VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)
Elayampalayam, Tiruchengode, Namakkal (DT), Tamilnadu – 637 205

B.Sc., (INFORMATION TECHNOLOGY)

(For the Candidates admitted from 2018-2019 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 program 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 Faculties 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

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.

Distribution of marks for attendance

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.

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

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 2018-19 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2018-19 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)

EVALUATION PATTERN – Project Internal

Review I : 10 Marks

Review II : 10 Marks

Review III : 20 Marks

EVALUATION PATTERN – Project External

Evaluation (External) : 40 Marks
Viva-voce (Internal & External) : 20 Marks

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VISION OF THE COLLEGE

- To evolve into a centre of Excellence in higher education through creative and innovative practices to secure social equity for women.

MISSION OF THE COLLEGE

- To provide sufficient learning infrastructure to the students to pursue their studies.
- To provide good opportunity for higher education and conducive environment to students to acquire education.
- To provide quality academic programs, training activities and Research Facilities.

- To facilitate Industry-Institute interaction

PG RESEARCH DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

VISION OF THE DEPARTMENT

To provide high academic goals to the students and make them like world leaders in both educational and research field through effective teaching.

MISSION OF THE DEPARTMENT

- To create, share and apply knowledge in Computer Applications including inter disciplinary areas that extends the scope of Computer Science and benefit humanity.
- To educate students to be successful, ethical and effective problem solvers.
- To prepare the students to contribute positively to the economic well being of our region and nation.

B.Sc. INFORMATION TECHNOLOGY
PROGRAM OBJECTIVES

PO1: The B.Sc. Information Technology program is to provide advanced and in depth knowledge of Communications and technology used in the Computer fields and its applications to enable students pursue a professional career in information and communication technology in related industry, business and research.

PO2: The course designed to impact professional knowledge and practical skills to the students.

PO3: Information Technology under graduate will have a strong understanding of the field of information technology including analysis techniques scientific principle and design methodologies to be the successfully employed, pursue a under graduate degree, or continue their professional educational

PROGRAMME SPECIFIC OUTCOMES

After completion of the programme the graduates will be able to

PSO1 : Students have a clear understanding of the concepts of key areas in Information technology

PSO2 : Students are capable to analyze and apply latest technologies to solve problems in the areas of Information Technology

PSO3 : It makes them to analyze and synthesis computing systems through quantitative and qualitative techniques.

PSO4 : The B.Sc IT Program is aimed at providing a platform to the students to enhance their skills in various fields of Computer Science & Information Technology like Hardware, Software development, Networking, Database Management & IT enabled services and to facilitate students to interact with IT professionals, Industry Partners & Academicians from IT and related areas.

MAPPING OF PO'S AND PSO'S

PSO / PO	PO1	PO2	PO3
PSO1	✓		

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]
ELAYAMPALAYAM, TIRUCHENGODE - 637 205.
B.Sc. INFORMATION TECHNOLOGY
COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS - OBE PATTERN
(For the Candidates admitted from the year 2018-2019)

Sem	Course Code	Part	Courses	Hour	Credit	Marks		
						Int. Marks	Ext. Marks	Total Marks
I	18U1LT01	I	Tamil-I	4	3	25	75	100
	18U1LE01	II	English I	4	3	25	75	100
	18U1ITC01	IV	Core – I Information Technology in Business	5	5	25	75	100
	18U1ITP01	IV	Core Lab - I Computer Practices Lab	5	3	40	60	100
	18U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	18U1ITC02	IV	Core-II Office Automation	4	3	25	75	100
	18U1VE01		Value Education	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**23**	**190**	**510**	**700**
II	18U2LT02	I	Tamil-II	4	3	25	75	100
	18U2LE02	II	English-II	4	3	25	75	100
	18U2ITC03	IV	Core III – Programming in C	4	4	25	75	100
	18U2ITP02	IV	Core Lab -II Programming in C Lab	4	3	40	60	100
	18U2MAA06	III	Allied II Discrete Mathematics	4	4	25	75	100
	18U2ITC04	IV	Core IV DTP Package	4	2	25	75	100
	18U2VE02		Environmental Studies	4	4	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**23**	**190**	**510**	**700**
III	18U3ITC05	IV	Core V-Data Structures and Algorithms	4	3	25	75	100
	18U3ITC06	IV	Core VI-Operating Systems	4	3	25	75	100
	18U3ITC07	IV	Core VII- Object Oriented Programming in C++	5	5	25	75	100
	18U3ITP03	IV	Core Lab - III Programming in C++ Lab	5	3	40	60	100
	18U3MAA14	III	Allied III - Resource Management Techniques-1	4	4	25	75	100
	18U3ITC08	IV	Core VIII E-Commerce	4	3	25	75	100
	18U3ITS01	VII	SBEC-I – Basics of Unix and	2	2	25	75	100

			Linux					
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**23**	**190**	**510**	**700**

IV	18U4ITC09	IV	Core IX-Information security	4	3	25	75	100
	18U4ITC10	IV	Core X- Computer Networks	4	3	25	75	100
	18U4ITC11	IV	Core-XI- Relational Database Management Systems	5	5	25	75	100
	18U4ITP04	IV	Core Lab - IV RDBMS Lab	5	3	40	60	100
	18U4CMA04	III	Allied-III Cost and Management Accounting	4	4	25	75	100
	18U4 ITC12	IV	Core XII Multimedia Design (Corel DRAW)	4	3	25	75	100
	18U4ITS02	VII	SBEC-II Mobile Application Development	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**23**	**190**	**510**	**700**
V	17U5ITC13	IV	Core-XIII Java & J2EE	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 & J2EE 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 Computer installation and Servicing	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	18U5ITE01	Data Mining and Data Warehousing
V	18U5ITE02	Mobile Computing
V	18U5ITE03	Distributed Computing

ELECTIVE – II

Semester	Course Code	Course Name
VI	18U6ITE04	Big Data Analytics
VI	18U6ITE05	Computer Graphics
VI	18U6ITE06	Component Technologies

Subject Title	Information Technology in Business	Semester	I
Subject Code	18U1ITC01	Specialization	NA
Type	Core – I	L:T:P:C	5 : 0 : 0 : 5

COURSE OBJECTIVE

- Learn the various components in computer systems such as I/O devices, Storage devices.
- Understand the reimbursement of computer system especially in business.

COURSE OUTCOME

On the successful completion of the course the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the Characteristics of Computers and parts of Computers	K1
CO2	To analyze the different types of input, output and storage devices	K2
CO3	To understand about software, hardware and types of Classification	K3
CO4	To analyze the Concepts of Computer Networks and its types	K4
CO5	To know about the structural design of Computer Network Architecture	K4

Subject Title	Information Technology in Business	Semester	I

Subject Code	18U1ITC01	Specialization	NA
Type	Core – I	L:T:P:C	5 : 0 : 0 : 5

Unit	Syllabus Contents	Levels	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.	K1	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.	K2	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.	K3	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.	K4	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.	K4	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.

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Computer Practices Lab	Semester	I	Hours:75
Subject Code	18U1ITP01	Specialization	NA	
Type	Core Lab - I	L:T:P:C	0 : 0 : 5 : 3	

COURSE OBJECTIVE

- Provide the Computer Knowledge using MS Office software.
- Develop skills to develop, presentation and storage of office documents.

COURSE OUTCOME

CO Number	CO Statement	Knowledge Level
CO1	Able to design different types of font styles, font sizes, headings	K1
CO2	Apply an attractive advertisement view for a company.	K2
CO3	Create a table with rows and columns.	K3
CO4	Create a call letter and visiting card.	K4
CO5	Make different visualization effects like animation.	K4

Subject Title	Computer Practices Lab	Semester	I	Hours:75
Subject Code	18U1ITP01	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

MAPPING WITH PROGRAM SPECIFIC OUTCOMES

CO \ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2		✓		✓

CO3	✓	✓	✓	
CO4	✓			
CO5	✓	✓	✓	✓

Subject Title	**Office Automation**	**Semester**	**I**
Subject Code	**18U1ITC02**	**Specialization**	**NA**
Type	**Core – II**	**L:T:P:C**	**4 : 0 : 0 : 3**

COURSE OBJECTIVE

- Provide awareness in automation and to sketch out the hidden talent of student's community recruitment.

COURSE OUTCOME

CO Number	CO Statement	Knowledge Level
CO1	Understand the MS-Office software	K1
CO2	Understand the MS-Excel, Functions and Conditioning	K2
CO3	Applying totals, subtotals, functions and data validation	K3
CO4	Understand the MS-Excel, Functions and	K4

	Conditioning	
CO5	Working with MS-ACCESS.	K4

Subject Title	**Office Automation**	**Semester**	**I**
Subject Code	**18U1ITC02**	**Specialization**	**NA**
Type	**Core – II**	**L:T:P:C**	**4 : 0 : 0 : 3**

Unit	Syllabus Contents	Levels	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.	K1	**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	K2	**12**

	formatting.		
III	Data Analysis: Process-Subtotals with Ranges-Lookup functions-pivot tables-Data Visualization-Data Validation-Working with Multiple sheets.	K3	**12**
IV	MS-POWERPOINT: Introduction-Menus-Toolbars-Navigating in PowerPoint-Working with PowerPoint.	K4	**12**
V	MS-ACCESS: Introduction-Starting Microsoft Access-Creating New Database-Opening Existing Database-Access Database Wizards-Tables-Creating Query-Form-Reports.	K4	**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.

Pedagogy : Chalk and Talk, PPT ……..

MAPPING WITH PROGRAM SPECIFIC OUTCOMES

CO \ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2		✓	✓	✓
CO3	✓		✓	
CO4				✓
CO5	✓	✓	✓	✓

Subject Title	**Programming in C**	**Semester**	**II**
Subject Code	**18U2ITC03**	**Specialization**	**NA**
Type	**Core – III**	**L:T:P:C**	**4: 0 : 0 : 4**

COURSE OBJECTIVE

- Learn the C Programming Concepts and able to write the coding in C language.
- Develop the programming ability in C programming language to solve the problems.

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COURSE OUTCOME

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of C Language	K1
CO2	Develop the programs using C Language	K2
CO3	Apply the various functions in C Language	K3
CO4	Understand and apply the concepts of Structures and Unions in C Language	K4
CO5	Understand the concept, apply and create the concept of Files	K4

Subject Title	Programming in C	Semester	II
Subject Code	18U2ITC03	Specialization	NA
Type	Core – III	L:T:P:C	4: 0 : 0 : 4

Unit	Syllabus Contents	Level	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.	K1	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.	K2	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.	K3	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	K4	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.	K4	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.

Pedagogy : Chalk and Talk, PPT ……..

MAPPING WITH PROGRAM SPECIFIC OUTCOMES

CO / PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2	✓	✓		✓
CO3	✓		✓	
CO4				✓
CO5	✓	✓		✓

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

COURSE OBJECTIVE

- Formulate all techniques of software development in the C Programming Language and demonstrate these techniques by the solution of a variety of problems spanning the breadth of the language.

COURSE OUTCOME

CO Number	CO Statement	Knowledge Level
CO1	Understand and Design a Program for using various functions in C Language.	K1
CO2	Design algorithms for the given problem specifications.	K2
CO3	Understand and design C programs to implement controls and looping statements	K3
CO4	Write C programs to implement arrays and functions.	K4
CO5	Write C programs to implement structures, pointers, and files.	K4

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

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.

MAPPING WITH PROGRAM SPECIFIC OUTCOMES

CO \ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2	✓	✓		✓
CO3	✓		✓	
CO4				✓
CO5	✓	✓		✓

Subject Title	DTP Package	Semester	II	Hours:60
Subject Code	18U2ITC04	Specialization	NA	
Type	Core - IV	L:T:P:C	4 : 0 : 0 : 2	

COURSE OBJECTIVE

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

COURSE OUTCOME

CO Number	CO Statement	Knowledge Level
CO1	To know about the basic hardware requirements of DTP	K1
CO2	Understand the concept of PageMaker.	K2

CO3	Understand and apply the concepts for publication.	K3
CO4	Understand, apply and create various PHOTOSHOP images.	K4
CO5	Creating selections in the Photoshop images.	K4

Subject Title	**DTP Package**	**Semester**	**II**
Subject Code	**18U2ITC04**	**Specialization**	**NA**
Type	**Core - IV**	**L:T:P:C**	**4 : 0 : 0 : 2**

Unit	Syllabus Contents	Levels	Number of Sessions
I	INTRODUCTION: Choosing the printing house - Hardware Requirement for DTP -General Design Considerations - Text Organization – Design Common Media Publication.	K2	**12**
II	PAGEMAKER: Getting Started with PageMaker – Working in PageMaker – The PageMaker window – Working with text –	K3	**12**

	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.		
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.	K4	**12**
IV	PHOTOSHOP- Starting Photoshop CS2 - Photoshop Program Window Working with Images: Editing Images – Color Modes.	K4	**12**
V	Making Selections: Moving a Portion of Images – Editing Selections – Filling a Selection -Transforming Selections Painting Tools: Drawing Tools –Retouching Tools.	K1	**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.

Pedagogy : Chalk and Talk, PPT ……..

MAPPING WITH PROGRAM SPECIFIC OUTCOMES

CO \ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	
CO2		✓		
CO3			✓	✓
CO4	✓	✓		✓
CO5	✓			

Subject Title	Data Structures and Algorithms	Semester	III
Subject Code	18U3ITC04	Specialization	NA
Type	Core-IV Theory	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- Understand and remember algorithms and its analysis procedure.
- Introduce the concept of data structures through ADT including List, Stack, Queues.
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structure algorithms. 6 Compute the complexity of various algorithms.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Explain the organization and operations of data structures Stack, Queues, Trees, Graphs, Heaps.	K5
CO2	Compare and contrast the functionalities and applications of different data structures	K2
CO3	Demonstrate specific search and sort algorithms using data structures given specific user requirements	K1
CO4	Apply the operations of data structures in designing software procedures based on specific requirements	K3
CO5	Assess the applicability of given data structures and associated operations to real time	K2
CO6	Identify suitable algorithms with appropriate data structures for real time software Requirements Computer applications	K3
CO7	Modify the existing operations of data structures for changing needs of the software requirements	K6

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		

CO2	✓		✓	
CO3	✓	✓		✓
CO4	✓		✓	
CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	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.	**K3**	**12**
II	**Linked List:** Definition – Single Linked List – Representation – Operations – Double Linked List – Operations. **Stacks:** Definition – Representation of stacks – Operations on Stacks – Applications of Stack: Evaluation of Arithmetic Expression. **Queues:** Definition-Representation of Queues – Applications of Queues: CPU Scheduling in a Multiprogramming Environment – Round Robin Algorithm.	**K4**	**15**
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.	**K4**	**12**
IV	**Sorting:** Basic Terminologies- 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. **Space and Time Complexity.**	**K3**	**12**
V	**Graphs**-Introduction-Graph Terminologies-Representation of Graphs-Operations on Linked List Representation of Graphs-Applications: Shortest Path Problem.	**K3**	**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.

Subject Title	Operating Systems	Semester	III
Subject Code	18U3ITC05	Specialization	NA
Type	Core-V Theory	L:T:P:C	4:0:0:3
Web Sites / Links	1. www.freetechbooks.com/algorithms-and-data-structures-f11.html		

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- To introduce students with basic concepts of Operating System, its functions and services.
- To familiarize the students with various views and management policies adopted by O.S. as pertaining with processes , Deadlock , memory , File and I/O operations.
- To brief the students about functionality of various OS like Unix , Linux and Windows XP as pertaining to resource management.
- To provide the knowledge of basic concepts towards process synchronization and related issues.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Analyze the structure of OS and basic architectural components involved in OS design	K4
CO2	Analyze and design the applications to run in parallel either using process or thread models of different OS	K6
CO3	Analyze the various device and resource management techniques for timesharing and distributed systems	K5
CO4	Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system	K4

CO5	Interpret the mechanisms adopted for file sharing in distributed Applications	**K2**
CO6	Conceptualize the components involved in designing a contemporary OS	**K2**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3		✓		✓
CO4	✓		✓	
CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	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. The Evolution of Operating System	**K3**	**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.	**K3**	**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	**K3**	**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.	**K4**	**12**

Subject Title	**Object Oriented Programming in C++**	**Semester**	**III**	
Subject Code	**18U3ITC06**	**Specialization**	**NA**	
Type	**Core-Theory**	**L:T:P:C**	**4:0:0:3**	**K3**	**12**
	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-RAID. **Case Study: Windows Operating System, Linux Operating System & MAC Operating System.**			

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/

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- Provide flexible and powerful abstraction
- Allow programmers to think in terms of the structure of the problem rather than in terms of the structure of the computer.
- Decompose the problem into a set of objects
- Objects interact with each other to solve the problem
- Create new type of objects to model elements from the problem space

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand the Principles of Objective Oriented Programming	**K2**
CO2	Understand and Apply the Token Expressions & Control Structures	**K3**

CO3	Apply the Functions in C++, Classes & Objects.	**K3**
CO4	Understand and Apply the Constructors & Destructors, Operator Overloading, Inheritance	**K3**
CO5	Pointers, Virtual Functions &Polymorphism, Working with Files, Exception handling	**K5**
CO6	An Object Oriented Approach in Real Life Problems	**K6**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3		✓		✓
CO4	✓		✓	
CO5			✓	✓

Unit	Syllabus Contents	Levels	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.	**K3**	**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.	**K3**	**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 .	**K3**	**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.	**K4**	**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.	**K3**	**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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Programming in C++ Lab	Semester	III
Subject Code	18U3ITP03	Specialization	NA
Type	Core Lab –III	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- To understand the Program using Class and Objects.
- To learn how to group the datatypes and functions within the class
- To learn how to use objects and relate with each other using various functions

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand and apply the concept of Class and Objects	K3
CO2	Understand and apply the concept of Constructors and Destructors	K3
CO3	Understand and apply the concept of Inheritance, Polymorphism and functions	K3
CO4	Understand and differentiate the Dynamic Polymorphism – Virtual Functions	K4
CO5	Formatted I/O, File Operation, Exception Handling	K3

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1		✓		

CO2	✓		✓	
CO3	✓	✓		✓
CO4			✓	
CO5	✓		✓	✓

List of Programs
Use Dev C or Linux C to compile and run the C++ Programs. 1. Write a C++ program using Classes and Objects. 2. Write a C++ program for Constructors & Destructors. 3. Write a C++ program for Array of objects, Passing objects as Function arguments. 4. Write a C++ program for Inline Functions 5. Write a C++ program for Function overloading 6. Write a C++ program for Operator overloading 7. Write a C++ program for Inheritance (All Types) 8. Write a C++ program for Dynamic Polymorphism – Virtual Functions. 9. Write a C++ program for Formatted I/O and File Operation. 10. Write a C++ program for Templates 11. Write a C++ program for Exception Handling 12. Write a C++ program for Friend Function

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

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

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about the overview of the internal system	**K5**
CO2	To know and use the Linux Operating System and commands	**K2**
CO3	Understand how to manage the files in Linux	**K1**
CO4	Apply the various commands and manage the files in Linux	**K3**
CO5	Understand the basic files in UNIX	**K2**
CO6	Basic file commands in UNIX	**K3**
CO7	To understand and apply Shell Operating System	**K2**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3	✓	✓		✓
CO4	✓		✓	
CO5	✓		✓	✓

List of Programs

1. Shell script to find a factorial of a given number.
2. Shell script to check whether the given number is even or odd.
3. Shell Script to print all prime numbers between m and n.
4. Shell script to reverse a given number and check whether it is palindrome or not.
5. Shell script to find maximum and minimum of a given set.
6. Shell script to count total number of vowels in a given string.
7. Write a menu driven program to calculate 1. Simple Interest 2. Compound Interest.
8. Shell script to create a file contains the following fields: Student no, Student name, age, sex, height and weight. Print all the details in a neat format.
9. Shell script to create emp file containing empname, empno, deptno and designation.
    a. Display empname and empno of any particular dept and the count of employees.
    b. Display empname and empno of employees who are not managers.
10. Shell script to create two data file and compare them to display unique and common entries.
11. Shell script to wish according to the day time.
12. Execution of various file/directory handling commands
    a. pwd command
    b. cd command
    c. ls command
    d. rm command
    e. mv command
    f. cat command
    g. cp command
    h. echo command
    i. mkdir command
    j. rm command
13. To search a pattern using grep and fgrep command
14. Filter commands & Pipe Commands
15. Managing Documents Command
16. Communicating with other users in Linux Command

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Information Security	Semester	IV
Subject Code	18U4ITC07	Specialization	NA
Type	Core-VII Theory	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- To understand the fundamentals of Cryptography
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data networks
- To design security applications in the field of Information technology

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about the security model	K3
CO2	To know and understand about the various security attacks and ethics in Information Security	K2
CO3	To know and mange the risk management	K1
CO4	To understand the Information security policy, standards, and practices	K2
CO5	Demonstrate the Physical Security in the organization and in workplace	K2

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2			✓	

CO3		✓		✓
CO4	✓		✓	
CO5			✓	✓

Unit	Syllabus Contents	Levels	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.	**K2**	**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.	**K2**	**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.	**K3**	**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.	**K4**	**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.	**K4**	**12**

Learning Resources	
Text Books	1. A. Angel Freedaraja, K. Benitlin subha "Information Security" Sams Publishers, Chennai. 2013.

Subject Title	Computer Networks	Semester	IV
Subject Code	18U4ITC08	Specialization	NA
Type	Core-VIII Theory	L:T:P:C	4:0:0:3
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		

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- To learn the concepts of state of art in network protocols, architecture and applications.
- Understand the division of network functionalities into layers.
- Aimed at giving basic understanding about system security. To understand the concepts of computer security, cryptography, secure protocols, detection and other security techniques.
- To understand the salient facets of information security basics and the basics of risk management.
- To provide an understanding of principal concepts, major issues, technologies, and basic approaches in information security.
- Master the key concepts of information security and how they "work."

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about the security model	K3
CO2	To know and understand about the various security attacks and ethics in Information Security	K2
CO3	To know and mange the risk management	K1

CO4	To understand the Information security policy, standards, and practices	**K2**
CO5	Demonstrate the Physical Security in the organization and in workplace	**K2**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1		✓		✓
CO2	✓		✓	
CO3		✓		✓
CO4	✓			
CO5		✓	✓	

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Data communications** – Components - Data Representation - Direction of Data flow-Networks - Categories – Topologies - **Protocols and Standards** - ISO/OSI Model - Layers in the OSI model - TCP/IP Protocol suite - Addressing.	**K2**	**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.	**K3**	**12**
III	**Data link layer:** Error Detection and Correction - Types of Errors – Redundancy. Framing - Flow and Error control - Noiseless channels: - Noisy channel **Networking Addresses:** IPV4 - Datagram - Fragmentation - Checksum - options. IPV6 - Advantages - Packet Format - Transition from IPV4 to IPv6 - Tunneling.	**K3**	**12**
IV	**Transport Layer:** 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.	**K3**	**12**
V	**Presentation Layer:** Protocols - Services. **Session Layer:** Protocols - Services. **Application Layer:** DNS - DNS in the Internet - DNS Messages - Types of Records - WWW and HTTP -	**K3**	**12**

Subject Title	**Relational Database Management Systems**	**Semester**	**IV**
Subject Code	**18U4ITC09**	**Specialization**	**NA**
Type	**Core – IX Theory**	**L:T:P:C**	**5:0:0:5**

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

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures, this will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the Storage and Query processing techniques

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know and understand about the data Management Components and about the Entity Relational Entity Model	**K5**

Web documents. **Network security:** Cryptography - Symmetric-Key Cryptography - Asymmetric-Key Cryptography.

CO2	To know and apply the SQL Commands and tables	**K2**
CO3	Apply and evaluate the different table commands like DML, DDL.	**K1**
CO4	To know and apply the PL/SQL commands and familiarize	**K3**
CO5	To understand the Composite Data types used in PL/SQL	**K2**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2			✓	
CO3	✓	✓		✓
CO4			✓	
CO5	✓			✓

Unit	Syllabus Contents	Levels	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:** 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.	**K3**	**15**
II	**Oracle9*i*:** 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.	**K3**	**16**
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.	**K4**	**16**
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.	**K4**	**16**
V	**PL/SQL Composite Data Types:** Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.	**K3**	**12**

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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	RDBMS LAB	Semester	IV
Subject Code	18U4ITP05	Specialization	NA
Type	Core Lab – V	L:T:P:C	5:0:0:3

COURSE OBJECTIVE

- To know the basic commands in SQL
- To understand the DML ,DDL Statements
- To familiarize in the Data Schemes
- To understand and program in PL/SQL

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know the DDL,DML statements	K1
CO2	To know and apply different types of simple queries	K3
CO3	To work with different data schemas	K3
CO4	To know and familiarize in PL/SQL programs	K3
CO5	To know and different types of writing Queries	K4

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4

CO1	✓	✓		
CO2	✓	✓	✓	✓
CO3	✓		✓	✓
CO4			✓	✓
CO5			✓	✓

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.

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	**Multimedia Design (Corel DRAW)**	**Semester**	**IV**
Subject Code	**18U4ITC10**	**Specialization**	**NA**
Type	**Core –X Theory**	**L:T:P:C**	**4:0:0:3**

COURSE OBJECTIVE

- To create illustrations, page layout, web graphics.
- Students can able to use their own designing skills with these applications to create stunning illustrations, logos, advertisement.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about the work suite applications in CorelDRAW	**K5**
CO2	To know and apply to draw the different graphical shapes	**K2**
CO3	To insert, update and delete the different objects	**K1**
CO4	To understand and apply the text editing	**K3**
CO5	To understand and apply the bitmaps	**K2**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3	✓	✓		✓
CO4	✓		✓	
CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	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	**K3**	**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	**K3**	**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	**K4**	**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	**K4**	**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	**K3**	**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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Mobile Application Development	Semester	IV
Subject Code	18U4ITS02	Specialization	NA
Type	SBEC:II	L:T:P:C	2:0:0:2

COURSE OBJECTIVE

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

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand about Android History, Platform	K5
CO2	Understand & Apply about Android Design Essentials, Android Terminologies	K2
CO3	Understand and know about Android Application Design Essentials	K1
CO4	Understand, know and differentiate about Common Android APIs	K3
CO5	To know about DDMS (Dalvik Debug Monitor Server) Server	K2

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓		
CO3	✓		✓	
CO4	✓			

CO5		✓	✓	

Unit	Syllabus Contents	Levels	Number of Sessions
I	**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.	K3	12
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.	K3	12
III	**Android Application Design Essentials:** Managing Application resources in a hierarchy-Working with different types of resources. **Android Application Design Essentials:** User Interface Screen Elements-Designing User Interfaces with Layouts.	K4	12
IV	**Using Common Android APIs:** Using Android Data and Storage APIs- Sharing Data between Applications with Content Providers-Using Android Web APIs and Using Android Telephony APIs.	K4	12
V	DDMS-**Debug and Other View:** DDMS - Dalvik Debug Monitor Server- LogCat View-File explorer-Breakpoints and Debug.	K3	12

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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Java Programming	Semester	V
Subject Code	18U5ITC11	Specialization	NA
Type	Core-XI Theory	L:T:P:C	5:0:0:5

COURSE OBJECTIVE

- To know how to program in the Java programming language,
- To develop knowledge of object-oriented paradigm in the Java programming language.
- Apply and use of Java in a variety of technologies and on different platforms.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand and write the program in Java with basic input and output functions	K2
CO2	To understand the functions, Class and Objects, Inheritance and Packages in Java	K3
CO3	To understand and apply the exception handling mechanisms in Java	K3
CO4	To know the concept of JDBC and apply in the program to connect with the Java Program	K4
CO5	To know and develop Applets and know its use	K3

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓		✓	
CO2			✓	
CO3	✓			✓
CO4			✓	
CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	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.	K3	12
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-Multithreading.	K3	12
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.	K3	12
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( )	K4	12
V	**Applets :** 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	K3	12

Learning Resources	
Text Books	1. Herbert Scheldt , 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.

Subject Title	Web Services	Semester	V
Subject Code	18U5ITC12	Specialization	NA
Type	Core-XII Theory	L:T:P:C	5:0:0:4
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		

Pedagogy: Chalk and Talk, PPT ……..

COURSE OBJECTIVE

The student should be made to,

- Understand and write well-formed XML documents
- Write the schema for the given XML documents in both DTD and XML Schema languages
- Format XML data to the desired format
- Parse XML documents by using DOM, SAX
- Create, deploy, and call Web services

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To understand what XML is all about.	K2
CO2	To understand the history of XML, including some background on Markup Languages (SGML, etc.)	K3
CO3	To know about SOAP and illustrate SOAP usage	K3
CO4	To understand and apply the concept of Highlight related technologies of Web services	K4
CO5	To apply the concept of security and its importance in Internet	K3

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4

CO1	✓			✓
CO2		✓		
CO3	✓		✓	✓
CO4	✓			
CO5		✓	✓	

Unit	Syllabus Contents	Levels	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).	**K3**	**08**
II	XML Technology: XML – Name Space – Structuring with schemas and DTD – Presentation Techniques: CSS- XSL - Transformation Techniques: XSLT , XPATH, XLINK & XQuery– XML Infrastructure Technologies: Infoset.	**K3**	**08**
III	SOAP: Overview of SOAP – HTTP – XML – RPC – SOAP, Protocol – Message Structure – SOAP with Attachments- SOAP Advantage and Disadvantage.	**K3**	**08**
IV	Web Services: Overview – Architecture – Key Technologies – UDDI – WSDL –ebxml – SOAP and web services in E – Commerce.	**K4**	**08**
V	XML Security: Security overview-Canonicalization-XML Security Frame work-XML Encryption-XML Digital Signature.	**K3**	**08**

Learning Resources	
Text Books	1. Frank P Coyle XML, Web Services and the Data Revolution, Pearson Education, 2002. 2. Michael P. Papazoglou, Web Services & SOA Principles and Technology, Pearson Education Limited 2008.
Reference Books	1. Sandeep Chatterjee,James Webber,"Developing Enterprise Web ervices".Pearson Education,2004. 2. Ramesh Nagappan,Robert Skocylas and Rima PatelSriganesh,"Developing Java Web services", Wiley Publishing,Inc,2004. 3. McGovern, et al., "Java Web Services Architecture",Morgan Kaufmann Publishers, 2005.
Web Sites / Links	1. https://www.w3schools.com/xml/ 2. https://www.tutorialspoint.com/soap/index.htm

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Software Engineering	Semester	IV
Subject Code	18U5ITC13	Specialization	NA
Type	Core- XIII Theory	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- Introduce software engineering basics
- To Learn Cost Estimation, Design notations and Software testing.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	An ability to work in one or more significant application domains	K3
CO2	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software	K3
CO3	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle	K3
CO4	Demonstrate an ability to use the techniques and tools necessary for engineering practice	K3
CO5	Develop simple back-end database using web service	K3
CO6	How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment	K1

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		✓
CO2			✓	

CO3	✓	✓		✓
CO4			✓	
CO5	✓	✓	✓	✓
CO6	✓	✓		✓

Unit	Syllabus Contents	Levels	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. **Software Development Life cycle models.**	**K3**	**12**
II	Software cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Estimation Costs. **Software Requirements Definition:** The Software Requirements specification – Formal Specification Techniques.	**K4**	**12**
III	**Software Design:** Fundamental Design Concepts – Modules and Modularization Criteria. Design Notations – Design Techniques. **Implementation Issues:** Structured Coding Techniques – Coding Style – Standards and Guidelines – Documentation Guidelines.	**K4**	**12**
IV	**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	**K3**	**12**
V	**Software Testing Process:** Psychology of Testing-Testing Team and development Team-Characteristics of Test Engineers-Levels of Testing-Testing Approaches- Types of Testing-test Plan. Manual testing and its limitations. **Software Testing Tools: Overview – Examples.**	**K3**	**12**

Learning Resources	
Text Books	1. Richard Fairley, "Software Engineering Concepts, TMH 2007. 2. Dr.K.V.K.K Prasad "Software Testing Tools, Dream Tech Press, 2010.

Subject Title	Java Programming Lab	Semester	V
Subject Code	18U5ITP06	Specialization	NA
Type	Core Lab – VI	L:T:P:C	4:0:0:3

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

Pedagogy: Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
- Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
- Understand the principles of inheritance, packages and interfaces.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Identify classes, objects, members of a class and relationships among them needed for a specific problem	**K3**
CO2	Write Java application programs using OOP principles and proper program structuring	**K3**
CO3	Demonstrate the concepts of polymorphism and Inheritance	**K3**

CO4	Write Java programs to implement error handling techniques using exception handling	**K2**
CO5	Understand and Apply the concept of JDBC in there Application	**K3**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2			✓	
CO3	✓	✓		✓
CO4				
CO5	✓		✓	✓

List of Programs

Subject Title	Computer Installation and Servicing	Semester	V

1. Write a java program to get two numbers from the user and add the two numbers.
2. Write a Program to find the frequency of odd & even numbers in the given matrix.
3. Implementation of Classes and Objects concepts.
4. Implementation of Constructor.
5. Write a Java Program to Handle Arithmetic Operation Through Inheritance.
6. Java Program to Illustrate Achieve Multiple Inheritance Using Multiple Interfaces.
7. Implementation of packages in java.
8. Write a Java program to implement the concept of importing classes from user defined package and creating packages.
9. Implementation of Interface concept.
10. Program to creating multiple thread.
11. Write a program to implement the concept of Exception Handling by creating user defined exceptions.
12. Write programs for using Graphics class
    - to display basic shapes and fill them
    - draw different items using basic shapes
    - set background and foreground colors.
13. Write a program to create a list using java AWT.
14. Develop an application to perform insert, update, retrieve and delete the record from the database in JDBC.

Subject Code	18U5ITS02	Specialization	NA
Type	SBEC - II Theory	L:T:P:C	2:0:0:2

COURSE OBJECTIVE

- Learn PC maintenance & upgrading skills.
- Familiarize themselves with PC memories such as RAM and ROM devices. This includes RAM types, RAM upgrading, ROM BIOS, and the CMOS chip.
- Learn PC troubleshooting and repairing skills
- Learn about various PC components technologies
- Learn about maintenance tools in Windows

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Installation of all the software's with cope with different operating system	K4
CO2	Develop computer system configuration	K3
CO3	Conduct diagnostics -testing and inspection	K3
CO4	Have Knowledge of hardware components and latest development in the field	K2
CO5	Conduct repair and maintenance of PC's Carry out installation of operating system and applications and have knowledge of Networking and system connectivity	K3
CO6	Start a small business enterprise by liaising with different stake holders	K4

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		✓
CO2	✓		✓	✓
CO3	✓	✓		✓
CO4			✓	✓
CO5	✓	✓	✓	✓

CO6	✓		✓	

Unit	Syllabus Contents	Levels	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.	**K3**	**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.	**K4**	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.	**K4**	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.	**K3**	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.	**K3**	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. 1. Stephen J.Bigelow, "Trouble Shooting, maintaining and Repairing PCs",Tata McGraw-Hill, New Delhi, 2001.

Subject Title	Project Work (In-House Mini Project)	Semester	V
Subject Code	18U5ITCPR01	Specialization	NA
Type	Project Work	L:T:P:C	5:0:0:4

Web Sites / Links	1. www.itap.purdue.edu/facilities/instructionallabs/resources/instructions.htm 2. http://www.ibm.com/support/knowledgecenter/SS3RA7_17.1.0 /modeler_install_concurrentlic_admin_ddita/common/installation/ common_admin_local.dita

Pedagogy: Chalk and Talk, PPT ……..

COURSE OBJECTIVE

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

Project Work Pattern

Subject Title	C#.NET	Semester	VI
Subject Code	18U6ITC14	Specialization	NA
Type	Core- XIV Theory	L:T:P:C	5:0:0:4

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)

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

COURSE OBJECTIVE

- To impart knowledge on web design issues, database connections and techniques for creating dynamic websites using C#.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level

CO1	Understand C# variables & Data types	**K3**
CO2	Understand & Apply different Conditional Looping Structures	**K3**
CO3	Understand the different Control Classes	**K4**
CO4	Understand and apply Validation Controls	**K3**
CO5	Understand and apply ADO.NET Fundamentals	**K3**
CO6	Understand & apply Data binding	**K3**

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3	✓	✓		✓
CO4	✓		✓	
CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**C# at Work-** . NET Framework & the CLR –Assemblies- File Extensions used in Visual C#- Visual C# Integrated Development Environment –Data Types in C#- C# Programming Language- C# Fundamentals	**K3**	**15**
II	**Arrays & Variables:** Variables –Arrays-User Defined **Data types in C#**: Classes, Inheritance- Methods – Operators – Branching & Looping – Exception Handling – Events. Namespaces, Classes, Objects, and Structs.	**K3**	**15**
III	**Visual Elements in C# :**General Components –User Defined Components –Graphics Handling, Web Form Controls – Classes – List Classes – Table Controls & Image Controls – Hyperlinks & Link Buttons.	**K3**	**15**
IV	**Validation:** Validation Controls- Validation Groups, Calendars & Ad Rotators-**HTML controls:** Client & Server HTML controls- HTML Server Control classes- HTML control classes.	**K3**	**15**
V	**Data Access with ADO.NET :** Introduction to Database-SQL Basics –Creating a new Data Connection –Dataset. **Binding controls to database:** Simple, Complex Binding- Binding data to Controls- Navigating in Data- Data Controls: The Grid view- The Details –The Form view.	**K3**	**15**

Learning Resources	
Text Books	1. Matt Teller and Kogent solutions inc, "C# 2005 Programming \Covers .NET 3.0 and 2.0 Black Book", Dream Tech press, 2007. 2. Kogent Learning Solutions Inc ," C# 2012 Programming Black Book Covers .NET 4.5".
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) 4. Beginning ASP.NET 2.0 in C# 2005: From Novice to Professional (Beginning: From Novice to Professional). Matthew MacDonald (Author) publication: APress 2005.
Web Sites / Links	1. www.slideshare.net/ 2. www.powershow.com/

Pedagogy: Chalk and Talk, PPT ……..

Subject Title	C#.NET Lab	Semester	VI
Subject Code	18U6ITP07	Specialization	NA
Type	Core Lab -VII	L:T:P:C	5:0:0:4

COURSE OBJECTIVES

- To impart knowledge on web design issues, database connections and techniques for creating dynamic websites using C#.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To understand and write the C# .net Programming	K3
CO2	To understand and apply different types of variables in C#	K3
CO3	Demonstrate the concepts of Object Oriented Concepts in C#	K2
CO4	To understand and apply web creation in C# Program	K3
CO5	Develop Graphical User Interface and work with Database	K4

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓		✓	
CO3		✓		✓
CO4	✓		✓	
CO5			✓	✓

List of Programs

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

1. Write a console application that obtains four int values from the user and displays the product.
2. If you have two integers stored in variables var1 and var2, what Boolean test can you perform to see if one or the other (but not both) is greater than 10?
3. Write an application that includes the logic from Exercise 1, obtains two numbers from the user, and displays them, but rejects any input where both numbers are greater than 10 and asks for two new numbers.
4. Write programs using conditional statements and loops:
   I) Generate Fibonacci series.
   II) Generate various patterns (triangles, diamond and other patterns) with numbers.
   III) Test for prime numbers.
   IV) Generate prime numbers.
   V) Reverse a number and find sum of digits of a number using Loops.
   VI) Test for vowels with loops and conditional statements.
   VII) Use of foreach loop with arrays.
5. Write an application that receives the following information from a set of students: Student Id: Student Name: Course Name: Date of Birth: The application should also display the information of all the students once the data is entered. Implement this using an Array of Structures.
6. Write an application that uses two command-line arguments to place values into a string and an integer variable, respectively. Then display these values.
7. Write a program to declare class „Distance" have data members dist1,dist2 ,dist3. Initialize the two data members using constructor and store their addition in third data member using function and display addition.
8. Create an application that allows the user to enter a number in the textbox named „getnum". Check whether the number in the textbox „getnum" is palindrome or not. Print the message accordingly in the label control named lbldisplay when the user clicks on the button „check".
9. Create an application which will ask the user to input his name and a message, display the two items concatenated in a label, and change the format of the label using radio buttons and check boxes for selection , the user can make the label text bold

,underlined or italic and change its color . include buttons to display the message in the label, clear the text boxes and label and exit.

10. List of employees is available in listbox. Write an application to add selected or all records from listbox (assume multi-line property of textbox is true).
11. Database programs with ASP.NET and ADO.NET. Create a Web App to display all the Empname and Deptid of the employee from the database using SQL source control and bind it to GridView . Database fields are(DeptId, DeptName, EmpName, Salary).
12. Database programs with ASP.NET and ADO.NET Create a Login Module which adds Username and Password in the database. Username in the database should be a primary key.
13. Database programs with ASP.NET and ADO.NET Create a web application to insert 3 records inside the SQL database table having following fields (DeptId, DeptName, EmpName, Salary). Update the salary for any one employee and increment it to 15% of the present salary. Perform delete operation on 1 row of the database table.
14. Programs using Language Integrated query. Create the table with the given fields. FIELD NAME DATA TYPE EmpNo number EmpName varchar EmpSal number EmpJob varchar EmpDeptNo number
15. Design the same webpages for BMS, BAF, BscIT students and apply same background color for all the pages using css.
    a. Set the label border color of rollno to red using css.
    b. Set the font-Arial , font style-bond , font size-18px of different controls(ie. Label, textbox, button) using css.
    c. Change the font family and color of all heading of above webpage using css.
    d. Use pseudo classes and display link, visited link and active link of contact us differently.

Subject Title	Web Technology	Semester	VI
Subject Code	18U6ITC15	Specialization	NA
Type	Core- XV Theory	L:T:P:C	4:0:0:4

COURSE OBJECTIVE

- Describe the various steps in designing a creative and dynamic website.

- Create web pages using html, JavaScript, CSS and applet codes.
- Design dynamic and interactive web pages by embedding Java Script code in HTML.
- Understand the concepts of HTML and XML DOM

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand the role of languages like HTML, DHTML, CSS, XML, JavaScript,web and web applications	K2
CO2	Analyze the interactive web applications using JSP	K4
CO3	Build a dynamic web pages using JavaScript (client side programming).	K3
CO4	Analyze and create XML documents and XML Schema, Build and consume web services.	K4
CO5	Use Java Script to validate security challenges.	K3

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓	✓	✓	
CO3	✓		✓	✓
CO4	✓	✓		

CO5	✓		✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**User HTML Basics:** An overview of HTML-Creating an HTML Document. Formatting an HTML Document- Fonts & Colors- Lists & Tables.	**K3**	**15**
II	Hyperlinks &Frames- Images- Working with Audio & Video- Forms- Style Sheets	**K3**	**15**
III	**PHP** Syntax & variables: Introduction- Comments-Variables & its scope –Data Types –Output in PHP. PHP Control Structures & Functions : Boolean Expression –Branching- Looping-using functions- Function Documentation – Defining own functions- Funcitons & Variable scope- function scope.	**K3**	**15**
IV	Passing Information with PHP- PHP string Handling- Arrays in PHP- PHP Number Handling.	**K3**	**15**
V	**MySQL Database Integration:** Introduction to Database & MySQL-SQL –**Integrating PHP & MySQL:** Connecting & Creating MySQL Queries-Fetching Data sets- Multiple Conenction- Creating MySQL Database with PHP –Error Checking.	**K3**	**15**

Learning Resources	
Text Books	1. Steve Suehring,Tim Converce and Joyce Park "PHP & MySQL " wiley Publication,2017. 2. NIIT, "HTML & XML –An Introduction " PHI Learning pvt 2012.
Reference Books	1. Larry Ullman "PHP 6 and MySQL5" Pearson Publications,2016. 2. Faithe Wempen " Microsoft step by step HTML5" O'Reilly Media Inc 2017.
Web Sites / Links	1. http://www.tutorials.com 2. www.w3schools.com\php

Pedagogy: Chalk and Talk, PPT ……..

Subject Title	Web Technology Lab	Semester	VI
Subject Code	18U6ITP08	Specialization	NA
Type	Core Lab -VIII	L:T:P:C	5:0:0:3

COURSE OBJECTIVES

- Describe the various steps in designing a creative and dynamic website.
- Create web pages using html, JavaScript, CSS and applet codes.
- Design dynamic and interactive web pages by embedding Java Script code in HTML.
- Understand the concepts of HTML and XML DOM

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand HTML Basics	K3
CO2	To understand and implement the Frames, links, Audio's and Videos.	K3
CO3	To know about PHP Programming basics	K2
CO4	To implement arrays and information passing in PHP	K3
CO5	To know and implement the MySQL Database connection using PHP.	K4

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		✓
CO2	✓		✓	
CO3		✓		✓

CO4	✓		✓	
CO5	✓			✓

List of Programs

HTML Programs

1. Design a web page for your College using basic HTML tags.
2. Create a Web page with the following using HTML
   a) To embed an image map in a web page
   b) To fix the hot spots
   c) Show all the related information when the hot spots are clicked.
3. Create a Web page with all types of cascading style sheets. Use all types of Cascading.

PHP Programs

4. Create a php webpage and print "hello world".
5. Create a php program to find odd or even number from given number
6. Write a php program to find maximum of three numbers.
7. Write a PHP program to swap two numbers.
8. Write a PHP Program to do various String Handling Functions in PHP.
9. Write a PHP program that demonstrate **form element**(input elements).
10. Write a PHP program that demonstrate passing variable using URL.
11. Write a PHP program to create a table in MySQL.
12. Write a PHP program to insert record into a table using MySQL.
13. Write a PHP program to drop table using MySQL.
14. Write a program to update table.
15. Create a student Registration in PHP and Save and Display the student Records.

Subject Title	Soft Skills	Semester	VI
Subject Code	18U6ITS03	Specialization	NA
Type	SBEC – III	L:T:P:C	2:0:0:2

COURSE OBJECTIVES

- To enable students to build a repositories of functional vocabulary and to move from the lexical level to the syntactic level.
- To train students to summon words, phrases relevant to the immediate communication tasks. To enable students to comprehend the concept of communication.
- To teach students the four basic communication skills, Listening, Speaking, Reading and Writing.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To develop communication skills and to know about the stages of communication.	K2
CO2	To Understanding about the listening and speech process.	K1
CO3	Able to know how to face the interview and to prepare for the interview.	K4
CO4	Making to discuss a topic with friends or classmates helps in learning the topic with perfection. It involves sharing of learning by the participants which equally benefits all the participants.	K5
CO5	To provide an opportunity to make it easier to engage the audience, Flexibility, Consistency and Versatility.	K6

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓	✓		
CO2	✓	✓		
CO3			✓	✓
CO4			✓	✓
CO5		✓	✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Nature of technical communication**: Communication as sharing – Stages of communication – Channels of communication – Nature of technical communication – Importance and need for technical communication – Technical communication skills.	**K2**	**6**
II	**The Listening process**: Types of listening – Listening with a purpose – Barriers to listening –The speech process – Conversation and oral skills –Strategies for good conversation – Improving fluency and self-expression – Body language.	**K1**	**6**
III	**Job interviews**: Interview process – Characteristics of job interview–Pre-interview preparation techniques – Interview questions – Answering strategies – Frequently asked interview questions – Projecting a positive image – Alternative interview formats.	**K4**	**6**
IV	**Group Discussion**: Nature of group discussion – Characteristics of successful group discussions – Selection group discussion – Group discussion strategies – Techniques for individual contribution – Group interaction strategies.	**K5**	**6**
V	**Presentation Skills**: Nature and importance of oral presentation –Planning the presentation – Preparing the presentation – Organizing your presentation – Rehearsing the presentation – Improving delivery.	**K6**	**6**

Learning Resources	
Text Books	1. M. Ashraf Rizvi, "Effective Technical Communication" Tata McGraw – Hill Publishing Company Limited , New Delhi.Unit -I (Chapter-1), Unit-II(Chapter-4,6), Unit-III(Chapter-9), Unit-IV(Chapter-10), Unit-V(Chapter-11).

Subject Title	Internet of Things	Semester	VI
Subject Code	18U6ITS04	Specialization	NA
Type	SBEC –IV	L:T:P:C	2:0:0:2

COURSE OBJECTIVE

- Obtain an overview of IoT applications.
- Comprehend the architecture, design principles and standards of IoT.
- Understand M2M and IoT technology fundamentals.
- Knowing about Python language.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about the evolution for mobile, home and embedded applications that is connected to the internet, to integrate communication.	K2
CO2	To gather knowledge about how the devices share the data on the cloud and analyze it in a secure manner on the network.	K1
CO3	To know how the industries are adopting Internet of Things solutions technology to improve their existing systems.	K4
CO4	To get knowledge about how the things to be connected with various devices.	K5
CO5	To get familiar about python data types and control statements.	K6

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1		✓	✓	
CO2	✓	✓		
CO3			✓	
CO4	✓			
CO5		✓		✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**INTRODUCTION TO INTERNET OF THINGS:** Introduction - Physical Design of IoT - Things in IoT, IoT Protocols - Logical Design of IoT - IoT Functional Blocks, IoT Communication Models, IoT Communication APIs.	**K2**	**6**
II	**IOT ENABLED TECHNOLOGIES:** Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - Embedded Systems. IoT Levels & Deployment Templates.	**K1**	**6**
III	**DOMAIN SPECIFIC IOTS:** Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle. IoT and M2M- M2M, Differences between IoT and M2M, SDN and NFV for IoT.	**K4**	**6**
IV	**IOT PLATFORMS DESIGN METHODOLOGY**: Introduction - IoT Design Methodology. Case Study on IoT System for Weather Monitoring.	**K5**	**6**
V	**IOT SYSTEMS-LOGICAL DESIGN USING PYTHON:** Introduction – Installing Python – Python Data Types & Data Structures: Control Flow - Functions – Modules – Packages - File Handling - Date / Time Operations - Classes.	**K6**	**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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Data Mining and Data Warehousing	Semester	V
Subject Code	18U5ITE01	Specialization	NA
Type	ELECTIVE -I	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- To residual risk after testing the software to an acceptable level.
- Testing provides verification, Validation and Automation tools.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understanding the basic concepts of Software Testing Strategies.	K3
CO2	To know about the Tools used for testing and should not be confused with automation products.	K3
CO3	Able to understand about code review and desk debugging techniques that reduce the burden on dynamic code testing.	K4
CO4	Understanding clearly about the new methodologies and processes are emerging to improve software quality.	K5
CO5	To easy understand and navigate the main objective of usability testing.	K6

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓	✓	
CO3		✓		✓
CO4	✓	✓		
CO5		✓	✓	✓

Unit	Syllabus Contents	Levels	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	**K1**	**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	**K2**	**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	**K4**	**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	**K4**	**12**
V	Data Warehouse and OLAP Technology: What is Data Warehouse? A Multidimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation	**K6**	**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

Subject Title	Network Security and Cryptography	Semester	V
Subject Code	18U5ITE02	Specialization	NA
Type	ELECTIVE –II	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- Understand cryptography and network security concepts and application
- Apply security principles to system design
- Identify and investigate network security threat
- Analyze and design network security protocols
- Conduct research in network security

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand cryptography and network security concepts and application	K2
CO2	Apply security principles to system design	K3
CO3	Identify and investigate network security threat	K2
CO4	Analyze and design network security protocols	K3
CO5	Conduct research in network security	K3

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓	✓	
CO3				✓
CO4	✓	✓		
CO5		✓		✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Introduction :** Introduction to Cryptography, Security Threats, Vulnerability, Active and Passive attacks, Security services and mechanism, Conventional Encryption Model, **CIA model:** Math Background : Modular Arithmatic, Euclidean and Extended Euclidean algorithm, Prime numbers, Fermat and Euler's Theorem	**K3**	**12**
II	**Classical Cryptography :** Dimensions of Cryptography, Classical Cryptographic Techniques Block Ciphers (DES, AES) : Feistal Cipher Structure, Simplifies DES, DES, Double and Triple DES, Block Cipher design Principles, AES, Modes of Operations	**K3**	**12**
III	**Public-Key Cryptography :** Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Elgamal Algorithm, Elliptic Curve Cryptography	**K2**	**12**
IV	**Hash and MAC Algorithms :** Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Digital Signatures	**K3**	**12**
V	**Security in Networks :** Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, Email Security – PGP, S/MIME	**K3**	**12**

Learning Resources	
Text Books	1. Cryptography And Network Security Principles And Practice Fourth Edition, William Stallings, Pearson Education.
Reference Books	1. Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall PTR 2. Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall 3. Cryptography: Theory and Practice by Douglas R. Stinson, CRC press.
Web Sites / Links	www.tutorialspoint.com

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Cloud Computing	Semester	V
Subject Code	18U5ITE03	Specialization	NA
Type	ELECTIVE -III	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- To impart the best concepts of Cloud, Platforms, security and its applications in various environments.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Able to learn about basics of cloud computing and advantages of cloud computing.	K2
CO2	Provides complete information about the evolution of cloud computing thoroughly.	K2
CO3	Understanding clearly about cloud Hardware and its infrastructure.	K4
CO4	Exploring different areas the cloud computing functions along with the mobile.	K4
CO5	To know the security services with security algorithms available for cloud computing.	K5

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓		✓	✓
CO2		✓		✓
CO3		✓	✓	
CO4	✓			✓
CO5			✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Cloud computing:** Introduction to Cloud Computing – history of cloud computing – client/server computing – peer-to-peer computing – distributed computing – collaboration computing – cloud computing – how cloud computing works: cloud storage – cloud architecture – cloud services – companies in the cloud – the pros and cons of cloud computing: advantages and disadvantages.	K3	10
II	**Evolution of cloud computing-**Web service delivered from the cloud -Developing cloud services-Building cloud networks - Virtualization.	K2	10
III	**Cloud Hardware and Infrastructure –** Client – Security – Network – Services – Platforms. Cloud Solutions: introduction – Cloud Application Planning – Cloud Ecosystem – Cloud Business Process Management – Cloud Service Management: Key Cloud Solution Characteristics – on-premise Cloud Orchestration and Provisioning Engine – Computing On Demand (COD) – Cloud Sourcing	K4	10
IV	**Migrating to the Cloud:** Cloud Services for individuals – Cloud Services Aimed at the Mid-Market – Enterprise-Class Cloud Offerings – Migration – Mobile Internet devices and the cloud - Best practices and the Future of Cloud Computing: Analyze your Service – Best Practices – How Cloud Computing Might Evolve.	K4	10
V	**Security in cloud:** Overview-Cloud Security Challenges-Software as a Service – Common standards in cloud computing - Symmetric ciphers: Classical encryption techniques – Data Encryption Standard – Advanced Encryption Standard – Multiple Encryption and Triple DES. Asymmetric ciphers: Public-key cryptography and RSA – Cryptographic hash function – Message authentication code.	K5	10

Learning Resources	
Text Books	1. ”Cloud Computing web – based applications at change the way you work & collaborate online”, Michael miller,pearson. 2. ”Cloud Computing” 2nd edition, Dr.Kumarsaurabh,wiley India. 3. ”Cloud Computing a practical approach”, McGraw Hills. 4. Cloud Computing Implementation , Management, & Security “John W. Rittinghouse, James F . Ransome “ Special Indian Edition.
Reference Books	1. “Cryptography and Network Security” principles and practices – William Stallings. 5th Edition.

Subject Title	Big Data Analytics	Semester	VI
Subject Code	18U6ITE04	Specialization	NA
Type	ELECTIVE –IV	L:T:P:C	5:0:0:4
Web Sites / Links	1. webobjects.cdw.com 2. www.forbes.com 3. cloudcomputinglegal.weebly.com		

Pedagogy : Chalk and Talk, PPT ……..

COURSE OBJECTIVE

- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To enable students to have skills that will help them to solve complex real-world problems in for decision support.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understanding the basic concepts of data science and its functions	K2
CO2	Exploring cluster analysis methods	K2
CO3	Exploring big data from different perspective	K5
CO4	Understanding hadoop framework with HDFS concepts	K2
CO5	Process Data with MapReduce	K5

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓	✓	
CO3		✓		✓
CO4	✓	✓		
CO5		✓	✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Introduction To Data Science:** Introduction of Data Science – Basic Data Analytics using R – R Graphical User Interfaces – Data Import and Export – Attribute and Data Types – Descriptive Statistics – Exploratory Data Analysis – Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation	K2	12
II	**Advanced Analytical Theory And Methods:** Overview of Clustering – K means – Use Cases – Overview of the Method – Perform a K-means Analysis using R – Classification – Decision Trees – Overview of a Decision Tree – Decision Tree Algorithms – Evaluating a Decision Tree – Decision Tree in R – Bayes Theorem – Naïve Bayes Classifier – Smoothing – Naïve Bayes in R.	K2	12
III	**Big data from different perspective:** Introduction of big data-Characteristics of big data-Data in the warehouse and data in Hadoop- Importance of Big data- Big data Use cases: Patterns for Big data deployment. Big data from Technology Perspective: History of Hadoop-Components of Hadoop-Application Development in Hadoop-Getting your data in Hadoop-other Hadoop Component.	K5	12
IV	**Hadoop Distributed File System Architecture:** HDFS Architecture – HDFS Concepts – Blocks – NameNode – Secondary NameNode – DataNode – HDFS Federation – Basic File System Operations – Data Flow – Anatomy of File Read – Anatomy of File Write.	K2	12
V	**Processing your data with MapReduce:** Getting to know MapReduce – MapReduce Execution Pipeline – Runtime Coordination and Task Management – MapReduce Application – Hadoop Word Count Implementation.	K5	12

Learning Resources	
Text Books	1. Paul Zikopoulos, Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Understanding Big Data: Analytics for Enterprise Class Hadoop and streaming Data,The McGraw-Hill Companies, 2012 2. Noreen Burlingame and Lars Nielsen, "A Simple Introduction to DATA SCIENCE", 2012
Reference Books	1. Bill Franks, ―Taming the Big Data Tidal Wave: Streams with Advanced Analytics‖, Wiley and SA 2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013. 3. Michael Berthold, David J. Hand, ―Intelligent 2007.
Web Sites / Links	• https://www.webopedia.com/TERM/B/Big_data_analytics.html • https://www.simplilearn.com/data-science-vs-big-data-vs-data-analytics-article

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Software Testing	Semester	VI
Subject Code	18U6ITE05	Specialization	NA
Type	ELECTIVE –V	L:T:P:C	5:0:0:4

COURSE OBJECTIVE

- To residual risk after testing the software to an acceptable level. Testing provides verification, Validation and Automation tools.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understanding the basic concepts of Software Testing Strategies.	K3
CO2	To know about the Tools used for testing and should not be confused with automation products.	K3
CO3	Able to understand about code review and desk debugging techniques that reduce the burden on dynamic code testing.	K4
CO4	Understanding clearly about the new methodologies and processes are emerging to improve software quality.	K5
CO5	To easy understand and navigate the main objective of usability testing.	K6

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓	✓	
CO3		✓		✓
CO4	✓	✓		
CO5		✓	✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	Building a Software Testing Strategy – Software Testing Design Techniques.	**K1**	**10**
II	Software Testing Tools and Selection of Test Automation Products - Software Testing Lifecycle and Software Testing Process. Testing Effort Estimation and Test Planning.	**K2**	**10**
III	Software Test Effort Estimation Technique - Pre-Development Testing Requirements and Design Phase – Best Practices in Program Phase Unit, System and Integration Testing.	**K4**	**10**
IV	A Case Study on Acceptance Testing – Implementation an Effective Test Management Process – Building an Effective Test Organization..	**K4**	**10**
V	Testing in Today's Business and Usability – Testing of Web – Based Applications	**K6**	**10**

Learning Resources	
Text Books	**1."Software Testing Effective Methods, Tools and Techniques"** by Renu Rajani and Pradeep Oak, Tata McGraw-Hill, 9th Reprint 2009.
Reference Books	**1."Software Testing Principles and Practices"** by Srinivasan Desikan & Gopalaswamy Ramesh, Pearson Education, Sixth Impression, 2008.
Web Sites / Links	http://www.tutorialspoint.com/software_testing/software_testing_pdf_version.htm http://www.computing.dcu.ie/~ray/teaching/CA358/dorothy_graham.pdf

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Machine Learning	Semester	VI
Subject Code	18U6ITE06	Specialization	NA
Type	ELECTIVE -IV	L:T:P:C	5:0:0:4

COURSE OBJECTIVE

To understand the need for machine learning for various problem solving

- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand Learning Problems	K2
CO2	To know and understand about Neural Networks and Genetic Algorithms	K3
CO3	Understand about various theorems	K3
CO4	To understand and know about Instant Learning	K3
CO5	To know about set rules	K2

MAPPING WITH PROGRAM OUTCOMES

CO/PO	PO1	PO2	PO3	PO4
CO1	✓			✓
CO2		✓	✓	
CO3		✓		✓
CO4	✓	✓		
CO5		✓	✓	✓

Unit	Syllabus Contents	Levels	Number of Sessions
I	Introduction : Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm Heuristic Space Search.	**K3**	**10**
II	NEURAL NETWORKS AND GENETIC ALGORITHMS:Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.	**K3**	**10**
III	BAYESIAN AND COMPUTATIONAL LEARNING :Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.	**K4**	**10**
IV	INSTANT BASED LEARNING: K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.	**K3**	**10**
V	ADVANCED LEARNING:Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning	**K4**	**10**

Learning Resources	
Text Books	1. Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) Private Limited, 2013
Reference Books	1. Ethem Alpaydin, ―Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004. 2. Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
Web Sites / Links	www.tutorialspoint.com

Pedagogy: Chalk and Talk, PPT ……..