VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).
(Affiliated to Periyar University, Approved by AICTE & Accredited by NAAC)
(Recognized u/s 2f & 12b by UGC)

A U T O N O M O U S

DEPARTMENT OF COMPUTER APPLICATIONS

B.Sc. COMPUTER TECHNOLOGY

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

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

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]
ELAYAMPALAYAM, TIRUCHENGODE - 637 205.
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc. COMPUTER TECHNOLOGY

COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS
for the Candidates admitted from the year 2017-2018

Sem	Course Code	Part	Courses	Hour	Credit	Marks		
						Int. Marks	Ext. Marks	Total Marks
I	17U1LT01	I	Tamil-I	4	3	25	75	100
	17U1LE01	II	English I	4	3	25	75	100
	17U1CTC01	IV	Core – I Digital Computer Fundamentals & C Programming	5	5	25	75	100
	17U1CTCP01	IV	Core Lab I – Problem Solving and C Programming Lab	5	3	40	60	100
	17U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	17U1CTC02	IV	Core-II - Basics of Hardware	4	3	25	75	100
	17U1VE01		Value Education	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**
II	17U2LT02	I	Tamil-II	4	3	25	75	100
	17U2LE02	II	English-II	4	3	25	75	100
	17U2CTC03	IV	Core III – Data Structures &Algorithms	4	3	25	75	100
	17U2CTCP02	IV	Core Lab II – Data Structures Lab	4	3	40	60	100
	17U2CTC04	IV	Core IV –Programming in C++	4	3	40	60	100
	17U2MAA06	III	Allied- II Discrete Mathematics	4	4	25	75	100
	17U2ES01		Environmental Studies	4	4	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
III	17U3CTC05	IV	Core V- Microprocessor and Computer Architecture	4	3	25	75	100
	17U3CTC06	IV	Core VI- Java Programming	4	3	25	75	100
	17U3CTC07	IV	Core VII- Relational Database Management Systems	5	5	25	75	100
	17U3CTCP03	IV	Core Lab III - RDBMS Lab	5	3	40	60	100
	14U3MAA14	IV	Allied- III Resource Management Techniques-I	4	4	25	75	100
	17U3CTCP04	IV	Core Lab IV – Java Programming Lab	4	3	40	60	100
	17U3CTS01	VII	SBEC-I – Office Package	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
IV	17U4CTC08	IV	Core VIII-Computer Networks	4	3	25	75	100
	17U4CTC09	IV	Core IX- Operating Systems	4	3	25	75	100
	17U4CTC10	IV	Core-X- Dot net Programming	5	5	25	75	100
	17U4CTCP05	IV	Core Lab V- Dot net Programming Lab	5	3	40	60	100
	17U4CMA04	III	Allied-IV Cost and Management Accounting	4	4	25	75	100
	17U4CTC11	IV	Core XI - Multimedia Design and Applications (DTP Package & Corel Draw)	4	3	25	75	100
	17U4CTS02	VII	SBEC-II (Basics of Unix and Linux)	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**

V	17U5CTC12	IV	Core-XII Web Technology	5	5	25	75	100
	17U5CTC13	IV	Core-XIII Software Engineering	5	5	25	75	100
	17U5CTC14	IV	Core-XIV Data Mining and Data Warehousing	5	3	25	75	100
	17U5CTE__	V	Elective –I	4	3	25	75	100
	17U5CTCP05	IV	Core Lab VI- Web Technology Lab	4	3	40	60	100
			NMEC - I	2	2	25	75	100
	17U5CTS03	VII	SBEC-III (Computer installation and Servicing))	2	2	25	75	100
			Library / Sports	**1**	**-**	**-**	**-**	**-**
			Mini Project	**2**	**1**	**40**	**60**	**100**
	TOTAL			**30**	**24**	**230**	**570**	**800**
VI	17U6CTC15	IV	Core-XV Computer Graphics & Multimedia	5	5	25	75	100
	17U6CTC16	V	Core – XVI Java & J2EE	5	5	25	75	100
	17U6CTE__	V	Elective –II	4	3	25	75	100
	17U6CTCP06	V	Core Lab VII- Graphics & Multimedia Lab	5	3	40	60	100
	17U6CTCP07	IV	Core Lab VIII - Java & J2EE Lab	5	3	40	60	100
			NMEC-II	2	2	25	75	100
	17U6CTS04	VII	SBEC-IV (Internet of Things)	2	2	25	75	100
	17U6EX01		Extension Activities	1	1	-	-	-
			Library / Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**205**	**495**	**700**
GRAND TOTAL				**180**	**140**	**1225**	**3075**	**4300**

ELECTIVE COURSES

ELECTIVE – I

Semester	Course Code	Course Name
V	17U5CTE01	Web Services
V	17U5CTE02	Soft Computing
V	17U5CTE03	Big Data Analytics

ELECTIVE – II

Semester	Course Code	Course Name
VI	17U6CTE04	Open Source Technologies
VI	17U6CTE05	Artificial Intelligence and Expert Systems
VI	17U6CTE06	Network Security & Cryptography

Subject Title	Digital Computer Fundamentals and C Programming	Semester	I	Hours :75
Subject Code	17U1CTC01	Specialization	NA	
Type	Core -I	L:T:P:C	5 : 0 : 0 : 5	

Objectives

1. The understand the basics of Digital Computer.
2. To understand about the internal working of computer.

Unit	Syllabus Contents	Number of Sessions
I	Electronic Digital Computers – Applications of computers – Basic components of Digital computers – Construction of Memory – Assembly languages – High level languages – Decimal system – Binary system – Octal System – Hexadecimal System – Binary addition – Subtraction – Conversions: Binary to decimal – decimal to binary – Binary number complements.	15
II	Boolean Algebra and Gate networks: Design using AND - OR - NAND – NOR Gates – Complementation and inverters – Basic laws of Boolean algebra – DeMorgan's theorem – Sum of Products – Products of Sum - Construction of ALU.	15
III	Overview of C: Introduction – Basic structure of C programs – Character set – C Tokens – Keywords & Identifiers – Constant – Variables – Data types – Assigning values to variables – Defining symbolic constant – Operators & expressions – Type conversions in expressions – Managing Input & Output Operations.	15
IV	Decision Making & Branching Statements: IF – IF-else – Nesting of IF-else – Switch – GOTO Statement. Looping Statement: While – Do..While statement – For statement. Arrays: Definition & Declaration – Types of arrays – Declaring & Initialing string variables – String handling functions. User defined function: Introduction – Definition of function – Function calls – Function declarations & Return types – Recursion.	15
V	Structures & Unions: Defining a structure – Declaring structure variables – Accessing structure members – structure Initialization. Unions. Pointers: Introduction – Understanding pointers – Accessing the address of a variable – Initializing of pointer variables. File Management: Introduction - Defining & Opening a file – Closing a file – Input / Output Operation on files.	15

Learning Resources	
Text Books	1. "Digital Computer Fundamentals" Thomas C Bartee, 6th Edition.T.M.H Publisher, New Delhi, 2008. 2. "Programming in ANSI C , E. Balagurusamy Tata MC Graw hill, New Delhi, 6th Edition.
Reference Books	1. M. M. Mano and C.R.Kime, 2001, Logic and Computer Design Fundamentals, 2nd Edn, Pearson Education, Delhi. 2. Givone, 2002, Digital Principles Design, Tata McGraw Hill, New Delhi. 3. M.Morris Mano, "Digital Logic and Computer Design", PHI Publications, New Delhi, 2008.
Web Sites / Links	1.https://www.tutorialspoint.com/computer_fundamentals/computer_overview.html 2.http://www.cprogramming.com 3.http://www-personal.acfr.usyd.edu.au

Content beyond the syllabus:

1. To know about the networks basics
2. To know about the flip flops
3. To know about the memory unit
4. To understand about the bus structures.

Subject Title	Problem Solving and C Programming Lab	Semester	I	Hours:75
Subject Code	17U1CTCP01	Specialization	NA	
Type	Core Lab - I	L:T:P:C	5:0:0:3	

Objectives:

1. To understand the logic for each problem.
2. To understand and write the Programming language in C.
3. To Know and write the C Programs for the logics.

List of Programs

1. In an Olympic competition the distance to be covered by the athlete player is given in meters. Develop an algorithm and write a C program to convert it into kilometers, yards and miles.
2. Sita went to the departmental stores and purchased two items. For what amount she had purchased and what is the average amount she had spend in the store.
3. What do we call a year that has 366 days? Find the current year and what type of year it is.
4. Thiru is working in reputed company and his basic salary is 40000.Calculate his gross salary based upon his HRA, Provident fund and DA as given values.
5. In Namakkal, today's temperature is 36 °C. What will be its equivalent Fahrenheit vice versa?
6. In our house we want to dig a well. The radius of circle is planned to be 30 meters. What will be the area and perimeter of the well?
7. In a class there are 10 students. As a class advisor I want to split them into two groups. How I will be splitting.
8. In a online application, there is only single box mentioned for the gender category. On printing the application the gender category should be like "Male" or "Female".
9. In our college, there is a digital display screen. To welcome the first year students "Hearty Welcome to New Comers" to be displayed on the digital screen and using function also.
10. The Address of my house is No 174, Vivekananda Street. Find my door number using Pointer Concept.
11. In your company, you want to view your employee's details. How will you view the employee records using structure concept.
12. Program to create a text file using file handling.

Subject Title	Basics of Hardware	Semester	I	Hours:60
Subject Code	14U1CTC02	Specialization	NA	
Type	Core -II	L:T:P:C	4: 0 : 0 :3	

Objectives

1. To understand the various hardware parts inside the computer.
2. To understand the functions of the internal parts of the computer.
3. To understand how to install the software.

Unit	Syllabus Contents	Number of Sessions
I	Introduction – A short history of Computers-Identifying the Major components of a PC-Identifying the internal components of a PC-CPU-RAM-Types of RAM Technologies-RAM Packages- Adding and Upgrading RAM.	12
II	Motherboards and BIOS- Common motherboard features-Types of Motherboards-Installing the Motherboard-The System BIOS-Expansion Buses-Internal Buses-Installing a Plug and Play Expansion Card-External Expansion Buses :USB and FireWire.	12
III	Power Supplies and Cases-Case Form and Function-Power supply-Cooling-Identifying Installing and troubleshooting-Identifying, Installing and Troubleshooting-Identifying and Installing Zip drives.	12
IV	Hard Drives-How Hard Drives store data-Installing a Hard Drive-Configuring a Hard Drive-Hard Drive Maintenance and Troubleshooting	12
V	Understanding CD Media Technologies-Input Devices- Installing a keyboard-Installing and Configuring a mouse-Identifying Less Common Input Devices-Printers-Identifying current Printer Technologies.	12

Learning Resources

Text Books	1.Mike Meyers " Introduction to PC Hardware and Troubleshooting".
Reference Books	1. Cisco Networking Academy "IT Essentials : PC Hardware and Software Companion Guide" Fifth edition . 2. Ron Gilster "PC Hardware A Beginner's Guide" .Tata McGraw –Hill Edition. 3. K.L.James " Computer Hardware Installation ,Interfacing Trouble Shooting and Maintenance PHI Learing Private Limited Delhi -2013.
Web Sites / Links	1. http://www.ce.ucf.edu/

Content beyond the syllabus:

1. To know about the SCSI.
2. How Sound Works in a PC.
3. To Know about Networks.

Subject Title	Data Structures & Algorithms	Semester	II	Hours:60
Subject Code	17U2CTC03	Specialization	NA	
Type	Core - III	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

1. To understand the theoretical concept of classical data structures.
2. To understand the basic concepts of data structures and how it is implemented in the programming Languages.

Unit	Syllabus Contents	Number of Sessions
I	Data Structures: Introduction – Concept of Data structure – Overview – Implementation of Data Structure –Arrays: One dimensional Array - Multidimensional Array – Pointer Array –Linked Lists: Definition – Single - Circular – Double – Circular Double Linked list – Applications of linked lists – Memory Representation.	12
II	Stacks: Introduction – Definition – Representation of Stack- Operations on stack – Applications of stack – Queues: Introduction – Definition – Representation of queues – Various Queue structures – Applications of Queues.	12
III	Tables: Rectangular Tables - Jagged Tables – Inverted Tables – Hash Tables – Trees: Definition – Representations of Binary tree – Operations on a binary tree – Types of Binary Trees– B Trees – B+ Tree Indexing – Graphs: Introduction – Graph Terminologies – Representation of graphs – operations on graph – Application graph structures.	12
IV	Sets: Definition and Terminologies – Representation of Sets – Operations of Sets – Applications of sets – Sorting: Sorting Techniques – Sorting by insertion – Sorting by selection – Sorting by Merging.	12
V	Searching: Basic terminologies – Linear Search Terminologies – Non linear search techniques – Graph searching. Time Complexity & space complexity.	12

Learning Resources

Text Books	1. Debasis Samanta, "Classic Data Structures" Second edition, PHI Learning Private Limited, New Delhi.
Reference Books	1. G.S.Baluja, "Data Structures Through C" Dhanpat Rai & Co., 4th Edition 2. Seymour Lipschutz,"Data Structures", Schaum's Outline Series, Tata Mc Graw Hill Publishing Company Ltd..
Web Sites / Links	1. www.tutorialspoint.com 2. http://nptel.ac.in/courses/106102064/1

Content beyond the syllabus:

1. To know about other different varieties of data structures.

2. To know about the different other searching algorithms.

Subject Title	Data Structures Lab	Semester	II	Hours:60
Subject Code	17U2CTCP02	Specialization	NA	
Type	Core Lab –II	L:T:P:C	4:0:0:3	

Objective:

1. To understand the different types of Structures.
2. To understand and write Structures in the Programming language in C.

List of Programs

1. Finding the maximum element in an array.
2. Create 5 nodes in singly linked list
3. Insert an element in the beginning and end of singly linked list.
4. Insert an element at any position in doubly linked list.
5. Delete a node at given position in doubly linked list.
6. Implement circular queue.
7. Linear search.
8. Binary search.
9. Merge sort.
10. Quick sort.

Subject Title	Programming in C++	Semester	II	Hours:60
Subject Code	17U2CTC04	Specialization	NA	
Type	Core - IV	L:T:P:C	4:0:0:3	

Objectives

1. To understand the basic concepts of OOPs.
2. With the help of methods and classes present in C++ and Java languages.

Unit	Syllabus Contents	Number of Sessions
I	Basic Concepts of OOP – Benefits of OOP – Applications of OOP - Structure of C++ - Applications of C++ -Tokens- Keywords- Identifiers and Constant-Data types - Variables – Operators-Manipulators-Expressions-Control Structures. Functions – Prototype- Call by Reference- Return by reference- Inline Functions- Default Arguments- const Arguments- Function Overloading- Friend and Virtual Function.	12
II	Classes and Objects – Class – Member Functions-Array with in a class- Memory Allocation for Objects- Static data members – Static member function- Array of Objects- Objects as Function Arguments – Friendly Functions-Returning Objects-const Member Functions- Pointers to Members, Constructors and Destructors.	12
III	Operator Overloading and type conversions. Inheritance: Extending classes- Derived Classes- single inheritance- Multilevel Inheritance- Multiple Inheritance- Hierarchical Inheritance- Hybrid Inheritance- Virtual Base Classes- Abstract Classes, Pointers, virtual Functions and Polymorphism: Pointers – Pointers to Objects – these Pointers Virtual Functions – Pure Virtual Functions.	12
IV	Managing I/O Operations: Streams in C++ - C++ Stream Classes – Formatted and Unformatted I/O Operations Managing Output with Manipulators. Working with Files: Classes for file Stream Operations-Opening and closing a File – Detecting end-of-file- File Pointers and their Manipulators – sequential I/O Operations- Updating a file- Error Handling during File Operations- Command Line Arguments	12
V	Templates: Class templates- Class templates with Multiple Parameters- Function templates- Function Templates with Multiple Parameters- overloading of Templates Functions- Member Function Templates- Non- type template arguments, Exception Handling: Basics-Exception Handling Mechanism- throwing Mechanism- Catching Mechanism- Rethrowing an Exception – Specifying Exceptions. Manipulating Strings.	12

Learning Resources	
Text Books	1. E.Balagurusamy, "Object-Oriented Programming with C++", Tata McGraw Hill Publishing Company Limited, New Delhi ,Second Edition, 2001. UNIT-I(CHAPTER-1,2,3,4),UNIT-II(CHAPTER-5,6,7),UNIT-III(CHAPTER-8,9,10), UNIT-IV(CHAPTER-11,12,13). 2. Bahrami "Object Oriented Systems", McGraw Hill International Edition,1999. UNIT-V(CHAPTER 3,5)
Reference Books	1. Bjarne Stroustrup," The C++ Programming Language", 4th Edition , 2013. 2. Mike McGrath,"C++ Programming in Easy Steps",4th Edition, 2011. 3. Robert Lafore, " Object Oriented Programming in Turbo C++", Galgotia ,2001.
Web Sites / Links	1. www.tutorialspoint.com 1. www.wikepedia.com

Content beyond the syllabus:

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

Subject Title	Microprocessor and Computer Architecture	Semester	III	Hours : 60
Subject Code	17U3CTC05	Specialization	NA	
Type	Core – V	L:T:P:C	4 : 0 : 0 : 3	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	**Microprocessor Architecture:** Microprocessor Architecture and its operations- 8085 /8080A – based microcomputer system-the 8085 microprocessor ,examples of an 8085 based microcomputer-instruction classification, Instruction format ,overview 80805/8080A Instruction set.	12
II	**Digital Logic Circuits:** Map Simplications – Combinational circuits – Flip Flops –**Digital Components: Integrated** circuits – Decoders – Multiplexers. **Register Transfer and Micro operations:** Register Transfer – Bus and Memory Transfers – Arithmetic Micro operations – Logic Micro operations – Shift Micro operations.	12
III	**Central Processing Unit :** General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer (RISC).	12
IV	**Computer Arithmetic:** Addition and Subtraction – Multiplication Algorithm – Division Algorithm – Floating Point Arithmetic Operations – Decimal Arithmetic Units – Decimal Arithmetic Operations.	12
V	**Memory Organization:** Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.	12

Learning Resources

Text Books	1. Ramesh Goankar, "Microprocessor Architecture Programming and Applications with the 8085/8080A" ,fifth edition. 2. "Computer System Architecture" by M.Morris Mano, Fifth Edition, Pearson Prentice Hall Private Limited, NewDelhi, 2014. 3. Yu-Cheng Liu,Glenn A.Gibson ,"Microcomputer Systems : The 8086 /8088 Family – Architecture,Programming and Design ",Second Edition ,Prentice Hall of India,2007.
Reference Books	1.Computer System Architecture" By P. V. S. Rao,PHI Private Ltd,2009 2."Computer Systems Organization & Architecture" by Carpinelli, Third Edition,Pearson Education,2008 3."Computer Organization & Architecture" by William Stallings, Seventh Edition, 2009.

	4.Doughlas V.Hall " Microprocessors and Interfacing ,Programming and Hardware",TMH,2012.
Web Sites / Links	1.dspace.utamu.ac.ug 2. www.slideshare.net/.../computer-computer-system-architecture

Content beyond the syllabus:

1. Virtual memory concept.
2. Virtual protection concept

Subject Title	Java Programming	Semester	III	Hours:60
Subject Code	17U3CTC06	Specialization	NA	
Type	Core- VI	L:T:P:C	4 : 0 : 0 : 3	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction - Object Oriented Programming - History of Java – Byte Code – A first Simple program – I/O Basis – Reading / Writing Console Input/Output – Lexical Issues – Java Data types – Variables – Type Conversion and Casting – Arrays – Operators – Control Statements.	12
II	Classes and Objects: A Simple Class and Declaring Objects, Methods – Examples – Constructor's – Inheritance – Basics – Using super - Creating a Multilevel Hierarchy – Packages and Interfaces: Packages – Access Protection – Importing Packages – Interfaces.	12
III	Exception Handling: Fundamentals – Types – Using try and catch – Built in Exceptions – Throwing our own Exception .Introducing AWT: AWT classes – Windows fundamentals - Working with frame windows – Working with graphics – Control fundamentals – Labels – Buttons – Text Field.	12
IV	Database programming: The Design of JDBC – JDBC Driver types – Uses of JDBC – SQL – Connecting to the database – Executing SQL – Statements – Managing Connections – Statements and Result sets – SQL Exception. The Applet Class-types of Applet- Basics-Applet Class – Architecture – An applet Skeleton - Applet Initialization and Termination- Overriding update( )	12
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	12

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

Content beyond the syllabus:

1. Program to know how to connect Database connection using coding in Java.
2. Implement a program that prompts the user for height and weight values and displays the associated body mass index.

Subject Title	Relational Database Management Systems	Semester	III	Hours:75
Subject Code	17U3CTC07	Specialization	NA	
Type	Core -VII	L:T:P:C	5 : 0 : 0 : 5	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction to DBMS: Information – Data and Data Management – Characteristics of a data in a database — Functions of DBMS – Components of DBMS – data dictionary. Data Base Architecture and Design: Introduction – Data base architecture – data abstraction. Entity –Relationship Modeling: Introduction – ER Model – Components of ER model – Relationships: Degree-Connectivity-Cardinality– ER modeling symbols. Data Normalization: Normalization-1NF-2NF-3NF-BCNF-4NF-5NF– Denormalization.	15
II	Oracle9*i*: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - *i*SQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.	16
III	Working with Table: Data Management and Retrieval: DML – Adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records –Retrieving Data from Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.	16
IV	PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	16
V	PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views.	12

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

Content beyond Syllabus:

- To understand about Spatial and temporal databases.
- To know about complex data types.

Subject Title	Relational Database Management Systems Lab	Semester	III	Hours:75
Subject Code	17U3CTCP03	Specialization	NA	
Type	Core Lab - III	L:T:P:C	5: 0 : 0 : 3	

Objectives

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

List of Programs

1. Basic SQL Queries

   i) DDL Statements ii) DML Statements

2. Simple Queries using built in functions.

3. Simple Queries Using set operations.

4. Database Schema for a customer-sale scenario

   Customer (Cust id : integer, cust_name: string)

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

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

   integer, qty_sold: integer)

For the above schema, perform the following:

a. Create the tables with the appropriate integrity constraints
b. Insert around 10 records in each of the tables
c. List all the bills for the current date with the customer names and item numbers.
d. List the details of the customer who have bought a product which has a price>200

5. Database Schema for a Student Library scenario

   Student(Stud_no : integer, Stud_name: string)

   Membership (Mem_no: integer, Stud_no: integer)

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

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

   integer)

For the above schema, perform the following:

a. Create the tables with the appropriate integrity constraints
b. Insert around 10 records in each of the tables

c. List all the student names with their membership numbers

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

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

6.Database Schema for a Employee-pay scenario

employee(emp_id : integer, emp_name: string)

department(dept_id: integer, dept_name:string)

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

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

payroll(emp_id : integer, pay_date: date)

For the above schema, perform the following:

a. Create the tables with the appropriate integrity constraints

b. Insert around 10 records in each of the tables.

c. List the employee details department wise.

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

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

f. List the details for an employee_id=5.

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

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

9. Write a PL/SQL program to implement trigger.

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

Subject Title	Java Programming Lab	Semester	III	Hours:60
Subject Code	17U3CTCP04	Specialization	NA	
Type	Core Lab – IV	L:T:P:C	4:0:0:3	

Objective:

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

List of Programs

Simple java applications

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

Simple package creation

4. developing user defined packages in java

Interfaces

5. developing user defined interfaces
6. use predefined interfaces

Threading

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

Exception handling mechanism in java

9. handling predefined exceptions
10. handling user defined exceptions

Subject Title	Office Package	Semester	III	Hours:30
Subject Code	17U2CTSO1	Specialization	NA	
Type	SBEC – I	L:T:P:C	2 : 0 : 0 : 2	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Introduction to MS-Office.MS-word: Introduction to word basics-Commands-Copying and Moving Text-Working with text- Find and Replace-Formatting Text-Mail Merge-Table-Spell Check and Grammar.	6
II	MS-EXCEL: Excel Basics-Introduction-Menus-Toolbars-Icons-Opening Excel-Cells-Entering and Editing Data-Creation of Chart-Naming Formulas-Functions.	6
III	MS-POWERPOINT: Introduction-Menus-Toolbars-Creating and Editing Slides-Working with PowerPoint.	6
IV	MS-ACCESS: Introduction-Starting Microsoft Access-Creating New Database-Opening Existing Database-Access Database Wizards-Tables-Creating Query.	6
V	MS-FRONTPAGE: Introduction-Menus-Toolbars-Creating Webpage-With Wizard-Hyperlinks	6

Learning Resources

Text Books	1.Sanjay Saxena,"MS-OFFICE 2000 for Everyone", Vikas Pub.House, NewDelhi. (Part-II, III, IV, V, VI& IX).
Reference Books	1. Joyce Cox, Joan Lambert, and Curtis Frye "Microsoft Step by Step ,soft office Professional 2010", First Edition,2010
Web Sites / Links	1.https://en.wikipedia.org/wiki/Microsoft_Office

Content beyond Syllabus:

1. Data Analytics in Ms-Excel
2. Data Visualization Tools.

Subject Title	Computer Networks	Semester	IV	Hours:60
Subject Code	17U4CTC08	Specialization	NA	
Type	Core -VIII	L:T:P:C	4 : 0 : 0 : 3	

Objectives

1. To study the details regarding communication of voice and video, networks and its functions, data conversions, controlling of errors, switching information and its devices, internetworking device and different layers of TCP/IP.

Unit	Syllabus Contents	Number of Sessions
I	**Introduction :** Uses Of Computer Networks - NETWORK HARDWARE – Network Software- Reference Models.	12
II	**Physical Layer:** Transmission Media – Wireless Transmission- Cellular Radio- Communication Satellites.	12
III	**Data Link Layer:** Data Link Layer Design Issues-Error Detection an Correction –Elementary Data Link Protocols- Sliding Window Protocols.	12
IV	**Medium Access Sub Layer:** Channel Allocation Problem-Multiple Access Protocols-Bridges. **Network Layers:** Network Layer Design Issues- Routing Algorithms-Congestion Control Algorithms.	12
V	**Transport Layer:** Transport Service-Elements of Transport Protocols-Internet Transport Protocols. **Application Layer:** Network Security-DNS-SNMP-Electronic Mail-WWW-Multimedia.	12

Learning Resources	
Text Books	1. Andrew S.Tanenbaum,"Computer Networks" 3rd Edition ,Prentice Hall.
Reference Books	1. William Stallings, 'Data and Computer Communication', 8th Edition, Pearson Education, 2003 / PHI. 2. "Data communications and Internetworking ", Behrouz A Forouzan, Fourth Edition,2006.
Web Sites / Links	1. www.nptel.in 2. Inspirit.net.in

Content beyond Syllabus:

1. Wireless Networks
2. Ad hoc Networks.

Subject Title	Operating Systems	Semester	IV	Hours:60
Subject Code	17U4CTC09	Specialization	NA	
Type	Core - IX	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

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

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

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

Content beyond Syllabus:

1. To understand about advanced Operating Systems.
2. To know about Multi-core Architecture.

Subject Title	Dot Net Programming	Semester	IV	Hours:75
Subject Code	17U4CTC10	Specialization	NA	
Type	Core - X	L:T:P:C	5:0:0:5	

Objectives:

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

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

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

Subject Title	Dot Net Programming Lab	Semester	IV	Hours:75
Subject Code	17U4CTCP05	Specialization	NA	
Type	Core Lab - V	L:T:P:C	5:0:0:3	

Objectives:

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

Develop the following On-line Applications using ASP.NET.

1. Create a Web site
2. Simple Web Page Creation using Asp.Net
3. Personal Information System
4. Hotel Reservation Using Asp.Net
5. Banking System
6. Shopping System
7. Air-line Reservation System
8. Recruitment System
9. Quiz program.
10. Library Management.

Subject Title	Multimedia Design and Applications (DTP Package & Corel Draw)	Semester	IV	Hours:60
Subject Code	17U4CTC11	Specialization	NA	
Type	Core – XI	L:T:P:C	4: 0 : 0 : 3	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	INTRODUCTION: Choosing the printing house - Hardware Requirement for DTP -General Design Considerations - Text Organization – Design Common Media Publication.	12
II	PAGEMAKER: Getting Started with PageMaker – Working in PageMaker – The PageMaker window – Working with text – Multiple Text Block. Editing Text: Making Changing in the Publication – Searching by Format – Replacing the Text. Formatting Text: Changing the Font Size – Making the text bold – Removing Boldface from the text – Underlining the text – Aligning the text.	12
III	Master pages: Adding Text to the Publication – Element on master pages – Creating a new Publication – Working with Columns. Managing and Printing a publication: Page Orientation – Page Numbering – Page Size – Dimension – Table of Contents – Managing Books – Printing a Publication.	12
IV	Understanding corelDRAW-graphics suite x4- corelDRAW-graphics suite applications-new and enhanced feature in corelDRAW- getting started with corelDRAW- exploring the workspace of corelDRAW- menu bar-standard-toolbar-property bar-tool box-drawing page-docker-color palette-drawing basic geometric figures- working with page layout	12
V	Working with lines-Drawing a curve-drawing calligraphic lines-about outline tool-defining lines and outlines setting-creating a calligraphic outline-adding an arrowhead	12

Learning Resources	
Text Books	1. "COMDEX-DTP Course Kit" Vikas Gupta, Dreamtech Publishers- New Delhi, 2008. 2. Learning CorelDRAW X4,Ramesh Bangia,First Edition,2003.
Reference Books	1. CorelDRAW X7 Official Guide,BOUTON,Eleventh Edition.
Web Sites / Links	1. https://en.wikipedia.org/wiki/Desktop_publishing. 2. http://www.businessdictionary.com/definition/desktop-publishing-DTP.html.

Content beyond Syllabus:

1. Understand about Adobe Photoshop.
2. Knowledge about Dreamweaver.

Subject Title	Basics of Unix and Linux	Semester	IV	Hours:30
Subject Code	17U4CTS02	Specialization	NA	
Type	SBEC : II	L:T:P:C	2:0:0:2	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction – Operating system – Function of Operating system – Types of Systems – Why study UNIX-Linux-Logging onto a system – Surveying the development of Unix and Linux – Issuing commands to execute utilities – UNIX Architecture – Features of UNIX – Locating commands – Internal and External commands – Command structure – Flexibility of command usage.	06
II	General purpose utilities: cal: The calendar – date: Displaying the System date – echo: Displaying a message – printf: An Alternate to echo – Email Basics – mailx – passwd – who. The File System: pwd: Checking your current directory – cd: Changing the current Directory – mkdir : Making Directories – rmdir: Removing Directories.	06
III	Handling ordinary Files – Basic File Attributes – Simple Filters – Filtering using Regular expression.	06
IV	The Linux operating system: The history of Linux – Linux Architecture – Linux compared to UNIX – Features and utilities in Linux – Shell available in Linux – Creating files using the Vi editor: Text editors – The Vi editors – The emacs editors – The joe editors. Managing Files and Directories: Introduction – Directory commands in Linux – File Commands in Linux.	06
V	Managing Documents: Locating files in Linux – standard files – Redirection – Filters – Pipes. Communicating with other users in Linux: mesg command – whoT- talk – write – finger – chfn utility – ping – traceroute command – ssh command – FTP command – ncftp command.	06

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

Content beyond the syllabus:

1. Understanding UNIX and LINUX Commands.

Subject Title	Web Technology	Semester	V	Hours:75
Subject Code	17U5CTC12	Specialization	NA	
Type	Core- XII	L:T:P:C	5:0:0:5	

Objectives:

1. It covers the TCP/IP Basics.
2. It includes Basics of Browser,tiers,servlets ,web security and XML.

Unit	Syllabus Contents	Number of Sessions
I	Web essentials – clients – servers - communication – markup languages – XHTML – simple XHTML pages style sheets – CSS.	15
II	Client side programming – Java script language – java script objects – host objects : Browsers and the DOM	15
III	Server side programming – java servlets – basics – simple program – separating programming and presentation – ASP/JSP - JSP basics ASP/JSP objects – simple ASP/JSP pages.	15
IV	Representing Web data – data base connectivity – JDBC – Dynamic Web pages – XML – DTD – XML schema – DOM – SAX – Xquery.	15
V	Building Web applications - cookies – sessions – open source environment – PHP – MYSQL –case studies.	15

Learning Resources

Text Books	1. Jeffrey C Jackson, " Web Technology – A computer Science perspective",Persoson Education,2007. 2. Chris Bates, "Web Programming – Building Internet Applications, "Wiley India, 2006.
Reference Books	1. Rajkamal,"Internet And Web Technologies", TMH.
Web Sites / Links	1. http://www.worldwebtechnologies.com/ 2. http://www.worldwebtechnologies.com/web-design-process.html

Content beyond the syllabus:

1. Design web pages using HTML.
2. Web Designing software.

Subject Title	Software Engineering	Semester	V	Hours:75
Subject Code	17U5CTC13	Specialization	NA	
Type	Core –XIII	L:T:P:C	5:0:0:5	

Objectives:

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

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

Learning Resources

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

Content beyond the syllabus:

1. Software Development Life Cycle
2. Learn about SRS (Software Requirement Specification)
3. Study about importance of testing with software engineering

Subject Title	Data Mining and Data Warehousing	Semester	V	Hours:75
Subject Code	17U5CTC14	Specialization	NA	
Type	Core -XIV	L:T:P:C	5:0:0:3	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction: What motivated data mining?-Why is it important?-What is data mining?-Data mining-On what kind of data?-Data mining Functionalities-Classification of Data mining-Data mining task primitives-Integration of a Data mining System with a Database or Data Warehouse System-Major issues in Data mining	15
II	Data Preprocessing: Why Preprocess the Data?-Descriptive Data Summarization-Data Cleaning-Data Integration and Transformation-Data Reduction-Data Discretization and Concept Hierarchy Generation	15
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	15
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	15
V	Data Warehouse and OLAP Technology: What is Data Warehouse? A Multidimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation	15

Learning Resources

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

Content beyond the syllabus:

1. Write down the drawbacks of the earlier existing decision support systems.
2. Justify that data warehouse is a blend of many technologies.
3. Justify that data warehouse is an environment not a product.

Subject Title	Web Technology Lab	Semester	V	Hours:60
Subject Code	17U5CTCP06	Specialization	NA	
Type	Core Lab - VI	L:T:P:C	4:0:0:3	

Objectives

1. Analyze a webpage and identify its elements and attributes.
2. Create WebPages using XHTML and Cascading Style Sheets.

List of Programs:

1. Design a web page for your College using basic HTML tags.
2. Create a Web page with the following using HTML.

    a) To embed an image map in a web page

    b) To fix the hot spots

    c) Show all the related information when the hot spots are clicked.

3. Create a Web page with all types of cascading style sheets.
4. Write a program in java using Servlets: To invoke servlets from HTML forms.
5. Write a JSP program to perform form validation.
6. Create a XML program to show the CD catalog information in a web page.
7. Programs using XML-Schema-XSLT/XSL.
8. Write your own XML and apply CSS style Sheet format for your program.
9. Write a program using XML-DTD.
10. Programs using PHP.

Subject Title	Computer Installation and Servicing	Semester	V	Hours:30
Subject Code	17U5CTS03	Specialization	NA	
Type	SBEC:III	L:T:P:C	2:0:0:2	

Objectives

1. Aims to equip participants with basic knowledge and skills about computer hardware and software maintenance and troubleshooting of common problems.

Unit	Syllabus Contents	Number of Sessions
I	The Visible PC: How the PC Works –input – processing – output – storage. The Complete PC: External Connections – Devices and their connections – Inside the system unit: Case – CPU – Ram – Motherboard – Power supply – Hard drive – Optical Drives.	06
II	Learning CPU: Memory and RAM – Address Bus – Modern CPU's - Intel Pentium early processors – Intel Pentium 4 – Intel core – AMD athelon – AMD Duron – Intel Celeron – Intel Pentium Dual Core – Intel Core i7. Types of RAM's: SDRAM – RDDRAM –DDRSDRAM - DDR2 – DDR3 – RAM Variations.	06
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.	06
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.	06
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.	06

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

Content beyond the syllabus:

1. Study about PC trouble shooting
2. Software up gradation
3. Learn the concepts of repairing and servicing PC

Subject Title	Project work (In-house mini project)	Semester	V	Hours:30
Subject Code	17U5CTPR01	Specialization	NA	
Type	Core Project - 1	L:T:P:C	2:0:0:1	

Objectives

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

PROJECT WORK PATTERN

1 **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	Computer Graphics And Multimedia	Semester	VI	Hours:75
Subject Code	17U6CTC15	Specialization	NA	
Type	Core -XV	L:T:P:C	5: 0 : 0 :5	

Objectives:

1. To explore different software components and their application.

Unit	Syllabus Contents	Number of Sessions
I	Basic − Line − Curve and ellipse drawing algorithms − Examples – Applications - Attributes − Two- Dimensional geometric transformations − Two-Dimensional clipping and viewing – Input techniques.	15
II	Three-Dimensional object representations − Three-Dimensional geometric and modeling transformations − Three-Dimensional viewing − Hidden surface elimination − Color models – Virtual reality - Animation.	15
III	Multimedia basics − Multimedia applications − Multimedia system architecture − Evolving technologies for multimedia − Defining objects for multimedia systems − Multimedia data interface standards − Multimedia databases.	15
IV	Compression and decompression − Data and file format standards − Multimedia I/O technologies − Digital voice and audio − Video image and animation − Full motion video − Storage and retrieval technologies.	15
V	Multimedia authoring and user interface − Hypermedia messaging − Mobile messaging − Hypermedia message component − Creating hypermedia message − Integrated multimedia message standards − Integrated document management − Distributed multimedia systems.	15

Learning Resources

Text Books	1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003. 2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.
Reference Books	1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998. 2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd.
Web Site / Links	1. https://www.tutorialspoint.com/computer_graphics/. 2. ttps://lecturenotes.in/subject/59/computer-graphics.

Content beyond Syllabus:

1. To understand about Multimedia tools.

2. To understand about New technologies in Multimedia.

Subject Title	Java & J2EE	Semester	VI	Hours:75
Subject Code	17U6CTC16	Specialization	NA	
Type	Core - XVI	L:T:P:C	5:0:0:5	

Objectives

1. To know the concepts about Architecture and interaction services of J2EE.

Unit	Syllabus Contents	Number of Sessions
I	JAVA:Introduction -The structure of Java program – Operators – Control statements Arrays – Classes – Inheritance -Packages and Interfaces.	15
II	Wrapper classes – mathematical methods – Exceptions- Threads – Applets - Graphics. Input and Output classes	15
III	J2EE:Client – Server Architecture: Two Tier Model – 3 Tier Model – n Tier Model – J2EE Architecture - .net Architecture – MPC Architecture.	15
IV	Interaction Services: RMI – CORBA – XML – JMS -Presentation Services: JSP – Javamail – Servlet	15
V	Component Model: EJB: Session beans: Stateless and Statefull – Entity beans – CMP and BMP – Message Driven Beans	15

Learning Resources

Text Books	1. Dr. K. Somasundaram, "Programming in Java 2", Jaico Publishing House – 2008. 2. Jim Keogh "The Complete Reference J2EE "Tata McGraw – Hill Edition 2002. 3. James Holmes "The Complete References Struts Second Edition " Tata McGraw Hill Edition-2007.
Reference Books	1. Ken Arnold, Games Gosling, David Holmes, "The Java Programming Language", 3rd Edition, TMH. 2. Patric Naughton and Herbert Schildt, "Jave 2 Complete Reference", TMH, 1999. 3. Nortron Peter and William Stanek, "Guide to Java Programing", Samsnet,1996. 4. Jusin Couch, Daniel H. Steinberg, "J2EE Bible" Wily India (P) Ltd, New Delhi 2002. 5. Paul Tremblett, "Instant Enterprise Java Y-Beans", Tata McGraw Hill Pub.
Web Sites / Links	1. https://www.leepoint.net/. 2. www.tutorialspoint.com/java/java_tutorial.pdf. 3. www.dsc.ufcg.edu.br/~jacques/cursos/j2ee/recursos/j2ee-1_3-doc-tutorial-draft5.pdf.

Content beyond Syllabus:

1. Developing applications using J2EE.
2. Study about NetBeanIDE.

Subject Title	Graphics and Multimedia Lab	Semester	VI	Hours:75
Subject Code	17U6CTCP07	Specialization	NA	
Type	Core Lab - VII	L:T:P:C	5:0:0:3	

Objectives:

1. To study about Multimedia Programs.

List of Programs

1. Program to implement Line using "DDA" algorithm.
2. Program to implement line using Bresenham's line drawing algorithm.
3. Program to implement circle using Midpoint algorithm.
4. Program to implement Circle using Bresenham's Circle Drawing algorithm.
5. Write a c++ program that implement Boundary Fill algorithm?
6. Write a c++ program that implement Shearing algorithm?
7. Program to implement Translation of the Square.
8. Program to implement Rotation of square.
9. Program to implement Reflection.
10. Program using Photoshop.

Subject Title	Java & J2EE Lab	Semester	VI	Hours:75
Subject Code	17U6CTCP08	Specialization	NA	
Type	Core Lab - VIII	L:T:P:C	5:0:0:3	

Objectives:

1. To understand the concepts of JAVA and J2EE.

List of Programs

1. Write a java program to generate Fibonacci series.
2. Write a java program to display tables from 1 to 10 using 2d Array.
3. Implementation of Classes and Objects concepts.
4. Implementation of Constructor.
5. Write a java program to create user defined exception.
6. Implementation of Interface concept.
7. Implementation of packages in java.
8. Implementation of multithreading.
9. To find the marks of the students using Remote Method Invocations.
10. To write a Servlet program to calculate the bonus of an employee.
11. To write a simple program for JSP.
12. To write a JSP program that works with JDBC.

Subject Title	Internet of Things	Semester	VI	Hours:60
Subject Code	17U6CTS04	Specialization	NA	
Type	SBEC:IV	L:T:P:C	2:0:0:2	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	**Introduction:** Introduction to Internet of Things – Defintion & Characteristics of IoT – Things in IoT – IoT Protocols – Logical Design of IoT: IoT functional Blocks – IoT Communication Models – IoT Communication APIs.	12
II	IoT Enabling Technologies: Wireless Sensor Networks – Cloud computing – Bigdata Analytics – Communication Protocols – Embedded Systems. Domain Specific IoTs: Home Automation – cities – Retail – Health & Monitoring.	12
III	Developing IoT: Introduction – IoT Design Methodology – Case Study on IoT System for Weather Monitoring.	12
IV	IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT: Software defined Networking – Network Function Virtualization.	12
V	IoT System Management with NETCONF-YANG: Need for IoT System Management – SNMP – NETCONF – YANG. Tools for IoT: Introduction - Chef – Puppet.	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.theinternet of things.eu 2. www.cisco.com/c/en_in/solutions/internet-of-things/overview.html

Content beyond Syllabus:

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

Subject Title	Web Services	Semester	V	Hours:60
Subject Code	17U5CTE01	Specialization	NA	
Type	Elective - I	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Role of XML-XML and the web- XML Language Basics-SOAP-Web Services-Revolution of XML-Service Oriented Architecture (SOA)	12
II	XML Technology: XML-Name Space-Structuring with schemas and DTD-Presentation Techniques-Transformation-XML Infrastructure.	12
III	SOAP: Overview of SOAP-HTTP-XML- RPC-SOAP, Protocol-Message Structure-SOAP with Attachments.	12
IV	Web Services: Overview-Architecture-Key Technologies-UDDI- WSDC-ebxml-SOAP and web services in E-Commerce.	12
V	XML Security: Security overview-Canonicalization-XML Security Frame work-XML Encryption-XML Digital Signature.	12

Learning Resources

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

Content beyond Syllabus:

1. Applications in B2B.
2. To understand about Web Service Tools.

Subject Title	Soft Computing	Semester	V	Hours:60
Subject Code	17U5CTE02	Specialization	NA	
Type	Elective - I	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

To learn basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations.

Unit	Syllabus Contents	Number of Sessions
I	Soft Computing: Introduction of Soft Computing-Soft Computing vs. Hard Computing-various types of Soft Computing techniques-Applications of Soft Computing. Fundamentals of Neural Networks: Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-Characteristics of Neural Networks-Learning Methods-Early Neural Network Architectures-Some applications domain.	12
II	Back propagation Networks: Architecture of Back propagation Network-Back propagation Learning –illustrations-Effect of Tuning Parameters of the Back propagation Neural Network-Selection of various parameters in Back propagation Neural Network-Variations of Standard Back propagation algorithms.	12
III	Supervised Learning Neural Networks: Introduction - Perceptron - Adaline – Multiple Adaptive Linear Neurons – Radial Basis Function Networks. Unsupervised Learning Neural Networks: Introduction – Fixed Weight Competitive Nets – Kohonen Self Organizing Feature Maps – Learning Vector Quantization – Adaptive Resonance Theory Network.	12
IV	Fuzzy logic: Fuzzy Set Theory: Fuzzy versus Crisp - Fuzzy Sets: Membership Function-Basic Fuzzy set operations-Properties-Fuzzy Relations: Fuzzy Cartesian Product-Operations. Fuzzy Systems: Fuzzy Logic-Fuzzy Rule based system-Defuzzification Methods-Applications.	12
V	Genetic Algorithm: Introduction – Biological Background – Genetic Algorithm and Search Space – Genetic Algorithm Vs Traditional Algorithm – Basic Terminologies in Genetic Algorithm – Simple Genetic Algorithm – General Genetic Algorithm – Operators – Stopping Condition in Genetic Algorithm Flow – Constraints in Genetic Algorithm – Advantages and Limitations of Genetic Algorithm- Applications of Genetic Algorithm.	12

Learning Resources	
Text Books	1. Rajasekaran. S and VijayalakshmiPai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, New Delhi-2011 (fifteenth edition) (Unit I,II,IV) 2. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, 2 ND Edition Wiley India, 2012.(Unit III & V)
Reference Books	1. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009. 2. Sudarshan K. Valluru and T.Nageswara Rao, Introduction to Neural Network and Genetic Algorithm Theory and Applications,Pashupathi Printers Ltd,New Delhi, 2010. 3. KwangH.Lee, First Course on Fuzzy Theory and Applications,Springer International Edition,2009. 4. AmirthavalliM,Fuzzy Logic and Neural Network,Scitech Publications Pvt.Ltd,2007
Web Sites/Links	1. www.banasthali.org 2. www.soft-computing.de/def.html

Content beyond the syllabus:

1. Applications using ANN
2. Scope of Soft Computing Techniques
3. Study about "R' Tools

Subject Title	Big Data Analytics	Semester	V	Hours:60
Subject Code	17U5CTE03	Specialization	NA	
Type	Elective - I	L:T:P:C	4:0:0:3	

Objectives:

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

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

Learning Resources

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

Content beyond Syllabus:

1. To understand about Hadoop.

Subject Title	Open Source Technologies	Semester	VI	Hours:60
Subject Code	17U6CTE04	Specialization	NA	
Type	Elective – II	L:T:P:C	4 : 0 : 0 : 3	

Objectives:

1. To enable the students to learn the concepts of open source, XML, PHP and MYSQL.

Unit	Syllabus Contents	Number of Sessions
I	Open Source: Definition – Application of Open Source, Advantages and disadvantages of open source –benefits of open source – commercial aspects of open source – open source operating system: introduction of Linux.	12
II	Introduction: What is XML? – Origin Of the XML Standards - Where XML Can Be Used, And What U Can Use it For. Well-Formed XML: Parsing XML – Attributes - Comments –Empty Elements - XML Declaration - Processing Instructions – Illegal PCDATA Characters - Errors in XML. Validation: Document Type Definitions.	12
III	Introduction to PHP: Sending data to the Web Browser – Variables & Strings – Programming with PHP & Creating HTML: Handling HTML Form & Operators-Validating Form Data & Arrays – Introduction to MySQL: Creating Database columns – Introduction to SQL: Inserting Records & Select Data.	12
IV	Advance SQL and MySQL:DB Design-Normal Forms - Performing Transactions - Error Handling and Debugging : Introduction – Displaying PHP Errors – PHP Debugging Techniques – Creating Custom error handlers – Using PHP with MySQL: Introduction – Connecting to MySQL – Security & Updation with PHP .	12
V	Cookies and Sessions: Making Login Page – Using Sessions – Security Methods:Preventing Spam – Preventing XSS & SQL Injection Attacks – Database Encryption - Perl-Compatible Regular Expression: Introduction – Defing Simple Patterns - Finding Matches & Using Modifiers.	12

Learning Resources	
Text Books	1. David Hunter, Jeff Rafter, Joe Fawcett, Eric Van der Vlist ,Danny Ayers, John Duckett, Andrew Watt, Linda McKinnon "Beginning XML 4th Edition", -Wiley India Pvt. Limited -2008. Unit I- Chapters 1,2,4 Unit II – Chapter 11, 12, 15. 2. Lary Ullman , "PHP6 AND MySQL5 For Dynamic Web Sites" -, Pearson Education – 2008.Unit III - Chapter 1, 2, 4,5, Unit IV- Chapters 6,7,8 Unit V, Chapters 11, 12, 13.
Reference Books	1. Chris Bates "Web Programming, Building Internet Applications", 3rd Edition, April 2006, WILEY Dreamtech. 2. Michael j. Young "Step by Step XML?" Microsoft Press, 2002.
Web Sites/Links	1. http://www.computerworld.com/open-source-tools/five-open-source-technologies.html. 2. http://searchsoa.techtarget.com/definition/XML. 3. https://www.php.net. 4. https://www.codecademy.com/tracks/php.

Content beyond syllabus:

1. Open Source Operating System (Solaris)
2. Open Source web server
3. Eclipse IDE platform

Subject Title	Artificial Intelligence and Expert Systems	Semester	VI	Hours:60
Subject Code	17U6CTE05	Specialization	NA	
Type	Elective :II	L:T:P:C	4:0:0:3	

Objectives:

1. To provide an overview of topics in the field of Artificial Intelligence.
2. Working Knowledge of designing a expert systems and applying expert system technologies in designing and analyzing engineering systems.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Artificial Intelligence Problems- Artificial Intelligence Techniques-Criteria for Success. Problems, Problems Space, Search: State Space Search-Production Systems-Problem Characteristics- Issues in design of search. Heuristic Search Techniques: Generate & Test- Hill climbing- Best First, problem Reduction, Constraint satisfaction, Means End Analysis.	12
II	Knowledge Representation Issues: Representations and Mappings-Approaches to Knowledge representation-Issues in knowledge representations-The Frame Problem. Using Predicate Logic: Representing Simple Facts in Logic-Representing instance and ISA Relationships-Computable Functions and Predicates- Resolution-Natural deduction.	12
III	Representing Knowledge Rules: Procedural vs. Declarative Knowledge-Logic Programming- Forward vs Backward Reasoning- Matching- Control Knowledge-Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning- Logics for Nonmonotonic Reasoning-Implementation Issues Augmenting Problem Solver- Implementation: Depth First Search-Implementation: Breadth First Search	12
IV	Statistical Reasoning: Probability and Bayes Theorem-Certainty Factors and Rule-based Systems- Bayesian Networks- Dempster- Shafer Theory- Fuzzy Logic- Weak slot -Filler Structures: Semantic Nets Frames. Strong Slot Filler Structures: Conceptual Dependency- Scripts	12
V	Game Playing: Overview-The Minimax Search Procedure-Adding Alpha-Beta Cutoffs-Additional Refinements- Expert Systems: Representing and using Domain Knowledge-Expert system Shells- Explanation- Knowledge Acquisition	12

Learning Resources	
Text Books	1. Elaine Rich ,Kevin Knight,Shivashankar B Nair, "Artificial Intelligence", Tata McGraw-Hill Publication, 3rd Edition,2010
Reference Books	1. Donald A.Waterman – A Guide to Expert Systems Tata Mcgraw Hill – second Edition,1991. 2. Stuart Russell and Peter Norving ,"Artificial Intelligence – A Modern Approach"Second Edition,2007.
Web Sites / Links	1. www. tutorialspoint.com. 2. www.myreaders.info. 3. www.listpdf.com.

Content beyond the Syllabus:

1. The major advantages of AI over natural languages.
2. The role of the intelligent systems and their potential benefits.

Subject Title	Network Security & Cryptography	Semester	VI	Hours:60
Subject Code	17U6CTE06	Specialization	NA	
Type	Elective : II	L:T:P:C	4:0:0:3	

Objectives

1. Identify and explain the concepts, policies, and technologies associated with a layered and diversified defense-in-depth strategy.
2. Define the concepts of auditing in a network, including the types of audits and the handling of data.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Security Trends-The OSI Security Architecture - Security Attacks - Security Services- Security Mechanisms- Model for Internetwork Security - Internet Standards and the Internet Society. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles - Symmetric Block Encryption Algorithms - Stream Ciphers and RC4 - Cipher Block Modes of Operations - Location of Encryption Devices-Key Distribution	12
II	Public Key Cryptography and Message Authentication: Approaches to Message Authentication – Secure Hash Functions and HMAC - Public Key Cryptography Principles - Public Key Cryptography Algorithms - Digital Signatures - Key Management Authentication Applications: Kerberos - X.509 Authentication service - Public Key Infrastructures.	12
III	Electronic mail Security: Pretty Good Privacy(PGP) - S/MIME. IP Security: IP Security Overview – IP Security Architecture - Authentication Header - Encapsulating Security Payload - Combining security Associations - Key Management.	12
IV	Web Security: Web Security Considerations- Security Sockets Layer (SSL) and Transport Layer Security (TLS) - Secure Electronic Transaction. Network Management Security: Basic Concepts of SNMP - SNMPV1 Community facility - SNMPV3.	12
V	Intruders: Intruders – Intrusion Detection – Password Management - Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks. Firewalls: Firewall Design Principles – Trusted Systems – Common Criteria for IT Security Evaluation.	12

Learning Resources	
Text Books	1. William Stallings, "Network Security Essentials – Applications and Standards", 3rd Edition, Pearson Education, 2009 Edition. Unit I : Chapter 1 & 2 , Unit II : Chapter 3 & 4, Unit III : Chapter 5 & 6, Unit IV : Chapter 7 & 8, Unit-V (Chapter 9, 10 & 11)
Reference Books	1. V.K.Pachghare , "Cryptography and Information Security" , PHI 2010. 2. William Stallings, "Cryptography and Network Security", Pearson Education - 2008. 3. Behrouz A Forouzan, Sophia Chung Fegan, "Data Communications and Networking", TMH-2006.
Web Sites / Links	1. Nptel.in 2. Tecnopedia.com

Content beyond Syllabus:

1. To know about Cyber security.
2. To understand about security algorithms.

VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).
(Affiliated to Periyar University, Approved by AICTE & Accredited by NAAC)
(Recognized u/s 2f & 12b by UGC)

A U T O N O M O U S

DEPARTMENT OF COMPUTER APPLICATIONS

B.Sc. COMPUTER TECHNOLOGY

SYLLABUS & REGULATIONS

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

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

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

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

Sem	Course Code	Part	Courses	Hour	Credit	Marks		
						Int. Marks	Ext. Marks	Total Marks
I	17U1LT01	I	Tamil-I	4	3	25	75	100
	17U1LE01	II	English I	4	3	25	75	100
	17U1CTC01	IV	Core – I Digital Computer Fundamentals & C Programming	5	5	25	75	100
	17U1CTCP01	IV	Core Lab I – Problem Solving and C Programming Lab	5	3	40	60	100
	17U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	17U1CTC02	IV	Core-II - Basics of Hardware	4	3	25	75	100
	17U1VE01		Value Education	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**
II	17U2LT02	I	Tamil-II	4	3	25	75	100
	17U2LE02	II	English-II	4	3	25	75	100
	17U2CTC03	IV	Core III – Data Structures &Algorithms	4	3	25	75	100
	17U2CTCP02	IV	Core Lab II – Data Structures Lab	4	3	40	60	100
	17U2CTC04	IV	Core IV –Programming in C++	4	3	40	60	100
	17U2MAA06	III	Allied- II Discrete Mathematics	4	4	25	75	100
	17U2ES01		Environmental Studies	4	4	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
III	17U3CTC05	IV	Core V- Microprocessor and Computer Architecture	4	3	25	75	100
	17U3CTC06	IV	Core VI- Java Programming	4	3	25	75	100
	17U3CTC07	IV	Core VII- Relational Database Management Systems	5	5	25	75	100
	17U3CTCP03	IV	Core Lab III - RDBMS Lab	5	3	40	60	100
		IV	Allied- III Resource Management Techniques-I	4	4	25	75	100
	17U3CTCP04	IV	Core Lab IV – Java Programming Lab	4	3	40	60	100
	17U3CTS01	VII	SBEC-I – Office Package	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
IV	17U4CTC08	IV	Core VIII-Computer Networks	4	3	25	75	100
	17U4CTC09	IV	Core IX- Operating Systems	4	3	25	75	100
	17U4CTC10	IV	Core-X- Dot net Programming	5	5	25	75	100
	17U4CTCP05	IV	Core Lab V- Dot net Programming Lab	5	3	40	60	100
	17U4CMA04	III	Allied-IV Cost and Management Accounting	4	4	25	75	100
	17U4CTC11	IV	Core XI - Multimedia Design and Applications (DTP Package & Corel Draw)	4	3	25	75	100

	17U4CTS02	VII	SBEC-II (Basics of Unix and Linux)	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**

V	17U5CTC12	IV	Core-XII Web Technology	5	5	25	75	100
	17U5CTC13	IV	Core-XIII Software Engineering	5	5	25	75	100
	17U5CTC14	IV	Core-XIV Data Mining and Data Warehousing	5	3	25	75	100
	17U5CTE__	V	Elective –I	4	3	25	75	100
	17U5CTCP05	IV	Core Lab VI- Web Technology Lab	4	3	40	60	100
			NMEC - I	2	2	25	75	100
	17U5CTS03	VII	SBEC-III (Computer installation and Servicing))	2	2	25	75	100
			Library / Sports	**1**	**-**	**-**	**-**	**-**
			Mini Project	**2**	**1**	**40**	**60**	**100**
	TOTAL			**30**	**24**	**230**	**570**	**800**
VI	17U6CTC15	IV	Core-XV Computer Graphics & Multimedia	5	5	25	75	100
	17U6CTC16	V	Core – XVI Java & J2EE	5	5	25	75	100
	17U6CTE__	V	Elective –II	4	3	25	75	100
	17U6CTCP06	V	Core Lab VII- Graphics & Multimedia Lab	5	3	40	60	100
	17U6CTCP07	IV	Core Lab VIII - Java & J2EE Lab	5	3	40	60	100
			NMEC-II	2	2	25	75	100
	17U6CTS04	VII	SBEC-IV (Internet of Things)	2	2	25	75	100
	17U6EX01		Extension Activities	1	1	-	-	-
			Library / Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**205**	**495**	**700**
GRAND TOTAL				**180**	**140**	**1225**	**3075**	**4300**

ELECTIVE COURSES

ELECTIVE – I

Semester	Course Code	Course Name
V	17U5CTE01	Web Services
V	17U5CTE02	Soft Computing
V	17U5CTE03	Big Data Analytics

ELECTIVE – II

Semester	Course Code	Course Name
VI	17U6CTE04	Open Source Technologies
VI	17U6CTE05	Artificial Intelligence and Expert Systems
VI	17U6CTE06	Network Security & Cryptography

Subject Title	**Microprocessor and Computer Architecture**	**Semester**	**III**	**Hours : 60**
Subject Code	**17U3CTC05**	**Specialization**	**NA**	
Type	**Core – V**	**L:T:P:C**	**4 : 0 : 0 : 3**	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	**Digital Logic Circuits:** Map Simplications – Combinational circuits – Flip Flops –**Digital Components: Integrated** circuits – Decoders – Multiplexers. **Register Transfer and Micro operations:** Register Transfer – Bus and Memory Transfers – Arithmetic Micro operations – Logic Micro operations – Shift Micro operations.	**12**
II	**Microprocessor Architecture:** Microprocessor Architecture and its operations- 8085 /8080A – based microcomputer system-the 8085 microprocessor ,examples of an 8085 based microcomputer-instruction classification, Instruction format ,overview 80805/8080A Instruction set.	**12**
III	**Central Processing Unit :** General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer (RISC).	**12**
IV	**Computer Arithmetic:** Addition and Subtraction – Multiplication Algorithm – Division Algorithm – Floating Point Arithmetic Operations – Decimal Arithmetic Units – Decimal Arithmetic Operations.	**12**

V	**Memory Organization:** Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory. **Case study : Comparative Analysis of D Flip Flop Circuits and SR Flip Flop circuits.**	**12**

Learning Resources	
Text Books	4. Ramesh Goankar, "Microprocessor Architecture Programming and Applications with the 8085/8080A" ,fifth edition. 5. "Computer System Architecture" by M.Morris Mano, Fifth Edition, Pearson Prentice Hall Private Limited, NewDelhi, 2014. 6. Yu-Cheng Liu,Glenn A.Gibson ,"Microcomputer Systems : The 8086 /8088 Family – Architecture,Programming and Design ",Second Edition ,Prentice Hall of India,2007.
Reference Books	1.Computer System Architecture" By P. V. S. Rao,PHI Private Ltd,2009 2."Computer Systems Organization & Architecture" by Carpinelli, Third Edition,Pearson Education,2008 3."Computer Organization & Architecture" by William Stallings, Seventh Edition, 2009. 4.Doughlas V.Hall " Microprocessors and Interfacing ,Programming and Hardware",TMH,2012.
Web Sites / Links	1.dspace.utamu.ac.ug 2. www.slideshare.net/.../computer-computer-system-architecture

Content beyond the syllabus:

1. Virtual memory concept.
2. Virtual protection concept

Subject Title	Java Programming	Semester	III	Hours:60
Subject Code	17U3CTC06	Specialization	NA	
Type	Core- VI	L:T:P:C	4 : 0 : 0 : 3	

Objectives

1. Examine the Java development environment and Identify fundamentals of Java syntax.
2. Understand fundamentals of programming such as variables, Arrays, Operators and control statements, etc.

Unit	Syllabus Contents	Number of Sessions
I	Introduction - Object Oriented Programming - History of Java – Byte Code – A first Simple program – I/O Basis – Reading / Writing Console Input/Output – Lexical Issues – Java Data types – Variables – Type Conversion and Casting – Arrays – Operators – Control Statements.	12
II	Classes and Objects: A Simple Class and Declaring Objects, Methods – Examples – Constructor's – Inheritance – Basics – Using super - Creating a Multilevel Hierarchy – Packages and Interfaces: Packages – Access Protection – Importing Packages – Interfaces.	12
III	Exception Handling: Fundamentals – Types – Using try and catch – Built in Exceptions – Throwing our own Exception .Introducing AWT: AWT classes – Windows fundamentals - Working with frame windows – Working with graphics – Control fundamentals – Labels – Buttons – Text Field.	12
IV	Database programming: The Design of JDBC – JDBC Driver types – Uses of JDBC – SQL – Connecting to the database – Executing SQL – Statements – Managing Connections – Statements and Result sets – SQL Exception. The Applet Class-types of Applet- Basics-Applet Class – Architecture – An applet Skeleton - Applet Initialization and Termination- Overriding update( )	12
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 **Case Study: Implementing Big Data Technologies with Java.**	12

Learning Resources	
Text Books	3. Herbert Schildt , The Complete Reference Java II,5th Edition , TATA Mc Graw-Hill 2002. 4. Cays.Hortmann hary cornell, Core Java Volume II – Advanced Features, Pearson education 2010.
Reference Books	4. Deital Deital "Java How to Program" Pearson Education,2005 5. Rashmi kanta Das "Core Java: For Beginners, Vikas Publishing Pvt Ltd,2009. 6. Martin *Rinchart*, "Java database development", Tata Mcgraw Hill 2000.
Web Sites / Links	3. www.csee.umbc.edu/courses/331/spring03/0101/lectures/java02.ppt 4. www.slideshare.net/intelligotech/java-tutorial-ppt-7189933

Content beyond the syllabus:

1. Program to know how to connect Database connection using coding in Java.
2. Implement a program that prompts the user for height and weight values and displays the associated body mass index.

Subject Title	Relational Database Management Systems	Semester	III	Hours:75
Subject Code	17U3CTC07	Specialization	NA	
Type	Core -VII	L:T:P:C	5 : 0 : 0 : 5	

Objectives

1. Learn the difference between data and information.

Unit	Syllabus Contents	Number of Sessions
I	Introduction to DBMS: Information – Data and Data Management – Characteristics of a data in a database — Functions of DBMS – Components of DBMS – data dictionary. Data Base Architecture and Design: Introduction – Data base architecture – data abstraction. Entity –Relationship Modeling: Introduction – ER Model – Components of ER model – Relationships: Degree-Connectivity-Cardinality– ER modeling symbols. Data Normalization: Normalization-1NF-2NF-3NF-BCNF-4NF-5NF–Denormalization.	15
II	Oracle9*i*: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - *i*SQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.	16
III	Working with Table: Data Management and Retrieval: DML – Adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records –Retrieving Data from Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.	16
IV	PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	16
V	PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers – Data Dictionary Views-Introduction of NoSQL DB. **Case Study: Creating student database providing views and interactions for retrieving with restrictions.**	12

Learning Resources	
Text Books	3. "Fundamentals of Data base management System" – Alexix Leon and Mathew Leon, TMH Publications Reprint, 2010. 4. "Database systems using oracle" – Nilesh Shah, 2nd edition, PHI.
Reference Books	3. Database Management Systems – Arun Majumdar, Pritimoy Bhattacharya, TMH. 4. Database Management Systems – Gerald V. Post, 3rd edition, TMH.
Web Sites / Links	3. http://www.studytonight.com/dbms/rdbms-concept 4. http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm

Content beyond Syllabus:

- To understand about Spatial and temporal databases.
- To know about complex data types.

Subject Title	Office Package	Semester	III	Hours:30
Subject Code	17U3CTSO1	Specialization	NA	
Type	SBEC – I	L:T:P:C	2 : 0 : 0 : 2	

Objectives

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Introduction to MS-Office.MS-word: Introduction to word basics-Commands-Copying and Moving Text-Working with text- Find and Replace-Formatting Text-Mail Merge-Table-Spell Check and Grammar.	6
II	MS-EXCEL: Excel Basics-Introduction-Menus-Toolbars-Icons-Opening Excel-Cells-Entering and Editing Data-Creation of Chart-Naming Formulas-Functions.	6
III	MS-POWERPOINT: Introduction-Menus-Toolbars-Creating and Editing Slides-Working with PowerPoint.	6
IV	MS-ACCESS: Introduction-Starting Microsoft Access-Creating New Database-Opening Existing Database-Access Database Wizards-Tables-Creating Query.	6
V	MS-FRONTPAGE: Introduction-Menus-Toolbars-Creating Webpage-With Wizard-Hyperlinks. **Case Study:** **1. Add foot-node & end note in word** 2. **Create a Macro in word** 3. **Insert an online picture in your word document in word.**	6

Learning Resources

Text Books	1.Sanjay Saxena,"MS-OFFICE 2000 for Everyone", Vikas Pub.House, NewDelhi. (Part-II, III, IV, V, VI& IX).
Reference Books	1. Joyce Cox, Joan Lambert, and Curtis Frye "Microsoft Step by Step ,soft office Professional 2010", First Edition,2010
Web Sites / Links	1.https://en.wikipedia.org/wiki/Microsoft_Office

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN [AUTONOMOUS]
ELAYAMPALAYAM, TIRUCHENGODE - 637 205.
DEPARTMENT OF COMPUTER APPLICATIONS
B.Sc. COMPUTER TECHNOLOGY

COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER CBCS
for the Candidates admitted from the year 2017-2018

Sem	Course Code	Part	Courses	Hour	Credit	Marks		
						Int. Marks	Ext. Marks	Total Marks
I	17U1LT01	I	Tamil-I	4	3	25	75	100
	17U1LE01	II	English I	4	3	25	75	100
	17U1CTC01	IV	Core – I Digital Computer Fundamentals & C Programming	5	5	25	75	100
	17U1CTCP01	IV	Core Lab I – Problem Solving and C Programming Lab	5	3	40	60	100
	17U1MAA03	III	Allied-I Numerical Methods	4	4	25	75	100
	17U1CTC02	IV	Core-II - Basics of Hardware	4	3	25	75	100
	17U1VE01		Value Education	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**
II	17U2LT02	I	Tamil-II	4	3	25	75	100
	17U2LE02	II	English-II	4	3	25	75	100
	17U2CTC03	IV	Core III – Data Structures &Algorithms	4	3	25	75	100
	17U2CTCP02	IV	Core Lab II – Data Structures Lab	4	3	40	60	100
	17U2CTC04	IV	Core IV –Programming in C++	4	3	40	60	100
	17U2MAA06	III	Allied- II Discrete Mathematics	4	4	25	75	100
	17U2ES01		Environmental Studies	4	4	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
III	17U3CTC05	IV	Core V- Microprocessor and Computer Architecture	4	3	25	75	100
	17U3CTC06	IV	Core VI- Java Programming	4	3	25	75	100
	17U3CTC07	IV	Core VII- Relational Database Management Systems	5	5	25	75	100
	17U3CTCP03	IV	Core Lab III - RDBMS Lab	5	3	40	60	100
	14U3MAA14	III	Allied- III Resource Management Techniques-I	4	4	25	75	100
	17U3CTCP04	IV	Core Lab IV – Java Programming Lab	4	3	40	60	100
	17U3CTS01	VII	SBEC-I – Office Package	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**205**	**495**	**700**
IV	17U4CTC08	IV	Core VIII-Computer Networks	4	3	25	75	100
	17U4CTC09	IV	Core IX- Operating Systems	4	3	25	75	100
	17U4CTC10	IV	Core-X- Dot net Programming	5	5	25	75	100
	17U4CTCP05	IV	Core Lab V- Dot net Programming Lab	5	3	40	60	100
	17U4CMA04	III	Allied-IV Cost and Management Accounting	4	4	25	75	100
	17U4CTC11	IV	Core XI - Multimedia Design and Applications (DTP Package & Corel Draw)	4	3	25	75	100
	17U4CTS02	VII	SBEC-II (Basics of Unix and Linux)	2	2	25	75	100
			Library	**1**	**-**	**-**	**-**	**-**
			Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**23**	**190**	**510**	**700**

V	17U5CTC12	IV	Core-XII Web Technology	5	5	25	75	100
	17U5CTC13	IV	Core-XIII Software Engineering	5	5	25	75	100
	17U5CTC14	IV	Core-XIV Data Mining and Data Warehousing	5	3	25	75	100
	17U5CTE__	V	Elective –I	5	4	25	75	100
	17U5CTCP06	IV	Core Lab VI- Web Technology Lab	5	3	40	60	100
		VI	NMEC - I	2	2	25	75	100
	17U5CTS03	VII	SBEC-III Computer installation and Servicing	2	2	25	75	100
			Library / Sports	**1**	**-**	**-**	**-**	**-**
	TOTAL			**30**	**24**	**190**	**510**	**700**
VI	17U6CTC15	IV	Core-XV Computer Graphics & Multimedia	5	5	25	75	100
	17U6CTC16	IV	Core – XVI Python Programming	5	5	25	75	100
	17U6CTE__	IV	Elective –II	4	3	25	75	100
	17U6CACPPR01	IV	PROJECT – I Project Work- (In house -Project)	5	3	40	60	100
	17U6CTCP07	IV	Core Lab VII - Python Programming Lab	5	3	40	60	100
		VI	NMEC-II	2	2	25	75	100
	17U6CTS04	VII	SBEC-IV (Internet of Things)	2	2	25	75	100
	17U6EX01		Extension Activities	1	1	-	-	-
			Library / Sports	1	-	-	-	-
	TOTAL			**30**	**24**	**205**	**495**	**700**
GRAND TOTAL				**180**	**140**	**1185**	**3015**	**4200**

ELECTIVE COURSES

ELECTIVE – I

Semester	Course Code	Course Name
V	17U5CTE01	Web Services
V	17U5CTE02	Soft Computing
V	17U5CTE03	Big Data Analytics

ELECTIVE – II

Semester	Course Code	Course Name
VI	17U6CTE04	Open Source Technologies
VI	17U6CTE05	Artificial Intelligence and Expert Systems
VI	17U6CTE06	Network Security & Cryptography

Subject Title	Web Technology	Semester	V	Hours:75
Subject Code	17U5CTC12	Specialization	NA	
Type	Core- XII	L:T:P:C	5:0:0:5	

Objectives:

3. It covers the TCP/IP Basics.
4. It includes Basics of Browser, tiers, servlets, web security and XML.

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

Learning Resources

Text Books	1. Steve Suehring,Tim Converce and Joyce Park "PHP & MySQL " wiley Publication,2017. 2. NIIT, "HTML & XML –An Introduction " PHI Learning pvt 2012.
Reference Books	2. Larry Ullman "PHP 6 and MySQL5" Pearson Publications,2016. 3. Faithe Wempen " Microsoft step by step HTML5" O'Reilly Media Inc 2017.
Web Sites / Links	3. http://www.tutorials.com 4. www.w3schools.com\php

Content beyond the syllabus:

3. Design web pages using HTML.
4. Web Designing software.

Subject Title	Software Engineering	Semester	V	Hours:75
Subject Code	17U5CTC13	Specialization	NA	
Type	Core –XIII	L:T:P:C	5:0:0:5	

Objectives:

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

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

Learning Resources

Text Books	2. Richard Fairley, "Software Engineering Concepts, TMH 2007. 3. Dr.K.V.K.K Prasad "Software Testing Tools, Dream Tech Press, 2010.
Reference Books	3. Eve Anderson, Philip Greenspun, Andrew Grumet, "Software Engineering for Internet Applications", PHI 2006. 4. Jeff Tian, "Software Quality Engineering" Student edition, 2006, Wiley India.
Web Sites / Links	3. www.softwareengineerinsider.com/articles/what-is-software-engineering.html 4. https://www.udemy.com/courses/development/software-engineering

Content beyond the syllabus:

1. Software Development Life Cycle
2. Learn about SRS (Software Requirement Specification)

Subject Title	Data Mining and Data Warehousing	Semester	V	Hours:75
Subject Code	17U5CTC14	Specialization	NA	
Type	Core -XIV	L:T:P:C	5:0:0:3	

Objectives

3. Understand data mining principles and techniques
4. Introduce DM as a method and acquaint the students with the DM techniques.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: What motivated data mining?-Why is it important?-What is data mining?-Data mining-On what kind of data?-Data mining Functionalities-Classification of Data mining-Data mining task primitives-Integration of a Data mining System with a Database or Data Warehouse System-Major issues in Data mining	15
II	Data Preprocessing: Why Preprocess the Data?-Descriptive Data Summarization-Data Cleaning-Data Integration and Transformation-Data Reduction-Data Discretization and Concept Hierarchy Generation	15
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	15
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	15
V	Data Warehouse and OLAP Technology: What is Data Warehouse? A Multidimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation	15

Learning Resources

Text Books	2. Jiawei Han and Micheline Kamber,"DATA MINING Concepts and Techniques", Morgan Kaufmann Publishers,Second Edition,2006.
Reference Books	4. Soman K. P, Shyam Diwakar, V. Ajay, Data Mining, Printice Hall, 2008. 5. Arun K.Pujari, "Data Mining Techniques", Universities Press (India) Limited, 2001. 6. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson, 2008.
Web Sites / Links	3. https://en.wikipedia.org/wiki/Data_mining 4. www.hinduwebsite.com/webresources/data_warehousing.asp

Content beyond the syllabus:

1. Write down the drawbacks of the earlier existing decision support systems.
2. Justify that data warehouse is a blend of many technologies.
3. Justify that data warehouse is an environment not a product.

Subject Title	Web Technology Lab	Semester	V	Hours:60
Subject Code	17U5CTCP06	Specialization	NA	
Type	Core Lab - VI	L:T:P:C	0:0:5:3	

Objectives

1. Plan different types of HTML Tags and usage.
2. Differentiate different types of Cascading Style Sheets in HTML.
3. Infer PHP Programs.
4. Critiquing the different types of String Handling Function in PHP.

List of Programs

HTML Programs

11. Design a web page for your College using basic HTML tags.
12. Create a Web page with the following using HTML
    d) To embed an image map in a web page
    e) To fix the hot spots
    f) Show all the related information when the hot spots are clicked.
13. Create a Web page with all types of cascading style sheets. Use all types of Cascading.

PHP Programs

14. Create a php webpage and print "hello world".
15. Create a php program to find odd or even number from given number
16. Write a php program to find maximum of three numbers.
17. Write a PHP program to swap two numbers.
18. Write a PHP Program to do various String Handling Functions in PHP.
19. Write a PHP program that demonstrate **form element**(input elements).
20. Write a PHP program that demonstrate passing variable using URL.
21. Write a PHP program to create a table in MySQL.
22. Write a PHP program to insert record into a table using MySQL.
23. Write a PHP program to drop table using MySQL.
24. Write a program to update table.
25. Create a student Registration in PHP and Save and Display the student Records.

Subject Title	Computer Installation and Servicing	Semester	V	Hours:30
Subject Code	17U5CTS03	Specialization	NA	
Type	SBEC:III	L:T:P:C	2:0:0:2	

Objectives

2. Aims to equip participants with basic knowledge and skills about computer hardware and software maintenance and troubleshooting of common problems.

Unit	Syllabus Contents	Number of Sessions
I	The Visible PC: How the PC Works –input – processing – output – storage. The Complete PC: External Connections – Devices and their connections – Inside the system unit: Case – CPU – Ram – Motherboard – Power supply – Hard drive – Optical Drives.	06
II	Learning CPU: Memory and RAM – Address Bus – Modern CPU's - Intel Pentium early processors – Intel Pentium 4 – Intel core – AMD athelon – AMD Duron – Intel Celeron – Intel Pentium Dual Core – Intel Core i7. Types of RAM's: SDRAM – RDDRAM –DDRSDRAM - DDR2 – DDR3 – RAM Variations.	06
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.	06
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.	06
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.	06

Learning Resources	
Text Books	1. Mike Meyers, "Introduction to PC Hardware and Troubleshooting", Tata McGraw-Hill, New Delhi, 2003.
Reference Books	2. Craig Zacker & John Rourke, "The complete reference:PC hardware", Tata McGraw-Hill, New Delhi, 2001. 3. B.Govindarajulu, "IBM PC and Clones hardware trouble shooting and maintenance", Tata McGraw-Hill, New Delhi, 2002. 4. 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

Content beyond the syllabus:

1. Study about PC trouble shooting
2. Software up gradation
3. Learn the concepts of repairing and servicing PC

Subject Title	Computer Graphics and Multimedia	Semester	VI	Hours:75
Subject Code	17U6CTC15	Specialization	NA	
Type	Core -XV	L:T:P:C	5: 0 : 0 :5	

Objectives:

2. To explore different software components and their application.

Unit	Syllabus Contents	Number of Sessions
I	Basic − Line − Curve and ellipse drawing algorithms − Examples – Applications - Attributes − Two- Dimensional geometric transformations − Two-Dimensional clipping and viewing – Input techniques.	15
II	Three-Dimensional object representations − Three-Dimensional geometric and modeling transformations − Three-Dimensional viewing − Hidden surface elimination − Color models – Virtual reality - Animation.	15
III	Multimedia basics − Multimedia applications − Multimedia system architecture − Evolving technologies for multimedia − Defining objects for multimedia systems − Multimedia data interface standards − Multimedia databases.	15
IV	Compression and decompression − Data and file format standards − Multimedia I/O technologies − Digital voice and audio − Video image and animation − Full motion video − Storage and retrieval technologies.	15
V	Multimedia authoring and user interface − Hypermedia messaging − Mobile messaging − Hypermedia message component − Creating hypermedia message − Integrated multimedia message standards − Integrated document management − Distributed multimedia systems.	15

Learning Resources

Text Books	1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003. 2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.
Reference Books	1. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 1998. 2. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd.
Web Site / Links	1. https://www.tutorialspoint.com/computer_graphics/. 1. ttps://lecturenotes.in/subject/59/computer-graphics.

Content beyond Syllabus:

3. To understand about Multimedia tools.
4. To understand about new technologies in Multimedia.

Subject Title	**Python Programming**	**Semester**	**VI**	**Hours:75**
Subject Code	**17U6CTC16**	**Specialization**	**NA**	
Type	**Core -XVI**	**L:T:P:C**	**5: 0 : 0 :5**	

Objectives:

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

Unit	**Syllabus Contents**	**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.	**15**
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.	**15**
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.	**15**
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)	**15**
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.	**15**

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 Site / Links	1. https://www.tutorialspoint.com/computer_graphics/. 2. ttps://lecturenotes.in/subject/59/computer-graphics.

Content beyond Syllabus:

5. To understand about Multimedia tools.
6. To understand about new technologies in Multimedia.

Subject Title	Project work (In-house mini project)	Semester	V	Hours:30
Subject Code	17U6CACPPR01	Specialization	NA	
Type	Core Project - 1	L:T:P:C	0:0:5:3	

Objectives

5. **To understand the problem in clear and concise mode**
6. **To know how to connect the statement with the problem**
7. **Usage of features of programming language in project.**
8. **Design the whole project**

PROJECT WORK PATTERN

1 **FIRST REVIEW:** **(20 Marks)**

6. Project Title
7. Project Platform (Language / Package Selected)
8. Confirmation Letter (from Company / Industry)
9. Details of Internal Guide with Designation & Qualification (in the company / Industry)
10. Presentation

SECOND REVIEW: **(20 Marks)**

7. Work Observation
8. Modules in Project (Design Screens Sample)
9. DFD / ERD / System Flow Diagram (Whichever Applicable)
10. Estimated Time of Completion
11. Completed Work in the form of Percentage Analysis
12. PowerPoint Presentation.

FINAL REVIEW: **(60 Marks)**

5. Documentation
6. Screens Shots
7. DFD / ERD / System Flow Diagram (Whichever Applicable)

Subject Title	Python Programming Lab	Semester	VI	Hours:60
Subject Code	17U6CTCP07	Specialization	NA	
Type	Core Lab - VII	L:T:P:C	0:0:5:3	

Objectives

To enable the students to gaining knowledge on Python Programming through practice

List of Programs

8. Final Project Report (with executable format including complete source code)

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

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	Internet of Things	Semester	VI	Hours:60
Subject Code	17U6CTS04	Specialization	NA	
Type	SBEC:IV	L:T:P:C	2:0:0:2	

Objectives

3. To assess the vision and introduction of IoT.
4. To understand the application areas of IOT.

Unit	Syllabus Contents	Number of Sessions
I	**Introduction:** Introduction to Internet of Things – Defintion & Characteristics of IoT – Things in IoT – IoT Protocols – Logical Design of IoT: IoT functional Blocks – IoT Communication Models – IoT Communication APIs.	12
II	IoT Enabling Technologies: Wireless Sensor Networks – Cloud computing – Bigdata Analytics – Communication Protocols – Embedded Systems. Domain Specific IoTs: Home Automation – cities – Retail – Health & Monitoring.	12
III	Developing IoT: Introduction – IoT Design Methodology – Case Study on IoT System for Weather Monitoring.	12
IV	IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT: Software defined Networking – Network Function Virtualization.	12
V	IoT System Management with NETCONF-YANG: Need for IoT System Management – SNMP – NETCONF – YANG. Tools for IoT: Introduction - Chef – Puppet.	12

Learning Resources

Text Books	1. Arshdeep Bahga, Vijay Madisetti " Internet of Things, A Hands on Approach" Universities Press 2015.
Reference Books	2. Oliver Hersent, David Boswarthick, Omar Elloumi. " The Internet of Things – Key applications and Protocols", Wiley, 2012.
Web Sites / Links	3. www.theinternet of things.eu 4. www.cisco.com/c/en_in/solutions/internet-of-things/overview.html

Content beyond Syllabus:

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

Subject Title	Web Services	Semester	V	Hours:60
Subject Code	17U5CTE01	Specialization	NA	
Type	Elective - I	L:T:P:C	5 : 0 : 0 : 4	

Objectives:

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

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Role of XML-XML and the web- XML Language Basics-SOAP-Web Services-Revolution of XML-Service Oriented Architecture (SOA)	12
II	XML Technology: XML-Name Space-Structuring with schemas and DTD-Presentation Techniques-Transformation-XML Infrastructure.	12
III	SOAP: Overview of SOAP-HTTP-XML- RPC-SOAP, Protocol-Message Structure-SOAP with Attachments.	12
IV	Web Services: Overview-Architecture-Key Technologies-UDDI- WSDC-ebxml-SOAP and web services in E-Commerce.	12
V	XML Security: Security overview-Canonicalization-XML Security Frame work-XML Encryption-XML Digital Signature.	12

Learning Resources

Text Books	2. Frank P Coyle XML, Web Services and the Data Revolution, Pearson Education,2002.
Reference Books	3. Sandeep Chatterjee,James Webber,"Developing Enterprise Web Services".Pearson Education,2004. 4. Ramesh Nagappan,Robert Skocylas and Rima PatelSriganesh,"Developing Java Web services", Wiley Publishing,Inc,2004.
Web Sites / Links	3. http://www.w3schools.com/webservices/ws_intro.asp. 4. http://www.service-architecture.com/articles/web-services/web_services_definition.html.

Content beyond Syllabus:

3. Applications in B2B.
4. To understand about Web Service Tools.

Subject Title	Soft Computing	Semester	V	Hours:60
Subject Code	17U5CTE02	Specialization	NA	
Type	Elective - I	L:T:P:C	5 : 0 : 0 : 4	

Objectives:

To learn basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations.

Unit	Syllabus Contents	Number of Sessions
I	Soft Computing: Introduction of Soft Computing-Soft Computing vs. Hard Computing-various types of Soft Computing techniques-Applications of Soft Computing. Fundamentals of Neural Networks: Basic Concepts of Neural Network-Model of an Artificial Neuron-Neural Network Architectures-Characteristics of Neural Networks-Learning Methods-Early Neural Network Architectures-Some applications domain.	12
II	Back propagation Networks: Architecture of Back propagation Network-Back propagation Learning –illustrations-Effect of Tuning Parameters of the Back propagation Neural Network-Selection of various parameters in Back propagation Neural Network-Variations of Standard Back propagation algorithms.	12
III	Supervised Learning Neural Networks: Introduction - Perceptron - Adaline – Multiple Adaptive Linear Neurons – Radial Basis Function Networks. Unsupervised Learning Neural Networks: Introduction – Fixed Weight Competitive Nets – Kohonen Self Organizing Feature Maps – Learning Vector Quantization – Adaptive Resonance Theory Network.	12
IV	Fuzzy logic: Fuzzy Set Theory: Fuzzy versus Crisp - Fuzzy Sets: Membership Function-Basic Fuzzy set operations-Properties-Fuzzy Relations: Fuzzy Cartesian Product-Operations. Fuzzy Systems: Fuzzy Logic-Fuzzy Rule based system-Defuzzification Methods-Applications.	12
V	Genetic Algorithm: Introduction – Biological Background – Genetic Algorithm and Search Space – Genetic Algorithm Vs Traditional Algorithm – Basic Terminologies in Genetic Algorithm – Simple Genetic Algorithm – General Genetic Algorithm – Operators – Stopping Condition in Genetic Algorithm Flow – Constraints in Genetic Algorithm – Advantages and Limitations of Genetic Algorithm- Applications of Genetic Algorithm.	12

Learning Resources	
Text Books	3. Rajasekaran. S and VijayalakshmiPai, Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI, New Delhi-2011 (fifteenth edition) (Unit I,II,IV) 4. Sivanandam. S. N and Deepa S. N, Principles of Soft Computing, 2 ND Edition Wiley India, 2012.(Unit III & V)
Reference Books	5. Fakhreddine O. Karray, Clarence De Silva, Soft Computing and Intelligent Systems Design, Pearson, 2009. 6. Sudarshan K. Valluru and T.Nageswara Rao, Introduction to Neural Network and Genetic Algorithm Theory and Applications,Pashupathi Printers Ltd,New Delhi, 2010. 7. KwangH.Lee, First Course on Fuzzy Theory and Applications,Springer International Edition,2009. 8. AmirthavalliM,Fuzzy Logic and Neural Network,Scitech Publications Pvt.Ltd,2007
Web Sites/Links	3. www.banasthali.org 4. www.soft-computing.de/def.html

Content beyond the syllabus:

1. Applications using ANN
2. Scope of Soft Computing Techniques
3. Study about "R' Tools

Subject Title	Big Data Analytics	Semester	V	Hours:60
Subject Code	17U5CTE03	Specialization	NA	
Type	Elective - I	L:T:P:C	5:0:0:4	

Objectives:

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

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

Learning Resources

Text Books	2. "Big Data Black Book". "DT Editorial services", Dream Tech Press, 2016.
Reference Books	3. "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data" EMC Educational services, Wiley Publications, 2015. 4. "Real-Time Big Data Analytics: Emerging Architecture", "Mike Barlow", O'Reilly Publications, 2013.
Web Sites / Links	3. http://searchbusinessanalytics.techtarget.com/definition/big-data-analytics 4. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html

Content beyond Syllabus:

1. To understand about Hadoop.
2. Knowledge about unstructured data.

Subject Title	**Open Source Technologies**	**Semester**	**VI**	**Hours:60**
Subject Code	**17U6CTE04**	**Specialization**	**NA**	
Type	**Elective – II**	**L:T:P:C**	**4 : 0 : 0 : 3**	

Objectives:

2. To enable the students to learn the concepts of open source, XML, PHP and MYSQL.

Unit	**Syllabus Contents**	**Number of Sessions**
I	Open Source: Definition – Application of Open Source, Advantages and disadvantages of open source –benefits of open source – commercial aspects of open source – open source operating system: introduction of Linux.	**12**
II	Introduction: What is XML? – Origin Of the XML Standards - Where XML Can Be Used, And What U Can Use it For. Well-Formed XML: Parsing XML – Attributes - Comments –Empty Elements - XML Declaration - Processing Instructions – Illegal PCDATA Characters - Errors in XML. Validation: Document Type Definitions.	**12**
III	Introduction to PHP: Sending data to the Web Browser – Variables & Strings – Programming with PHP & Creating HTML: Handling HTML Form & Operators-Validating Form Data & Arrays – Introduction to MySQL: Creating Database columns – Introduction to SQL: Inserting Records & Select Data.	**12**
IV	Advance SQL and MySQL:DB Design-Normal Forms - Performing Transactions - Error Handling and Debugging : Introduction – Displaying PHP Errors – PHP Debugging Techniques – Creating Custom error handlers – Using PHP with MySQL: Introduction – Connecting to MySQL – Security & Updation with PHP .	**12**
V	Cookies and Sessions: Making Login Page – Using Sessions – Security Methods:Preventing Spam – Preventing XSS & SQL Injection Attacks – Database Encryption - Perl-Compatible Regular Expression: Introduction – Defining Simple Patterns - Finding Matches & Using Modifiers.	**12**

Learning Resources	
Text Books	3. David Hunter, Jeff Rafter, Joe Fawcett, Eric Van der Vlist ,Danny Ayers, John Duckett, Andrew Watt, Linda McKinnon "Beginning XML 4th Edition", -Wiley India Pvt. Limited -2008. Unit I- Chapters 1,2,4 Unit II – Chapter 11, 12, 15. 4. Lary Ullman , "PHP6 AND MySQL5 For Dynamic Web Sites" -, Pearson Education – 2008.Unit III - Chapter 1, 2, 4,5, Unit IV- Chapters 6,7,8 Unit V, Chapters 11, 12, 13.
Reference Books	3. Chris Bates "Web Programming, Building Internet Applications", 3rd Edition, April 2006, WILEY Dreamtech. 4. Michael j. Young "Step by Step XML?" Microsoft Press, 2002.
Web Sites/Links	5. http://www.computerworld.com/open-source-tools/five-open-source-technologies.html. 6. http://searchsoa.techtarget.com/definition/XML. 7. https://www.php.net. 8. https://www.codecademy.com/tracks/php.

Content beyond syllabus:

4. Open Source Operating System (Solaris)
5. Open Source web server
6. Eclipse IDE platform

Subject Title	Artificial Intelligence and Expert Systems	Semester	VI	Hours:60
Subject Code	17U6CTE05	Specialization	NA	
Type	Elective :II	L:T:P:C	4:0:0:3	

Objectives:

3. To provide an overview of topics in the field of Artificial Intelligence.
4. Working Knowledge of designing a expert systems and applying expert system technologies in designing and analyzing engineering systems.

Unit	Syllabus Contents	Number of Sessions
I	Introduction: Artificial Intelligence Problems- Artificial Intelligence Techniques-Criteria for Success. Problems, Problems Space, Search: State Space Search-Production Systems-Problem Characteristics- Issues in design of search. Heuristic Search Techniques: Generate & Test- Hill climbing- Best First, problem Reduction, Constraint satisfaction, Means End Analysis.	12
II	Knowledge Representation Issues: Representations and Mappings-Approaches to Knowledge representation-Issues in knowledge representations-The Frame Problem. Using Predicate Logic: Representing Simple Facts in Logic-Representing instance and ISA Relationships-Computable Functions and Predicates- Resolution-Natural deduction.	12
III	Representing Knowledge Rules: Procedural vs. Declarative Knowledge-Logic Programming- Forward vs Backward Reasoning- Matching- Control Knowledge-Symbolic Reasoning under Uncertainty: Introduction to Nonmonotonic Reasoning- Logics for Nonmonotonic Reasoning-Implementation Issues Augmenting Problem Solver- Implementation: Depth First Search-Implementation: Breadth First Search	12
IV	Statistical Reasoning: Probability and Bayes Theorem-Certainty Factors and Rule-based Systems- Bayesian Networks- Dempster- Shafer Theory- Fuzzy Logic- Weak slot -Filler Structures: Semantic Nets Frames. Strong Slot Filler Structures: Conceptual Dependency- Scripts	12
V	Game Playing: Overview-The Minimax Search Procedure-Adding Alpha-Beta Cutoffs-Additional Refinements- Expert Systems: Representing and using Domain Knowledge-Expert system Shells- Explanation- Knowledge Acquisition	12

Learning Resources	
Text Books	2. Elaine Rich ,Kevin Knight,Shivashankar B Nair, "Artificial Intelligence", Tata McGraw-Hill Publication, 3rd Edition,2010
Reference Books	3. Donald A.Waterman – A Guide to Expert Systems Tata Mcgraw Hill – second Edition,1991. 4. Stuart Russell and Peter Norving ,"Artificial Intelligence – A Modern Approach"Second Edition,2007.
Web Sites / Links	4. www. tutorialspoint.com. 5. www.myreaders.info. 6. www.listpdf.com.

Content beyond the Syllabus:

3. The major advantages of AI over natural languages.
4. The role of the intelligent systems and their potential benefits.

Subject Title	Network Security & Cryptography	Semester	VI	Hours:60
Subject Code	17U6CTE06	Specialization	NA	
Type	Elective : II	L:T:P:C	4:0:0:3	

Objectives

3. Identify and explain the concepts, policies, and technologies associated with a layered and diversified defense-in-depth strategy.
4. Define the concepts of auditing in a network, including the types of audits and the handling of data.

Unit	Syllabus Contents	Number of Sessions
I	**Introduction:** Security Trends-The OSI Security Architecture - Security Attacks - Security Services- Security Mechanisms- Model for Internetwork Security - Internet Standards and the Internet Society. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles - Symmetric Block Encryption Algorithms - Stream Ciphers and RC4 - Cipher Block Modes of Operations - Location of Encryption Devices-Key Distribution	12
II	**Public Key Cryptography and Message Authentication:** Approaches to Message Authentication – Secure Hash Functions and HMAC - Public Key Cryptography Principles - Public Key Cryptography Algorithms - Digital Signatures - **Key Management Authentication Applications:** Kerberos - X.509 Authentication service - Public Key Infrastructures.	12
III	**Electronic mail Security:** Pretty Good Privacy (PGP) - S/MIME. **IP Security:** IP Security Overview – IP Security Architecture - Authentication Header - Encapsulating Security Payload - Combining security Associations - Key Management.	12
IV	**Web Security:** Web Security Considerations- Security Sockets Layer (SSL) and Transport Layer Security (TLS) - Secure Electronic Transaction. **Network Management Security:** Basic Concepts of SNMP - SNMPV1 Community facility - SNMPV3.	12
V	**Intruders:** Intruders – Intrusion Detection – Password Management - Malicious Software: Viruses and Related Threats – Virus Countermeasures – Distributed Denial of Service Attacks. **Firewalls:** Firewall Design Principles – Trusted Systems – Common Criteria for IT Security Evaluation.	12

Learning Resources	
Text Books	2. William Stallings, "Network Security Essentials – Applications and Standards", 3rd Edition, Pearson Education, 2009 Edition. Unit I : Chapter 1 & 2 , Unit II : Chapter 3 & 4, Unit III : Chapter 5 & 6, Unit IV : Chapter 7 & 8, Unit-V (Chapter 9, 10 & 11)
Reference Books	4. V.K.Pachghare , "Cryptography and Information Security" , PHI 2010. 5. William Stallings, "Cryptography and Network Security", Pearson Education - 2008. 6. Behrouz A Forouzan, Sophia Chung Fegan, "Data Communications and Networking", TMH-2006.
Web Sites / Links	3. Nptel.in 4. Tecnopedia.com

Content beyond Syllabus:

3. To know about Cyber security.
4. To understand about security algorithms.

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