database-Opening Existing Database-Access Database Wizards-Tables-Creating Query-Form-Reports.	12

Learning Resources	
Text Books	1.Sanjay Saxena,"MS-OFFICE 2000 for Everyone", Vikas Pub.House, NewDelhi.
Reference Books	1. Joyce Cox, Joan Lambert, and Curtis Frye "Microsoft Step by Step ,Microsoft office Professional 2010", First Edition,2010
Web Sites / Links	1.https://en.wikipedia.org/wiki/Microsoft_Office 2. https://www.tutorialspoint.com/ (III Unit)

Content beyond the Syllabus
1. Data Analytics in Ms-Excel.
2. Data Visualization Tools.

Subject Title	Programming in C	Semester	II	Hours:60
Subject Code	17U2ITC03	Specialization	NA	
Type	Core – III	L:T:P:C	4: 0 : 0 : 4	

Objectives :
1. To learn the Concepts in C and learn the programming ability in c programming languages.

Unit	Syllabus Contents	Number of Sessions
I	Overview of C: Basic structure of C programs. Constants, variables and data types: Character set – C Tokens – Keywords and identifiers – Constants – Variables– Assigning values to variables. Operators and expression – Evaluation of expressions – Precedence of arithmetic operators – Type conversions in expressions –Managing input and output operations: Reading and writing a character – Formatted input and output.	12
II	Decision making and branching: Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF ladder, Switch statements – GOTO statements. Decision making and looping: WHILE statement – DO statement – FOR statement – Jumps in loops. Arrays: Definition & Declaration – One dimensional – Two dimensional – Multi dimensional arrays - Dynamic arrays.	12
III	Character arrays and strings: Introduction – Declaring and initializing string variables – Reading strings from terminal – Writing strings to screen – String handling functions .User – Defined functions: Introduction – Need for user – Defined function – A Multi- function program – Elements of user – Defined function – Definition of functions – Return values and their types – Function calls – Function declaration – All category of functions – Nesting of functions – Recursion.	12
IV	Structures and Unions: Introduction – Defining a structure – Declaring structure variables – Accessing structure members – Structure initialization – Copying and comparing structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions – Size of structures – Bit fields. Pointers: Introduction – Understanding pointers – Accessing the address of a variable – Initializing of pointer variables. Pointer expressions –Pointers and arrays – Pointers and character strings	12
V	Arrays of pointers – Pointers as function arguments – Functions returning pointers – Pointers to functions – Pointer and structures. File Management: Introduction – Defining and opening a file –Closing a file – Input/Output operation on files – Error handling during I/O operations – Random access files – Command line arguments.	12

Learning Resources	
Text Books	1. Programming in ANSI C, E. Balgurusamy Tata McGraw Hill, New Delhi, 5 th Edition.
Reference Books	1. "C: The complete Reference ―, Herbert Schildt,Mc Graw Hill,New Delhi, 4 Th Edition 2. PROGRAMMING IN C, B.L.JUNEJA, Cengage Learning India
Web Sites / Links	1. www.cprogrammingnotes.com 2. www.eazynotes.com/pages/c/c-notes.html

Content beyond the Syllabus
1. To know about linear and nonlinear data Structures.
2. To know about fundamentals and advanced features of C Programming.

Subject Title	Programming in C Lab	Semester	II	Hours:60
Subject Code	17U2ITP02	Specialization	NA	
Type	Core Lab – II	L:T:P:C	0 : 0 : 4 : 3	

Objectives:
1. To understand the concepts of C.

List of Programs

1. Gets the value for N using scanf statement. Calculate the factorial of that N Value using formula in C Language.

   Ex: If N Value is 5 the Output should be 120.

2. Read the N Value using scanf statement. Find the Fibonacci series upto N using loop.

   Ex: If N Value is 5,The output is 0 1 1 2 3

3. Find the solution for the Quadratic Equation (All cases) using switch statement.

4. Read the marks of your class students for one subject. First sort the marks and find out who is secured highest mark and lowest mark in that subject.

5. Read the value for two matrices. And calculate the addition, subtraction of two matrices. And print the A & B Matrices and Result Matrix.

6. Read the string value and find out whether the given string is Palindrome or not.
   Ex: If string is MoM , then it is palindrome, the string is HAI means it's not palindrome.

7. Read the String Value and implement all string handling functions using built in functions.

8. C is a powerful general-purpose programming language. It is fast, portable and available in all platforms.
   Find the number of characters, words and lines in a given above paragraph.

9. Read all your class student names. To sort and display your class student names in both ascending and descending order.

10. Input : A=5 & B=7 Output: A=7 & B=5.

    Swap two numbers using functions and Pointers.

11. Get the all subject marks of CIA I. Prepare Student Mark list for Your Class using Structure.

12. Prepare Pay Bill for college using file concept.

Subject Title	DTP Package	Semester	II	Hours:60
Subject Code	17U2ITC04	Specialization	NA	
Type	Core - IV	L:T:P:C	4 : 0 : 0 : 2	

Objectives :
1. The Students know of the versatility of the microcomputer with page-design software, enabling students to produce materials of near photo-typed quality.

Unit	Syllabus Contents	Number of Sessions
I	INTRODUCTION: Choosing the printing house - Hardware Requirement for DTP -General Design Considerations - Text Organization – Design Common Media Publication.	12
II	PAGEMAKER: Getting Started with PageMaker – Working in PageMaker – The PageMaker window – Working with text – Multiple Text Block. Editing Text: Making Changing in the Publication – Searching by Format – Replacing the Text. Formatting Text: Changing the Font Size – Making the text bold – Removing Boldface from the text – Underlining the text – Aligning the text.	12
III	Master pages: Adding Text to the Publication – Element on master pages – Creating a new Publication – Working with Columns. Managing and Printing a publication: Page Orientation – Page Numbering – Page Size – Dimension – Table of Contents – Managing Books – Printing a Publication.	12
IV	PHOTOSHOP- Starting Photoshop CS2 - Photoshop Program Window Working with Images: Editing Images – Color Modes.	12
V	Making Selections: Moving a Portion of Images – Editing Selections – Filling a Selection -Transforming Selections Painting Tools: Drawing Tools – Retouching Tools.	12

Learning Resources	
Text Books	1. "COMDEX-DTP Course Kit" Vikas Gupta, Dreamtech Publishers- New Delhi, 2008.
Reference Books	1."ADOBE PHOTOSHOP CS6 Bible",Lisa DaNae Dayley and Brad Dayley,2006 2."ADOBE IN DESIGN CC on Demand", Steve Johnson,Que Publishing ,2013
Web Sites / Links	1.https://en.wikipedia.org/wiki/Desktop_publishing 2.http://www.businessdictionary.com/definition/desktop-publishing-DTP.html

Content beyond Syllabus:
1. Understand about Adobe Photoshop.
2. Knowledge about Dreamweaver.

Subject Title	Data Structures And Algorithms	Semester	III	Hours:60
Subject Code	17U3ITC05	Specialization	NA	
Type	Core -V	L:T:P:C	4 : 0 : 0 : 3	

Objectives :
1. To understand the basic concept of data structures and its usage in memory management and to learn about designing algorithms.

Unit	Syllabus Contents	Number of Sessions
I	Introduction and Overview: Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures. Arrays: Definition – Terminology – One Dimensional Array – Multidimensional Array – Applications. Linked List: Definition – Single Linked List – Representation – Operations – Double Linked List – Operations.	12
II	Stacks: Introduction – Definition – Representation of stacks – Operations on Stacks – Applications of Stack: Evaluation of Arithmetic Expression. Queues: Introduction -Definition-Representation of Queues – Applications of Queues: CPU Scheduling in a Multiprogramming Environment – Round Robin Algorithm.	12
III	Trees: Basic Terminologies-Definition and Concepts – Representation of Binary tree – Operations on Binary Tree: insertion – Deletion – Tree Traversals – Types of Binary Trees: Expression tree – Binary Search Tree – Heap Trees.	12
IV	Sorting: Basic Terminologies- Time complexity-Sorting Techniques- Sorting by Selection: Heap Sort-Sorting by Exchange: Bubble Sort - Quick Sort-Shell Sort-Sorting by Distribution: Radix Sort- Sorting by Merge: Merge Sort.	12
V	Graphs-Introduction-Graph Terminologies-Representation of Graphs-Operations on Linked List Representation of Graphs-Applications: Shortest Path Problem. Case study: Data Structure Selection	12

Learning Resources	
Text Books	1. Debasis Samanta "Classical Data structure" 2nd Edition, PHI Learning Private Limited, New Delhi, 2011.(UNIT I-V)
Reference Books	1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education Asia, 2009. 2. Alfred V. Aho, Murray Hill, John E. Hopcroft, Jeffrey D. Ullman, " Data Structures and Algorithms".3 rd Edition, Pearson Education,2008.
Web Sites / Links	1. www.freetechbooks.com/algorithms-and-data-structures-f11.html

Content beyond the syllabus:
1. To know about other different varieties of data structures.
2. To know about the different other searching algorithms.

Subject Title	Operating Systems	Semester	III	Hours:60
Subject Code	17U3ITC06	Specialization	NA	
Type	Core -VI	L:T:P:C	4 : 0 : 0 : 3	

Objectives :
1. This course provides the overview of computer system and the operating system, the concepts of process management, memory management, storage management, protection and security issues, and distributed systems.

Unit	Syllabus Contents	Number of Sessions
I	Operating System Overview: Operating System Objectives and Functions. History of Operating System: First – Second – Third – Fourth Generation Operating System. Types of Operating System: Main Frame – Server – Multiprocessor – Personal Computer – Embedded – Real-Time Operating System.	12
II	Threads: Process and Threads – Multithreading – Thread Functionality – Mutual Exclusion and Synchronization: Principles of Concurrency – Mutual Exclusion – Semaphores. Deadlock and Starvation: Resources – Principles of Deadlock – Deadlock Detection and Recovery – Deadlock Avoidance and Prevention.	12
III	Memory Management: Memory Management Requirements – Memory Partitioning – Paging – Segmentation. Virtual Memory: Hardware and Control Structures. Operating System Software: Fetch Policy – Placement Policy – Replacement Policy – Basic Algorithms – Page Buffering	12
IV	Scheduling: Types of Scheduling: Long Term Scheduling – Medium Term Scheduling – Short-Term Scheduling. Scheduling Algorithm: Short Term Scheduling Criteria – The Use of Priorities – Alternative Scheduling Policies. File Management: Overview – File Organization and Access – File Sharing – Record Blocking – Secondary Storage Management.	12
V	I/O Devices-Organization of the I/O Functions: The Evolution of the I/O function-Direct Memory Access. I/O Buffering: Single Buffer-Double Buffer-Circular Buffer-The Utilities of Buffering. Disk Scheduling: Disk Performance Parameters-Disk Scheduling Polices-Case Study:Windows	12

Learning Resources	
Text Books	1."Operating Systems Internals and Design Principles" by William Stallings, Second Edition, PHI Learning Private Limited, New Delhi, 2008.
Reference Books	1."Modern Operating Systems" by Andrew S. Tanenbaum, Third Edition, PHI Learning Private Limited, NewDelhi, 2011. 2."Operating Systems", by Achyut S Godbole, Second Edition, TMH Publishing Company Limited, New Delhi, 2008. 3."Operating System Concepts", by Silberschatz, Galvin and Gagne, Sixth Edition, John Wiley & Sons Inc 2002.
Web Sites / Links	1.http://faculty.salina.k-state.edu/tim/ossg/Introduction/OSrole.html 2.www.tutorialspoint.com/operating_system/

Content beyond Syllabus:
1. To understand about advanced Operating Systems.
2. To know about Multi-core Architecture.

Subject Title	Object Oriented Programming in C++	Semester	III	Hours:75
Subject Code	17U3ITC07	Specialization	NA	
Type	Core - VII	L:T:P:C	5:0:0:5	

Objectives:
1. This subject deals with the concepts of C++ Programming language.
2. On successful completion of this subject the students have the programming ability in C++ Language.

Unit	Syllabus Contents	Number of Sessions
I	Basic Concepts of OOP-Benefits of OOP- Applications of OOP- Structure of C++ - Applications of C++ - Tokens - Data types - Operators- Manipulators- Expressions- Function in C++ : Prototype- Call by Value - Call by Reference - Return by Reference - Inline Function - Default Arguments - Const arguments - Function Overloading- Friend and Virtual functions.	15
II	Class and Objects: Specifying a class – Member function – Arrays within a class – Memory Allocation for objects – Static data members – Static member function – Array of objects - Object as Function Arguments - Friendly functions - Returning Objects – Const member functions – Pointer to members.	15
III	Constructors and Destructors: Constructors - Parameterized constructors – Multiple constructors in a class – Dynamic Initialization of objects – Copy Constructors –Destructors – Operator Overloading and Type Conversion .	15
IV	Inheritance : Extending classes – Derived classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid inheritance – Virtual Base class – Abstract class – Pointers , Virtual Functions and Polymorphism : Pointers – This Pointers – Virtual Functions – Pure Virtual Functions – Managing Input / Output Console Operations : C++ Streams – C++ Stream classes – Formatted and Unformatted I/O Operations.	15
V	Working with Files: Classes for file stream Operations – Opening and Closing a file – Detecting End of File – File Pointers and their Manipulators – Error Handling during file Operations – Templates : class Templates – function Templates – Exception Handling : Throwing Mechanism – Catching mechanism – Re throwing an exception - Specifying Exceptions.	15

Learning Resources	
Text Books	1. "Object Oriented Programming with C++", E.Balagurusamy, 6th edition, T.M.H Publisher, New Delhi, 2013 (Unit I to V).
Reference Books	1. "The C++ Programming Language", Bjarne Stroustrup, Fourth edition, 2013. 2. "C++ Programming in Easy Steps", Mike McGrath, Fourth Edition, 2011.
Web Sites / Links	1. www.tutorialspoint.com 2. www.scribd.com

Content beyond the syllabus:

1. To learn about UML diagrams.
2. To understand about Object Oriented Databases.

Subject Title	Programming in C++ Lab	Semester	III	Hours:75
Subject Code	17U3ITP03	Specialization	NA	
Type	Core Lab - III	L:T:P:C	0:0:5:3	

Objectives:

1. To have practical understanding in programming in C++

List of Programs

1. Simple C++ Programs to Implement Various Control Structures.

 a. If statement

 b. Switch case statement and do while loop

 c. For loop and while loop

2. Programs to Understand Structure & Unions.

a. Structure

b. union

3. Programs to Understand Pointer Arithmetic.

4. Functions & Recursion.

a. Recursion

b. function

5. Inline Functions.

6. Programs to Understand Different Function Call Mechanism.

a. Call by reference & Call by Value

7. Programs to Understand Storage Specifiers.

8. Constructors & Destructors.

9. Use of "this" Pointer. Using class

10. Programs to Implement Inheritance and Function Overriding.

a. Multiple inheritance –Access Specifiers

b. Hierarchical inheritance – Function Overriding /Virtual Function

11. Programs to Overload Unary & Binary Operators as Member Function & Non Member Function.

a. Unary operator as member function

b. Binary operator as non member function

12. Programs to Understand Friend Function & Friend Class.

a. Friend Function

b. Friend class

13. Programs on Class Templates

Subject Title	E-Commerce	Semester	III	Hours:60
Subject Code	17U3ITC08	Specialization	NA	
Type	Core - VIII	L:T:P:C	4:0:0:3	

Objectives:
1. To enable the students to understand the technology of e-Commerce for business application.
2. To identify the impact of e-commerce.
3. To identify the main barriers to the growth and development of e-commerce in organizations.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to Electronic commerce: What is Electronic commerce? Impact of E-commerce – Benefits of E-Commerce – Limitations of E-Commerce – Identifying transacting partners – Barriers to E-Commerce.	12
II	Technology of E-commerce: What is Network? Benefits – Kinds of Networks - Networks used for E-commerce and Business - The Internet - Who manages internet? Architecture of Internet – Domain name – What is intranet & why it is important - What is extranet & why it is important?	12
III	Elements of E-Commerce: Applications What is web based Business? What is webpage? WWW – use of website by corporation – E-mail – Business uses of E-mail - Search engines – Business use of search engine – Shopping carts and uses.	12
IV	Security and E-Commerce: Security an issue – Types of security Breaches – What is security – Security measures – Encryption technology – Digital certificate – Some applications of Encryption and authentication.	12
V	Electronic Payment systems: Electronic or digital cash - Electronic checks - Online credit card systems - Emerging Business requirements – Internet based manufacturing - EDI- Benefits of EDI .CASE STUDY: Banking sector, online purchase.	12

Learning Resources	
Text Books	1. Rana Tassabeshji, "Applying E-Commerce for Business" SAGE Publications , New Delhi. 2. Ravi Kalakota, Andrew B.Whinson " Electronic commerce" Pearson Education, 2014.
Reference Books	1. Electronic commerce - Bharat Bhasker, Tata Mc Graw Hill Publishing Co Ltd, New Delhi. 2. Frontiers of Electronic Commerce – Ravi Kalakota & Andrew B.Whinston, Dorling Kindersley (India) Pvt Ltd.
Web Sites / Links	1. https://www.tutorialspoint.com/e_commerce 2. https://ecommerceguide.com/guides

Content beyond the syllabus:

1. Understanding about E-commerce in textiles

2. Applications of trading using e- commerce

Subject Title	Basics of Unix and Linux	Semester	III	Hours:30
Subject Code	17U3ITS01	Specialization	NA	
Type	SBEC: I	L:T:P:C	2:0:0:2	

Objectives

1. To Introduce UNIX and LINUX workstations.
2. Develop a Deeper understanding of operating systems their functions and services.
3. To learn the fundamentals of the UNIX and LINUX Commands.

Unit	Syllabus Contents	Number of Sessions
I	UNIT I OVERVIEW General Overview of the System - History – System structure – User perspective –Operating system services – Assumptions about hardware - Introduction to the Kernel - Architecture of the UNIX operating system – Introduction to system concepts - The Buffer Cache - Buffer headers – Structure of the buffer pool – Scenarios for retrieval of a buffer– Reading and writing disk blocks – Advantages and disadvantages of the buffer cache.	6
II	The Linux operating system: The history of Linux – Linux Architecture – Linux compared to UNIX – Features and utilities in Linux – Shell available in Linux – Creating files using the Vi editor: Text editors – The Vi editors – The emacs editors – The joe editors. Managing Files and Directories: Introduction – Directory commands in Linux – File Commands in Linux.	6
III	Managing Documents: Locating files in Linux – standard files – Redirection – Filters – Pipes. Communicating with other users in Linux: mesg command – whoT- talk – write – finger – chfn utility – ping – traceroute command – ssh command – FTP command – ncftp command.	6
IV	Handling ordinary Files – Basic File Attributes – Simple Filters – Filtering using Regular expression. UNIX Processes – Pipes – Signals – Process Utilities (ps, kill, wait, sleep)- Filters: cat, head, tail, sort, uniq grep, fgrep, egrep – Sed.	6
V	Shell Scripting: Variables – Loops – Functions – Quoting - Here documents – Arithmetic. Programming Tools: make, nmake, gmake - rcs, cvs, sccs - ar, tar, cpio, pax - RPM, autoconfig - dbx, gdb	6

Learning Resources	
Text Books	1. Sumitabha das, "UNIX Concepts and Applications" fourth edition Tata Mcgraw Hill Publishing Company Limited,2006. 2. Operating System LINUX, NIIT Prentice Hall of India Private Ltd, New Delhi,2003.
Reference Books	1. John Muster "Introduction to UNIX and LINUX" Tata Mcgraw Hill Publishing Company Limited,2003 2. Richard Petersen "The Complete Reference" Tata Mcgraw Hill Edition, 2008.
Web Sites / Links	1. https://www.linux.com 2. http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html

Content beyond the syllabus:

1. Understanding UNIX & LINUX Commands.

Subject Title	Information Security	Semester	IV	Hours:60
Subject Code	17U4ITC09	Specialization		NA
Type	Core - IX	L:T:P:C		4:0:0:3

Objectives
1. Aimed at giving basic understanding about system security. To understand the concepts of computer security, cryptography, secure protocols, detection and other security techniques.
2. To understand the salient facets of information security basics and the basics of risk management.

Unit	Syllabus Contents	Number of Sessions
I	INTRODUCTION: What is Security? Critical Characteristics of Information - NSTISSC Security Model – Components of an Information System – Securing Components – Balancing information security and access - Approaches to information security implementation – SDLC – Securing the SDLC – Sec SDLC – security professional and the organization.	12
II	SECURITY INVESTIGATION: Need for security – Threats – Attacks – Legal, Ethical, and professional issues in information security: Law and ethics in information security –Ethics and information security.	12
III	SESCUTITY ANALYSIS: Introduction to Risk Management – Risk Identification: Asset identification and valuation and prioritization – Data classification and Management – Threat Identification – Vulnerability Identification. Risk Assessment – Risk control strategies – Selecting a risk control strategy.	12
IV	LOGICAL DESIGN: Information security policy, standards, and practices – Design of security architecture – Continuity strategies: Business Impact Analysis – Incident Response plan – Disaster Recovery plan – Business Continuity plan.	12
V	PHYSICAL DESIGN: Security Technologies: Firewalls – Intrusion Detection and Prevention Systems. Cryptography: Encryption Methodologies – cryptography tools. Physical security: physical access controls – Interception of Data – Mobile and portable systems –Special considerations for physical security professionals.	12

Learning Resources	
Text Books	1. A. Angel Freedaraja, K. Benitlin subha "Information Security" Sams Publishers, Chennai. 2013.
Reference Books	1. Timothy J. Shimell, Jonathan M Spring "Introduction to Information Security" Syngress Elsevier, 2014. 2. Mark Stamp, "Information Security", A John wiley & sons, Inc Publication, New Jersey. 2nd Edition
Web Sites / Links	1. www.infosec.gov.hk/english/information/what.html 2. www.uniassignment.com

Content beyond the syllabus:

1. Understanding about information security tools

2. Applications of information security

Subject Title	Computer Networks	Semester	IV	Hours:60
Subject Code	17U4ITC10	Specialization	NA	
Type	Core - X	L:T:P:C	4:0:0:3	

Objectives

1. To learn the concepts of state of art in network protocols, architecture and applications.

Unit	Syllabus Contents	Number of Sessions
I	Data communications – Components - Data Representastion - Direction of data flow-Networks - Categories – Topologies - Protocols and Standards - ISO/OSI Model - Layers in the OSI model - TCP/IP Protocol suite - Addressing.	12
II	Physical layer and Media: Analog and Digital – Data rate limits- bandwidth utilization: Multiplexing-Spread Spectrum – Transmission media –Guided media and unguided media-switching-circuit switched networks-virtual circuit networks.	12
III	Data link layer - Error Detection and Correction –Types of Errors – Redundancy - Detection Vs Correction - Forward error correction Vs Retransmission – Framing - Flow and Error control -Noiseless channels - Noisy channel – HDLC. Wireless channels: Bluetooth – connecting devices-SONET – Architecture - Layers of SONET. Networking – Addresses – IPv4 – IPv6 . IPV4 – Datagram – Fragmentation - Checksum – options. IPV6 – Advantages – Packet Format – Extension headers – Transition from IPV4 to IPv6 – Dual stack – Tunneling – Header Translation – ICMP – IGMP.	12
IV	UDP – Ports for UDP – User Datagram – checksum – operations – uses .TCP – Services – Features – Segment – Connection – Flow Control – Error Control - SCTP. Congestion Control – Open loop – Closed loop – QOS – Integrated Services.	12
V	DNS – Distribution of Namespace – DNS in the Internet –DNS Messages – Types of Records - WWW and HTTP– Architecture – Web documents – HTTP. Presentation Layer – Protocols – Services. Session Layer: Protocols – Services. Network security: Cryptography – Symmetric-Key Cryptography – Asymmetric-Key Cryptography – Security Services - Digital Signature.	12

	Learning Resources	
Text Books	1. "Data communications and Internetworking ", Behrouz A Forouzan, Fourth Edition,2006. 2. "Computer Networks",Tannenbaum , Fifth Edition	
Reference Books	1. Computer Networking: Principles,Protocols and Practice, Olivier Bonaventure,2011. 2. James F.Kurose and Keith W.ROSS, "Computer Networking: A Top-Down Approach Featuring the Internet", Fifth Edition 2012. 3. Andrew S.Tanenbaum ," Computer Networks", PHI, Fourth Edition ,2008.	
Web Sites / Links	1. www.tutorialspoint.com/computer.../computer_networking.htm 2. www.journals.elsevier.com/computer-networks	

Content beyond the syllabus:

1. Understanding about network security
2. Knowing about latest tools for networks

Subject Title	Relational Database Management Systems	Semester	IV	Hours:75
Subject Code	17U4ITC11	Specialization	NA	
Type	Core - XI	L:T:P:C	5:0:0:5	

Objectives

1. To understand the concepts of Relational database management systems and enable the students to learn the data base systems, SQL, PL/SQL and Developer 2000.On successful completion of the course the students should understood the designing the data base and concepts of database management systems.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to DBMS: Information – Data and Data Management – Characteristics of a data in a database — Functions of DBMS – Components of DBMS – data dictionary. Data Base Architecture and Design: Introduction – Data base architecture – data abstraction. Entity – Relationship Modeling: Introduction – ER Model – Components of ER model – Relationships: Degree-Connectivity-Cardinality– ER modeling symbols. Data Normalization: -1NF-2NF-3NF-BCNF-4NF-5NF– Denormalization.	15
II	Oracle9*i*: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - *i*SQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.	15
III	Working with Table: Data Management and Retrieval: DML – Adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records –Retrieving Data from Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.	15
IV	PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	15
V	PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.	15

Learning Resources	
Text Books	1."Fundamentals of Data base management System" – Alexix Leon and Mathew Leon, TMH PublicationsReprint, 2010. 2. "Database systems using oracle" – Nilesh Shah, 2nd edition, PHI.
Reference Books	1. Database Management Systems – Arun Majumdar, Pritimoy Bhattacharya, TMH. 2. Database Management Systems – Gerald V. Post, 3rd edition, TMH.
Web Sites / Links	1.http://www.studytonight.com/dbms/rdbms-concept 2.http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm

Content beyond the syllabus:

1. Understanding about advanced RDBMS

2. Applications of RDBMS

Subject Title	Relational Database Management Systems Lab	Semester	IV	Hours:75
Subject Code	17U4ITP04	Specialization	NA	
Type	Core Lab - IV	L:T:P:C	5:0:0:3	

Objectives

1. To understand the concepts of Relational database management systems and enable the students to learn the data base systems, SQL, PL/SQL and Developer 2000.On successful completion of the course the students should understood the designing the data base and concepts of database management systems.

List of Programs

1. Basic SQL Queries

   i) DDL Statements ii) DML Statements

2. Simple Queries using built in functions.

3. Simple Queries Using set operations.

4. Database Schema for a customer-sale scenario

   Customer (Cust id : integer, cust_name: string)

   Item (item_id: integer, item_name: string, price: integer)

   Sale (bill_no: integer, bill_data: date, cust_id: integer, item_id:

   integer, qty_sold: integer)

For the above schema, perform the following:

   a. Create the tables with the appropriate integrity constraints

   b. Insert around 10 records in each of the tables

   c. List all the bills for the current date with the customer names and item numbers.

   d. List the details of the customer who have bought a product which has a price>200

5. Database Schema for a Student Library scenario

   Student(Stud_no : integer, Stud_name: string)

   Membership (Mem_no: integer, Stud_no: integer)

   Book (book_no: integer, book_name:string, author: string)

   Iss_rec(iss_no:integer, iss_date: date, Mem_no: integer, book_no:

   integer)

For the above schema, perform the following:

   a. Create the tables with the appropriate integrity constraints

   b. Insert around 10 records in each of the tables

   c. List all the student names with their membership numbers

   d. List all the issues for the current date with student and Book names

   e. List the details of students who borrowed book whose author is CJDATE

6.Database Schema for a Employee-pay scenario

      employee(emp_id : integer, emp_name: string)

      department(dept_id: integer, dept_name:string)

      paydetails(emp_id : integer, dept_id: integer, basic: integer,

      deductions: integer, additions: integer, DOJ: date)

      payroll(emp_id : integer, pay_date: date)

For the above schema, perform the following:

   a. Create the tables with the appropriate integrity constraints

   b. Insert around 10 records in each of the tables

   c. List the employee details department wise

   d. List all the employee names who joined after particular date

   e. List the details of employees whose basic salary is between 10,000 and 20,000

   f. List the details for an employee_id=5

7. Write a PL/SQL program to find largest number from the given three numbers.

8.Write a PL/SQL program to check whether the given number is Armstrong or not

9.Write a PL/SQL program to implement trigger

10. Write a PL/SQL program to implement cursor.

Subject Title	Multimedia Design (CorelDRAW)	Semester	IV	Hours:60
Subject Code	17U4 ITC12	Specialization	NA	
Type	Core - XII	L:T:P:C	4:0:0:3	

Objectives

1. To create illustrations, page layout, web graphics.
2. Students can able to use their own designing skills with this application to create stunning illustrations, logos, advertisement.

Unit	Syllabus Contents	Number of Sessions
I	Understanding corelDRAW-graphics suite x4- corelDRAW-graphics suite applications-new and enhanced feature in corelDRAW- getting started with corelDRAW- exploring the workspace of corelDRAW- menu bar-standard-toolbar-property bar-tool box-drawing page-docker-color palette-drawing basic geometric figures- working with page layout	12
II	Working with lines-Drawing a curve-drawing calligraphic lines-about outline tool-defining lines and outlines setting-creating a calligraphic outline-adding an arrowhead	12
III	Working with objects-Selecting and deselecting objects-Deleting objects-sizing objects- combing objects-grouping in corelDRAW-grouping objects-ungrouping objects- applying convert to curve command on objects-selecting color on objects-filling objects-using fills-using pattern fills	12
IV	Working with text-Types of text-preparing layout for using the text-creating artistic text-creating paragraph text- converting text from one type to another changing the appearance- font-font size- alignment-applying effects- drop cap-bulleted list-wrapping paragraph-converting text to an object-curve command-breaking part text	12
V	Working with bitmaps-Changing vector images to bitmap images – converting vector images to bitmap images- converting vector images to bitmap images when exporting –importing a bitmap into drawing-cropping-resembling and resizing-special effects to bitmaps-color transform-sharpen-tracing	12

Learning Resources	
Text Books	1. Comdex 9 in 1 DTP Course Kit, VIKAS GUPTA, Dream Tech Press
Reference Books	1. Learning CorelDRAW X4,Ramesh Bangia,First Edition,2003 2. CorelDRAW X7 Official Guide,BOUTON,Eleventh Edition
Web Sites / Links	1. product.corel.com/help/CorelDRAW/540229932/Main/EN/.../CorelDRAW -X7.pd 2. learn.corel.com › Graphics Tutorials › CorelDRAW Tutorials 3. www.coreldraw.com/us/pages/800382.html

Content beyond the syllabus:

1. Developing applications using corelDRAW

2. Knowing about advanced versions of corelDraw

Subject Title	Computer Installation and Servicing	Semester	IV	Hours:30
Subject Code	17U4ITS02	Specialization	NA	
Type	SBEC:II	L:T:P:C	2:0:0:2	

Objectives

1. Equip the participants with basic knowledge and skills about computer hardware and software maintenance and troubleshooting of common problems.

Unit	Syllabus Contents	Number of Sessions
I	The Visible PC: How the PC Works –input – processing – output – storage. The Complete PC: External Connections – Devices and their connections – Inside the system unit: Case – CPU – Ram – Motherboard – Power supply – Hard drive – Optical Drives.	6
II	Learning CPU: Memory and RAM – Address Bus – Modern CPU's - Intel Pentium early processors – Intel Pentium 4 – Intel core – AMD athelon – AMD Duron – Intel Celeron – Intel Pentium Dual Core – Intel Core i7. Types of RAM's: SDRAM – RDDRAM –DDRSDRAM - DDR2 – DDR3 – RAM Variations.	6
III	Learning Motherboard: CMOS – BIOS – POST - Expansion Slots – Motherboard Components – Hardware Technologies: Platter Based – Solid Based Drives – Parallel and Serial ATA's – SCSI – RAID. Removable Media: Flash Memory – USB – Flash Cards - Optical Devices – CD – DVD- Blue-ray Media's.	6
IV	Installing & Upgrading Windows: Hardware Requirements – type of installation - Backup & Restoring Data – Partition the Hard Drive and file System – Installing XP Professional – Post Installation Tasks – Boot Process – Partitioning Files.	6
V	Learning Local Area Networking: Topologies – Network organization – Configuring TCP/IP – Wireless Networking Components - Wireless Networking Standards – Connecting to the Internet. Computer Security: Security Concepts – Malicious Software – Virus Prevention and Recovery.	6

Learning Resources	
Text Books	1. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGraw-Hill, New Delhi, 2003.
Reference Books	1. Craig Zacker & John Rourke, "The complete reference: PC hardware", Tata McGraw-Hill, New Delhi, 2001. 2. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance", Tata McGraw-Hill, New Delhi, 2002. 3. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs", Tata McGraw-Hill, New Delhi, 2001.
Web Sites / Links	1. www.itap.purdue.edu/facilities/instructionallabs 2. http://www.ibm.com

Content beyond the syllabus:

1. Knowing about installing software.

2. Knowing about installing OS.

Subject Title	Java Programming	Semester	V	Hours:75
Subject Code	17U5ITC13	Specialization	NA	
Type	Core - XIII	L:T:P:C	5:0:0:5	

Objectives

1. To understand how Java Programming is used in web programming.
2. To analyze Web developer needs to have the knowledge of Java programming.

Unit	Syllabus Contents	Number of Sessions
I	Introduction - Object Oriented Programming - History of Java – Byte Code – A first Simple program – I/O Basis – Reading / Writing Console Input/Output – Lexical Issues – Java Data types – Variables – Type Conversion and Casting – Arrays – Operators – Control Statements.	15
II	Classes and Objects: A Simple Class and Declaring Objects, Methods – Examples – Constructor's – Inheritance – Basics – Using super - Creating a Multilevel Hierarchy – Packages and Interfaces: Packages – Access Protection – Importing Packages – Interfaces.	15
III	Exception Handling: Fundamentals – Types – Using try and catch – Built in Exceptions – Throwing our own Exception .Introducing AWT: AWT classes – Windows fundamentals - Working with frame windows – Working with graphics – Control fundamentals – Labels – Buttons – Text Field.	15
IV	Database programming: The Design of JDBC – JDBC Driver types – Uses of JDBC – SQL – Connecting to the database – Executing SQL – Statements – Managing Connections – Statements and Result sets – SQL Exception. The Applet Class-types of Applet- Basics-Applet Class – Architecture – An applet Skeleton - Applet Initialization and Termination- Overriding update( )	15
V	Simple Applet Display Methods -Requesting Repainting -A Simple Banner Applet -Using the Status Window -The HTML APPLET Tag -Passing Parameters to Applets -Improving the Banner Applet -getDocumentBase( ) and getCodeBase( ) -AppletContext and showDocument( ) -The AudioClip Interface -The AppletStub Interface-Outputting to the Console	15

Learning Resources	
Text Books	1. Herbert Schildt , The Complete Reference Java II,5th Edition , TATA Mc Graw-Hill 2002. 2. Cays.Hortmann hary cornell, Core Java Volume II – Advanced Features, Pearson education 2010.
Reference Books	1. Deital Deital "Java How to Program" Pearson Education,2005 2. Rashmi kanta Das "Core Java: For Beginners, Vikas Publishing Pvt Ltd,2009. 3. Martin *Rinchart*, "Java database development", Tata Mcgraw Hill 2000.
Web Sites / Links	1. www.csee.umbc.edu/courses/331/spring03/0101/lectures/java02.ppt 2. www.slideshare.net/intelligotech/java-tutorial-ppt-7189933

Content beyond the syllabus:

1. Program to know how to connect Database connection using coding in Java.

2. Implement a program that prompts the user for height and weight values and displays the associated body mass index.

Subject Title	Web Services	Semester	V	Hours:75
Subject Code	17U5ITC14	Specialization	NA	
Type	Core - XIV	L:T:P:C	5:0:0:5	

Objectives

1. To know about the role in implementing Service Oriented Architecture (SOA).

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Role of XML-XML and the web- XML Language Basics-SOAP-Web Services-Revolution of XML-Service Oriented Architecture (SOA)	15
II	XML Technology: XML-Name Space-Structuring with schemas and DTD-Presentation Techniques-Transformation-XML Infrastructure**.**	15
III	SOAP: Overview of SOAP-HTTP-XML- RPC-SOAP, Protocol-Message Structure-SOAP with Attachments.	15
IV	Web Services: Overview-Architecture-Key Technologies-UDDI- WSDC-ebxml-SOAP and web services in E-Commerce**.**	15
V	XML Security: Security overview-Canonicalization-XML Security Frame work-XML Encryption-XML Digital Signature.	15

Learning Resources	
Text Books	1.Frank P Coyle XML, Web Services and the Data Revolution, Pearson Education,2002.
Reference Books	1.Sandeep Chatterjee,James Webber,"Developing Enterprise Web Services".Pearson Education,2004. 2.Ramesh Nagappan,Robert Skocylas and Rima PatelSriganesh,"Developing Java Web services", Wiley Publishing,Inc,2004.
Web Sites / Links	1.http://www.w3schools.com/webservices/ws_intro.asp 2.http://www.service-architecture.com/

Content beyond the syllabus:

1. Developing applications using web services

2. Study about B2B, B2C

Subject Title	Software Engineering	Semester	V	Hours:75
Subject Code	17U5ITC15	Specialization		NA
Type	Core - XV	L:T:P:C		5:0:0:3

Objectives
1. Introduce software engineering basics
2. To Learn Cost Estimation, Design notations and Software testing.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to Software Engineering: Definitions – Size Factors – Quality and Productivity Factors. Planning a Software Project: Planning the Development Process – Planning an Organizational Structure.	15
II	Software cost Factors – Software Cost Estimation Techniques –Staffing-Level Estimation – Estimating Software Estimation Costs.	15
III	Software Requirements Definition: The Software Requirements specification – Formal Specification Techniques. Software Design: Fundamental Design Concepts – Modules and Modularization Criteria.	15
IV	Design Notations – Design Techniques. Implementation Issues: Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.	15
V	Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing. Software Maintenance: Enhancing Maintainability during Development – Managerial Aspects of Software Maintenance – Configuration Management.Case Study	15

Learning Resources	
Text Books	1. Richard Fairley, "Software Engineering Concepts, TMH 2007.
Reference Books	1. Eve Anderson, Philip Greenspun, Andrew Grumet, "Software Engineering for Internet Applications", PHI 2006. 2. Jeff Tian, "Software Quality Engineering" Student edition, 2006, Wiley India.
Web Sites / Links	1. www.softwareengineerinsider.com/articles/what-is-software-engineering.html 2. https://www.udemy.com/courses/development/software-engineering

Content beyond the syllabus:

1. Knowing about case tools

2. Study about CAD / CAM

Subject Title	**JAVA PROGRAMMING LAB**	Semester	**V**	Hours:60
Subject Code	**17U5ITP05**	Specialization	NA	
Type	**Core Lab - VI**	L:T:P:C	**5:0:0:3**	

Objectives

1. To get a clear understanding of object-oriented concepts.
2. To understand object oriented programming through JAVA.

List of Programs

Simple java applications
1. for understanding Class and Object s.
2. references to an instant of a class
3. handling strings in JAVA

Simple package creation
4. developing user defined packages in java

Interfaces
5. developing user defined interfaces
6. use predefined interfaces

Threading
7. creation of threading in java applications
8. multi threading

Exception handling mechanism in java
9. handling predefined exceptions
10. handling user defined exceptions

Subject Title	Mobile Application Development	Semester	V	Hours:30
Subject Code	17U5ITS03	Specialization	NA	
Type	SBEC:III	L:T:P:C	2:0:0:2	

Objectives

1. Gain a basic understanding of computer architecture and object oriented programming.
2. Understand Mobile application Design Principles.
3. Identify need and opportunity in app markets.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to Open Source: What is Open Source- License Issues (MPL, GPL, and LGPL) and Open Source Vs Traditional Development Methodologies. Introduction to Android: Introducing Android-History of Mobile Software Development-Open Handset Alliance-the Android Platform-Layers of Android-Android SDK-Kinds of Android Components-Building a Sample Android Application.	6
II	Android Application Design Essentials: Anatomy of an Android Applications-Android Terminologies- Application Context-Actives - Services-Intents-Receiving and Broadcasting Intents-Android Manifest File and its common settings-Using Intent Filter-Permissions-Managing Application resources in a hierarchy-Working with different types of resources.	6
III	Android Application Design Essentials: User Interface Screen Elements-Designing User Interfaces with Layouts- Drawing and Working with Animation.	6
IV	Using Common Android APIs:Using Android Data and Storage APIs-Managing data using SQLite-Sharing Data between Applications with Content Providers-Using Android Networking APIs-Using Android Web APIs and Using Android Telephony APIs.	6
V	DDMS-Debug and Other View:DDMS - Dalvik Debug Monitor Server-LogCat View-File explorer-Breakpoints and Debug.	6

Learning Resources	
Text Books	1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd Edition, 2011. 2. W. Frank Ableson, Robi Sen, Chris King, "Android in Action", 2nd Edition, Manning Publications Co., 2011.
Reference Books	1. Chris Haseman, "Android Essentials", Apress Publications, 2008. 2. James Steele, Nelson To, "The Android Developer's Cookbook-Building Applications with the Android SDK", Addison-Wesley Publications, 2011.
Web Sites / Links	1. www.tonex.com 2. developer.android.com

Content beyond the syllabus:

1. Android App Creation

Subject Title	**Project Work** **(In-House Mini Project)**	Semester	V	Hours:15
Subject Code	**17U5ITPR01**	Specialization		NA
Type	**Mini Project**	L:T:P:C		0:0:1:1

Objectives
1. To understand the problem in clear and concise mode
2. To know how to connect the statement with the problem
3. Usage of features of programming language in project.
4. Design the whole project

<div align="center">Project Work Pattern</div>

FIRST REVIEW: (20 Marks)

1. Project Title
2. Project Platform (Language / Package Selected)
3. Confirmation Letter (from Company / Industry)
4. Details of Internal Guide with Designation & Qualification (in the company / Industry)
5. Presentation

SECOND REVIEW: (20 Marks)

1. Work Observation
2. Modules in Project (Design Screens Sample)
3. DFD / ERD / System Flow Diagram (Whichever Applicable)
4. Estimated Time of Completion
5. Completed Work in the form of Percentage Analysis
6. PowerPoint Presentation.

FINAL REVIEW: (60 Marks)

1. Documentation
2. Screens Shots
3. DFD / ERD / System Flow Diagram (Whichever Applicable)
4. Final Project Report (with executable format including complete source code)

<div align="center">The Passing minimum shall be 40% out of 60 marks (24 Marks)</div>

Subject Title	**C#.NET**	Semester	**VI**	**Hours:75**
Subject Code	**17U6ITC16**	Specialization		**NA**
Type	**Core - XIV**	L:T:P:C		**5:0:0:5**

Objectives
1. Create a rich GUI for web based applications using a rich set of controls
2. Create secure (authentication and authorization) web applications
3. Personalize a web page using Web Parts

Unit	Syllabus Contents	Number of Sessions
I	Introduction the .NET Framework: .NET Framework – C#, VB.NET and the .NET Languages – CLR- .NET Class library. Learning the C# languages: C# language Basics- Variables- Data types – Variable Operations -Object based Manipulation - Conditional & Looping Structures- Methods, Types, Objects and Namespaces.	**15**
II	Web Form Fundamentals: HTML Control classes - Page class – Web Controls: Web Control classes- List classes – Table controls – AutoPostBack and Web control events. Tracing, Logging and Error Handling: Exception Handling – Handling Exceptions -Throwing your own exception - Logging exceptions - Error Pages - Page Tracing.	**15**
III	Validation: Understanding Validation – The Validation Controls. Rich Controls: The Calendar – The AdRotator – Pages with Multiple Views. State Management: View state - Custom cookies - Session state – Application state.	**15**
IV	ADO.NET Fundamentals: ADO.NET and Data Management – SQL Basics – ADO.NET Basics. ADO.NET: Direct Data Access – Creating a Connection – Defining a Select command – Updating data –Disconnected data access.	**15**
V	Data binding: Introducing Data Binding - Single Value Data Binding – Repeated value Data Binding - Data Source Controls. The Data Controls: The Grid View –The Details View-The Form View.	**15**

	Learning Resources
Text Books	1. Beginning ASP.NET 2.0 in C# 2005: From Novice to Professional (Beginning: From Novice to Professional). Matthew MacDonald (Author) publication: APress 2005. (Unit –I: Chapter 1,2&3 Unit-II :Chapter 5,6&7 Unit-III :Chapter 8,9&13 Unit- IV :Chapter 13,14&15 Unit-V :Chapter 17)
Reference Books	1. Pro ASP.NET 2.0 in C# 2005-Matthew Macdonald and Mario Szpuszta-Apress 2. C# 2008 for programmers –Third Editon-Deitel developer series:Paul J.Deitel and Harvey M.Deitel :Pearson. 3. Murach's ASP.NET 2.0 web programming C# 2005-Jeel Murach & Anne Boehm:SPD(Shroff publishers & Distributors pvt.Ltd)
Web Sites / Links	1. www.slideshare.net/ 2. www.powershow.com/

Content beyond the syllabus:

1. Application development using .NET

2. Study about tools and technologies of .NET

Subject Title	**C#.NET Lab**	**Semester**	**VI**	**Hours:75**
Subject Code	**17U5ITP06**	**Specialization**	**NA**	
Type	**Core Lab - VII**	**L:T:P:C**	**5:0:0:3**	

Objectives
1. Create a web based applications using a rich set of controls
2. Create secure web applications

List of Programs

Develop the following On-line Applications using C#.NET.

1. Create a Web site

2. Simple Web Page Creation using Asp.Net

3. Personal Information System

4. Hotel Reservation Using Asp.Net

5. Banking System

6. Shopping System

7. Air-line Reservation System

8. Recruitment System

9. Quiz program.

10. Library Management.

Subject Title	Web Technology	Semester	VI	Hours:75
Subject Code	17U6ITC17	Specialization		NA
Type	Core - XVII	L:T:P:C		5:0:0:3

Objectives

1. To understand HTML,CSS basics, XMl & AJAX.
2. To understand Java Script, PHP & MySQL and PERL.

Unit	Syllabus Contents	Number of Sessions
I	HTML & CSS :HTML Introduction – Basic HTML – The Document Body – Text –Hyperlinks – Adding MoreFormatting – Lists – Tables – Using Color and Images – Images – Multimedia Objects – Frames –Forms – The HTML Document Head in Detail – XHTML – CSS Introduction – Using Styles – Definingyour Own Styles – Properties and Values in Styles – Formatting Blocks – Layers.	15
II	XML & Ajax Basic XML – Document Type Definition – XML Schema – Document Object Model – Presenting XML –Using XML Parser - Essential Ajax - Ajax and the DOM, XML, CSS and Dynamic HTML.	15
III	JAVA Script What is Dynamic HTML – Java Script Basics – Variables – String Manipulation –MathematicalFunctions – Statements – Operators – Arrays – Functions – Data and Objects – Regular Expressions –Exception Handling – Built-in Objects – Events – Dynamic HTML with Java Script	15
IV	PHP & MySQL Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML -Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers - MySQL Database Administration - PHP/MySQL Functions -Displaying Queries in Tables - Building Forms from Queries.	15
V	Perl The Basic Perl Program – Scalars – Arrays – Hashes Control Structures – Processing Text – Regular Expressions – Using Files – Subroutines – Bits and Pieces – Handling XML with Perl – Handling the DOM with Perl.	15

Learning Resources	
Text Books	1. Web Programming (Building Internet Applications), Chris Bates 2nd edition, Wiley India private Ltd; New Delhi- 2002. Chapters Covers: 1-8, 14 2. Ajax Bible, Steven Hoizner, Wiley India private Ltd; New Delhi - 2007.Chapters Covers: 1, 8-11. 3. PHP5 and MySQL Bible, Tim Converse and Joyce Park with Clark Morgan, Wiley Publishing,Inc. 2004. Chapters Covers: 1-10, 14-17
Reference Books	1. Steven M. Schafer, "HTML, CSS, JavaScript, Perl, Python and PHP - Web standardsProgrammer's Reference", Wiley Publishing, Inc. 2005. 2. Mitch Conrad, Kay Ether, Michal D. Thomas, "XML problem Design – solution", Wiley India private Ltd; New Delhi- 2006.
Web Sites / Links	1. http://www.worldwebtechnologies.com 2. http://www.worldwebtechnologies.com

Content beyond the syllabus:

1. Knowing about the tools for web technology

2. Study about latest technologies of web technology

Subject Title	Web Technology Lab	Semester	VI	Hours:75
Subject Code	17U5ITP07	Specialization	NA	
Type	Core Lab - VIII	L:T:P:C	5:0:0:3	

Objectives
1. Analyze a webpage and identify its elements and attributes.
2. Create web pages using HTML and XML and javascript.

List of Programs

1. Design a web page for your college using basic HTML tags.
2. Design Online Book Store using List and Frames
3. Design a Time Table using Table and Images
4. Embedding Video and Audio Files in HTML
5. Design Event Web Page using Style Sheet (Font/Text, Color and Border Properties)
6. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.
7. Web page using XML with Java Script
8. Design Image Mapping using Java Script
9. Registration Form Validation using Java Script
10. Simple Game using Event handling in Java Script
11. Accessing the Student Exam Result Database(MySQL) using PHP
12. Online Shopping cart with Table operations(Insert, Select, Delete, Update) using PHP

Subject Title	Internet of Things	Semester	VI	Hours:30
Subject Code	17U6ITS04	Specialization		NA
Type	SBEC- IV	L:T:P:C		2:0:0:2

Objectives
1. To assess the vision and introduction of IoT.
2. To understand the application areas of IOT.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Introduction to Internet of Things – Defintion & Characteristics of IoT – Things in IoT – IoT Protocols – Logical Design of IoT: IoT functional Blocks – IoT Communication Models – IoT Communication APIs.	6
II	IoT Enabling Technologies: Wireless Sensor Networks – Cloud computing – Bigdata Analytics – Communication Protocols – Embedded Systems. Domain Specific IoTs: Home Automation – cities – Retail – Health & Monitoring.	6
III	Developing IoT: Introduction – IoT Design Methodology – Case Study on IoT System for Weather Monitoring.	6
IV	IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT: Software defined Networking – Network Function Virtualization.	6
V	IoT System Management with NETCONF-YANG: Need for IoT System Management – SNMP – NETCONF – YANG. Tools for IoT: Introduction - Chef – Puppet.	6

Learning Resources	
Text Books	1. Arshdeep Bahga, Vijay Madisetti " Internet of Things, A Hands on Approach" Universities Press 2015.
Reference Books	1. Oliver Hersent, David Boswarthick, Omar Elloumi. " The Internet of Things – Key applications and Protocols", Wiley, 2012.
Web Sites / Links	1. www.theinternetof things.eu 2. www.cisco.com/c/en_in/solutions/internet-of-things/overview.html

Content beyond the syllabus:

1. Knowing about the Architectural Overview of IoT
2. Various IoT Protocols (Datalink, Network, Transport, Session, Service)

ELECTIVES

Subject Title	Data Mining and Data Warehousing	Semester	V	Hours:60
Subject Code	17U5ITE01	Specialization	NA	
Type	Elective - I	L:T:P:C	4:0:0:3	

Objectives
1. Understand data mining principles and techniques
2. Introduce DM as a method and acquaint the students with the DM techniques.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: What motivated data mining?-Why is it important?-What is data mining?-Data mining-On what kind of data?-Data mining Functionalities-Classification of Data mining-Data mining task primitives-Integration of a Data mining System with a Database or Data Warehouse System-Major issues in Data mining	12
II	Data Preprocessing: Why Preprocess the Data?-Descriptive Data Summarization-Data Cleaning-Data Integration and Transformation-Data Reduction-Data Discretization and Concept Hierarchy Generation	12
III	Mining Frequent patterns, Associations and Correlations: Mining various kinds of association Rules-Classification and Prediction: What is Classification? What is Prediction? Issues regarding classification and Prediction-Bayesian Classification-Classification by Back propagation-Prediction	12
IV	Types of Data in cluster Analysis-Categorization of major Clustering methods Hierarchical methods-Density-based Methods-Spatial Data mining-Text mining-Data Mining Applications-Social Impacts of data mining-Trends in data mining	12
V	Data Warehouse and OLAP Technology: What is Data Warehouse? A Multidimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation	12

Learning Resources	
Text Books	1. Jiawei Han and Micheline Kamber,"DATA MINING Concepts and Techniques", Morgan Kaufmann Publishers,Second Edition,2006.
Reference Books	1. Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2008. 2. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2001. 3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson, 2008.
Web Sites / Links	1. https://en.wikipedia.org/wiki/Data_mining 2. www.hinduwebsite.com/webresources/data_warehousing.asp

Content beyond the syllabus:

1. knowing about the tools for data mining

2. Study about latest technologies of data mining

Subject Title	Mobile Computing	Semester	V	Hours:60
Subject Code	17U5ITE02	Specialization		NA
Type	Elective - I	L:T:P:C		4 : 0 : 0 : 3

Objectives

- To develop background knowledge about mobile computing.
- To provide the importance of transmission of data
- To learn about mobile communication

Unit	Syllabus Contents	Number of Sessions
I	Introduction - Introduction to Telephone Systems - Mobile communication: Need for mobile communication - Requirements of mobile communication – History of mobile communication - Introduction to Cellular Mobile Communication.	12
II	Mobile Communication Standards - Mobility Management: Handoff Techniques – Handoff Detection and Assignment – Types of Handoffs – Radio Link Transfer – Roaming Management - Frequency Management - Cordless Mobile Communication Systems.	12
III	Mobile Computing: History of data Networks - Classification of Mobile data networks - CDPD System. Satellites in Mobile Communication - Global Mobile Communication – Mobile Internet - Wireless Network Security - Wireless Local Loop Architecture - Wireless Application Protocol.	12
IV	WCDMA Technology and Fibre Optic Microcellular Mobile Communication – Ad Hoc Network and Bluetooth Technology - Intelligence Mobile Communication System - Fourth Generation Mobile Communication Systems.	12
V	Mobile network layer: Mobile IP – Dynamic host configuration protocol – Mobile Ad-Hoc networks. Mobile transport layer: Traditional TCP – Classical TCP Improvement – TCP over 2.5/3G Wireless networks – Performance enhancing proxies – Support for Mobility: File Systems – World Wide Web.	12

Learning Resources	
Text Books	1. T.G. Palanivelu & R.Nakkeeran, "Wireless and Mobile Communication", PHI Learning Private Limited, 2009. 2. Jochen Schiller, "Mobile Communications", Pearson Education, Second Edition , 2009.
Reference Books	1. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002. 2. Asoke K Talukder, "Mobile Computing: Technology, Applications, and Service Creation", Tata McGraw-Hill Communications Engineering, 2009
Web Sites / Links	1. www.tutorialspoint.com/mobile_computing/ 2. https://en.wikipedia.org/wiki/Mobile_computing

Content beyond the syllabus:

1. App development using mobile computing

2. Study about latest technologies of mobile computing

Subject Title	Distributed Computing	Semester	V	Hours:60
Subject Code	17U5ITE03	Specialization	NA	
Type	Elective - I	L:T:P:C	4 : 0 : 0 : 3	

Objectives
- To expose students to both the abstraction and details of file systems.

    To introduce concepts related to distributed computing systems

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Definition Of distributed system- goals - Types of Distributed Systems Architectures: Architectural Styles - System Architectures - Architectures Vs Middleware – Self-Management in Distributed Systems. Processes: Threads – Virtualization - Clients Servers - Code Migration.	12
II	Communication: Fundamentals - Remote Procedure Call – Message-Oriented Communication – Stream-Oriented Communications - Multicast Communication. Naming: Names, Identifiers and Addresses - Flat Naming - Structured Naming –Attribute-Based Naming	12
III	Synchronization: Clock Synchronization - Logical Clocks - Mutual Exclusion -Global Positioning of Nodes - Election Algorithms. Consistency and Replication: Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models-Replica Management - Consistency Protocols.	12
IV	Fault Tolerance: Introduction to Fault Tolerance - Process Resilience - Reliable Client-Server Communication - Reliable Group Communication - Distributed Commit- Recovery. Security: Introduction to Security - Secure Channels - Access Control -Security Management.	12
V	Distributed Object-Based Systems: Architecture – Processes – Communication –Naming – Synchronization - Consistency and Replication – Fault Tolerance -Security. Distributed file system: Architecture –Processes-communication-Naming-Synchronization-Consistency and Replication - Fault Tolerance – Security – Distributed Web-Based Systems.	12

Learning Resources	
Text Books	1. Andrew S.Tanenbaum, Maarten Van Steen, "Distributed Systems" Principles and Paradigms. Second Edition, PHI Publications, New Delhi - 2008. Unit-I (Chapters -1,2,&3) , Unit-II (Chapters- 4 & 5), Unit-III (Chapters-6 & 7), Unit-IV (Chapters-8 & 9), Unit-V (Chapter-(10,11 &12)
Reference Books	1. Birman, Kenneth P, "Reliable Distributed Systems - Technologies, Web Services, and Applications" , Springer Publications, 2005 Edition, 2. G.coulouris, Jean Dollimore & Tim Kindberg,Distributed Systems: Concepts and Design (4th Edition) , Addison Wesley Publications, 2005 Edition
Web Site / Links	1. www.adarshpatil.com 2. www.webopedia.com 3. http://www.cs.uic.edu/

Content beyond the syllabus:

1. Compare with parallel computing

2. Study about latest technologies of distributed computing

Subject Title	Big Data Analytics	Semester	VI	Hours:60
Subject Code	17U6ITE04	Specialization	NA	
Type	Elective - II	L:T:P:C	4:0:0:3	

Objectives
1. To understand the basic concepts of big data, methodologies for analyzing structured and unstructured data and Hadoop.

Unit	Syllabus Contents	Number of Sessions
I	Overview of BigData: What is Big Data? Structuring Big Data – Types od Data - Elements of Big Data – Volume, Velocity, Variety – Veracity - Big Data Analytics – Advantages of Big Data Analytics - Careers in Big Data – Future of Big Data.	12
II	Technologies for Handling BigData: Distributed and Parallel Computing for Big Data – Introducing Hadoop – Cloud computing and Big Data: Features of Cloud Computing – Cloud Delivery Models – Cloud Services for Big Data – Cloud Providers in Big Data Market – In-memory Computing Technology for Big Data.	12
III	Understanding Hadoop Ecosystem: Hadoop Ecosystem – Hadoop Distributed File System – HDFS Architecture – Concept of Blocks in HDFS Architecture – HDFS Commands – Introducing Hbase – Map Reducing Framework – Role of Hbase in Big Data processing.	12
IV	Analyzing Data with Pig: Introducing Pig – Running Pig – Working with operators in Pig – Introducing to No Sql – Types of No Sql Data Models – Flum Architecture – Sqoop – Imporitng Data – What is Mahout – Machine Learning – Mahout Algorithms.	12
V	Understanding Analytics and Big Data: Comparing report and analysis – Types of analytics – Points to consider during analysis – Developing an Analytic team – Understanding text analytics – Analytical approaches – History of analytical tools – Introducing popular analytical tools.	12

Learning Resources	
Text Books	1. "Big Data Black Book"."DT Editorial services", Dream Tech Press, 2016.
Reference Books	1. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data" EMC Educational services, Wiley Publications, 2015. 2. "Real-Time Big Data Analytics: Emerging Architecture", "Mike Barlow", O'Reilly Publications, 2013.
Web Sites / Links	1. http://searchbusinessanalytics.techtarget.com/definition/big-data-analytics 2. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Content beyond the syllabus:

1. Knowing about the concept of unstructured data

2. Study about latest technologies of big data

Subject Title	Computer Graphics	Semester	VI	Hours:60
Subject Code	17U6ITE05	Specialization	NA	
Type	Elective -II	L:T:P:C	4 : 0 : 0 : 3	

Objectives

1. To explore different software components and their application.

Unit	Syllabus Contents	Number of Sessions
I	Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.	12
II	Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms. 2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.	12
III	2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.	12
IV	3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods. 3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.	12
V	Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods. Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications.	12

Learning Resources	
Text Books	1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.. 2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
Reference Books	1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition. 2. "Procedural elements for Computer Graphics", David F Rogers, Tata McGraw hill, 2nd edition. 3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH. 4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
Web Site / Links	1. https://www.tutorialspoint.com/computer_graphics/ 2. https://lecturenotes.in/subject/59/computer-graphics

Content beyond the syllabus:

1. Knowing about the image processing

2. Study about latest technologies of computer graphics

Subject Title	Cloud Computing	Semester	VI	Hours:60
Subject Code	17U6ITE06	Specialization	NA	
Type	Elective - II	L:T:P:C	4 : 0 : 0 : 3	

Objectives
1. To understand the cloud computing concepts.

Unit	Syllabus Contents	Number of Sessions
I	Cloud computing Basics: Cloud Computing Overview-Applications-Intranets and the cloud-Organizations and cloud computing: When You Can Use Cloud Computing-When You Shouldn't Use Cloud Computing-Benefits-Limitations-Security Concerns-Regulatory Issues	12
II	Cloud Computing Services-How Those Applications Help Your Business-Deleting Your Datacenter-Hardware Infrastructure-Clients-Security-Network-Services-Accessing the cloud: Platforms-Web Applications-Web APIs-Web Browsers.	12
III	Cloud Storage: Overview-Cloud Storage Providers-Standards: Application-Client-Infrastructure –Service- Software as a service: Overview-driving forces- Company offerings- industries.	12
IV	Software plus services-overview-mobile device integration-providers-microsoft online-Developing Applications: Google-Microsoft-intuit Quickbase-cast iron cloud-Bungee connect-Development-troubleshooting	12
V	Local clouds and thin clients: Virtualization in Your Organization- Server Solutions-Thin Clients-Case Study: McNeilus Steel.Cloud Services for Individuals-Cloud Services Aimed at the Mid-Market-Enterprise-Class Cloud Offerings-Migration .	12

Learning Resources	
Text Books	1. Anthony T. Velte "Cloud computing – A practical Approach",Mc Graw Hill,2010
Reference Books	1. Judith S. Hurwitz ,"Cloud computing for dummies",Wiley india-2009
Web Site / Links	1. https://www.slideshare.net/SrinivasaRao110/cloud-computing-note 2. https://www.scribd.com/document/214964412/Cloud-Computing-Notes

Content beyond the syllabus:

1. Difference between COM and DCOM

2. Study about latest technologies of component oriented language.