

# **BACHELOR OF COMPUTER SCIENCE**

**SYLLABUS – 2017**

**Under  
CHOICE BASED CREDIT SYSTEM**



**Since 1951**

**PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE**

**JAMAL MOHAMED COLLEGE (AUTONOMOUS)**

*College with Potential for Excellence*

*Re-accredited (3<sup>rd</sup> Cycle) with 'A' Grade by NAAC*

**TIRUCHIRAPPALLI – 620 020**

SEM	COURSE CODE	PART	COURSE	COURSE TITLE	Ins. Hrs /Week	CREDIT	MARKS		TOTAL
							CIA	ESE	
I	17U1LT1/LA1/LF1/LH1/LU1	I	Language – I		6	3	25	75	100
	17UCN1E1	II	English – I		6	3	25	75	100
	17UCS1C1	III	<b>Core – I</b>	Programming in C	5	5	25	75	100
	17UCS1C2P		<b>Core – II</b>	C Programming Lab	3	2	20	80	100
	17UMA1A1		<b>Allied – I</b>	Calculus	5	4	25	75	100
	17UMA1A2		<b>Allied – II</b>	Numerical Methods	3	2	25	75	100
	17UCN1VE	IV	Value Education	Value Education	2	2	-	100	100
<b>TOTAL</b>				<b>30</b>	<b>21</b>			<b>700</b>	
II	17U2LT2/LA2/LF2/LH2/LU2	I	Language – II		6	3	25	75	100
	17UCN2E2	II	English – II		6	3	25	75	100
	17UCS2C3	III	<b>Core – III</b>	Object Oriented Programming with C++	6	5	25	75	100
	17UCS2C4P		<b>Core – IV</b>	C++ Programming Lab	3	2	20	80	100
	17UMA2A3		<b>Allied – III</b>	Operations Research	4	3	25	75	100
	17UMA2A4		<b>Allied – IV</b>	Statistics	3	2	25	75	100
	17UCN2ES	IV	Environmental Studies	Environmental Studies	2	2	-	100	100
<b>TOTAL</b>				<b>30</b>	<b>20</b>			<b>700</b>	
III	17U3LT3/LA3/LF3/LH3/LU3	I	Language – III		6	3	25	75	100
	17UCN3E3	II	English – III		6	3	25	75	100
	17UCS3C5	III	<b>Core – V</b>	Database Management Systems	4	4	25	75	100
	17UCS3C6P		<b>Core – VI</b>	RDBMS Lab	3	2	20	80	100
	17UPH3A5		<b>Allied – V</b>	Electricity and Magnetism	4	3	25	75	100
	17UPH3A6P		<b>Allied – VI</b>	Applied Physics Practicals – I	3	2	20	80	100
	17UCS3N1	IV	Non-Major Elective – I #	Internet Basics	2	2	-	100	100
	17UCN3S1		Skill Based Elective – I @	Soft Skills Development	2	2	-	100	100
<b>TOTAL</b>				<b>30</b>	<b>21</b>			<b>800</b>	
IV	17U4LT4/LA4/LF4/LH4/LU4	I	Language – IV		6	3	25	75	100
	17UCN4E4	II	English – IV		6	3	25	75	100
	17UCS4C7	III	<b>Core – VII</b>	Data Structures and Algorithms	5	5	25	75	100
	17UCS4C8P		<b>Core – VIII</b>	Data Structures Lab	3	2	20	80	100
	17UPH4A7		<b>Allied – VII</b>	Electronics	5	3	25	75	100
	17UPH4A8P		<b>Allied – VIII</b>	Applied Physics Practicals – II	3	2	20	80	100
	17UCS4N2	IV	Non-Major Elective – II#	Web Design	2	2	-	100	100
	17UCN4EA	V	Extension Activities	NCC, NSS, etc.	-	1	-	-	-
<b>TOTAL</b>				<b>30</b>	<b>21</b>			<b>700</b>	
V	17UCS5C9	III	<b>Core – IX</b>	Java Programming	6	5	25	75	100
	17UCS5C10P1		<b>Core – X (a)</b>	Java Programming Lab	3	3	10	40	50
	17UCS5C10P2		<b>Core – X (b)</b>	HTML Lab	2	2	10	40	50
	17UCS5C11		<b>Core – XI</b>	Computer Organization and Architecture	5	5	25	75	100
	17UCS5C12		<b>Core – XII</b>	Operating Systems	5	5	25	75	100
	17UCS5M1A/B	IV	Major Based Elective – I**		5	4	25	75	100
	17UCS5S2A/B		Skill Based Elective – II@		2	2	-	100	100
	17UCS5S3PA/BP		Skill Based Elective – III@		2	2	-	100	100
	17UCS5EC1		<b>Extra Credit Course – I</b>	Data Mining	-	<b>4*</b>	--	<b>100*</b>	<b>100*</b>
	<b>TOTAL</b>				<b>30</b>	<b>28</b>			<b>700</b>
VI	17UCS6C13	III	<b>Core – XIII</b>	Computer Graphics and Multimedia	5	5	25	75	100
	17UCS6C14		<b>Core – XIV</b>	Computer Networks	5	5	25	75	100
	17UCS6C15		<b>Core – XV</b>	Microprocessor Fundamentals	5	5	25	75	100
	17UCS6C16P1		<b>Core – XVI (a)</b>	Digital and Microprocessor Lab	3	3	10	40	50
	17UCS6C16P2		<b>Core – XVI (b)</b>	Multimedia Lab	2	2	10	40	50
	17UCS6M2 A/B		Major Based Elective – II**		5	4	25	75	100
	17UCS6M3PA/BP	Major Based Elective – III**		4	4	20	80	100	
	17UCN6GS	V	Gender Studies	Gender Studies	1	1	-	100	100
	17UCS6EC2		<b>Extra Credit Course – II</b>	Network Security	-	<b>4*</b>	--	<b>100*</b>	<b>100*</b>
	<b>TOTAL</b>				<b>30</b>	<b>29</b>			<b>700</b>
<b>GRAND TOTAL</b>					<b>180</b>	<b>140</b>	-	-	<b>4300</b>

\* - Not considered for Grand Total and CGPA

# - Non Major Elective: Students have to choose one of the courses offered by other departments from the list given in Page Number 27 & 28 during semester II and III respectively

**@Skill Based Elective**

<b>Semester</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>
V	17UCS5S2A	VB .Net
	17UCS5S2B	Fundamentals of XML
	17UCS5S2AP	VB .Net Lab
	17UCS5S2BP	XML Lab

**\*\*Major Based Elective**

<b>Semester</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>
V	17UCS5M1A	Software Engineering
	17UCS5M1B	Software Testing
VI	17UCS6M2A	Open Source Technology
	17UCS6M2B	Mobile Application Development
	17UCS6M3AP	Open Source Lab
	17UCS6M3BP	Mobile Application Development Lab

**SEMESTER - I : CORE - I  
PROGRAMMING IN C**

**Course Code : 17UCS1C1**

**Hours / Week: 5**

**Credit : 5**

**Objective**

To impart basic knowledge of programming skills in C.

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**UNIT I** **15 hours**

History of C – Importance of C – Basic Structure of C Programs – Constants, Variables and Data Types – Operators and Expressions – # Managing Input and Output Operations #.

**UNIT II** **15 hours**

Decision Making and Branching – Decision Making with IF Statement – Simple IF Statement – The IF ... ELSE Statement – Nesting of IF ... ELSE Statements – # The ELSE IF Ladder # – The Switch Statement – The ?: Operator – The GOTO Statement – Decision Making and Looping – The WHILE Statement – The DO Statement – The FOR Statement.

**UNIT III** **15 hours**

Arrays – One-Dimensional Arrays – Two-Dimensional Arrays – Multi-dimensional Arrays – Character Arrays and Strings – Declaring and Initializing String Variables – Reading and Writing Strings – Arithmetic Operations on Characters – Comparison of Two Strings – # String-handling Functions #.

**UNIT IV** **15 hours**

User-Defined Functions – Function Declaration – Category of Functions – Nesting of Functions – Recursion – Storage Classes – Structures and Union – Arrays of Structures – Arrays within Structures – # Structures within Structures # – Structures and Functions – Unions.

**UNIT V** **15 hours**

Pointers – Pointer Declaration – Pointer Expression – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers to Function – File Management – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Error Handling During I/O operations – Random Access to Files – # Command Line Arguments #.

**# ..... # self-study portion**

**Text Book**

E. Balagurusamy, *Programming in ANSI C*, Tata McGraw Hill Education Private Ltd., Fifth Edition, 2011.

**UNIT I** : Chapter 1 (Sections 1.1, 1.2, 1.8), Chapters 2, 3 & 4

**UNIT II** : Chapter 5 & Chapter 6 (Sections 6.1 to 6.4)

**UNIT III** : Chapter 7 (Sections 7.1 to 7.7) & Chapter 8 (Sections 8.1 to 8.8)

**UNIT IV** : Chapter 9 & Chapter 10 (Sections 10.1 to 10.12)

**UNIT V** : Chapter 11 (Sections 11.1 to 11.15) & Chapter 12

**Reference Book**

D. Ravichandran, *Programming in C*, New Age International (P) Ltd., First Edition, 1996.

**SEMESTER - I : CORE - II**  
**C PROGRAMMING LAB**

**Course Code : 17UCS1C2P**

**Hours / Week : 3**

**Credit : 2**

**Max. Marks : 100**

**Internal Marks : 20**

**External Marks : 80**

1.
  - a) Find simple interest.
  - b) Check whether the given number is odd or even.
  
2.
  - a) Find the roots of a quadratic equation using if ... else statement.
  - b) Find the biggest of 3 given numbers using nested if ... else statement.
  
3.
  - a) Find the sum of individual digits of a given number using while statement.
  - b) Find the sum of odd numbers between 1 and 100 using do ... while statement.
  
4.
  - a) Display Monday to Sunday using switch statement.
  - b) Find the sum and average of the given 'n' numbers using for loop.
  
5.
  - a) Find the factorial of the given number using recursive function.
  - b) Sort the given set of numbers using array.
  
6.
  - a) Perform the addition of two given matrices using arrays.
  - b) Swap the two values using pointers.
  
7.
  - a) Check whether the given string is palindrome or not.
  - b) Arrange the given set of names in alphabetical order.
  
8. Illustrate the use of arrays of structure.
  
9. Prepare mark sheet using file.

**SEMESTER - II : CORE - III**  
**OBJECT ORIENTED PROGRAMMING WITH C++**

**Course Code : 17UCS2C3**  
**Hours / Week : 6**  
**Credit : 5**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To give the concepts of object oriented programming, the syntax of statements in C++ language and to impart the programming skills in C++.

**UNIT I** **18 hours**

Principles of Object Oriented Programming – Software Evolution – Basic Concepts of Object Oriented Programming – Benefits of OOP – Applications of OOP – Structure of C++ Program – Tokens – Keywords – Identifiers and Constants – Basic Data Types – User Defined Data Types – Derived Data Types – Declaration of Variables – Operators – Manipulators – # Expressions and their types # – Control Structures.

**UNIT II** **18 hours**

Functions – The Main Function – Function Prototyping – Call by Reference – Return by Reference – Inline Functions – Default Arguments – Recursion Function – Overloading. Classes and Objects – Specifying a Class – Defining Member Functions – A C++ program with Class – # Static Data Members – Static Member Functions # – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.

**UNIT III** **18 hours**

Constructors and Destructors – Constructors - Parameterized Constructors – Multiple Constructors in a Class – Copy Constructors – Destructors – Operator Overloading – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – # Overloading Binary Operators using Friends # – Rules for Overloading Operators.

**UNIT IV** **18 hours**

Inheritance: Extending Classes – Defining Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Virtual Base Classes – Pointer, Virtual Functions and Polymorphism – Pointers – Pointers to Objects – this Pointer – # Pointers to Derived Classes # – Virtual Functions – Pure Virtual Functions.

**UNIT V** **18 hours**

Managing Console I/O Operations – C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Working with Files – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – # More about Open( ): File Modes #.

# ..... # **self-study portion**

**Text Book**

E. Balagurusamy, *Object-Oriented Programming with C++*, Tata McGraw Hill Education Private Ltd., New Delhi, Fifth Edition, 2011.

- UNIT I** : Chapter 1, Chapter 2 (Section 2.6) & Chapter 3  
**UNIT II** : Chapter 4 (Sections 4.1 to 4.7, 4.9, 4.10) & Chapter 5 (Sections 5.3 to 5.5, 5.11 to 5.16)  
**UNIT III** : Chapter 6 (Sections 6.1 to 6.4, 6.7, 6.11) & Chapter 7 (Sections 7.1 to 7.5, 7.8)  
**UNIT IV** : Chapter 8 (Sections 8.1 to 8.3, 8.5, 8.6, 8.9) & Chapter 9 (Sections 9.1 to 9.7)  
**UNIT V** : Chapter 10 (Sections 10.1 to 10.5) & Chapter 11 (Sections 11.1 to 11.5)

**Reference Book**

Robert Lafore, *Object-Oriented Programming in Turbo C++*, Galgotia Publications Pvt. Ltd., New Delhi, 1994.

**SEMESTER - II : CORE - IV**  
**C++ PROGRAMMING LAB**

**Course Code : 17UCS2C4P**  
**Hours / Week : 3**  
**Credit : 2**

**Max. Marks : 100**  
**Internal Marks : 20**  
**External Marks : 80**

1. Display first N Fibonacci numbers.
2. Swap integer values using call by value and call by reference.
3.
  - a) Find the largest of three numbers using inline function.
  - b) Multiply and division of two number using inline function.
4. Add two numbers using member functions defined outside the class.
5. Define a class to represent a bank account. Include the following members:  
**Data members:**  
Name of the depositor, Account number, Type of account, Balance amount in the account  
**Member functions:** To assign initial values, To deposit an amount, To withdraw an amount after checking the balance, To display the name and balance.  
Write a main program to invoke the member functions.
6.
  - a) Find the volume of cube, cylinder and rectangular box using function overloading.
  - b) Illustrate the use of friend function.
7.
  - a) Illustrate the use of arrays of objects.
  - b) Add two times in hours and minutes format using objects as function arguments.
8.
  - a) Illustrate the parameterized constructor.
  - b) Add two complex numbers using overloaded constructors.
9. Illustrate unary and binary operator overloading.
10. Arrange the numbers in ascending order using pointers.
11. Illustrate single inheritance.
12. Use a single file for both writing and reading the data.

**SEMESTER - III : CORE - V  
DATABASE MANAGEMENT SYSTEMS**

**Course Code : 17UCS3C5**

**Hours / Week : 4**

**Credit : 4**

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**Objective**

To provide the basic concepts of the database systems including data models, storage structure, normalization and SQL.

**UNIT I**

**12 hours**

Introduction: Flat File – Database System – Database – Actionable for DBA – The Entity – Relationship Model: The Entity Relationship Model – Data Models: Relational Approach – The Hierarchical Approach – # The Network Approach #.

**UNIT II**

**12 hours**

Storage Structure: File Organization and Addressing Schemes – Sequential Organization – Indexed Sequential Organization – Direct Organization of File – Interface Indexing – Hashing Scheme of File Organization – Dynamic Hashing Technique – Insertion Scheme in Dynamic Hashing – B-Trees – Indexing Methods – Relational Data Structure: Introduction – Relations – Domains.

**UNIT III**

**12 hours**

Normalization : Purpose of Normalization – Definition of Functional Dependence (FD) – Normal Forms – First Normal Form – # Second Normal Form # – Third Normal Form – Boyce Codd Normal Form (BCNF).

**UNIT IV**

**12 hours**

Structured Query Language: Features of SQL – Select SQL Operations – Grouping the Output of the Query – Querying form Multiple Tables – Retrieval Using Set Operators – Nested Queries – T-SQL – Triggers and Dynamic Execution: Transact-SQL.

**UNIT V**

**12 hours**

Procedural Language-SQL: PL/SQL Block Structure – PL/SQL Tables – Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor – Processing Explicit Cursor – Implicit Cursor – Exception Handlers – Sub Programs in PL/SQL – # Functions # – Precaution While Using PL/SQL Functions – Stored Packages – Dropping Procedure, Function and Package – Triggers – Object-Oriented Technology.

**# ..... # self-study portion**

**Text Book**

Rajesh Narang, *Database Management Systems*, PHI Learning Private Limited, New Delhi, Fourth Printing, 2009.

**UNIT I** : Chapters 1, 2 & 3

**UNIT II** : Chapters 4 & 5

**UNIT III** : Chapter 7

**UNIT IV** : Chapters 8 & 9

**UNIT V** : Chapters 10 & 11

**Reference Book**

Alexis Leon and Mathews Leon, *Essentials of Database Management Systems*, Vijay Nicole Imprints Private Limited, 2006.



**SEMESTER - III : CORE – VI**  
**RDBMS LAB**

**Course Code : 17UCS3C6P**  
**Hours / Week : 3**  
**Credit : 2**

**Max. Marks : 100**  
**Internal Marks : 20**  
**External Marks : 80**

**1. SQL: Data Definition Languages**

Table Creation - Primary Key, Candidate key  
Table Alteration - Rename table and Column name,  
Add Column, Drop column,  
Modify Column size and Data type  
Drop Table

**2. SQL: Data Manipulation Languages**

Insertion  
Updation  
Deletion  
String Operations  
Set Operations  
Tuple Variables  
Aggregate Functions with Grouping and Having Clause  
Ordering Tuples  
Nested Subqueries  
Join Operations  
Views

**3. PL/SQL Procedure**

Reverse the String  
Find Factorial number using Recursive Function  
Prepare Student Mark Sheet  
Employee Pay Roll

**SEMESTER - III : NON-MAJOR ELECTIVE – I  
INTERNET BASICS**

**Course Code : 17UCS3N1**  
**Hours / Week: 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

**Objective**

To understand the fundamental concepts of Internet and its applications.

**UNIT I 6 hours**

Internet – Introduction – Internet Access / Dial-up connection – Internet Services Features – Getting Connected: TCP/IP accounts vs Shell accounts – Configuring TCP/IP Account – # Configuring the shell account #.

**UNIT II 6 hours**

World Wide Web: Web Page – HTML – HTML Tags – Net Surfing – Web Browsing: Internet Explorers – #Netscape Navigator #.

**UNIT III 6 hours**

Internet Addressing – IP address – Domain Name – Electronic Mail – # URL #.

**UNIT IV 6 hours**

Internet Protocol: TCP/IP – File Transfer Protocol – # Hyper Text Transfer Protocol # – Telnet – Gopher – WAIS.

**UNIT V 6 hours**

Searching the Web: Web Index – Web Search Engine – Web Meta – Searcher – Search Functions – # Simple Search using Alta Vista # – Advanced Searches.

**# ..... # self-study portion**

**Text Book**

Alexis Leon and Mathews Leon, *Internet For Every One*, Leon Press, 1999.

**UNIT I** : Chapters 1 & 2  
**UNIT II** : Chapters 3 & 4  
**UNIT III** : Chapter 5  
**UNIT IV** : Chapter 6  
**UNIT V** : Chapter 7

**Reference Books**

1. Deitel and Deitel, *Internet and World Wide Web - How to Program*, PHI, Fourth Edition, 2008.
2. Christian Cramlish, *The Internet*, BPB, Second Edition, 2004.

**SEMESTER - IV : CORE - VII**  
**DATA STRUCTURES AND ALGORITHMS**

**Course Code : 17UCS4C7**  
**Hours / Week : 5**  
**Credit : 5**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To understand the concepts of data structures and algorithms.

**UNIT I**

**15 hours**

Introduction and Preliminaries : Basic Terminology, Elementary Data Organization, Data Structures – Data Structure Operations, Algorithms: Complexity, Time-space Tradeoff – Mathematical Notations and Functions – Control Structures – Complexity of Algorithms.

**UNIT II**

**15 hours**

Arrays and Stacks : Arrays – Introduction – Linear Array, Representation of Linear Array in Memory, Traversing Linear Arrays, Inserting and Deleting, Multidimensional Arrays – Stacks – Array Representation of Stack, Arithmetic Expressions: Polish Notation – # Recursion #.

**UNIT III**

**15 hours**

Queues and Linked Lists : Queues – Deques – Array Representation Queues – Insertion and Deletion – Linked List, Representation of Linked Lists in Memory, Traversing a Linked List, Insertion into a Linked List, Deletion from a Linked List, # Two-Way Linked Lists #.

**UNIT IV**

**15 hours**

Trees and Graphs : Binary Trees, Representing Binary Trees in Memory, Traversing Binary Tree – Threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree – Graph Theory – Terminology, Sequential Representation of Graph: Adjacency Matrix, Path Matrix.

**UNIT V**

**15 hours**

Sorting and Searching: Sorting – Bubble Sort, Insertion Sort, Selection Sort, #Merge Sort#, Quick sort, Heap Sort – Searching; Linear Search, Binary Search.

**# ..... # self-study portion**

**Text Book**

Seymour Lipschutz and G.A. Vijayalakshmi Pai (Schaum's Series), *Data Structures*, Tata McGraw Hill Publishing Company Ltd., New Delhi, Indian Adopted Edition, 2006.

**UNIT I** : Chapter I (Sections 1.1 to 1.5) & Chapter II (Sections 2. 2, 2 .4, 2.5)  
**UNIT II** : Chapter IV (Sections 4.1 to 4.5 , 4.9) & Chapter VI (Sections 6.1 to 6.3, 6.5, 6.7)  
**UNIT III** : Chapter VI (Sections 6.1.0 to 6.1.2) & Chapter V (Sections 5.1 to 5.4, 5.7 to 5.8, 5.10)  
**UNIT IV** : Chapter VII (Sections 7.1 to 7.9) & Chapter VIII (Sections 8.1 to 8.3)  
**UNIT V** : Chapter IX (Sections 9.1 to 9.6, 4.6 to 4.8, 6.6, 7.17)

**Reference Book**

Ashok N. Kamthane, *Introduction to Data Structures in C*, Pearson Edition, 2007.

**SEMESTER - IV : CORE - VIII  
DATA STRUCTURES LAB**

**Course Code : 17UCS4C8P**  
**Hours / Week : 3**  
**Credit : 2**

**Max. Marks : 100**  
**Internal Marks : 20**  
**External Marks : 80**

1. Merging two arrays into a single array.
2. To find the following in a matrix:
  - i. Row Sum
  - ii. Column Sum
  - iii. Trace Sum (Sum of Diagonal Elements)
  - iv. Sum of all the elements
3. Matrix addition and multiplication operations
4. Find an element using sequential and binary search.
5. Perform the following types of sorting:
  - i. Bubble sort
  - ii. Insertion sort
  - iii. Selection sort
6. Find the factorial of a number using recursion
7. PUSH and POP an element from STACK
8. Insert and delete an element from QUEUE.
9. Insert and delete a node in a linked list.

**SEMESTER - IV : NON-MAJOR ELECTIVE – II  
WEB DESIGN**

**Course Code : 17UCS4N2**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

**Objective**

To present the fundamental concepts of Internet, Internet Technologies and to give the knowledge on HTML.

**UNIT I** **6 hours**  
Introduction to the Internet – Computers in Business, Networking, Internet, E-mail, Resource Sharing, Gopher, World Wide Web, Usenet, Telnet, Bulletin Board Service, Wide Area Information Service.

**UNIT II** **6 hours**  
Internet Technologies - Modem, Internet Addressing, Physical Connections, Telephone Lines – Internet Browsers – Internet Explorer, Netscape Navigator.

**UNIT III** **6 hours**  
Introduction to HTML – History of HTML, HTML Documents, Anchor Tag, Hyper Links – Head and Body Sections – Header Section – Title, Prologue, Links, Colorful Web Page, Comment Lines.

**UNIT IV** **6 hours**  
Designing the Body Section – Heading Printing, Aligning the Headings, Horizontal Rule, Paragraph, Tab Settings, Lists, Unordered Lists, Ordered Lists.

**UNIT V** **6 hours**  
Table Handling – Tables, Tables Creation in HTML –Frames – Frameset Definition, Frame Definition, Nested Framesets.

**Text Book**

C. Xavier, *World Wide Web Design with HTML*, TMH, 19<sup>th</sup> Reprint, 2008.

**UNIT I** : Chapter 1 (Sections 1.1 to 1.11)  
**UNIT II** : Chapter 2 (Sections 2.1 to 2.4) & Chapter 3 (Sections 3.1, 3.2)  
**UNIT III** : Chapter 4 (Sections 4.1 to 4.6) & Chapter 5 (Sections 5.1 to 5.6)  
**UNIT IV** : Chapter 6 (Sections 6.1 to 6.5) & Chapter 7 (Sections 7.1 to 7.4)  
**UNIT V** : Chapter 8 (Sections 8.1 to 8.3) & Chapter 10 (Sections 10.1 to 10.3)

**Reference Books**

1. Thomas A. Powell, *HTML & XHTML*, TMH, Fourth Edition, Thirteenth Reprint, 2007.
2. N.P. Gopalan and J. Akilandeswari, *Web Technology A Developer's Perspective*, PHI, Second Printing, July 2008.

**SEMESTER - V : CORE - IX**  
**JAVA PROGRAMMING**

**Course Code : 17UCS5C9**

**Hours / Week: 6**

**Credit : 5**

**Objective**

To understand the basic concepts of object oriented programming with Java language.

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**UNIT I**

**18 hours**

Fundamentals of Object Oriented Programming – Java Evolution – Overview of Java Language – Constants, Variables and Data types – Operators and Expressions – Branching and Looping Statements.

**UNIT II**

**18 hours**

Classes, Objects and Methods – Defining a Class – Creating Objects – Constructors -Method Overloading – Static Members – Inheritance: Extending a Class – Overriding Methods – Final Classes – Abstract Methods and Classes – Visibility Control – Arrays, Strings and Vectors: One-dimensional Arrays – Creating an Array – Two-dimensional Arrays – Strings – Vectors – Wrapper Classes – # Enumerated Types #.

**UNIT III**

**18 hours**

Interfaces: Multiple Inheritance : Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages : Java API Package – Creating and Accessing Packages – Hiding Classes – Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – # Thread Exceptions # – Thread Priority.

**UNIT IV**

**18 hours**

Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Managing Input/Output Files in Java - Stream Classes – Character Stream, Byte Stream – Using Streams – # Using the File Classes # – Input / Output Exceptions – Creation of Files – Reading / Writing Characters – Reading/Writing Bytes – Handling Primitive Data Types – Random Access Files.

**UNIT V**

**18 hours**

Applet Programming: How Applets differ from Applications – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Applet Tag – Adding Applet to HTML File – Running the Applet – Passing Parameters to Applets – Displaying Numerical Values – Getting Input from the User – Graphics Programming – The Graphics Class.

**# ..... # self-study portion**

**Text Book**

E. Balagurusamy, *Programming With Java a Primer*, TMH, Fourth Edition, 2010.

**UNIT I** : Chapters 1 to 7

**UNIT II** : Chapter 8 (Sections 8.1 to 8.16) & Chapter 9 (Sections 9.1 to 9.8)

**UNIT III** : Chapter 10, Chapter 11 (Sections 11.1 to 11.9) & Chapter 12 (Sections 12.1 to 12.8)

**UNIT IV** : Chapter 13 (Sections 13.1 to 13.7) & Chapter 16 (Sections 16.1 to 16.5)

**UNIT V** : Chapter 14 (Sections 14.1 to 14.16) & Chapter 15 (Sections 15.1 to 15.9)

**Reference Book**

P. Radha Krishna, *Object Oriented Programming through Java*, University Press (India) Private Ltd., 2007.

**SEMESTER - V : CORE – X (a)**  
**JAVA PROGRAMMING LAB**

**Course Code : 17UCS5C10P1**  
**Hours / Week : 3**  
**Credit : 3**

**Max. Marks : 50**  
**Internal Marks : 10**  
**External Marks : 40**

1. Simple programs to demonstrate
  - a) Various ways of input in Java
  - b) Operators and expressions
  - c) Control statements
2. Define a class, describe its constructor, and instantiate its object
3. Demonstrate method overloading
4. Demonstrate single and two-dimensional arrays.
5. Demonstrate various methods in the String and StringBuffer class.
6. Demonstrate methods in the vector class.
7. Implement the single inheritance.
8. Implement the multiple inheritance.
9. Implement the concept of importing classes from user defined package and creating packages.
10. Implement the concept of threading by using Thread class and Runnable interface.
11. Implement the concept of Exception Handling.
12. Use Applet
  - a) To display a message.
  - b) For passing parameters.
13. Using Graphics class to display basic shapes and fill them and set background and foreground colors.
14. Demonstrate the use of I/O streams.

**SEMESTER - V : CORE – X (b)**  
**HTML LAB**

**Course Code : 17UCS5C10P2**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 50**  
**Internal Marks : 10**  
**External Marks : 40**

1. Develop a HTML document, which displays your name as <h1> heading and displays any three of your friends. Each of your friend's names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells about your friend.
2. Write names of several states in a paragraph and store it as an HTML document, states.html. Each state name must be a hot text. When you click Tamilnadu (for example), it must open tn.html and it should provide a brief introduction about Tamil Nadu.
3. Design a HTML document describing you. Assign a suitable background design and background color and a text color.
4. Develop a complete web page using Frames and Framesets which gives the information about a College using HTML.
5. Develop a complete set of web pages to describe your skills in various areas using HTML.
6. Develop a web site to publish your family and the details of each member using HTML.
7. Develop a HTML document to display a Registration Form for an intercollegiate function.
8. Develop a HTML document to design Alumni Registration Form of your college.
9. Create a HTML table with rows and columns and split them using Rowspan and Colspan.
10. Create a web page in the format of front page of a newspaper using Text links. Align the text with colors.



**SEMESTER - V : CORE – XI**  
**COMPUTER ORGANIZATION AND ARCHITECTURE**

**Course Code : 17UCS5C11**  
**Hours / Week : 5**  
**Credit : 5**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To understand the principles of digital logic circuits and their design. To understand the working of a central processing unit architecture of a computer.

**UNIT I** **15 hours**

Number Systems – Decimal, Binary, Octal and Hexadecimal Systems – Conversion from one system to another – Addition, Subtraction, Multiplication and Division of Binary, Octal and Hexadecimal Numbers – Binary Codes – 8421, 2421, Excess-3, Gray – Weighted and Non-weighted codes, Reflected Code, Self-complementary Codes – # BCD Codes # – Alphanumeric Codes.

**UNIT II** **15 hours**

Basic Logic Gates – Universal Logic – Boolean Laws and Theorems – Boolean Expressions – Sum of Products – Product of Sums – Simplification of Boolean Expressions – Karnaugh Map Method (up to 4 Variables) – Implementation of Boolean Expressions using Gate Networks.

**UNIT III** **15 hours**

Combinational Circuits – Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Building Blocks – Half and Full Adders – Half and Full Subtractors – Parallel adder – 2's Complement Adder-Subtractor.

**UNIT IV** **15 hours**

Sequential Circuits – Flip Flops – RS, Clocked RS, D, JK, T and Master-Slave Flip Flops – Shift Register – # Counters # – Asynchronous and Synchronous counters – Mod  $n$  Counter – Ring Counter.

**UNIT V** **15 hours**

Register Transfer and Micro Operations: Register Transfer Language – Register Transfer – Arithmetic Micro operations – # Logic Micro operations # – Arithmetic Logic Unit – Central Processing Unit: General Register Organization – # Stack Organization # – Instruction Formats – Addressing Modes – Data Transfer and Manipulation.

# ..... # self-study portion

**Text Books**

1. Donald P. Leach and Albert Paul Malvino, Goutam Saha, *Digital Principles and Applications*, TMH, Sixth Edition, 2006.

**UNIT I** : Chapter 5 (Sections 5.1 to 5.8)

**UNIT II** : Chapter 2 (Sections 2.1, 2.2) & Chapter 3 (Sections 3.1, 3.2, 3.5, 3.7)

**UNIT III** : Chapter 4 (Sections 4.1 to 4.3, 4.6) & Chapter 6 (Sections 6.7, 6.8)

2. Morris Mano M, *Computer System Architecture*, PHI, Third Edition, 2008.

**UNIT IV** : Chapter 3 (Section 3.5)

**UNIT V** : Chapter 4 (Section 4.1, 4.2, 4.4, 4.5, 4.7) & Chapter 8 (Section 8.2 to 8.6)

**Reference Book**

Thomas C. Barte, *Digital Computer Fundamentals*, Tata McGraw Hill, 6<sup>th</sup> Edition, 25<sup>th</sup> Reprint, 2006.

**SEMESTER - V : CORE - XII  
OPERATING SYSTEMS**

**Course Code : 17UCS5C12**  
**Hours / Week : 5**  
**Credit : 5**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To understand the basic knowledge of operating systems and its various schemes and services.

**UNIT I 15 hours**

Operating System Overview – Basic Concepts and Terminologies – Operating System as Resource Manager – # Process View Point # – Hierarchical and Extended Machine View – I/O Programming and Interrupt Programming – I/O Programming – Interrupt Structure and Processing.

**UNIT II 15 hours**

Memory Management – Single Contiguous Allocation – Multiprogramming – Partitioned Allocation – Relocatable Partitioned Memory Management – Paged Memory Management – # Page Removal Algorithms # – Thrashing – Segmented Memory Management – Segmented and Demand Paged Memory Management.

**UNIT III 15 hours**

Process Management – Process State Model – Job Scheduling – Process Scheduling – Multiprocessor Systems – Process Synchronization – # Resolving Deadlocks #.

**UNIT IV 15 hours**

Device Management – Techniques – Device Characteristics – I/O Traffic Controller – I/O Scheduler and Device Handlers – Virtual Devices – # Spooling #.

**UNIT V 15 hours**

Information Management: File System Model – Symbolic, Basic File System – # Access Control Verification # – Logical, Physical File System – Allocation Strategy, Device Strategy Modules.

**# ..... # self-study portion**

**Text Book**

S.E. Madnick & J J. Donovan, *Operating Systems*, McGraw Hill International Book Co, New Delhi, 2013.

**Reference Books**

1. Harvey M. Deitel, *An Introduction to Operating Systems*, Addison-Wesley Publishing Co., New York, 1984.
2. James L. Peterson & Abraham Silberschatz, *An Introduction to Operating Systems*, Addison-Wesley Publishing Co., New York, 1987.

**SEMESTER - V : MAJOR BASED ELECTIVE – I  
SOFTWARE ENGINEERING**

**Course Code : 17UCS5M1A**

**Hours / Week : 5**

**Credit : 4**

**Objective**

To provide fundamental concepts of software model, design, testing and quality.

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**UNIT I**

**15 hours**

Introduction-The evolving role of the software – The changing nature of software – Software myths – A generic view of process – A process framework – The CMM integration – The process models – The Waterfall model – The RAD model – The Evolutionary software process models – The Prototyping model – The Spiral model – Specialized Process models – The Component based development – # The formal methods model #.

**UNIT II**

**15 hours**

Systems engineering hierarchy – Requirement engineering tasks – Requirements analysis – Analysis modeling approaches – # Data modeling concepts # – Flow-oriented modeling.

**UNIT III**

**15 hours**

Design process and design quality – Design concepts – # Data design # – Architectural design – The art of debugging.

**UNIT IV**

**15 hours**

Software testing fundamentals – White-box testing – Basis-path testing – Control structure testing – Black-box testing – Validation testing – System testing.

**UNIT V**

**15 hours**

Quality Concepts – Software quality assurance – Software reviews – Formal technical reviews – Software measurement – Metrics for software quality.

**# ..... # self-study portion**

**Text Book**

Roger S Pressman, *Software Engineering-A Practitioner's Approach*, McGraw Hill International Edition, USA, Sixth Edition, 2008.

**UNIT I** : Chapter 1 (Sections 1.1, 1.3, 1.5), Chapter 2 (Sections 2.2, 2.3) & Chapter 3 (Sections 3.2, 3.3.2, 3.4.1, 3.4.2, 3.5.1, 3.5.2)

**UNIT II** : Chapter 6 (Section 6.2), Chapter 7 (Section 7.2) & Chapter 8 (Sections 8.1, 8.2, 8.3, 8.6)

**UNIT III** : Chapter 9 (Sections 9.2, 9.3), Chapter 10 (Sections 10.2, 10.4) & Chapter 13 (Section 13.7)

**UNIT IV** : Chapter 14 (Sections 14.1, 14.3, 14.4, 14.5, 14.6) & Chapter 13 (Sections 13.5, 13.6)

**UNIT V** : Chapter 26 (Sections 26.1, 26.2, 26.3, 26.4) & Chapter 22 (Sections 22.2, 22.3)

**Reference Books**

1. Shari Lawrence Fleeger and Joanne M. Atlee, *Software Engineering: Theory and Practice*, Pearson Education South Asia, New Delhi, Fourth Edition, Third Impression 2013.
2. Ian Sommerville, *Software Engineering*, Pearson Education Asia, New Delhi, Ninth Edition, 2015.
3. Jibitesh Mishra, *Software Engineering*, Pearson Education, First Edition, 2011.
4. Rohit Khurana, *Software Engineering Principles and Practices*, Vikas Publishing House, Second Edition, 2010.

**SEMESTER - V : MAJOR BASED ELECTIVE – I  
SOFTWARE TESTING**

**Course Code : 17UCS5M1B**  
**Hours / Week : 5**  
**Credit : 4**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To understand the basic concepts of software testing.

**UNIT I**

**15 hours**

Context of Testing in Producing Software – Dijkstra’s Doctrine – A Test in Time – Test the Tests First – The Pesticide Paradox – Phases of Software Project – Quality, Quality Assurance and Quality Control – Testing Verification and Validation – Process Model to Represent Different Phases – # Life Cycle Models # .

**UNIT II**

**15 hours**

What is White-Box Testing? – Static Testing – Structural Testing – What is Black-Box Testing? – Why Black-Box Testing? – When to do Black-Box Testing? – # How to do Black-Box Testing? #.

**UNIT III**

**15 hours**

Integration Testing – What is Integration Testing? – Integration Testing as a Type of Testing – System Testing Overview – Why is System Testing Done? – Functional System Testing – Acceptance Testing – Methodology for Performance Testing – Collecting Requirements – Writing Test Cases – Automating Performance Test Cases – Executing Performance Test Cases – # Types of Regression Testing # – When to do Regression Testing – How to Regression Testing.

**UNIT IV**

**15 hours**

Organization Structures for Testing Teams – # Test Planning, Management, Execution, and Reporting #.

**UNIT V**

**15 hours**

Software Testing Automation – Test Metrics and Measurements.

**# ..... # self-study portion**

**Text Book**

Srinivasan Desikan and Gopaldaswamy Ramesh, *Software Testing Principles and Practices*, Pearson, Seventeenth Impression, 2013.

**UNIT I** : Chapter 1 (Sections 1.1, 1.4 to 1.6) & Chapter 2 (Sections 2.2 to 2.5)

**UNIT II** : Chapter 3 (Sections 3.1 to 3.3) & Chapter 4 (Sections 4.1 to 4.4)

**UNIT III** : Chapter 5 (Sections 5.1, 5.2), Chapter 6 (Sections 6.1 to 6.6),  
Chapter 7 (Sections 7.3.1 to 7.3.4) & Chapter 8 (Sections 8.1 to 8.4)

**UNIT IV** : Chapter 14 (Sections 14.1 to 14.6) & Chapter 15 (Sections 15.1 to 15.6)

**UNIT V** : Chapter 16 (Sections 16.1 to 16.10) & Chapter 17 (Sections 17.1 to 17.7)

**Reference Book**

M.G. Limaye, *Software Testing Principles, Techniques and Tools*, Tata McGraw Hill Education Private Ltd., Second Reprint, 2010.

**SEMESTER - V : SKILL BASED ELECTIVE – II**  
**VB .NET**

**Course Code : 17UCS5S2A**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

**Objective**

To provide fundamental concepts of .Net Framework.

**UNIT I**

**6 hours**

Creating a windows application – Creating a web application – Creating a console application – What's new in VB.Net – The .Net framework and the Common Language Runtime – The System NameSpaces – Building VB.Net Applications – The Visual Basic IDE – The Visual Basic Keywords – Visual Basic Statements – Statement syntax – Overview – Understanding Attributes – # The option and Imports statements #.

**UNIT II**

**6 hours**

Declaring constants – Declaring variables – Data types – Converting between data types – Declaring arrays and dynamic arrays – Handling strings – Using Visual Basic operators – Commenting our code – Decisions with if..else statements – Using select case – Selections with switch and choose – Using the do loop – For loop – For Each..Next loop – While loop – With statement – # Sub procedures and functions # – Creating sub procedures – Creating functions.

**UNIT III**

**6 hours**

Windows forms – Windows MDI forms – Adding controls to forms – Handling events – Windows form in code – Using the MsgBox function – Using the InputBox function – Working with multiple forms – Handling mouse and keyboard events – The control class – Text boxes – Creating multiline, word wrap text boxes – Accessing text, adding scrollbars, aligning text in text boxes – Rich Text boxes – # Labels #.

**UNIT IV**

**6 hours**

Command Button – Checkboxes – Radio buttons – List boxes – Combo boxes – Picture boxes – Scroll bars – Splitters – Timers – Menus – Built in dialog boxes – Image lists – Tree views – List views – Toolbars – Status bars – Progress bars – Tab controls – Validation controls – Required field validators – Comparison validators – Range validators – Regular expression validators – Calendars – AdRotators.

**UNIT V**

**6 hours**

What are Databases? – Accessing data with the server explorer – Accessing data with data adaptors and datasets – Working with ADO.NET – Creating a new data connection – Creating a dataset – Populating a dataset – Displaying data in a data grid – Selecting a data provider – Data access using data adaptor controls – Connecting to an MS Jet Database – Using relational databases – # Adding multiple tables to a dataset # – Using data views.

**Text Book**

Steven Holzner, Visual Basic .NET Black Book, 2007.

**UNIT I** : Chapters 1 & 2  
**UNIT II** : Chapters 2 & 3  
**UNIT III** : Chapters 4 & 5  
**UNIT IV** : Chapters 6 to 10 & 19  
**UNIT V** : Chapter 21

**Reference Books**

1. C. Muthu, *Visual Basic .Net*, Vijay Nicole Publication, 2007.
2. Shirish Chavan, *Visual Basic .Net*, Pearson Education, 2007.

**SEMESTER - V : SKILL BASED ELECTIVE – II  
FUNDAMENTALS OF XML**

**Course Code : 17UCS5S2B**  
**Hours / Week: 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

**Objective:**

To understand the basic concepts of XML.

**UNIT I 6 hours**

Introducing XML: What is XML – An introduction to XML applications: XML for XML - Your first XML document – Structuring data: preparing a style sheet for document display attributes, empty tags and XSL – # Well formed XML documents #.

**UNIT II 6 hours**

Foreign Languages and Non Roman Text: Legacy character sets – Document type definitions: Document type definitions and validity – Entities and external DTD subsets – Attribute declarations in DTDs: Attribute – # Attribute types # – Embedding Non-XML data.

**UNIT III 6 hours**

Cascading Style Sheets level 1: CSS – Attaching style sheets to documents – inheritance – comments in CSS – Font, color, background, text and box properties.

**UNIT IV 6 hours**

XSL transformations – Overview of XSL transformations – Computing the value of a node with XSL: value of – Processing multiple elements with XSL: for each – Copying the current node with XSL: copy – # Merging multiple style sheets #.

**UNIT V 6 hours**

Namespaces - XML applications: The importance of reading DTDs – Designing a new XML application: Organization of the data.

**# ..... # self-study portion**

**Text Book**

Elliotte Rusty Harold, *XML Bible*, IDG Books India (P) Ltd., First Edition, 2000.

**UNIT I** : Chapters 1 to 6

**UNIT II** : Chapter 6 & Chapters 8 to 11

**UNIT III** : Chapter 12

**UNIT IV** : Chapter 14

**UNIT V** : Chapters 20 & 23

**Reference Book**

Heather Williamson, *XML The Complete Reference*, Tata McGraw Hill, 2001.

**SEMESTER - V : SKILL BASED ELECTIVE – III**  
**VB .NET LAB**

**Course Code : 17UCS5S3AP**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

1. Accept a character from console and check the case of the character.
2. Accept any character from keyboard and display whether it is vowel or not.
3. Accept a string and convert the case of the characters.
4. Develop a menu based VB.Net application to implement a text editor with cut, copy, paste, save and close operations.
5. Implement a calculator with memory and recall operations.
6. Develop a Form in VB.NET to pick a date from Calendar control and display the day, month, and year details in separate text boxes.
7. Develop a VB.Net application to perform timer based quiz of 10 questions.
8. Develop a VB.Net application using the File, Directory and Directory controls to implement a common dialog box.
9. Develop a database application to store the details of students using ADO.NET
10. Develop a database application using ADO.NET to insert, modify, update and delete operations.
11. Develop a VB.Net application using Datagrid to display records.
12. Develop a VB.Net application using Datagrid to add, edit and modify records.

**SEMESTER - V : SKILL BASED ELECTIVE – III**  
**XML LAB**

**Course Code : 17UCS5S3BP**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 100**  
**External Marks : 100**

1. Display the given string.
2. Display the following details:

Primary Information	Secondary Information	Tertiary Information
Name	Nick name	Birthday
Title	Contact source	Spouse's name
Company name	Purchases	Anniversary
Address		
Phone number		
E-mail		

3. Prepare a sonnet.
4. Prepare an invitation with an image.
5. Sending greeting with colorful borders.
6. Display 10 different colors using Cascading Style Sheet.
7. Display baseball statistics.
8. List the job details of various employees with fields (job-title, job-id, country, company, salary and year of experience).
9. Create XSL for displaying various country names and their currency names.
10. Prepare a calendar for a month using XSL.



**SEMESTER - V : EXTRA CREDIT COURSE – I**  
**DATA MINING**

**Course Code : 17UCS5EC1**  
**Credit : 4\***

**Max. Marks : 100\***  
**External Marks : 100\***

**Objective**

To understand the basic concepts of data mining.

**UNIT I**

Introduction – What is data mining? – Why data mining now? – The data mining process – Data mining applications – Data mining techniques – Some data mining case studies – The future of data mining – Guidelines for successful data mining – Data mining software.

**UNIT II**

Association Rules Mining – Basics – The task and a Naïve Algorithm – The Apriori Algorithm – Improving the efficiency of the Apriori Algorithm – Apriori-Tid – Direct hashing and pruning – Dynamic itemset counting – Mining frequent patterns without candidate generation – Performance evaluation of algorithms – Software for association rule mining.

**UNIT III**

Classification – Decision tree – Building a decision tree – The tree induction algorithm – Split algorithm based on information theory – Split algorithm based on the Gini index – Overfitting and pruning – Decision tree rules – Naïve Bayes Method – Estimating predictive accuracy of classification methods – Improving accuracy of classification methods – Other evaluation criteria for classification methods – Classification software.

**UNIT IV**

Cluster analysis – What is cluster analysis? – Desired features of cluster analysis – Types of data – Computing distance – Types of cluster analysis methods – Partitional methods – Hierarchical methods – Density-based methods – Dealing with large databases – Quality and validity of cluster analysis methods – Cluster analysis software.

**UNIT V**

Web Data Mining – Web terminology and characteristics – Locality and hierarchy in the Web – Web content mining – Web usage mining – Web structure mining – Web mining software.

**Text Book**

G.K. Gupta, *Introduction to Data Mining with Case Studies*, PHI, Second Printing, 2008.

**UNIT I** : Chapter 1 (Sections 1.1 to 1.8)  
**UNIT II** : Chapter 2 (Sections 2.2 to 2.11)  
**UNIT III** : Chapter 3 (Sections 3.2 to 3.13)  
**UNIT IV** : Chapter 4 (Sections 4.1 to 4.11)  
**UNIT V** : Chapter 5 (Sections 5.2 to 5.7)

**Reference Book**

Arun K. Pujari, *Data Mining Techniques*, Universities Press, Ninth Impression, 2006.

**SEMESTER - VI : CORE - XIII**  
**COMPUTER GRAPHICS AND MULTIMEDIA**

**Course Code : 17UCS6C13**

**Max. Marks : 100**

**Hours / Week : 5**

**Internal Marks : 25**

**Credit : 5**

**External Marks : 75**

**Objective**

To present concepts on basic graphical techniques, raster graphics, two dimensional and three dimensional graphics.

**UNIT I**

**15 hours**

Introduction: The origin of Computer Graphics- Interactive Graphics Display Point Plotting Techniques: Incremental Methods-Line Drawing Algorithms – Symmetrical DDA – Simple DDA – Bresenham’s Algorithm – Circle Generators. Line Drawing Displays: The CRT- Beam Penetration CRT – The Shadow Mask CRT – Inherent Memory Devices.

**UNIT II**

**15 hours**

Two Dimensional Transformations: Translation – Scaling – Rotation – Matrix Representations – Concatenation. Clipping And Windowing: Line Clipping Algorithm – Cohen – Sutherland Line Clipping Algorithm – Midpoint Subdivision – # Polygon Clipping #. Graphical Input Device: Mouse –Tablets – Light pen.

**UNIT III**

**15 hours**

Graphical Input Techniques: Positioning Techniques – Pointing and Selection. Three Dimensional Graphics Rotation: Translation – Scaling – Rotation. Hidden Surface Elimination: The Depth – Buffer Algorithm – Scan Line Coherence Algorithms – Span Coherence Algorithm – Area Coherence Algorithms – # Warnock’s Algorithm #.

**UNIT IV**

**15 hours**

Multimedia: Definitions – Uses of Multimedia. Text: Fonts and Faces – using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia – Hypertext. Image: Making still Images – Color – Image File Formats. Sound: The Power of Sound – Digital Audio – MIDI Sound – # Multimedia System Sounds # – Audio File Formats.

**UNIT V**

**15 hours**

Animation: The Power of Motion – Principles of Animation – Animation by Computer – Making Animation that work. Video : Using Video – How Video works and is displayed – Digital Video Containers – Obtaining Video Clips – # Stages of Multimedia Project # – Hardware – Software Authoring Systems. Multimedia Skills : Multimedia Team.

**# ..... # self-study portion**

**Text Books**

1. William M. Newman Robert F.Sproull , *Principles of Interactive Computer Graphics*, Tata McGraw – Hill Publishing Company Ltd., Second Edition, 1997.

**UNIT I** : Chapters 1, 2 & 3

**UNIT II** : Chapters 4, 5 & 11

**UNIT III** : Chapter 12, Chapter 22 (Section 22.1) & Chapter 24

2. Tay Vaughan, *Multimedia : Making it Work*, Tata McGraw – Hill Education Pvt. Ltd., Eighth Edition, 2011.

**UNIT IV** : Chapters 1, 2, 3 & 4

**UNIT V** : Chapters 5, 6, 7 & 8

**Reference Books**

1. Donald Hearn and M. Pauline Baker, *Computer Graphics*, Prentice Hall of India, Second Edition, Reprint, 2007.
2. Steven Harrington, *Computer Graphics – A Programming Approach*, Tata McGraw-Hill International Edition, Second Edition, 1987.
3. David Hillman, *Multimedia Technology and Applications*, Galgotia Publications Pvt. Ltd., 1998.

**SEMESTER - VI : CORE - XIV  
COMPUTER NETWORKS**

**Course Code : 17UCS6C14**

**Hours / Week : 5**

**Credit : 5**

**Objective**

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

To understand the basic concepts of computer networks.

**UNIT I 15 hours**

Introduction – Uses of Computer Networks – Network Hardware: Personal Area Networks – Local Area Networks – Metropolitan Area Networks – Wide Area Networks – Internetworks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-Oriented Versus Connectionless Service – Service Primitives. Reference Models: The OSI Reference Model – # The TCP/IP Reference Model #.

**UNIT II 15 hours**

The Physical Layer: Guided Transmission Media – Digital Modulation and Multiplexing: Baseband Transmission – # Frequency Division Multiplexing # – The Public Switched Telephone Network: Structure of the Telephone System – The Politics of Telephones – The Local Loop: Modems, ADSL, and Fiber – Trunks and Multiplexing – Switching.

**UNIT III 15 hours**

The Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer – Framing – Error Control – Flow Control. Error Detection and Correction – Elementary Data Link Protocols – Sliding Window Protocols – The Medium Access Control Sub – layer: Data Link Layer Switching: Uses of Bridges – Learning Bridges – Spanning Tree Bridges – # Repeaters, Hubs, Bridges, Switches, Routers, and Gateways #.

**UNIT IV 15 hours**

The Network Layer: Network Layer Design Issues – Routing Algorithms: The Optimality Principle – Shortest Path Algorithm – Distance Vector Routing – Link State Routing – Hierarchical Routing – Broadcast Routing – Congestion Control Algorithms: Approaches to Congestion Control – Traffic-Aware Routing – # Admission Control # – The Network Layer in the Internet – The IP Version 4 Protocol – IP Addresses.

**UNIT V 15 hours**

The Transport Layer: The Transport Service: Services Provided to the Upper Layers – Transport Service Primitives – Berkeley Sockets – Elements of Transport Protocols – The Application Layer: DNS: The Domain Name System – The DNS Name Space – # Domain Resource Records # – Electronic Mail: Architecture and Services – The User Agent – Message Format.

**# ..... # self-study portion**

**Text Book**

Andrew S. Tanenbaum and David J. Wetherall, *Computer Networks*, PHI, 5<sup>th</sup> Edition, 2011.

- UNIT I** : Chapter 1 (Sections 1.1, 1.2, 1.3.1 to 1.3.4, 1.4.1, 1.4.2)  
**UNIT II** : Chapter 2 (Sections 2.2, 2.5.1, 2.5.3, 2.6)  
**UNIT III** : Chapter 3 (Sections 3.1, 3.2, 3.3, 3.4) & Chapter 4 (Section 4.8.4)  
**UNIT IV** : Chapter 5 (Sections 5.1, 5.2.1, 5.2.2, 5.2.4 to 5.2.7, 5.3.1 to 5.3.3, 5.6.1, 5.6.2)  
**UNIT V** : Chapter 6 (Sections 6.1.1 to 6.1.3, 6.2) & Chapter 7 (Sections 7.1.1, 7.1.2, 7.2.1 to 7.2.3)

**Reference Books**

1. Behrouz A. Forouzan, *Data Communications and Networking*, Tata McGraw-Hill, Fourth Edition, 2007.
2. William Stallings, *Data and Computer Communication*, PHI, Tenth Edition, 2013.

**SEMESTER - VI : CORE - XV  
MICROPROCESSOR FUNDAMENTALS**

**Course Code : 17UCS6C15**

**Hours / Week : 5**

**Credit : 5**

**Objective**

To understand the basic principles of microprocessor architecture & its pin configuration. To write simple assembly language programs. To understand the concepts of memory and I/O interfacing.

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**UNIT I**

**15 hours**

Word Length of a Microprocessor – Evolution of Microprocessors – Single Chip Microcontrollers – Embedded Microprocessors – Hardware, Software and Firmware – Central Processing Unit – Memory – Buses – Processing Speed of a Computer – Classification of Computers – Von Neumann Architecture – Harvard Architecture – Data Flow Architecture – Types of Microprocessors – Microprocessor Applications.

**UNIT II**

**15 hours**

Intel 8085 Microprocessor Architecture – Register – Status Flags – Pin Configuration – Opcode and Operands – #Instruction Formats# – Instruction Cycle – Fetch Operation – Execute Operation – Addressing Modes.

**UNIT III**

**15 hours**

Instruction Set of 8085 – Data Transfer Instructions – Arithmetic Instructions – Logical Instructions – Shift and Rotate Instructions – Branch Instructions – Jump, Call and Return – Stack Instructions – I/O, Machine Control and other Instructions – Assembly Language – # Assemblers – Stacks – Subroutines – Macros #.

**UNIT IV**

**15 hours**

Assembly Language Programs – Addition, Subtraction, Multiplication and Division of 8-bit numbers – Decimal Addition and Subtraction – Multibyte Addition and Subtraction – 1's and 2's Complements – Assembly and Disassembly of a Byte – Sum of a Series – Block Data Transfer – Finding the Smallest and the Biggest Number in an Array – Arranging a Series of Numbers in Descending and Ascending Order.

**UNIT V**

**15 hours**

Peripheral Devices and Interfacing – Address Space Partitioning – Memory and I/O Interfacing – Data Transfer Schemes – Interrupts of Intel 8085 – Interfacing Devices and I/O Devices – I/O Ports – Programmable Peripheral Interface – # Delay Subroutines #– Seven-Segment Displays – Types of Seven-Segment Displays – Interfacing Seven-segment Displays.

**# ..... # self-study portion**

**Text Book**

Badri Ram, *Fundamentals of Microprocessors and Microcomputers*, Dhanpat Rai Publications, Sixth Revised and Enlarged Edition, 2010.

**UNIT I** : Chapter 1 (Sections 1.1, 1.2, 1.5 to 1.15, 1.24, 1.29)

**UNIT II** : Chapter 3 (Sections 3.1.3, 3.1.5, 3.1.7) & Chapter 4 (Sections 4.3, 4.4)

**UNIT III** : Chapter 4 (Sections 4.6), Chapter 5 (Sections 5.2, 5.5, 5.6, 5.14)

**UNIT IV** : Chapter 6 (Sections 6.2 to 6.18, 6.20 to 6.37)

**UNIT V** : Chapter 7 (Sections 7.1 to 7.6, 7.7.1) & Chapter 9 (Sections 9.2, 9.3)

**Reference Book**

Ramesh Gaonkar, *Microprocessor Architecture, Programming and Applications with 8085*, Prentice Hall of India, Fifth Edition, 2002.

**SEMESTER - VI : CORE - XVI (a)**  
**DIGITAL AND MICROPROCESSOR LAB**

**Course Code : 17UCS6C16 P1**  
**Hours / Week : 3**  
**Credit : 3**

**Max. Marks : 50**  
**Internal Marks : 10**  
**External Marks : 40**

**Digital Experiments**

1. Study of Logic Gates
2. Study of De Morgan's Theorems
3. Construction of Basic Logic Gates using Universal Logic
4. Karnaugh Map Reduction of Boolean Expressions (Three variable expressions only)
5. Half Adder and Full Adder using AND, OR, NOT & EXOR only
6. Half Subtractor and Full Subtractor using AND, OR, NOT & EXOR only
7. Study of 4-bit Parallel Adder / Subtractor using Logic Gates and MSI Devices (IC7483)
8. Study of Multiplexer
9. Study of Demultiplexer

**Microprocessor Experiments**

1. 8-bit Addition, Subtraction, Multiplication and Division
2. Multibyte Addition and Subtraction
3. Decimal addition and subtraction
4. Assembly and Disassembly of a byte
5. Sum of a Series
6. Block Data Transfer
7. Smallest and Biggest Number in an Array
8. Sorting of Numbers (Ascending and Descending order)

**SEMESTER - VI : CORE - XVI (b)**  
**MULTIMEDIA LAB**

**Course Code : 17UCS6C16 P2**  
**Hours / Week : 2**  
**Credit : 2**

**Max. Marks : 50**  
**Internal Marks : 10**  
**External Marks : 40**

**Designing Software**

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images.  
(ii) Using brushes and creating multicolor real life images.
2. Cropping, rotating, overlapping, superimposing and pasting photos on a page.
3. Create a single image from selected portions of many.
4. Develop a commercial brochure with background tints.
5. Create an image with multi-layers of images and texts.
6. Apply masks and filtering on images.

**Animation Software**

Develop an image(s) and do the following.

1. Basic Drawing and Painting.
2. Working with Strokes and Fills.
3. Create Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects.
4. Create and Manage Multiple Layers.
5. Convert Text into Shapes
6. Animate using motion, shape, tweening and actions.

**SEMESTER - VI : MAJOR BASED ELECTIVE – II**  
**OPEN SOURCE TECHNOLOGY**

**Course Code : 17UCS6M2A**

**Hours / Week : 5**

**Credit : 4**

**Objective**

**Max. Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

To understand the basic concepts of open source softwares like Linux, MySQL and PHP.

**UNIT I**

**15 hours**

Linux – The choice of a GNU generation – Introduction – Linux distributions – Download and install – Decisions, Decisions – # Linux Partition Sizes # – Accounts – Security – Basic Unix. Apache Web Server: Introduction – Starting, Stopping and Restarting Apache - Configuration – Securing Apache.

**UNIT II**

**15 hours**

MySQL – Introduction – SHOW DATABASES and CREATE DATABASE – USE Command – CREATE TABLE and SHOW TABLE Command – DESCRIBE, INSERT, SELECT, UPDATE & DELETE Command – Some administrative details – Table Joins – # Loading and Dumping a database #.

**UNIT III**

**15 hours**

Essential PHP – Creating a first PHP page – More echo power – Using PHP “Here” documents – Working with variables – Creating constants – # Understanding PHP’s internal data types # – Operators and Flow control – Working with the Assignment operators – The PHP String operators – Bitwise operator – PHP Comparison operators – PHP Logical operators – Ternary operators – Using if, else, else if statement – Switch statement – Using for, while, do...while, for each loops.

**UNIT IV**

**15 hours**

Strings and Arrays – The String functions – Converting to and from strings – Formatting text strings – Building yourself some arrays – PHP array functions – Sorting Arrays – Handling Multi dimensional arrays – # Splitting and Merging arrays # – Creating functions in PHP.

**UNIT V**

**15 hours**

File Handling – Opening files using fopen – Reading text from a file using fgets – Closing a file – Checking if a file exists with file\_exists – Writing to a file with fwrite – Sessions, Cookies, and FTP – Setting a cookie – Reading a cookie – Setting cookie’s expiration – Deleting cookies – Working with FTP – # Downloading files with FTP #.

**# ..... # self-study portion**

**Text Books**

1. James Lee and Brent Ware, *Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP*, Dorling Kindersley (India) Pvt. Ltd., 2008.

**UNIT I** : Chapters 2 & 3

**UNIT II** : Chapter 5

2. Steven Holzner, *The Complete Reference PHP*, Tata McGraw Hill, New Delhi, 2007.

**UNIT III** : Chapters 1 & 2

**UNIT IV** : Chapters 3 & 4

**UNIT V** : Chapters 9 & 11

**Reference Book**

M.N. Rao, *Fundamentals of Open Source Software*, PHI Learning Private Ltd., Delhi, 2015.

**SEMESTER - VI : MAJOR BASED ELECTIVE – II**  
**MOBILE APPLICATION DEVELOPMENT**

**Course Code : 17UCS6M2B**  
**Hours / Week: 5**  
**Credit : 4**

**Max. Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objective**

To understand the basic concepts of mobile applications.

**UNIT I**

**15 Hours**

Introduction - Installation and Configuration of Your Development Platform: Installing Eclipse and Java – Installing Android Developer Kit -Starting an Android Application Project

**UNIT II**

**15 Hours**

Application Design –Controls and User interface: Check Boxes, Radio Button, The Spinner, and Date Picker – # Key classes #

**UNIT III**

**15 Hours**

Basic Graphics by Extending the View Class - Multi Screen applications: Stretching the Screen – Pop-up Dialog Boxes – # Menus on the Android Devices # – Key Classes

**UNIT IV**

**15 Hours**

Working with Images - Text Files – Data Tables and XML: Working with Text Files – Data Tables using SQLite – # Using XML for Data Exchange # – Key classes

**UNIT V**

**15 Hours**

Client Server Application – Key classes: Socket – # Server Socket # – HTTP URL connection – URL

# ..... # self-study portion

**Text Book**

James C. Sheusi, *Android Application Development for Java Programmers*, Course Technology, 2013.

**UNIT I** : Chapters 1 & 1  
**UNIT II** : Chapters 3 & 4  
**UNIT III** : Chapters 5 & 7  
**UNIT IV** : Chapters 8 & 9  
**UNIT V** : Chapter 10

**Reference Book**

Wei Meng Lee, *Beginning Android Application Development*, Wiley Publishing, Inc, 2011.



**SEMESTER - VI : MAJOR BASED ELECTIVE – III**  
**OPEN SOURCE LAB**

**Course Code : 17UCS6M3AP**  
**Hours / Week : 4**  
**Credit : 4**  
**LINUX**

**Max. Marks : 100**  
**Internal Marks : 20**  
**External Marks : 80**

1. Perform basic commands – ls, cp, cat, more, chmod, head, tail, mv, cd, pwd in vi editor.
2. Script to perform the following basic math operations:
  - i. Addition
  - ii. Subtraction
  - iii. Multiplication
  - iv. Division

### **MySQL**

1. Perform DDL and DML commands using MySQL.
2. Implement queries using Aggregate functions, Group By, Having Clause and Order Clause.
3. Implement different types of joins in MySQL.

### **PHP**

1. Check whether the given character is a vowel or a consonant.
2. Generate a multiplication table using for each statement.
3. Create a chess board using nested for loop.
4. Sort the given set of positive integers using arrays.
5. Check whether a passed string is a palindrome or not using functions.
6. Addition of two given matrices.
7. Get all combinations of a string using arrays.
8. Design an authentication web page in PHP with MySQL to validate username and password.
9. Create a visitor counter using file concept.

**SEMESTER - VI : MAJOR BASED ELECTIVE – III**  
**MOBILE APPLICATION DEVELOPMENT LAB**

**Course Code : 17UCS6M3BP**

**Hours / Week : 4**

**Credit : 4**

**Max. Marks : 100**

**Internal Marks : 20**

**External Marks : 80**

1. Display a welcome message using basic control.
2. Demonstrate the check box and Radio button.
3. Demonstrate Spinner.
4. Display Today date using Date Picket controls.
5. Change the background color using buttons.
6. Perform addition and subtraction operations using simple controls.
7. Demonstrate various dialog boxes.
8. Display your name using Toast.
9. Create simple menu application for college course details.
10. Change various shapes for Button using XML.
11. Various DML manipulation using database.
12. Send a message using Intent.
13. Zoom the picture using zooming controls.

## SEMESTER - VI : EXTRA CREDIT COURSE – II NETWORK SECURITY

**Course Code : 17UCS6EC2**  
**Credit : 4\***

**Max. Marks : 100\***  
**External Marks : 100\***

### **Objective**

To impart the knowledge in network security approaches, applications, and issues.

### **UNIT I**

Introduction: Security Trends – The OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms – A Model for Internetwork Security. Symmetric Encryption and Message Confidentiality: Symmetric Encryption Principles – Symmetric Block Encryption Algorithms – Stream Ciphers and RC4 – Cipher Block Modes of Operation – Location of Encrypted Devices – Key Distribution.

### **UNIT II**

Public-Key Cryptography and Message Authentication: Approaches to Message Authentication – Secure Hash Functions and HMAC – Public-Key Cryptography and Algorithms – Digital Signature – Key Management.

### **UNIT III**

Electronic Mail Security: Pretty Good Privacy – Notation – Operational Description – Cryptographic Keys and Key Rings – Public Key Management. S/MIME: RFC32 – Multipurpose Internet Mail Extensions – S/MIME Functionality – S/MIME Message – S/MIME Certificate Processing – Enhanced Security Services.

### **UNIT IV**

IP security: IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Security Payload – Combining Security Associations – Key Management.

### **UNIT V**

Web Security: Web Security Considerations – Secure Socket Layer (SSL) and Transport Layer Security (TLS) – Secure Electronic Transaction (SET). Network Management Security: Basic Concepts of SNMP – SNMPv1 community facility – SNMPv3.

### **Text Book**

William Stallings, *Network Security Essentials Applications and Standards*, Third Edition, Pearson Education Inc., Fifth Impression, 2011.

**UNIT I** : Chapter 1 (Sections 1.1 to 1.6) & Chapter 2 (Sections 2.1 to 2.6)  
**UNIT II** : Chapter 3 (Sections 3.1 to 3.6)  
**UNIT III** : Chapter 5 (Sections 5.1, 5.2)  
**UNIT IV** : Chapter 6 (Sections 6.1 to 6.6)  
**UNIT V** : Chapter 7 (Sections 7.1 to 7.3) & Chapter 8 (Sections 8.1 to 8.3)

### **Reference Books**

1. William Stallings, *Cryptography and Network Security Principles and Practices*, Fourth Edition, 2006.
2. Periman and Speciner, *Network Security*, PHI, 2011.