VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

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

DEPARTMENT OF COMPUTER APPLICATIONS

B.Sc. INFORMATION TECHNOLOGY

SYLLABUS & REGULATIONS

AUTONOMOUS

FOR CANDIDATES ADMITTED FROM 2020-2021 ONWARDS UNDER AUTONOMOUS - OBE PATTERN

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

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN

[AUTONOMOUS]

B.Sc., (INFORMATION TECHNOLOGY)

(Candidates admitted from 2020-2021 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. Model Tests - 10 Marks
2. Average of Two tests - 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 / In-House Project)

EXTERNAL

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

Distribution of Marks

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

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

VII. ELIGIBILITY FOR EXAMINATION

Distribution of marks for attendance

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

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

VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES

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

a) 75 % and above shall be declared to have passed the examination in first class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
b) 60% and above but below 75 % shall be declared to have passed the examinations in first class without Distinction.
c) 50%and above but below 60% shall be declared to have passed the examinations in second class.

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

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

IX. ELIGIBILITY FOR AWARD OF THE DEGREE

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

X. PROCEDURE IN THE EVENT OF FAILURE

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

XI. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2020-21 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2020-21 and thereafter.

EVALUATION OF EXTERNAL EXAMINATIONS (EE)

QUESTION PAPER PATTERN – Theory

Time Duration: 3 Hours Max. Marks: 75

PART- A: 20x1= 20

Answer all the Questions (Objective types)

Two Questions from each unit

PART- B: 5x5 = 25

Answer all the Questions

One Question from each unit (either or type)

PART- C: 3x10 = 30

Answer Any Three Questions

One Question from each unit (3 Out of 5)

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

QUESTION PAPER PATTERN – Practical

Time duration: 3 Hours Max. Marks : 60

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

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

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]
ELAYAMPALAYAM, TIRUCHENGODE - 637 205.
PG & Research Department of Computer Science and Applications
B.Sc. INFORMATION TECHNOLOGY
COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER OBE PATTERN
for the Candidates admitted from the year 2020-2021

Sem	Course Code	Part	Courses	Hour	Credit	Marks		
						Int. Marks	Ext. Marks	Total Marks
I	18U1LT01	I	Tamil-I	6	3	25	75	100
	20U1LE01B	II	English I	6	3	25	75	100
	20U1ITC01	IV	Core – I C Programming	4	4	25	75	100
	20U1ITCP01	IV	Core Lab - I C Programming Lab	4	4	40	60	100
	18U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	20U1ITC02	IV	Core-II Information Technology in Business	4	3	25	75	100
	18U1VE01		Value Education	2	2	25	75	100
	TOTAL			**30**	**23**	**190**	**510**	**700**
II	18U2LT02	I	Tamil-II	6	3	25	75	100
	20U1LE02B	II	English-II	6	3	25	75	100
	20U2ITC03	IV	Core III – Programming in C++	5	5	25	75	100
	20U2ITCP02	IV	Core Lab –II Programming in C++ Lab	5	4	40	60	100
	18U2MAA06	III	Allied II Discrete Mathematics	4	4	25	75	100
	18U2ES01		Environmental Studies	4	4	25	75	100
	TOTAL			**30**	**23**	**165**	**435**	**600**
III	20U3ITC04	IV	Core IV-Data Structures and Algorithms	5	3	25	75	100
	20U3ITC05	IV	Core V-Operating Systems	4	3	25	75	100
	20U3ITC06	IV	Core VI- Java Programming	4	4	25	75	100
	20U3ITCP03	IV	Core Lab - III Java Programming Lab	4	3	40	60	100
	20U3ITCP04	IV	Core Lab –IV Office Automation	3	3	40	60	100
	18U3MAA10	III	Allied III - Resource Management Techniques-1	4	4	25	75	100
	20U3ITS01	VII	SBEC-I Computer Installation and Servicing	2	2	25	75	100
	18U3MAN01	VI	NMEC – I	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**230**	**570**	**800**
IV	20U4ITC07	IV	Core VII-Software Engineering	4	3	25	75	100
	20U4ITC08	IV	Core VIII- Computer Networks	4	4	25	75	100
	20U4ITC09	IV	Core-IX- Relational Database Management Systems	4	4	25	75	100
	20U4ITCP05	IV	Core Lab - V Relational Database Management System Lab	4	3	40	60	100
	18U4CMA04	III	Allied-III Cost and Management Accounting	4	3	25	75	100
	20U4ITC10	VII	Core - X PHP Programming	4	3	25	75	100
	20U4ITSP02	VII	SBEC Practical - II PHP Programming Lab	2	2	40	60	100
	18U3MAN02	VI	NMEC-II	2	2	25	75	100
			Library	1	-	-	-	-
			Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**230**	**570**	**800**

V	20U5ITC11	IV	Core-XI .Net Programming	5	4	25	75	100
	20U5ITC12	IV	Core-XII Computer Graphics and Animation	5	4	25	75	100
	20U5ITC13	IV	Core-XIII Object Oriented Analysis and Design	5	4	25	75	100
	20U5ITCP06	IV	Core Lab - VI .Net Programming Lab	4	3	40	60	100
	20U5ITE_	V	Elective – I	4	4	25	75	100
	20U5ITPR01	IV	**Mini Project (In house -Project)**	4	3	40	60	100
	20U5ITS03	VII	SBEC – III Multimedia Design(CorelDraw)	2	2	25	75	100
			Library/ Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**205**	**495**	**700**
VI	20U6ITC14	IV	Core-XIV Python Programming	5	4	25	75	100
	20U6ITC15	IV	Core-XV Web Technology	5	4	25	75	100
	20U6ITCP07	IV	Core Lab -VII Python Programming Lab	4	3	40	60	100
	20U6ITCP08	IV	Core Lab-VIII Web Technology Lab	4	4	40	60	100
	20U6ITE_	V	Elective –II	4	3	25	75	100
	20U6ITC16	VII	Core-XVI Internet of Things	4	3	25	75	100
	20U6ITS04	VII	SBEC-IV Soft Skills	2	2	25	75	100
			Library/Sports	1	-	-	-	-
	20U6EX01		Extension Activities	1	1	-	-	-
	TOTAL			**30**	**24**	**205**	**495**	**700**
GRAND TOTAL				**180**	**142**	**1225**	**3075**	**4300**

ELECTIVE COURSES

ELECTIVE – I

Semester	Course Code	Course Name
V	20U5ITE01	Data Mining and Data Warehousing
V	20U5ITE02	Network Security and Cryptography
V	20U5ITE03	Cloud Computing

ELECTIVE – II

Semester	Course Code	Course Name
VI	20U6ITE04	Big Data Analytics
VI	20U6ITE05	Software Testing
VI	20U6ITE06	Machine Learning

Subject Title	C Programming	Semester	I
Subject Code	20U1ITC01	Specialization	NA
Type	Core-I Theory	L:T:P:C	4:0:0:4

COURSE OBJECTIVE

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To interpret the basic elements like variables, data types and operators in C Language	K2
CO2	To implement the C Program Decision making and Branching Statements	K3
CO3	Execute Character Arrays and Strings by using String handling functions and User defined functions in C Language	K3
CO4	Organize Structures, Unions and Pointers in C Language	K4
CO5	Generate Array of Pointers and Files in C Language	K6

MAPPING WITH PROGRAM OUTCOMES

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

Unit	Syllabus Contents	Levels	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:	**K3**	**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.	**K3**	**12**
III	**Character arrays and strings**: Declaring and initializing string variables – Reading strings from terminal – Writing strings to screen – String handling functions -User Defined functions- 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:** 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 **Pointers:** Understanding pointers – Accessing the address of a variable – Initializing of pointer variables.	**K3**	**12**
V	**Arrays of pointers** – Pointers as function arguments – Functions returning pointers – Pointers to functions – Pointer and structures. **File Management:** 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.	**K3**	**12**

Learning Resources	
Text Books	1. Programming in ANSI C, E. Balagurusamy 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 3. https://www.javatpoint.com/c-programming-language-tutorial

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	C Programming Lab	Semester	I
Subject Code	20U1ITCP01	Specialization	NA
Type	Core Lab -I	L:T:P:C	4:0:0:4

COURSE OBJECTIVE

- To make the student learn a programming language.
- To learn problem solving techniques.
- To teach the student to write programs in C and to solve the problems.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Read, understand and trace the execution of programs written in C language.	K3
CO2	Write the C code for a given algorithm.	K3
CO3	To understand and Apply the concept of Structures and Union	K3
CO4	To understand and Apply the concept of Files	K3
CO5	Implement Programs with pointers and arrays, perform Pointer arithmetic, and use the pre-processor.	K3
CO6	Write programs that perform operations using derived Data types.	K4

MAPPING WITH PROGRAM OUTCOMES

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

List of Programs

Use Editors like DevC or Linux Based Environment to compile and run the C Language Program. Don't use Turbo C.

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.

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Information Technology in Business	Semester	I
Subject Code	20U1ITC02	Specialization	NA
Type	Core-II Theory	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- Provide a basic knowledge of computer hardware and software
- Introduce the business areas to which computers may be applied
- Provide an introduction to business organization and information systems
- Develop the skills in communication, verbal and written, which play an important part in business computing and information processing
- Provide sufficient training in programming to enable the design, writing and documenting of a program or suite of programs in a high-level language
- Develop knowledge of capabilities of generic software.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand the and recognize the computer hardware and software	K2
CO2	Analyze the different types of computers and its applications	K4
CO3	Understand the different types of Input and Output Devices	K2
CO4	Understand and Implement the area where Computer's are used and its applications	K3
CO5	Understand OS and Software	K2
CO6	Understand Networks , its architecture and Internet Protocols	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 to computers:** Introduction -Characteristics of computers – Generation of computers - **Classification of Digital computer systems:** Microcomputers- Minicomputers – Mainframes – Supercomputers – Network computers – **Components of computer**: Introduction – Parts of computer – Input devices – Output devices – Storage devices.	K3	12
II	**Basic concepts of Hardware and Software:** Computer software – Hardware, software interaction. Classification of software: System software – Application Software –Utility software. **Operating Systems:** Functions of an operating System, Classification of operating Systems. Types of Computer Languages - Compilers, and Interpreters.	K4	12
III	**Computers in Business and Industry:** Organizational response – Office Automation systems – Tools for Management control – computers in Engineering – Business on the Internet. **Introduction to Internet:** Introduction to Internet-History of Internet– Advantages-Disadvantages- Types of networks- Network Topologies - Internet services.	K4	12
IV	**Internet protocols:** Concept of TCP/IP-HTTP--FTP-SNMP-UDP. Domain Naming Systems-WWW-Web browsers-Web servers-Searching the web – Electronic mail. **Internet Messaging & Web applications:** Internet Relay Chat-Instant Messaging- Telnet-Usenet Newsgroups-Searching the Web- Search Engines	K4	12
V	**Ethical and Security Issues in Information Technology:** Security Threats – Security measures: Firewall – Antivirus software –concepts of Encryption. **Case Study: Recent Trends in Computer Business through Social Networks.**	K4	12

Learning Resources	
Text Books	1. "Computer Applications in Business", "Alexis Leon, Mathew's Leon, Vijay Nicole Imprints Pvt Ltd, 2013. 2. Internet-World Wide Web – Raymond Greenlaw Ellen Happ, McGrawHill Publication, Second Edition, India.
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 3. www.msuniv.ac.in/Download/Pdf/1ce72b61e5ac4e6

Pedagogy: Chalk and Talk, PPT ……..

Subject Title	Programming in C++	Semester	II
Subject Code	20U2ITC03	Specialization	NA
Type	Core-III Theory	L:T:P:C	5:0:0:5

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 – Re throwing an exception - Specifying Exceptions.	**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	II
Subject Code	20U2ITP02	Specialization	NA
Type	Core Lab –II	L:T:P:C	5:0:0:4

COURSE OBJECTIVE

- To understand the Program using Class and Objects.
- To learn how to group the data types 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
Suggested to 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 ……..

Subject Title	Data Structures and Algorithms	Semester	III
Subject Code	20U3ITC04	Specialization	NA
Type	Core-IV Theory	L:T:P:C	5:0:0:3

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.
- 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**	**10**
II	**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. **Linked List:** Definition – Single Linked List – Representation – Operations – Double Linked List – Operations.	**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 – Applications.	**K4**	**12**
IV	**Searching and Sorting Techniques:** 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. **Searching Techniques:** Sequential searching – Binary searching.	**K3**	**11**
V	**Graphs**-Introduction-Graph Terminologies-Representation of Graphs-Operations on Linked List Representation of Graphs-Applications: Shortest Path Tree - Dijkstra's algorithm for shortest paths.	**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.
Web Sites / Links	1. www.freetechbooks.com/algorithms-and-data-structures-f11.html

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Operating Systems	Semester	III
Subject Code	20U3ITC05	Specialization	NA
Type	Core-V Theory	L:T:P:C	4:0:0:3

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	Organize the various device and resource management techniques for timesharing and distributed systems	K5
CO4	Explain 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
V	**I/O Devices-Organization of the I/O Functions**: The Evolution of the I/O function-Direct Memory Access. **I/O Buffering**: Single Buffer-Double Buffer-Circular Buffer-The Utilities of Buffering. **Disk Scheduling**: Disk Performance Parameters-Disk Scheduling Polices-RAID. **Case Study: Windows OS, Linux OS, and MAC OS**	K3	12

Learning Resources	
Text Books	1. "Operating Systems Internals and Design Principles" by William Stallings, Second Edition, PHI Learning Private Limited, New Delhi, 2012.
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 ……..

Subject Title	Java Programming	Semester	III
Subject Code	20U3ITC06	Specialization	NA
Type	Core-VI Theory	L:T:P:C	4:0:0:4

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	15
II	**Classes and Objects:** A Simple Class and Declaring Objects, Methods – Examples – Constructor's – Inheritance – Basics – Using super - Creating a Multilevel Hierarchy – **Packages and Interfaces:** Packages – Access Protection – Importing Packages – Interfaces – Multithreading.	K3	15
III	**Exception Handling:** Fundamentals – Types – Using try and catch – Built in Exceptions – Throwing our own Exception .**Introducing AWT:** AWT classes – Windows fundamentals - Working with frame windows – Working with graphics – Control fundamentals – Labels – Buttons – Text Field.	K3	15
IV	**Database programming:** The Design of JDBC – JDBC Driver types – Uses of JDBC – SQL – Connecting to the database – Executing SQL – Statements – Managing Connections – Statements and Result sets – SQL Exception. The Applet Class-types of Applet- Basics-Applet Class – Architecture – An applet Skeleton - Applet Initialization and Termination- Overriding update( )	K4	15
V	Simple Applet Display Methods -Requesting Repainting -A Simple Banner Applet -Using the Status Window -The HTML APPLET Tag -Passing Parameters to Applets -Improving the Banner Applet - getDocumentBase( ) and getCodeBase( ) -AppletContext and showDocument( ) -The AudioClip Interface -The AppletStub Interface-Outputting to the Console	K3	15

Learning Resources

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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Java Programming Lab	Semester	III
Subject Code	20U3ITP03	Specialization	NA
Type	Core Lab - III	L:T:P:C	4:0:0:3

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

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 Title	Office Automation	Semester	III
Subject Code	20U3ITP04	Specialization	NA
Type	Core Lab - IV	L:T:P:C	3:0:0:3

COURSE OBJECTIVE

It would enables the students in crafting professionals word documents, excel spreadsheet, power point.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To perform documentation	K3
CO2	To perform accounting operations	K4
CO3	To perform presentation and typing skills	K3
CO4	Various Job oppournities	K4
CO5	To gather the Knowledge about Emails and filling documents.	K2

MAPPING WITH PROGRAM OUTCOMES

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

Ms Word Processor

1. i)Create a document, save it and edit the document as follows:
   a.Cut, Copy, Paste options.
   b.Find and Replace options.
   c.Undo and Redo options.
   ii) Format the document:
   a.Using Bold, Underline and Italic.
   b.Change Character style and size.
   c.Formatting paragraph: Center, Left aligns & Right align
   d.Changing paragraph and line spacing, Using Bullets and Numbering in Paragraphs.
   e.Creating Hanging Paragraphs.
2. Create a word document from yesterday's News Paper
   a)The heading should be 16-point Arial Font in Bold –Center Alignment.
   b)The rest of the document should use 10-point font size with Page Border
   c)Other heading should use 10-point Courier New Font and the use News paper name in water marking.
   d)The header should show your name and the footer should show the page number.
   e)Use Page breaks
3. Enhance the documents using Header, Footer, Page Setup, Border, Page number, watermarking, Orientation and Print Preview. Insert tables and pictures in a document as follows
   f)Creating Tables in a document, Selecting Rows & Column sort the record
   g) Insert a picture -edit size and add name of the picture above it.
   h) Also do basic text formatting like -bold, italic, underline, alignments etc in table.,
4. Using mail merge, send an invitation /notice (by creating the invitation/notice) for the following situation (at least 5 addresses to be entered) (Any one of the following)
   i)For opening a new branch
   j)Inauguration function
   k) Informing about new scheme or offer

5. Create a document about you and insert his images (left, right and center alignment) using text wrapping format.

   a)Use bullets and Numbering for highlighting his job profile.

   b)Use options in Page setup.

   c)Use the Indent and spacing options.

   d)Use Hyperlinks to view his achievements

6. Table creation.

   a)Create a table with the following columns Name, Father name, Address, DOB and Phone No.

   b)Include email-id as last column and Reg.No. as 2ndColumn.

   c)Use various Styles and Border options.

   d)Use Quick table option and design the same table.

Ms Excel

7. Consider the student worksheet below

   a)Calculate total & average using formula.

   b)Find maximum and minimum mark in each subject.

   c)Apply different font style size and color. Fill the heading row with green color.

Student Details							
Reg no	Name	Sub1	Sub 2	Sub 3	Total	Percentage%	Grade

8. Enter student names and their HSC marks.
   i) Create a sheet with alphabetical order of names and name the sheet as sorted list.
   ii) Create another sheet sorting the above data in descending order of marks.
9. Use the sheet create in exercise 1 Add a Column at the right end for “Grade”.Grade is Calculated as follows:

   If percentage >= 90 Grade = ‘A’

   If percentage >= 80 &< 90 Grade = ‘B’

   If percentage >= 70 &< 80 Grade = ‘C’

   If percentage >= 60 &< 70 Grade = ‘D’

   otherwise students will be declared as Fail.

   i)Calculate Grade using if function.

ii)Apply filter to display the marks of the students details for each Grade

10. i) Creating and running a macro.

    ii)Assigning button to a defined macro.iii)Editing a macro.

MS POWER POINT:

11. Create a presentation using auto content wizard about a social issue with minimum 5 slides.
    a. Use Slide number.
    b. Date and time options.
    c. Insert a movie clip.
12. Prepare a presentation about various career options for your degree
    a. Try different views.
    b. Use various transition effects and custom animation with Advanced Slide options.
13. Prepare a presentation about your favorite sportsman with slides having
    a. His / her Debut play.
    b. His / her achievements using hyperlinks.
    c. Insert audio for slideshow.
    d. Use various options in Illustration to show the images

Subject Title	Computer Installation and Servicing	Semester	III
Subject Code	20U3ITS01	Specialization	NA
Type	SBEC – I 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 – Types of RAM and ROM with its characteristics.	**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.
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 ……..

Subject Title	Software Engineering	Semester	IV
Subject Code	20U4ITC07	Specialization	NA
Type	Core- VII 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.
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 ……..

Subject Title	Computer Networks	Semester	IV
Subject Code	20U4ITC08	Specialization	NA
Type	Core-VIII Theory	L:T:P:C	4:0:0:4

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 manage 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:** Characteristics – Integrated service – Differentiated service.	**K3**	**12**
V	**Presentation Layer:** Protocols - Services. **Session Layer:** Protocols - Services. **Application Layer:** SNMP- DNS - DNS in the Internet - DNS Messages - Types of Records - WWW and HTTP - Web documents.	**K3**	**12**

Learning Resources	
Text Books	1. "Data communications and Internetworking ", Behrouz A Forouzan, Fourth Edition, 2006.
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. 4. Computer Networks", Tannenbaum, Fifth Edition.
Web Sites / Links	1. www.tutorialspoint.com/computer.../computer_networking.htm 2. www.journals.elsevier.com/computer-networks

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Relational Database Management Systems	Semester	IV
Subject Code	20U4ITC09	Specialization	NA
Type	Core –IX Theory	L:T:P:C	4:0:0:4

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
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:** Information – Data and Data Management – Characteristics of a data – Functions – Components – Data dictionary. **Data Base Architecture and Design:** 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**	**12**
II	**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.	**K3**	**14**
III	**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.	**K4**	**10**
IV	**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**	**14**
V	**PL/SQL Composite Data Types:** Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.	**K3**	**10**

Learning Resources	
Text Books	1. "Fundamentals of Data base management System" – Alexix Leon and Mathew Leon, TMH Publications Reprint, 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	Relational Database Management System Lab	Semester	IV
Subject Code	20U4ITP05	Specialization	NA
Type	Core Lab – V	L:T:P:C	4:0:0:3

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 apply different types of Quires	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	PHP Programming	Semester	IV
Subject Code	20U4ITC10	Specialization	NA
Type	Core - X Theory	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

- Deep understanding of the PHP scripting language to the high end
- Provides the student with the necessary tools to write scripts that are secure, efficient and reliable.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of PHP programming language with Basics & Control Structures	K3
CO2	Working PHP With MySQL	K3
CO3	Understand the concepts of Functions & Arrays	K4
CO4	Applying the concepts of Object Oriented PHP, Error and Exception Handling in PHP Programming	K4
CO5	Explore the concepts Strings and Regular Expression, Design the Web Form	K4

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 PHP:** History - General Language Features – PHP Basics: Embedding PHP Code in your Web Pages - Commanding Your Code - Output Data to the Browser. PHP's Supported Data Types- Identifiers – Variables – Constants – Expressions –String – Interpolation. **Control Structures:** Conditional Statements - Looping Statements - File Inclusion Statements	K3	12
II	**Introduction to MySQL:** Naming Database Elements-Choosing Your Column Types- Choosing other Column Properties-Accessing MySQL. **Using PHP With MySQL** Modifying The Template - Connecting To MySQL - Executing Simple Queries - Retrieving Query Results -Ensuring Secure SQL-Counting Returned Records- Updating Records With PHP.	K3	12
III	**Functions**: Invoking a Function - Creating a Function - Function Libraries. **Arrays:** Creating an Array - Adding and Removing Array Elements - Locating Array Elements - Traversing Array - Merging – Slicing - Splicing and Dissecting Array.	K3	12
IV	**Object Oriented PHP:** Benefits of OOP - Key OOPs Concepts-Constructors and Destructors- Static Class Members –The instance of Keyword- **Error and Exception Handling-** Configuration Directives- Error Logging-Exception Handling	K4	12
V	**Strings and Regular Expression:** Other String Specific Function - Alternatives for Regular Expression Functions**. Forms:** PHP and Web Forms-Taking Advantage of Pear: HTML_QuickForm-Installing HTML_QuickForm-Creating a Simple Form- Using Auto-Completion	K3	12

Learning Resources	
Text Books	1. "Beginning PHP and Oracle From Novoice to professional" W.Jason Gilmore and Bob Brylr edition – 2008 2. "PHP 6 and my SQL 5 " Larry Ullman -2008(chapter 4 & 8)
Reference Books	1. "Spring into PH5 the Small Professional choice" Steven Holzner, Pearson education, Edition: First Impression 2006. 2. "PHP and my SQL for dynamic websites" – Larry Ullam-fourth edition 2015. 3. "PHP 6 and my SQL ": bible – Steve Suehring, Tim converse, Joy Park - 2009.
Web Sites / Links	3. "Beginning PHP and Oracle From Novoice to professional" W.Jason Gilmore and Bob Brylr edition – 2008 4. "PHP 6 and my SQL 5 " Larry Ullman -2008(chapter 4 & 8)

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	PHP Programming Lab	Semester	IV
Subject Code	20U4ITSP02	Specialization	NA
Type	SBEC Practical-II	L:T:P:C	2:0:0:2

COURSE OBJECTIVE

- To develop applications in PHP using various concepts like to establish the connectivity between PHP and MySQL and develop programs to add records, retrieve records and delete records from a table.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Design algorithms for the given problem specifications.	K1
CO2	Write VB .Net programs for the designed algorithm specification.	K2
CO3	Write VB .Net programs to implement controls	K3
CO4	Write VB .Net programs to implement Files.	K2
CO5	Write PHP programs to create forms	K5

MAPPING WITH PROGRAM OUTCOMES

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

List of Programs
1. Develop PHP program using the following a. Use of conditional statements in PHP b. Use of looping statements in PHP **c.** Use of different types of arrays
2. Write a PHP program to prepare the student marks list.
3. Create a PHP Program to find odd or even number from given numbers.
4. Write a PHP Program to demonstrate the variable function a. Gettype() b. Settype() c. Isset() d. Unset()
5. Give the example of String function a. Substr() b. Strcmp() c. Strcasecmp() d. Strpos()
6. Write a PHP Program that demonstrates Form element input elements.
7. Database connectivity in PHP with MySQL.
8. To create a table using PHP Programming.
9. To create a table and do all the DDL commands using PHP Programming.
10. Develop a PHP program to display student information using MYSQL table.
11. Creating simple webpage using PHP.
12. Create a College Web site using PHP Program.

Subject Title	. Net Programming	Semester	V
Subject Code	20U5ITC11	Specialization	NA
Type	Core-XI Theory	L:T:P:C	5:0:0:4

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#.**	**K3**	**12**
II	**Arrays & Variables:** Variables –Arrays-User Defined **Data types in C#**: Classes, Inheritance- Methods – Operators – Branching & Looping – Exception Handling – Events.	**K3**	**12**
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**	**12**
IV	**Validation:** Validation Controls- Validation Groups, Calendars & Ad Rotators-**HTML controls:** Client & Server HTML controls-HTML Server Control classes- HTML control classes.	**K3**	**12**
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**	**12**

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.
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	Computer Graphics and Animation	Semester	V
Subject Code	20U5ITC12	Specialization	NA
Type	Core-XII Theory	L:T:P:C	5:0:0:4

COURS OBJECTIVE

- To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- To become familiar with various software programs used in the creation and implementation of multi- media
- To appreciate the importance of technical ability and creativity within design practice.
- To understand the two dimensional, three-dimensional graphics and their transformations.
- To become familiar with understand clipping techniques
- To become familiar with Blender Graphics

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Design two dimensional graphics.	K4
CO2	Apply two dimensional transformations.	K3
CO3	Design three dimensional graphics.	K2
CO4	Apply three dimensional transformations.	K2
CO5	Apply Illumination and color models.	K3
CO6	Apply clipping techniques to graphics.	K3
CO7	Understood Different types of Multimedia File Format	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 To Computer Graphics:** GUI - Video Display Devices – CRT - Raster and Random scan displays – Input Devices - Hard Copy Devices - Line Drawing Algorithm - DDA Algorithm - Line Function – Circle Generating Algorithm.	K4	12
II	**Attributes Of Output Primitives:** Line Attributes - Curve Attributes - Color and Gray Scale Levels -Area Fill Attributes - Character Attributes - Bundled Attributes. **Two Dimensional Geometric Transformations:** Basic Transformations – Matrix Representations -Composite Transformation – Translation – Rotation – Scaling - Reflection and Shear.	K5	12
III	**Two Dimensional Viewing:** Viewing Pipeline - Viewing Functions - Point Clipping and Line Clipping - Cohen Sutherland Line Clipping - Polygon Clipping – Sutherland – Hodgeman Clipping - Curve and Text Clipping - Exterior Clipping.	K5	12
IV	**GUI and Interactive Input Methods:** Input of Graphical Data - Input Functions - Picture Construction Techniques. COLOR MODELS: XYZ - RGB - YIQ - CMY Color Models.	K4	12
V	**Multimedia:** Images and Graphics. VIDEO AND ANIMATION: Computer Based Animation – Basic Concepts – Animation Languages – Methods of Controlling Animation – Display of Animation – Transmission of Animation – Comments.	K5	12

Learning Resources	
Text Books	1. Computer Graphics"-Donald Hearn And M. Puelin Baker- SECOND EDITION UNIT I Chapter 1, 2, 3, UNIT II Chapter 4, 5, UNIT III CHAPTER 6, UNIT IV Chapter 7, 8 & 15. 2. "MULTIMEDIA COMPUTING, COMMUNICATIONS & APPLICATIONS", Ralf Steinmetz & Klara Nahrstedt.
Reference Books	1. "MULTIMEDIA SYSTEM DESIGN", Prabhat K, Andleigh & Kiran Thakrar.
Web Sites / Links	www.tutorialspoint.com

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Object Oriented Analysis and Design	Semester	V
Subject Code	20U5ITC13	Specialization	NA
Type	Core-XIII Theory	L:T:P:C	5:0:0:4

COURSE OBJECTIVE

- To teach the student the essential and fundamental aspects of object oriented analysis and design, in terms of "how to use" it for the purpose of specifying and developing software. To analyze various computer forensics technologies
- Explore and analyze different analysis and design models, such OO Models, Structured Analysis and Design Models, etc.
- Providing clear instructions and information on the "How-to" dimension for applying the UML models and to the ways to document their products
- Understanding by studying and developing examples of existing UML models

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	To know about different types of methodologies and Object Basics	K4
CO2	Explore and analyze different analysis and design models, such OO Models, Structured Analysis and Design Models, etc	K3
CO3	To know the benefits and the risks of using UML	K3
CO4	Understanding the fundamental principles through advanced concepts of analysis and design using UML	K4
CO5	Focusing on lessons learned of using UML and its applications	K4

MAPPING WITH PROGRAM OUTCOMES

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

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Introduction: An Overview Of Object Oriented Systems Development**: Introduction – Two orthogonal views of the software – Object-Oriented Systems Development Methodology - Why an Object Orientation? – Overview of the Unified Approach. **Object Basics:** Introduction –An Object – Oriented Philosophy – Objects – Objects are Grouped in Classes – Attributes: Object State and Properties – Object Behavior and Object-Oriented Systems Development Life Cycle.	K3	15
II	**Methodology, Modeling, And Unified Modeling Language: Object Oriented Methodologies:** Introduction: Toward Unification – Too Many Methodologies – Survey of Some of the Object Oriented Methodologies – Rumbaugh et al.'s Object Modeling Technique – The Booch Methodology – The Jacobson et al. Methodologies – Patterns – Frameworks.	K4	15
III	**Unified Modeling Language:** Introduction – Static and Dynamic Models – Why Modeling? Introduction to the unified Modeling Language – UML Diagrams – UML class Diagram –Use-case Diagram – UML Dynamic Modeling – Model Management: Packages and Model Organization – UML Extensibility – UML Meta-Model.	K3	11
IV	**Object-oriented analysis: use-case driven Object–oriented analysis process: identifying use cases:** Introduction – Why Analysis is a Difficult Activity – Business Object Analysis: Understanding the Business Layer – Use Case Driven Object-Oriented Analysis: The Unified Approach – Business Process Modeling – Use-Case Model – Developing Effective Documentation.	K4	12
V	**Identifying Object Relationships, Attributes, And Methods:** Introduction – Associations – Super-Sub Class Relationships – A-Part-of Relationships – Aggregation– Class Responsibility: Identifying Attributes and Methods - Defining Attributes by Analyzing Use Cases and other UML Diagrams – Defining Attributes for ViaNet Bank Objects – Object Responsibility: Methods and Messages.	K4	12

Learning Resources	
Text Books	1. Ali Bahrami, "Object Oriented Systems Development", McGraw – Hill international editions.
Reference Books	1. N. Kanchana Devi, "Object Oriented Analysis & Design", Charulatha publications 2. Grady Booch, "Object Oriented Analysis and Design with applications" II Edition Addison Wesley, 1994.
Web Sites	1. www.uml-diagrams.org 2. https://en.wikipedia.org/wiki/Object-oriented_analysis_and_design 3. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_uml_analysis_model.

Pedagogy: Chalk and Talk, PPT ……..

Subject Title	. Net Programming Lab	Semester	V
Subject Code	20U5ITP06	Specialization	NA
Type	Core Lab -VI	L:T:P:C	4:0:0:3

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	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. 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).
10. 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.

Subject Title	Project Work (In-House Mini Project)	Semester	VI
Subject Code	20U6ITPR01	Specialization	NA
Type	Project Work	L:T:P:C	2:0:0:1

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

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)

Subject Title	Multimedia Design (Corel DRAW)	Semester	V
Subject Code	20U5ITS03	Specialization	NA
Type	SBEC – III Theory	L:T:P:C	2:0:0:2

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**	**6**
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**	**6**
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**	**6**
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**	**6**
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**	**6**

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	Python Programming	Semester	VI
Subject Code	20U6ITC14	Specialization	NA
Type	Core-XIV Theory	L:T:P:C	5:0:0:4

COURSE OBJECTIVE

- To learn a dynamic, interpreted (Byte code-Compiled) and high level programming language.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Understanding Modules and Functions in Python Programming	K2
CO2	Learning about Conditions and Decision Making in Python Programming	K3
CO3	Working with Lists, Tuples and Dictionaries in Python Programming	K3
CO4	Executing Files, Modules and Packages using Error Exception.	K4

MAPPING WITH PROGRAM OUTCOMES

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

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Python:** Introduction – Python interpreter and interactive mode – Values & Types – Variable – Expressions and Statements – Assigning Values in Python, Variable Declaration, Multiple Assignment – **Operators** – Types of Operators, Operator Precedence – Modules and Functions: Modules, Function Definition and Use, Defining a Function, Calling Function, Uses of Function, Advantages of Functions - Flow of Execution.	**K1**	**12**
II	**Conditionals:** Booleans Values and Operators – Operators – Operator Precedence – Decision Making – if, if… Else, If…Elif… Else & Nested statements – Iteration – Fruitful Functions – Scope of Variable – Global and Local Variable in Function, Nonlocal Variable – Composition – Recursion. **Parameters and Arguments:** Functions with No Arguments, Functions with Arguments, Functions with Return Value.	**K2**	**12**
III	**Strings:** String Slices – String are Immutable – String Functions and Methods – String Module – Lists as Array. **Lists:** Accessing Elements in Lists Using Subscript Operator, List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters, Deleting List Elements, Python Functions for List Operations, List Comprehension.	**K3**	**12**
IV	**Tuples:** Advantages of Tuple Over List, Accessing Values, Updating Tuples, Delete Tuple Elements, Tuple Assignment, Tuple Methods, Other Tuple Operations, Tuples As Return Values, Built-in Functions with Tuple, Variable Length Arguments Tuples – **Dictionaries:** Built-in Dictionary Functions and Methods, Access update and Add Elements, Delete and Remove Elements, Sorting, Iterating through, Reverse Lookup, Inverting a Dictionary, Memorization(Memos)	**K4**	**13**
V	**Files:** Reading and Writing, Format Operator, Command Line Arguments – Errors and Exceptions: Errors, Exceptions. Modules: Writing Modules, Locating Modules. **Packages:** Steps to create a Python Package.	**K5**	**11**

Learning Resources	
Text Books	1. Dr. S. Suresh kumar, "Problem Solving and Python Programming" Charulatha Publications, 2018.
Reference Books	1. Python Essential Reference (4th Edition): David Beazley 2. Beginning Python: From Novice to Professional Beginning (Beginning From Novice to Professional) by Magnus Lie Hetland second edition) 3. Core Python Programming (2nd Edition): Wesley J Chun.
Web Sites / Links	1.https://www.w3schools.com/python/ 2.https://www.learnpython.org/ 3.https://docs.python.org/3/tutorial/ 4.http://www.tutorialspoint.com/python

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Web Technology	Semester	VI
Subject Code	20U6ITC15	Specialization	NA
Type	Core- XV Theory	L:T:P:C	5:0:0:4

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	HTML & XHTML: The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-Creating HTML Documents.	**K3**	**15**
II	CSS & JAVA SCRIPT: Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Rules Cascading and Inheritance-Text Properties-Box Model. Client-Side Programming: The JavaScript Language-History and Versions -Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-DHTML with JavaScript.	**K3**	**15**
III	JAVA SERVLET: Java Servlet Architecture-Servlet Life Cycle-Form GET and POST actions-Session Handling-Understanding Cookies-Installing and Configuring Apache Tomcat Web Server-Database Connectivity: JDBC perspectives, JDBC program example.	**K3**	**15**
IV	JSP: Understanding Java Server Pages-JSP Standard Tag Library(JSTL)-JSP Directives -Creating HTML forms by embedding JSP code-JSP objects –Page redirection -Session tracking in JSP –introduction to Java bean-Using java bean with JSP.	**K3**	**15**
V	AJAX & WEB SECURITY: AJAX: Ajax Client Server Architecture-Introduction to XML-XML Http Request Object-Call Back Methods; Web Services: Introduction-Java web services Basics –Creating, Publishing, Testing and Describing a Web services.	**K3**	**15**

Learning Resources	
Text Books	1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2011.2. 2. Deitel and Deitel and Nieto, “Internet and World Wide Web -How to Program”, Prentice Hall, 5th Edition, 2011.
Reference Books	1. Herbert Schildt, “Java-The Complete Reference”, 8thEdition, Mc Graw Hill Professional, 2011. 2. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India, 2011. 3. Chris Bates, Web Programming –Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
Web Sites / Links	1. www.geeksforgeeks.org/introduction-java-servlets 2. www.javatpoint.com/ajax-tutorial

Pedagogy: Chalk and Talk, PPT ……..

Subject Title	Python Programming Lab	Semester	VI
Subject Code	20U6ITCP07	Specialization	NA
Type	Core Lab -VII	L:T:P:C	4:0:0:3

COURSE OBJECTIVE

To enable the students to gaining knowledge on Python Programming through practices.

COURSE OUTCOMES

CO Number	CO STATEMENT	Knowledge Level
CO1	Design programs using Iterations	K1
CO2	Working with Arrays for Data Structure	K2
CO3	Implement the Command line Argument in Python programming	K4
CO4	Implement the File processing in Python programming	K5

MAPPING WITH PROGRAM OUTCOMES

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

List of Programs:

1. To compute the GCD of Two Numbers.
2. Find square root of a Number.
3. To find the exponentiation of a given positive Number.
4. To perform Linear search from the list of Elements.
5. List the first N prime Numbers.
6. Find the Maximum of a list of Numbers.
7. Implementation Insertion Sort.
8. Remove all the duplicate elements in a list.
9. Implement a program that take command line Arguments.
10. Implement a python program find the most frequent words in a text read from a file.

Subject Title	Web Technology Lab	Semester	VI
Subject Code	20U6ITCP08	Specialization	NA
Type	Core Lab -VIII	L:T:P:C	4:0:0:4

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

MAPPING WITH PROGRAM OUTCOMES

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

List of Programs

1. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
2. Write an HTML code to demonstrate the usage of external CSS.
3. Writing program in XML and create a style sheet in CSS &display the document in internet explorer.
4. Create a tourism web page for your home town with the following using HTML elements
   a.To embed a map in a web page
   b.To fix the hot spots in that map
   c.Show all the related information when the hot spots are clicked.
   d.Develop the feedback form to get the feedback from user
5. Create a web page with the following.
   a.Cascading style sheets.
   b.Embedded style sheets.
   c.Inline style sheets.
   Use our college information for the web pages.
6. Create an E-Mail registration form and validate the necessary field using JavaScript
7. Write a JavaScript to design a simple calculator to perform the following operations:sum, product, difference and quotient
8. Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to5pt.
9. Develop the online shopping application using JSP. Assume the product informations are available in the database already
10. Program using AJAX.

Subject Title	Internet of Things	Semester	VI
Subject Code	20U6ITC16	Specialization	NA
Type	Core-XVI Theory	L:T:P:C	4:0:0:3

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**	**12**
II	**IOT ENABLED TECHNOLOGIES:** Wireless Sensor Networks - Cloud Computing - Big data analytics - Communication protocols - Embedded Systems. IoT Levels & Deployment Templates.	**K1**	**12**
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**	**12**
IV	**IOT PLATFORMS DESIGN METHODOLOGY**: Introduction - IoT Design Methodology. Case Study on IoT System for Weather Monitoring.	**K5**	**12**
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**	**12**

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	Soft Skills	Semester	VI
Subject Code	20U6ITS04	Specialization	NA
Type	SBEC – IV	L:T:P:C	2:0:0:2

COURSE OBJECTIVE

- 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).
Reference Books	1.Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw-Hill. New Delhi 2.Sasikumar.V and P.V. Dhamija. "Spoken English: A Self-Learning Guide to Conversation Practice. ", 1993 34th Reprint. Tata McGraw-Hill. New Delhi.
Web Sites / Links	• https://www/ibm.com/blogs/internet-of-things/what-is-the-iot • https://www.sap.com/india/trends/inter-of-things.html • https://computer.howstuffworks.com>tech>Computer>Internet>Connectivity

Pedagogy : Chalk and Talk, PPT ……..

ELECTIVES

Subject Title	Data Mining and Warehousing	Semester	V
Subject Code	20U5ITE01	Specialization	NA
Type	ELECTIVE -I	L:T:P:C	4:0:0:4

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	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

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Network Security and Cryptography	Semester	V
Subject Code	20U5ITE02	Specialization	NA
Type	ELECTIVE -II	L:T:P:C	4:0:0:4

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	20U5ITE03	Specialization	NA
Type	ELECTIVE -III	L:T:P:C	4:0:0:4

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.
Web Sites / Links	1. webobjects.cdw.com 2. www.forbes.com 3. cloudcomputinglegal.weebly.com

Pedagogy : Chalk and Talk, PPT ……..

Subject Title	Big Data Analytics	Semester	VI
Subject Code	20U6ITE04	Specialization	NA
Type	ELECTIVE -IV	L:T:P:C	4:0:0:3

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	20U6ITE05	Specialization	NA
Type	ELECTIVE -V	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	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	20U6ITE06	Specialization	NA
Type	ELECTIVE -VI	L:T:P:C	4:0:0:3

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 Neighbor 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 ……..