

HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

COIMBATORE-641 028

B.Sc INFORMATION TECHNOLOGY

SCHEME OF EXAMINATIONS – CBCS PATTERN

(For the students admitted from the Academic year 2016 - 2017 and onwards)

CODE NO.	SUBJECT	LECTURE HRS /WEEK	EXAM DURATION (HRS)	MAX.MARKS			CREDIT POINTS
				IE	EE	TOTAL	
<b>First Semester</b>							
<b>Part - I</b>							
16LAT01 / 16LAH01/ 16LAM01/ 16LAF01	Tamil / Hindi / Malayalam / French – I	6	3	25	75	100	3
<b>Part - II</b>							
16ENG01	English - I	6	3	25	75	100	3
<b>Part - III</b>							
16ITU01	Foundations of Information Technology	4	3	25	75	100	3
16ITU02	Digital Fundamentals and Architecture	5	3	25	75	100	4
16ITU03	Programming with C	5	3	25	75	100	4
16ITU04	Practical I : Programming Lab - C	4	3	40	60	100	3
<b>Second Semester</b>							
<b>Part - I</b>							
16LAT02 / 16LAH02 / 16LAM02/ 16LAF02	Tamil / Hindi / Malayalam / French – II	6	3	25	75	100	3
<b>Part – II</b>							
16ENG02	English – II	6	3	25	75	100	3
<b>Part – III</b>							
16ITU05	Data Structures	4	3	25	75	100	3
16ITU06	Programming with C++	4	3	25	75	100	3
16ITU07	Practical II: Programming Lab C++	3	3	40	60	100	3
16ITU08	Allied : Numerical Methods (MAT)	5	3	25	75	100	3
<b>Part - IV</b>							
16GSU01	Value Education - Human Rights	2	-	100	-	100	2
<b>Third Semester</b>							
<b>Part – III</b>							
16ITU09	System Software and Operating System	5	3	25	75	100	4
16ITU10	Java Programming	5	3	25	75	100	4
16ITU11	Computer Networks	5	3	25	75	100	4
16ITU12	Practical III: Programming Lab –Java	5	3	40	60	100	3

16ITU13	Practical IV: Networking Lab	3	3	40	60	100	3
16ITU14	<b>Allied : Mathematical structures (MAT)</b>	5	3	25	75	100	3
	<b>Part - IV</b>						
16GSU02	Environmental Studies	2	-	100	-	100	2
<b>Fourth Semester</b>							
	<b>Part - III</b>						
16ITU15	Visual Basic Programming	5	3	25	75	100	4
16ITU16	Relational Database Management Systems	5	3	25	75	100	4
16ITU17	Software Engineering	5	3	25	75	100	4
16ITU18	Practical V: Programming Lab – Visual Basic	4	3	40	60	100	3
16ITU19	Practical VI: ORACLE Lab	4	3	40	60	100	3
16ITU20	<b>Allied : Business Accounting (COM)</b>	5	3	25	75	100	3
	<b>Part - IV</b>						
16GSU03	<b>Skill Based: Internet Security</b>	2	-	100	-	100	2
	<b>Part - V</b>						
16GSU04	Extension Activity		-	100	-	100	2
<b>Fifth Semester</b>							
	<b>Part - III</b>						
16ITU21	Computer Graphics and Multimedia	6	3	25	75	100	5
16ITU22	.NET Programming	5	3	25	75	100	4
16ITU23	Data Mining and Warehousing	5	3	25	75	100	4
16ITU24	<b>Practical VII: Graphics and Multimedia Lab</b>	4	3	40	60	100	3
16ITU25	<b>Practical VIII: Programming Lab – .NET</b>	4	3	40	60	100	3
16ITU26	<b>Elective - I</b> (a) Information Security (OR) (b) Artificial Intelligence and Expert Systems	6	3	25	75	100	4
	<b>Part - IV</b>						
16GSU05	<b>Non - Major Elective</b> General Awareness		-	100	-	100	2
	<b>Part - V</b>						
16GSU06	Law of Ethics	-		100		100	2
<b>Sixth Semester</b>							
	<b>Part - III</b>						
16ITU27	Software Testing	6	3	25	75	100	5
16ITU28	Open Source Tools	6	3	25	75	100	5
16ITU29	<b>Practical IX: Software Testing &amp; SPM Lab</b>	6	3	40	60	100	5
16ITU30	<b>Practical X: Open Source Lab</b>	6	3	40	60	100	5
16ITU31	<b>Elective - II</b> (a) E-Commerce (OR) (b) Digital Image Processing	6	3	25	75	100	4
16ITU32	Project Work		-	40	60	100	4
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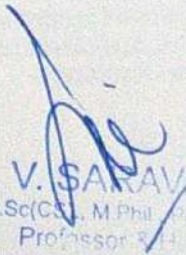
Code No.	Subject	Semester No.
16ITU01	<b>FOUNDATIONS OF INFORMATION TECHNOLOGY</b>	<b>I</b>
<b>Objective:</b>	To gain knowledge on the working of the computer system and the technologies involved.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Information Technology an Overview</b> Introduction - Information Systems – Software and Data – IT in Business and Industry – IT in Education and Training – The Global Positioning System (GPS) The Computer System and Central Processing Unit: Types of Computers – The Anatomy of a Computer – The Foundations of Modern Information Technology- Bits and Bytes – The Binary Code – The Central Processing Unit -The Microprocessor – Memory – ROM and RAM.	<b>10</b>
<b>Unit II</b>	<b>Input and Output</b> Input Devices – Keyboard, Mouse, Joystick, Trackballs, OCR, Scanner, Graphics Tablet, Touch pads. The foundations of Modern Output Pixels and Resolution- Pixels – Resolution – The range of colors- Display Screens-Types of Screens – Resolution. Printers: Laser Printers – Other Printers – Color Printers. Secondary Storage: How data is stored – Storage Characteristics – Storage Media – FDD – HDD – Optical Discs – Increasing Data Storage and Capacity.	<b>10</b>
<b>Unit III</b>	<b>Software – An Introduction</b> Software – User Interfaces – Application Programs – Operating Systems- Introduction – Types – Utilities – Major Software Issues. Communications. The Electronic Web: Network Applications – Fax, Voice, Information Services, Person to person communications, Group Communication, Exchanging Files, Understanding Bandwidth.	<b>10</b>
<b>Unit IV</b>	<b>Information Technology in Business</b> Corporate Computing – Transaction Processing – Information Tools for Management Control – Marketing, Advertising and Sales – Business on the internet- Programming and System Development: Programs – An introduction .Programming Languages: First and Second Generations – Procedural Languages.	<b>09</b>
<b>Unit V</b>	<b>Personal, Social and Ethical Issues</b> Computers and Health – Viruses – Intellectual Property Rights – Computer Crime – Cryptography – The Burning Issues.	<b>09</b>

**Text Book:**

1. Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, "Information Technology – The Breaking Wave", Tata McGrawHill Edition 1999.

**Reference Books:**

1. Yadav D.S, " Foundations of Information Technology", New Age International 2006.
2. Alka Sabharwal , Sangeeta Panchal, ," Foundations of Information Technology", oxford university press,2013.
3. Rajaraman V, "Introduction To Information Technology", PHI Learning Pvt. Ltd, 2013.

  
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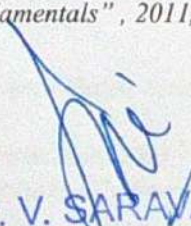
Code No.	Subject	Semester No.
16ITU02	<b>DIGITAL FUNDAMENTALS AND ARCHITECTURE</b>	<b>I</b>
<b>Objective:</b>	On successful completion of this subject the students should have Knowledge on Digital circuits and Architecture and Interfacing of various Components.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Number System and codes</b> Introduction - Number System - Floating Point Representation of Numbers - Arithmetic Operation - 1's and 2's Complements: 1's Complement Subtraction - 2's Complement Subtraction. 9's Complement - 10's Complement - BCD.	<b>12</b>
<b>Unit II</b>	<b>Boolean algebra, Minimization Techniques and Logic Gates</b> Introduction - Boolean Logic Operations - Basic Laws of Boolean Algebra - Demorgan's Theorems - Sum of Products and Product of Sums - Karnaugh Map. Logic Gates: OR Gate - AND Gate - NOT Gate - NAND Gate - NOR Gate.	<b>12</b>
<b>Unit III</b>	<b>Arithmetic Circuits and Flip Flops</b> Introduction - Half Adder - Full Adder, Half Subtractor - Full Subtractor - Multiplexers - Demultiplexers - Decoders. Flip Flops: Types of Flip Flops - S-R Flip Flop - JK Flip Flop - T Flip Flop. Registers: Shift registers.	<b>12</b>
<b>Unit IV</b>	<b>Input -Output Organization</b> Input-Output Interface - Asynchronous Data Transfer - Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt. Direct Memory Access - Input - Output Processor: CPU-IOP Communication..	<b>12</b>
<b>Unit V</b>	<b>Memory Organization</b> Memory Hierarchy-Main Memory - Associative Memory - Cache Memory - Virtual Memory: Address Space and Memory Space- Address mapping using Pages- Associative memory Page Table.	<b>12</b>

**Text Book :**

1. Salivahanan S and Arivazhagan S., "Digital Circuits and Design", Vikas Publishing House Pvt Ltd. (UNIT - I,II,III) Third Edition.
2. Morris Mano M. , "Computer System Architecture", PHI, 3<sup>rd</sup> edition (UNIT - IV, V)

**Reference Books:**

1. Albert Paul Malvino, Donald P Leach, "Digital principles and applications", TMH, 1996.
2. Puri V.K. "Digital Electronics Circuits And Systems", TMH, 2000.
3. Thomas C. Bartee, "Digital Computer Fundamentals", 2011, TMH Publication, 6<sup>th</sup> edition.

  
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Code No.	Subject	Semester No.
16ITU03	PROGRAMMING WITH C	I
Objective:	On successful completion of this subject the students have the programming ability in C Language.	
Unit No.	Topics	Hours
Unit I	<b>Overview of C</b> Importance of C-Basic structure of C Programs-Programming style-Executing a C Program- Constants, Variables and Data types: Character set - C Tokens – Keyword and Identifiers- Constants, Variables and Data types- Operators and Expressions: Types of Operators-Arithmetic Expressions-Evaluation of Expressions.	12
Unit II	<b>Managing Input and Output operations</b> Reading and Writing a Character-Formatted I/O- Decision Making and Branching – Decision making with if statement – switch statement – Looping-while-do-for statement-Jumps in Loops.	12
Unit III	<b>Arrays</b> Types of Array – Dynamic Array- Character Arrays and Strings –Reading strings from terminal-String Handling functions-Table of strings. User defined Functions – Elements-Function declaration – Category of function – Nesting of function - Recursion.	12
Unit IV	<b>Structures and Unions</b> Array of structures – structures within structures- structures and functions. Union –size of structures-Bit fields. Pointers – Pointer expression – Pointers and Array-Pointer to function.	12
Unit V	<b>File management in C</b> File operations-Dynamic memory allocation – Linked lists- MALLOC, CALLOC and RELLOC. Preprocessors – Macro substitution-Programming Guide lines.	12

**Text Book:**

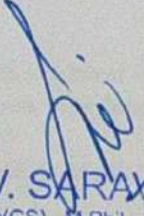
1. Balagurusamy E, "Programming in ANSI C", 4<sup>th</sup> edition, Tata McGraw-Hill.

**Reference Books:**

1. Byron S Gottfried, "Programming with C", Schaum's Outline Series – Tata McGraw Hill Publications, New Delhi.
2. Yashavant P. Kanetkar, "Pointers in C", BPB Publications 2003.
3. Ashok Kamthane, "Programming with ANSI and Turbo C", Pearson Education India, 2009..

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Code No.	Subject	Semester No.
16ITU04	<b>PRACTICAL I: PROGRAMMING LAB C</b>	I
<b>Objective:</b>	To develop the C programming skills	
<b>Ex. No.</b>	<b>Program List</b>	
1	Write a C program to find the sum of the digits of a number	
2	Write a C program to solve of a Quadratic Equation (all cases)	
3	Write a C program to implement a Sum of Series (sine, cosine, exponential).	
4	Write a C program to sort numbers in Ascending and descending order using Arrays (Use it to find Largest and Smallest Numbers).	
5	Write a C program to Sort a set of names in Alphabetical order	
6	Write a C program to implement Matrix operations (Addition, Subtraction, and Multiplication – using functions.	
7	Write a C program to Find factorials, generating Fibonacci Numbers using recursive functions	
8	Write a C program for String manipulations without using string functions (string length, string comparison, string copy, palindrome checking, counting words and lines in strings (Use function pointers).	
9	Write a C program to Create and process of Sequential files for Payroll.	
10	Write a C program to implement dynamic memory allocation & Pointer usage.	
11	Write a C program to copy file into another file.	
12	Write a C program to find sum of numbers given in Command line arguments recursively.	

  
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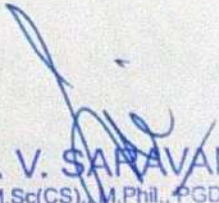
Code No.	Subject	Semester No.
16ITU05	DATA STRUCTURES	II
Objective:	This subject provides a practical application using different tools and techniques in Data structure and algorithms.	
Unit No.	Topics	Hours
Unit I	<b>Introduction</b> Introduction to Algorithm -Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation of Expressions -Singly Linked List – doubly linked list-Polynomial addition.	10
Unit II	<b>Trees</b> Binary tree representations – Tree Traversal – Threaded Binary Trees - Counting binary trees. Graphs: Terminology and Representations - Traversals, Connected Components.	09
Unit III	<b>Spanning trees</b> Biconnected components - Hashing: Introduction- Static Hashing- Dynamic Hashing. <b>Symbol tables:</b> Static tree table-Dynamic table.	09
Unit IV	<b>Sorting</b> Internal sorting - Insertion sort-quick sort-heap sort-Merge sort-two way merge sort-sorting on several keys. External Sorting: Storage device- Magnetic tape – Disk storage - Sorting with disk- K-way merging - Sorting with tape. Searching: Binary search.	10
Unit V	<b>Files</b> Files, Queries and Sequential organizations - Index Techniques- File Organizations-sequential organizations-Random Organization-Linked Organization-Inverted Files-Cellular Partitions - Storage Management.	10

**Textbook:**

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar, "Fundamentals of Data Structure", Galgotia Publications 1999.

**Reference Books:**

1. Horowitz, Sahni, Anderson-freed, "Fundamentals of Data structures in C", Second edition, 2008.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, 2001.
3. Narashimha Karumanchi, "Data Structures and Algorithms Made Easy", CareerMonk Publications, Second Edition.

  
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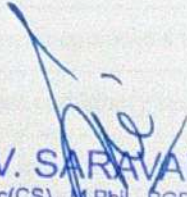
Code No.	Subject	Semester No.
16ITU06	PROGRAMMING WITH C++	II
<b>Objective:</b>	To inculcate knowledge on Object-oriented programming concepts using C++	
Unit No.	Topics	Hours
Unit I	<b>Introduction to C++:</b> Introduction to C++ - Key concepts of Object-Oriented Programming –Advantages- Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: Decision Making and Statements: If.. Else, jump, go to, break, continue and Switch case statements - Loops in C++: For, While, Do - Functions in C++ - Inline functions – Function Overloading.	09
Unit II	<b>Classes, Objects and Constructor, Destructor:</b> Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – Array of objects –Friend functions – Overloading member functions – Bit fields and classes – Constructor and Destructor with static members.	09
Unit III	<b>Operator Overloading and Types of Inheritance:</b> Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – Type conversion. Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchical, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.	10
Unit IV	<b>Array and Pointers:</b> Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – Array of classes – Memory models – New and Delete operators – Dynamic object – Binding , Polymorphism and Virtual Function.	10
Unit V	<b>Files:</b> Files – File stream classes – File modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling – String- Declaring and Initializing string objects – String Attributes – Miscellaneous functions.	10

**Text book:**

1. Ashok N Kamthane, "C++ Programming", Pearson Education publication, 2003.

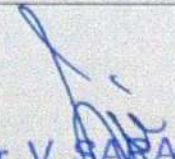
**Reference books:**

1. Balagurusamy. E, "Object-Oriented Programming with C++" Tata Mc-Grawhill Publications 2003, 2<sup>nd</sup> Edition.
2. Maria Litvin & Gray Litvin, "C++ for you", Vikas publication, 2<sup>nd</sup> Edition], 2002.
3. Yashavant P. Kanetkar, "Let Us C++",BPB Publications, 2003.

  
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Code No.	Subject	Semester No.
16ITU07	PRACTICAL II: PROGRAMMING LAB - C++	II
Objective:	To develop the object oriented programming skills	
Ex. No.	Program List	
1	Write a C++ Program to create a class to implement the Data Structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions.	
2	Write a C++ Program to create a class to implement the Data Structure QUEUE. Write a constructor to initialize the items of the QUEUE. Write a member function REAR () to insert an element and member function FRONT() to delete an element check for overflow and underflow conditions.	
3	Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.	
4	Write a C++ Program for Banking Information system using FRIEND FUNCTION.	
5	Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write a Member function ADD (), SUB (), MUL (), DIV () to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.	
6	Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display strings. Overload the Operator + to concatenate two Strings, == to compare two strings	
7	Write a C++ Program to create class, which consists of STUDENT detail like Student Number, Student Name, Department, Mark. Write a member function to get and display them. Derive a class RESULT from the above class and write a member function to calculate TOTAL, PERCENTAGE, and GRADE. Display the result of the student depending on the grade using Multi Level Inheritance.	
8	Write a C++ Program to create class which consists of EMPLOYEE detail like Employee Number, Employee Name, Department, Basic Salary and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade using Multiple Inheritance.	
9	Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGLE from class Shape and Calculate Area and Perimeter of each class separately and display the result.	
10	Write a C++ program to perform Arithmetic operations using TEMPLATE.	
11	Write a C++ Program to implement linear and binary search .	
12	Write a C++ Program to merge two files into a single file.	

  
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Code No.	Subject	Semester No.
16ITU09	<b>SYSTEM SOFTWARE AND OPERATING SYSTEM</b>	III
<b>Objective:</b>	To impart knowledge on various aspects of System Software and Operating System	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Introduction</b> System Software and machine architecture –Assemblers – Basic Assembler functions – Machine dependent features – Program Relocation – Machine independent features –Literals – Symbol Defining statements – Expression – Program blocks – Control Sections and Program Linking – Assembler design options.	12
<b>Unit II</b>	<b>Loaders and Linkers</b> Basic Loader functions – Machine dependent loader features – Relocation Program – Machine independent loader features - Loader options – Loader design options – linkage editor – dynamic linking – Bootstrap Loader	12
<b>Unit III</b>	<b>Text Editors</b> Overview of editing process –user interface –editor structure. Machine dependent compiler feature: Intermediate form of the program – machine independent compiler features – compiler design options – division into passes – interpreters – P-code compilers	12
<b>Unit IV</b>	<b>Introduction</b> Definition of DOS – History of DOS –Definition of Process – Process states – Process state Transition – Interrupt Processing – Interrupt classes. Storage Management Real storage: Real storage management strategies – Contiguous Vs non-Contiguous storage allocation –Single user Contiguous storage allocation – Fixed Partition multiprogramming - Variable Partition multiprogramming.	12
<b>Unit V</b>	<b>Virtual Storage</b> Virtual storage management strategies – Page replacement strategies – Demand Paging – Page size. Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization – FCFS –SSTF –SCAN – RAM Disks.	12

**Text Book:**

1. Leland –L-Beck, "System Software: An introduction to System Programming", Pearson Education Publishers, Third Edition, New Delhi, 2003.

**Reference Books:**

1. Deitel H.M., "Operating System", Pearson Education Publishers, 2<sup>nd</sup> Edition, 2003.
2. Achyut .S.Godbole, "Operating System", TMH Publications, 2003.
3. Ramesh Bangia, Balvir Singh, " Operating Systems and Software Diagnostics" , First Edition, 2007.

  
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Code No.	Subject	Semester No.
16ITU10	JAVA PROGRAMMING	III
<b>Objective:</b>	To inculcate knowledge on java programming	
Unit No.	Topics	Hours
Unit I	<b>Introduction to Java</b> Features of Java - Object Oriented Concepts – History of Java- Structure – Java Tokens – Statements – Java Virtual Machine - Data Types - Variables - Operators - Decision Making and Branching - Decision Making and Looping.	12
Unit II	<b>Object Oriented concepts</b> Classes, Objects and Methods: Methods & variables - Constructor-Overloading - Static members - Final Classes – Abstract method - Arrays, Strings and Vectors. – Interfaces: Multiple Inheritance – Extending interfaces-implementing interfaces. Packages: Putting Classes together-creating, accessing & using packages.	12
Unit III	<b>Multithreaded Programming</b> Creating Threads -Extending Threads -Thread life cycle - Thread Exception-priority -Implementing runnable interface. Managing Errors and Exceptions: Introduction - Exception handling – Exceptions - Multiple Catch statement - using finally statement– Applet Programming – Graphics Programming.	12
Unit IV	<b>Files</b> Managing Input / Output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.	12
Unit V	<b>Advanced concepts of Java</b> AWT Class and Controls: Introduction -AWT class - AWT controls-Labels, Buttons, Check Box, List, Text Field, Text Area – AWT managers and menus – Layout manager – Menu Bar & Menus - Event handling by AWT components - Java Bean - Socket Programming – Servlets - Java Server Pages, JDBC.	12

**Text Book:**

1. Balagurusamy E, "Programming With Java – A Primer –", TMH, 3<sup>rd</sup> Edition..

**Reference Books:**

1. Patrick Naughton & Hebert Schildt, "The Complete Reference Java 2", TMH., 3<sup>rd</sup> Edition.
2. John R.Hubbard, "Programming With Java" TMH, 2<sup>nd</sup> Edition.
3. Herbert Schildt, "The Complete Reference Java", Paperback, 7th Edition, 2006.

  
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Code No.	Subject	Semester No.
16ITU11	COMPUTER NETWORKS	III
<b>Objective:</b>	On successful completion of the course the students should have understanding of the use of computer networks and the functions of the various layers.	
Unit No.	TOPICS	Hours
Unit I	<b>Introduction</b> Use of computer networks: Business Applications – Home Applications – Mobile Users. Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues – Connection Oriented and Connectionless Services. References Models: OSI Reference Model – TCP/IP Reference Model – Comparison of OSI and TCP/IP - Critique of OSI Protocols – Critique of TCP/IP Reference Model.	12
Unit II	<b>Physical Layer – Guided Transmission Media</b> Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission- Microwave-Transmission – Infrared and Millimeter Waves – Light Waves. Communication Satellites: Geo- Stationery Satellites – Medium Earth Orbit Satellites – Low Earth Orbit Satellites – Satellites versus-Fiber - Public Switched Telephone System – Structure of Telephone System.	12
Unit III	<b>Data Link Layer</b> Data Link Layer Design Issues – Services Provided To The Network Layer – Framing. Error Detection and Correction: Error Detecting Codes – Error Correcting Codes. Elementary Data Link Protocols: Unrestricted Simplex Protocol – Simplex Stop and Wait Protocol – Simplex Protocol For Noisy Channel. Sliding Window Protocol 1 -Bit Sliding Window Protocol.	12
Unit IV	<b>Network Layer</b> Design Issues: Store And Forward Packet Switching – Services Provided To The Transport Layer – Implementation Of Connectionless Service – Implementation Of Connection Oriented Service – Comparison Of Virtual Circuit And Datagram Subnets. Routing Algorithms: Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing – LinkState Routing – Hierarchical Routing - Broadcast Routing – Multicast Routing - Distant Vector Routing.	12
Unit V	<b>Transport Layer</b> Services Provided To The Upper Layers – Transport Service Primitives – Elements Of Transport Protocols – Addressing – Connection Establishment And Connection Release. <b>DNS</b> (The Domain Name System): The DNS Name Space – Resource Records – Name Servers. <b>Application Layer:</b> DNS – Email. Network Security: Cryptography – Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures.	12

**Text Book:**

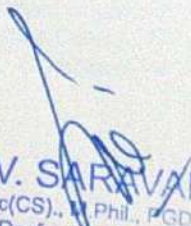
1. Andrew S. Tanenbaum, "Computer Networks", Prentice hall India Pub, Fourth Edition, 2005.

**Reference Books:**


1. Douglas E. Comer, "Computer Networks & Internets with Internet Applications", Pearson Education, Fourth Edition, 2008.
2. William Stallings, "Data and computer communications", PHI, seventh edition, 2000.
3. James F. Kurose, "Computer Networking: A Top - Down Approach", 2012.

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Code No.	Subject	Semester No.
16ITU12	<b>PRACTICAL III: PROGRAMMING LAB - JAVA</b>	III
<b>Objective:</b>	To develop the programming skill in object oriented concepts and applets	
<b>Ex. No.</b>	<b>Program List</b>	
1	Write the java program for the manipulation of string class.	
2	Write a java program to demonstrate overloading & overriding.	
3	Write a java program to implement the multiple inheritance using interfaces.	
4	Write a java program to demonstrate the use of packages.	
5	Write a java program to implement the concept of Multithreading.	
6	Write a java program to create an Exception and throw the exception.	
7	Write a java program to demonstrate Graphics and Applet class.	
8	Create a java program to create Frame, Textbox, List box and buttons using AWT.	
9	Write a java program to develop a menu using AWT.	
10	Write a java program to implement the concept of Applet & AWT.	
11	Write a java program to implement the concept of various events.	
12	Write a java program which open an existing file and append the text to that file.	

  
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Code No.	Subject	Semester No.
16ITU13	PRACTICAL IV: NETWORKING LAB	III
Objective:	To understand the concept of Network Programming.	
Ex. No.	Program List	
1	Write a simple program that can read a Host name and convert it into an IP address.	
2	Write a program using TCP Sockets(like Date &Time of Server & Client, Echo Server & Client, etc.,)	
3	Write a program for implementation of Data Link Layer Error Detection Mechanism (GoBackN)	
4	Write a program for Protocol Simulation of Stop and Wait.	
5	Write a TCP Client & Server application to transfer a file.	
6	Design an UDP Client and Server application to transfer a file.	
7	Write a program for Distance Vector Algorithm to find suitable path for transmission.	
8	Write a Program to implement RPC to generate a Fibonacci Series.	

  
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Code No.	Subject	Semester No.
16ITU15	VISUAL BASIC PROGRAMMING	IV
Objective:	To understand the Visual Basic event-driven programming concepts, terminology, and available tools, and learn to design and develop Windows-based business applications using Visual Basic programs that meet commercial programming standards.	
Unit No.	Topics	Hours
Unit I	<b>Introduction to Visual Basic</b> Introduction Graphical User Interface (GUI), Programming Language (Procedural, Object Oriented, Event Driven), The Visual Basic Environment, How to use VB compiler to compile / debug and run the programs. Variables, Constants, and Calculations: - Variables, Variables Public, Private, Static, Constants, Data Types, Naming rules/conventions, Constants, Named & intrinsic, Declaring variables, Scope of variables, Val Function, Arithmetic Operations, Formatting Data.	12
Unit II	<b>Decision &amp; Conditions</b> If Statement, If-then-else Statement, Comparing Strings, Compound Conditions(And, Or, Not), Nested If Statements, Case Structure ,Using If statements with Option Buttons & Check Boxes, Displaying Message in Message Box, Testing whether Input is valid or not. Using Call Statement to call a procedure.	12
Unit III	<b>Introduction to VB Controls</b> Textboxes, Frames, Check Boxes, Option Buttons, Images, Setting a Border & Styles, The Shape Control, The line Control, Working with multiple controls and their properties, Designing the User Interface, Keyboard access, Tab controls, Default & Cancel property, Coding for controls. Menus, Sub-Procedures and Sub-functions : Defining / Creating and Modifying a Menu, Using common dialog box, Creating a new sub-procedure, Passing Variables to Procedures, Passing Argument ByVal, ByRef, Writing a Function Procedure.	12
Unit IV	<b>Multiple Forms Creation</b> Adding, removing Forms in project, Hide, Show Method, Load, Unload Statement, Me Keyword, Referring to Objects on a Different Forms. Arrays: Single-Dimension Arrays, Initializing an Array, User-Defined Data Types, Accessing Information with User-Defined Data Types, Using List Boxes with array, Two dimensional arrays.	12
Unit V	<b>Data Files</b> Sequential files & Random files. Accessing Database File: Creating the database files for use by Visual Basic (Using MS-Access) Using the Data Control, setting its property, Using Data Control with forms, navigating the database object using the move next, move previous, move first and move last methods, checking for BOF and EOF, using list boxes and combo boxes as data bound controls, updating a database file ( adding, deleting records ), Displaying data in grids.	12

**Text Book:**

1. Julia Case Bradley & Anita C. Millspaugh, "Programming in Visual Basic 6.0" by McGraw-Hill.

**Reference Books:**

1. Byron S. Gottfried, "Visual Basic", Schaum Outline Series, TMH.
2. Eric A. Smith, Valor Whisher, Hank Marquis, "Visual Basic 6 Programming Bible", BPB Publications.
3. Rod Stephens, "Visual Basic 2012 Programmer's Reference", Paperback – 26 Sep 2012.

  
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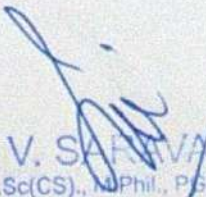
Code No.	Subject	Semester No.
16ITU16	RELATIOANAL DATABASE MANAGEMENT SYSTEMS	IV
<b>Objective:</b>	To lay a strong foundation into the basic principles, theory and practice of using relational databases. To emphasize the need, role, importance and uses of databases in applications development.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Purpose of Database</b> Overall System Structure - Entity Relationship Model - Mapping Constraints - Keys - E-R Diagrams. Data Storage and Querying Transaction Management. Database Architecture.	12
<b>Unit II</b>	<b>Relational Model</b> Structure - Formal Query Language - Relational Algebra - Tuple and Domain Relational Calculus.	12
<b>Unit III</b>	<b>Introduction to Oracle</b> Types of Databases, Relational Database properties. Structured Query Language - Basic Structure - Set Operations - Aggregate Functions - Date, Numeric, and Character Functions - Nested Sub queries - Modification Of Databases - Joined Relations-DDL - Embedded SQL.	12
<b>Unit IV</b>	<b>Relational Database Design</b> Pitfalls - Normalization Using Functional Dependencies - First Normal Form-Second Normal Form-Third Normal Form Fourth Normal Form And BCNF.	12
<b>Unit V</b>	<b>Structured Query Language</b> SQL (DDL,DML, DCL Commands) – Integrity Constraints – PL/SQL – PL/SQL Block – procedure, function – Cursor management – Triggers – Exception Handling.	12

**Text Book:**

1. Singh. S.K. "Database systems: Concepts, Design & applications", Pearson Education.

**Reference Books:**

1. Raghu Ramakrishnan and Johannes Gehrke, " Database Management Systems", McGraw-Hill Education, 2003.
2. Nilesh Shah, "Database system using Oracle", PHI Learning Private Limited, second edition.
3. Abraham Silberschatz , Henry F. Korth, S. Sudarshan, " Database System Concepts", Fifth edition, McGraw-Hill-2005.

  
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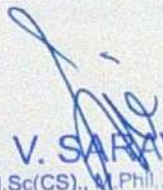
Code No.	Subject	Semester No.
16ITU17	SOFTWARE ENGINEERING	IV
<b>Objective:</b>	To learn the concept of designing the software in software concerns.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Software Process</b> Introduction -S/W Engineering Paradigm - life cycle models - system engineering - computer based system - verification - validation - life cycle process - development process -system engineering hierarchy.	12
<b>Unit II</b>	<b>Software Requirements</b> Functional and non-functional - user - system -requirement engineering process - feasibility studies - requirements - validation and management - software prototyping - prototyping in the software process - rapid prototyping techniques - user interface prototyping - S/W document.	12
<b>Unit III</b>	<b>Design Concepts And Principles</b> Design process and concepts - modular design - design heuristic - design model and document. Architectural design - software architecture - data design - architectural design - transform and transaction mapping - user interface design - user interface design principles. Real time systems - Real time software design - system design - real time executives - monitoring and control system.	12
<b>Unit IV</b>	<b>Testing</b> Software testing - levels - test activities - types of s/w test - black box testing - testing boundary conditions - structural testing - test coverage criteria based on data flow mechanisms - regression testing - testing in the large. S/W testing strategies - strategic approach and issues – unit , integration, validation & system testing and debugging.	12
<b>Unit V</b>	<b>Software Project Management</b> Measures and measurements - S/W complexity and science measure - size measure - data and logic structure measure - information flow measure. Software cost estimation - function point models - COCOMO model- Delphi method.- Defining a Task Network - Scheduling - Earned Value Analysis - Error Tracking - Software changes - program evolution dynamics - software maintenance - Architectural evolution - Taxonomy of CASE tools.	12

**Text Book:**

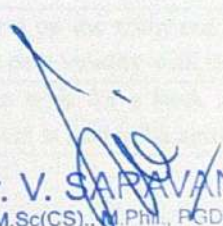
1. Roger S.Pressman and James F Peters and Witold Pedryez, "Software Engineering", McGraw-Hill International Edition, 6th edition, 2004.

**Reference Books:**

1. James F Peters and Witold Pedryez, "Software Engineering - An Engineering Approach", New Delhi, 2000.
2. Bruce R.MAXIM,Roger S.Pressman "Software Engineering - An Engineering Approach", McGraw-Hill eight edition.
3. David A. Gustafson, " Schaum's Outline of Software Engineering", McGraw-Hill, First edition.

  
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Code No.	Subject	Semester No.
16ITU18	PRACTICAL V: PROGRAMMING LAB – VISUAL BASIC	IV
Objective:	Make the students to write the code which covers the following objectives	
Ex. No.	Program List	
1	Create a VB application to make the text bold, italic, underlined and also to color the text (using checkbox, option button, textbox controls)	
2	Using a scroll bar display the numbers from 1 to 100 in the textbox depending on the position of the scroll box. The numbers should be continuously as and when the scroll box is moved.	
3	Create a VB application that allows the user to change the shape by selecting a particular shape from a list of options from a list box, as well as change its color through a common dialog box.	
4	Create a VB application that creates the illusion of moving the jet plane in four directions, North, South, East, and West. And also let the user magnify and diminish the jet plane by changing the height and width properties of the object.	
5	Create a VB application with the following operations: A To add the text typed in the text box as an entry in the listbox. B.To remove entries from the listbox by pressing the "remove" button.	
6	Create a note pad using VB.	
7	Create a VB application with Simple login form for a Windows application that checks the entered username and password against a list of usernames and passwords in a database table.	
8	Create an application to explore different files in different directories which are in different drives using drive control, directory control and file control tools in a system.	
9	Create a Traffic Light program in Visual Basic using three shapes (set their shape properties to circle and fill the colors) and timer control	
10	Create an application for a Scientific Calculator	
11	Create a simple applications using file system controls	
12	Create a Database Applications using data control.	

  
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Code No.	Subject	Semester No.
16ITU19	PRACTICAL VI: ORACLE LAB	IV
<b>Objective:</b>	To identify, explore, and transfer new technologies that have the potential to substantially improve Oracle in various fields.	
<b>Ex. No.</b>	<b>Program List</b>	
1	Create a table for Student details with Registration Number as Primary Key and following fields: Name, Course, Gender, Age, Year of Joining and Percentage. Insert at least 10 rows and perform various queries using any one Comparison, Logical, Set, Sorting, and Grouping Operators.	
2	Create tables for a corporate management system which shows the use of primary and foreign key. The main table should have the following fields: Employee ID, Designation, Date of Joining, Date of Birth, Gender, Date of Transfer. Create a Report (Select Verb) with fields Employee ID, Gender, Date of Joining, and Date of Transfer with the Column Formats.	
3	Write a PL/SQL block to find out if a year is a leap year. A leap year is divisible by 4 but not by 100, or it is divisible by 400.(Hint: The function MOD(n,d) divides n by d and return the integer remainder from the operations).	
4	Write a trigger that is fixed before the DML statement's execution on the Employee table. The trigger checks the day based on the SYSDATE .If the day is Sunday the trigger does not allow the DML statements execution and raises an exception. Write the appropriate message in the exception handling section.	
5	Write a PL/SQL to divide the student's results table into three tables based on the results (One table for "Pass" and second one for "Average" and third one for "Fail"). Use a cursor for handling records of students table and create necessary fields for the table structure.	
6	Create a PL/SQL block to declare the cursor to select last name, first name, salary, and hire date from the EMPLOYEE table. Retrieve the rows from the cursor and get the employee's information if the salary is greater than Rs.50, 000 and the hire date is before 31, December, 2015.	
7	Declare a PL/SQL record based on the structure of the DEPT table. Use a substitution variable to retrieve information about a specific department and store it in the PL/SQL record. View the record information.	
8	Write a trigger that is fires after an INSERT statement is executed for the student table. The trigger writes the new students ID, users name, and system update in a table called TRACKING.(Create tracking table ).	
9	Create a database trigger to implement on the main and transaction tables which is related to the inventory system for checking the data validity with the tables having the needed fields.	
10	Write a PL/SQL program to create a table for a bank account and create and exception for managing the account where the account is said to be zero.	

  
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Code No.	Subject	Semester No.
16ITU21	<b>COMPUTER GRAPHICS AND MULTIMEDIA</b>	V
<b>Objective:</b>	To impart fundamental algorithms and techniques and gain knowledge and to understand the latest innovations in computer graphics.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>COMPUTER GRAPHICS</b> <b>Basic Concepts</b> Introduction-Uses of Computer graphics -Display devices - CRT, Color CRT monitors-Direct view storage tube – Flat panel displays-Raster scan system, Random scan system, aspect ratio. Line drawing algorithm-simple DDA – Bresenham's line drawing algorithm-circle generation. Attributes of Output primitives-line, area, curve, character.	<b>14</b>
<b>Unit II</b>	<b>Two Dimensional Concepts</b> Basic transformation, Matrix Representation –Composite transformation, General pivot point rotation-fixed point scaling, other transformation.2D viewing-viewing transformation-Windowing transformation. Clipping operations-point clipping-Line clipping-Sutherland-Hodgeman polygon clipping-Text clipping.	<b>15</b>
<b>Unit III</b>	<b>Three Dimensional Concepts</b> 3D display methods-3D dimensional transformation-3D viewing-Viewing pipeline-Viewing coordinates-Projections. Hidden surface removal-Object space method-Back face detection method-Painter's algorithm-Image space methods-area subdivision –Octree-Depth buffer-Scan line-Ray tracing Surface renderings-Shading	<b>15</b>
<b>Unit IV</b>	<b>MULTIMEDIA</b> <b>Text and Image</b> Text-Introduction-Types of text Unicode Standards- Font-Insertion Text-Text Compression-File Formats. Image- Image types-color models-Basics steps for Image Processing-Image processing software.	<b>14</b>
<b>Unit V</b>	<b>Audio and Video</b> Audio- Introduction-Elements of Audio system-MIDI. Video-Introduction-Analog Video Camera-Transmission of Video signals. Animations: Introductions-Uses of Animation-Types of Animation-Principles of Animations-Techniques of Animation.	<b>14</b>

**Text Book :**

1. Donald Hearn & Pauline Baker M. "Computer Graphics-C version", Pearson Education, 2<sup>nd</sup> Edition.
2. Ranjan Parekh",Principles of Multimedia",Tata McGrawHill companies.

**Reference Books:**

1. Amarendra N.Sinha,Arun D Udai,"Computer Graphics",Tata McGraw Hill Publishing Company,2007
2. Judith Jeffcoate "Multimedia in Practice Technology and Application",PHI Publishers,2002.
3. Ze-Nian Li,Mark S.Drew"Fundamentals of Multimedia",PHI Publishers,2008.

  
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Code No.	Subject	Semester No.
16ITU22	.NET PROGRAMMING	V
<b>Objective:</b>	On successful completion of this subject the students must have the programming ability in .Net programming and its framework	
Unit No.	Topics	Hours
Unit I	<b>Introduction to .NET</b> NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries. Introduction to Visual Studio, Project basics, types of project in .Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, and Object Browser. The Environment: Editor tab, format tab, general tab, docking tab. Visual development & Event-driven Programming –Methods and events.	12
Unit II	<b>The VB.NET Language</b> Variables –Declaring variables, Data Type of variables, Forcing variables declarations, Scope & lifetime of a variable, Constants, Arrays, types of array, control array, Collections, Subroutines, Functions, Passing variable Number of Argument Optional Argument, Returning value from function. Control flow statements: conditional statement, loop statement. MsgBox & Inputbox.	12
Unit III	<b>Object oriented Programming</b> Classes & objects, fields Properties, Methods & Events, constructor, inheritance. Access Specifiers: Public Private, Protected. Overloading, My Base & My class keywords. Overview about C# and VB.NET. Similarities & differences from Java, Structure of C# program. Language features: Type system, boxing and unboxing, flow controls, Classes. Exception Handling. Various Types of Exceptions.	12
Unit IV	<b>Working with Forms</b> Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, RadioButton, Panel, scroll bar, Timer, ListView, TreeView, toolbar, StatusBar. There Properties, Methods and events. OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog. Link Label. Designing menus : ContextMenu, access & 20hortcut keys.	12
Unit V	<b>Database programming with ADO.NET</b> Overview of ADO. Conversion from ADO to ADO.NET, Accessing Data using Server Explorer. Creating Connection, Command, Data Adapter and Data Set with OLEDB and SQLDB. Display Data on data bound controls, display data on Datagrid. Generate Reports Using CrystalReportViewer.	12

**Text Book:**

1. Steven Holzne, "VB.NET Programming Black Book", dreamtech pub.

**Reference Books:**

1. Evangelos petroustos, "Mastering VB.NET", BPB publications.
2. Bill Evjen, Jason Beres, et.al, "Introduction to .NET framework", Worx publication.
3. Andrew Troelsen, "Pro VB 2008 and the .NET 3.5 Platform (Windows.Net)", 3<sup>rd</sup> edition 2008.

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Code No.	Subject	Semester No.
16ITU23	DATAMINING AND WAREHOUSING	V
Objective:	To know the basic concepts of Data Mining and Data Warehousing	
Unit No.	Topics	Hours
Unit I	<b>Data Mining -Introduction</b> Basic Data Mining Tasks-Data Mining versus Knowledge Discovery in Databases – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective	12
Unit II	<b>Classification Techniques</b> Classification – Introduction – Statistical-Based Algorithms – Distance-Based Algorithm – Decision Tree-Based Algorithm - Neural Network –Based Algorithm – Rule – Based Algorithm – Combining Techniques.	12
Unit III	<b>Clustering Techniques</b> Clustering – Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithm –Partitional Algorithm – Clustering Large Databases – BIRCH – DBSCAN – CURE Algorithm.	12
Unit IV	<b>Association Rule Mining</b> Association Rules – Introduction – Large Item sets – Basic Algorithm – Parallel and Distributed Algorithm – Comparing Approaches – Incremental Rules – Advanced Association Rule Techniques – Measuring the Quality of Rules	12
Unit V	<b>Data Warehouse</b> An introduction – characteristics of Data Warehouse – Data Marts – Other Aspects of Data Marts. Introduction – OLTP and OLAP systems – Data modeling – Star schema for multidimensional view – Multifact star schema or snow flake schema – Case Studies: Data warehousing in the TamilNadu Government. Data Warehousing for the Ministry of Commerce.	12

**Text Book :**


1. Margaret H.Dunham, "Data Mining: Introductory and Advance Topics", Pearson Education, New Delhi.

**Reference Books:**

1. Prabhu, C.S.R. "Data warehousing :Concepts, Techniques, Products and Applications", PHI Publishers,3<sup>rd</sup> Edition,2009. (For Unit V).
2. Arun.k.Pujari. " Data Mining Techniques",University Press,2<sup>nd</sup>Edition,2009.
3. Bharat Bhushan Agarwal, Sumit Prakash Tayal, "Data Mining and Data Warehousing", Laxmi Publications; First edition 2009.

  
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Code No.	Subject	Semester No.
16ITU24	PRACTICAL VII: GRAPHICS AND MULTIMEDIA LAB	V
Ex. No.	Program List	
<b>GRAPHICS</b>		
1	Write a program to rotate an image	
2	Write a program to draw a line using DDA algorithm	
3	Write a program to bounce a ball and move it with sound effect	
4	Write a program to move a car with sound effect	
<b>PHOTOSHOP</b>		
5	Animate a plane flying in the clouds using Photoshop	
6	Convert Black and white photo to color photo	
7	Create Web page using Photoshop	
8	Create see through text using Photoshop	
<b>FLASH</b>		
9	Change a shape from one form to another form using flash	
10	Draw a parrot with various tools available in flash and make it to fly with key frame animation	
11	Create a box and make it to rotate in 3 dimensions with the help of shape animation using flash	
12	Create a simple game with the help of action script	

  
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Code No.	Subject	Semester No.
16ITU25	PRACTICAL VIII: PROGRAMMING LAB: .NET	V
<b>Objective:</b>	On successful completion of this subject the students have the programming ability in .Net programming language.	
<b>Ex. No.</b>	<b>Program List</b>	
1	Write simple procedure for performing the following events: a) Various views like docking, floating etc for all tabs. b) Change the title of the form. c) Prepare a simple Bio-Data with multiple forms.	
2	Write a VB.Net program with working with various user-defined methods.	
3	Write a VB.Net program to perform any five event handling.	
4	Write a VB.Net program to perform the simple calculator application.	
5	Prepare a C# Application program to demonstrate the employee details using constructors.	
6	Prepare a C# program for creating user-defined Exception.	
7	Working with Menu Editors – Text Editor.	
8	Working with Tree Viewer Control.	
9	Working with MDI for any Simple Application.	
10	Develop a Simple project for Student Information System with reports.	

  
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Code No.	Subject	Semester No.
16ITU26	INFORMATION SECURITY	V
<b>Objective:</b>	On successful completion of this subject the students should have known about the different types of network security.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Introduction to Security</b> Security attacks, Security services and mechanism-model for network security-classical Encryption techniques - Symmetric cipher model - Substitution techniques-Transposition techniques & Steganography.	15
<b>Unit II</b>	<b>Principles Of Modern Symmetric Ciphers</b> Block cipher principles - feistel cipher structure – DES - Encryption & Decryption, Differential & linear crypt analysis - AES.	14
<b>Unit III</b>	<b>Public key encryption</b> Public key cryptography & RSA-Basics of number theory - RSA algorithm - key management - Diffe Hellman key exchange - Elliptic curve cryptography	15
<b>Unit IV</b>	<b>Message Authentication &amp; Hash function</b> Authentication requirements – Authentication function- message Authentication codes - Hash function & security of hash function of MACs.	14
<b>Unit V</b>	<b>System Level Security</b> Intrusion detection - password management - Viruses and related Threats - Virus Counter measures - Firewall Design Principles - Trusted Systems.	14

**Text Book:**

1. Dhiren R.Patel , "Information Security", Theory and Practice, PHI 2008.

**Reference Books:**

1. Roberta Bragg, Mark Rhodes – Ousley,keithstrassberg, "Network Security", The Complete reference, Tata McGraw Hill Edition, 2007.
2. Mark Rhodes-Ousley, "Information Security: The Complete Reference", Second Edition 2013.
3. Nina Godbole, "Information Systems Security: Security Management, Metrics, Frameworks and Best Practices" Wiley publishers, 2008.

  
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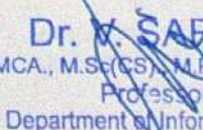
Code No.	Subject	Semester No.
16ITU26	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	V
<b>Objective:</b>	To have enriched knowledge regarding heuristic search, Knowledge representation and Expert system.	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Introduction to AI</b> Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.	15
<b>Unit II</b>	<b>Heuristic Search techniques</b> Generate and Test – Hill Climbing – Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis.	14
<b>Unit III</b>	<b>Knowledge representation issues</b> Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem.	15
<b>Unit IV</b>	<b>Using Predicate Logic</b> Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction. Planning: Overview – Components of a planning system.	14
<b>Unit V</b>	<b>Representing knowledge using rules</b> Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge .Brief explanation of Expert Systems – Definition – Characteristics – architecture – Knowledge Engineering – Expert System Life Cycle.	14

**Text Book:**

1. Elaine rich and Kelvin Knight, "Artificial Intelligence", Tata McGraw hill Publication, 2nd Edition, 1991 (chapters 1- 6).

**Reference Books:**

1. Stuart Russell & Peter Norvig, "Artificial Intelligence a modern Approach", 2nd Edition ,Pearson Education.
2. Patterson D W, " Introduction To Artificial Intelligence And Expert Systems", Pearson Education(Singapore) Pte. Ltd.
3. Janakiraman V S, "Foundations Of Artificial Intelligence And Expert Systems", Macmillan Publisher, 2005.

  
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Code No.	Subject	Semester No.
16ITU27	SOFTWARE TESTING	VI
<b>Objective:</b>	To develop the skill of software testing and to gain knowledge on software testing and how to test the software at various levels.	
Unit No.	Topics	Hours
Unit I	<b>Introduction to Testing:</b> Briefly history of Testing - Testing opportunities - Testing principles, Software Development Life Cycle Models: Waterfall Model - Fish Bone Model - Spiral Model - RAD Model-Prototype Model - Phases of software project - Software quality - Quality Assurance - Quality Control - Difference between QA & QC.	14
Unit II	<b>Software Testing Definition:</b> Verification – Validation – Static testing – Dynamic Testing – Difference between verification and validation - Difference between static testing and Dynamic testing, Testing Techniques: Boundary value Analysis – Equivalent class partition - Test Design: Test Methodology – Test Scenarios – Test cases – Test Template – Types of Test Cases – Difference between Test Scenario and Test Case – Creating Manual Test case design for Sample Application.	15
Unit III	<b>Testing Types:</b> Black-Box testing-White-Box testing – Challenges in White-Box Testing – Unit Testing – Integration Testing: Integration Testing as type of testing – Integration testing as a Phase Testing -Gray-Box testing – Alpha Testing – Beta Testing – Glass-Box Testing.	15
Unit IV	<b>System and Acceptance Testing:</b> System Testing Overview – Functional Testing - Non-Functional Testing - Functional versus Non-Functional Testing – Acceptance Testing – Summary of Testing Phases. Test Planning, Management, Execution and Reporting.	14
Unit V	<b>Performance Testing:</b> Factors governing Performance Testing – Methodology of Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: Types of Regression Testing – Best Practices in Regression Testing.	14

**Text Book:**

1. Srinivasan Desikan & Gopalswamy Ramesh, "Software Testing Principles and Practices", Pearson Education, 2006.

**Reference Books:**

1. Renu Rajani, Pradeep Oak, "Software Testing. – Effective Methods, Tools & Techniques" – Tata McGraw Hill.
2. Bob Hughes & Mike Cotterell, "Software Project Management ", 4th ed, PHI.
3. Ron Patton, "Software Testing" Second Edition, 2005.

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Code No.	Subject	Semester No.
16ITU28	OPEN SOURCE TOOLS	VI
<b>Objective:</b>	Emphasize usability and a "just works" philosophy in default configurations and feature designs.	
Unit No.	Topics	Hours
Unit I	<b>Introduction to open source</b> Open source software – The Web - Structural Data – Serving Up Static Data – Serving Up Dynamic Data – Serving up Content With Embedded HTML – Security.	14
Unit II	<b>Linux operating system</b> Introduction about Linux – Linux Distributions : Download & Install – Decisions – Linux Partition Sizes – Accounts – Security - Basic Unix - Shell – Owners, Group, Permission, Ownership – Processes – Path and Environment – Commands.	15
Unit III	<b>Apache</b> Introduction about Apache – Start, Stop and restart Apache Service – configuration – Modifying Default Configuration – Modifying Default Configuration - Securing Apache - Set User and Group - .htaccess – Create a simple Website.	15
Unit IV	<b>My sql database</b> Introduction about Mysql – Data Definition Language - Data Manipulation Language – Integrating PHP and Mysql – Performing Database Queries – Integrating Web forms and Databases.	14
Unit V	<b>Server script</b> Introduction about PHP – Server Side Scripting Overview – PHP Syntax and Variables – PHP Control Structures and Functions – Passing Information with PHP – String Handling.	14

**Text Book:**

1. Steve Suehring Tim Converse and Joyce Park , "PHP6 and MySQL Bible", Wiley-India. New Delhi 2009.

**Reference Books:**

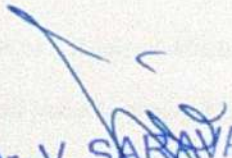
1. Dacie Cristian, "Pack Pub AJAX and PHP" - 2006.
2. Scouarnec Yann, Stolz Jeremy Jeremy and Glass Michael , "Beginning PHP5, APACHE, MYSQL Web Development" Wiley-India. New Delhi, 2005.
3. Christopher Diggins, "Linux Unwired", Shroff Publishers & Distributors Pvt. Ltd, 2004.

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Code No.	Subject	Semester No.
16ITU29	<b>PRACTICAL IX: SOFTWARE TESTING &amp; SPM LAB</b>	<b>VI</b>
<b>Objective:</b>	To gain knowledge on how to test the Applications Using Automation test and to Inculcate knowledge on Software testing & SPM Programming concepts.	
<b>Ex. No.</b>	<b>Program List</b>	
	<b>SOFTWARE TESTING LAB</b> Automation Tool: Win runner	
1	Perform Synchronization point test using Flight Reservation Application	
2	Create a software test case to perform TSL programming for Flight Reservation Application	
3	Develop a test case to implement the GUI object properties Test for the Flight Reservation Application	
4	Write a test case to perform Bitmap check points for Flight Reservation Application	
5	Write a test case to perform Database check points for Student Information Application	
6	Develop a test case to implement Data Driven Test	
<b>SOFTWARE PROJECT MANAGEMENT LAB</b>		
1	Using any of the CASE tools, Practice requirement analysis and specification for different firms.	
2	Practice function oriented design.	
3	Practice creating software documentation for the Analysis phase of software development life cycle for a real time application.	
4	Practice creating software documentation for the Development phase of software development life cycle for a real time application.	
5	Practice creating software documentation for the Implementation phase of software development life cycle for a real time application.	
6	Practice creating software documentation for the Testing phase of software development life cycle for a real time application.	

  
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Code No.	Subject	Semester No.
16ITU30	PRACTICAL X: OPEN SOURCE LAB	VI
<b>Objective:</b>	To develop the skill in programming with Open source and also the programmatic skill in Unix, PHP and MYSQL	
<b>Ex. No.</b>	<b>Program List</b>	
1	Create a Program for arithmetic operations using Bash Script	
2	Create a String Manipulation program using Bash Script	
3	Create a Program for File Handling in Unix	
4	Create a User Control program in Unix.	
5	Create a Login form using PHP and MYSQL	
6	Create a Dynamic web page using PHP and Mysql.	
7	Create a Simple validation control in PHP.	
8	Create a Program to upload a file in PHP	
9	Create a Program for Fibonacci Series	
10	Create a webpage for Student Details using PHP and MYSQL	

  
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Code No.	Subject	Semester No.
16ITU31	E - COMMERCE	VI
<b>Objective:</b>	To guide students through the essentials of creating a secure commerce environment	
Unit No.	Topics	Hours
<b>Unit I</b>	<b>Electronic Commerce Business Framework</b> Define Electronic commerce - Architecture of E-Commerce - The Internet - Business Framework - Various categories of E-commerce -Driving forces of E-commerce - Phases of E-commerce.	14
<b>Unit II</b>	<b>Electronic Commerce Infrastructure</b> E-Commerce technology overview - TCP\IP Internet Protocols & Web Clint server - Markup language and web development - Internet applications, Telnet, FTP -Intranet & Extranet. Business Model Electronic Commerce: Electronic commerce business models - Business models in practice - Emerging business models of Electronic Commerce.	15
<b>Unit III</b>	<b>Security Electronic Commerce</b> Security overview - Classification of security issue – Cryptography - Public-Key Encryption - Protecting Network. Payment Electronic Commerce: Electronic Data Interchange -Electronic Commerce & Banking - Electronic Payment Systems - Electronic cash - Online credit card based systems - Smart cards	15
<b>Unit IV</b>	<b>Marketing Electronic Commerce</b> Issue E-Business and Internet Marketing - Online Service Industries - Market Research in Internet - Advertisement in internet - Commerce catalogues: Information filtering. Policy And Implementation Electronic Commerce: International nature of e-commerce - Legal aspects of E-Commerce -Privacy and intellectual Property -E-commerce implementation	14
<b>Unit V</b>	<b>Online Services Industries:</b> Major feature of online service industry - Online financial services - Banking: Online travel and tourism services - Online job markets - Online stock trading: Intermediaries and their changing roles and new models.	14

**Text Book:**

1. Indrajit Chatterjee, "E- Commerce- An Indian Perspective", Scitech Publication, 2010.

**Reference Books:**

1. Ravi Kalakota & Andrew B. Whinston, "Frontiers of Electronic Commerce", Addison-Wesley Publishing Company, 1996.
2. Rajaraman V, "Essentials of E - Commerce Technology", Prentice Hall India Learning Private Limited, 1st edition 2009.
3. Nidhi Dhawan, "Introduction To E-Commerce", International Book House Pvt Ltd. (2010).

  
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Code No.	Subject	Semester No.
16ITU31	<b>DIGITAL IMAGE PROCESSING</b>	VI
<b>Objective:</b>	To understand theoretical foundations of Digital Image Processing and to study various techniques of image enhancement.	
Unit No.	Topics	Hours
Unit I	<b>Introduction</b> What is Digital Image Processing? – The Origins of Digital Image Processing- Gamma Ray Imaging – X Ray Imaging – Imaging in Ultra Violet band – Fundamental steps in Digital Image Processing – Components of an Image Processing System.	14
Unit II	<b>Digital Image Fundamentals</b> Elements of Visual Perception – Light and the electromagnetic spectrum – Image sensing and Acquisition – Image Acquisition using a single sensor - Image Acquisition using sensor strips - Image Acquisition using sensor arrays – A simple image formation model. Image Sampling and Quantization: Basic Concepts in Sampling and Quantization – Representing digital images – Spatial & Intensity Resolution – Image Interpolation.	15
Unit III	<b>Color Image Processing</b> Color Fundamentals – Color Models – Pseudo Color Image Processing – Basics of full Color image processing – Color transformation – Smoothing and Sharpening – Image segmentation based on color – Noise in color image – Color image compression.	15
Unit IV	<b>Image Compression</b> Fundamentals – Spatial and Temporal Redundancy - Irrelevant Information - Measuring Image Formation –Image Compression Models – Compression Methods – Huffman's coding – Arithmetic coding – Digital image watermarking	14
Unit V	<b>Image Segmentation</b> Fundamentals of Image Segmentation – Thresholding – Using image smoothing to improve Global thresholding – Using edges to improve Global thresholding – Region based segmentation: Region growing – Region splitting – Region Merging.	14

**Text Book:**

1. Gonzalez R.C and Woods R.E, "Digital Image Processing", Addison Wesley, third edition.

**Reference Books:**

1. Anil K. Jain, "Fundamentals of Digital Image Processing", Prentice Hall.
2. Chanda & Majumdar, "Digital Image Processing and Analysis", Prentice Hall, third edition.
3. Rafael C. Gonzalez, "Digital Image Processing ", 3rd Edition.

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